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Cities and the environment

Cities and the environment: New approaches for eco-societies

Edited by Takashi Inoguchi,
Edward Newman, and Glen Paoletto

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Acronyms

ADB	Asian Development Bank
ANSI	American National Standards Institute
BSI	British Standards Institute
CAN	Climate Action Network
CFCs	chlorofluorocarbons
CLAIR	Council of Local Authorities for International Relations (Japan)
COP1, COP3	First (Third) Conference of Parties of the Framework Convention on Climate Change
DESA	United Nations Department of Economic and Social Affairs
ECLAC	Economic Commission for Latin America and the Caribbean
EFILWC	European Foundation for the Improvement of Living and Working Conditions
EL	Environmental Labelling
EMAS	Environmental Management and Audit Scheme
EMECS	International Center for the Environmental Management of Enclosed Coastal Seas
EMPACT	Environmental Monitoring for Public Access and Community Tracking

EPA	Environmental Protection Agency
GDP	gross domestic product
GLC	Great Lakes Commission
GLO-DISNET	Global Network on Natural Disaster Risk Management
GNP	gross national product
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit [German Association for Technical Cooperation]
ICLEI	International Council for Local Environmental Initiatives
IDNDR	International Decade for Natural Disaster Reduction
IIASA	International Institute for Applied Systems Analysis
ILO	International Labour Organization
I–O	input–output
ISO	International Standards Organization
IT	information technology
IULA	International Union of Local Authorities
JI	Joint Implementation
JICA	Japan International Cooperation Agency
JOCV	Japan Overseas Cooperation Volunteers
LACIC	Local Authorities Center for International Cooperation (Japan)
LBCDP	Lake Biwa Comprehensive Development Plan
LCA	Life Cycle Assessment
LCI	Life Cycle Inventory
LCIA	Life Cycle Impact Analysis/Assessment
MHA	Ministry of Home Affairs (Japan)
MITI	Ministry of International Trade and Industry (Japan)
MMA	Metro-Manila Authority
MMDCC	Metro-Manila Disaster Coordinating Committee
MVFS	Marikina Valley Fault System
NGO	non-governmental organization
ODA	overseas development assistance
OECD	Organization for Economic Cooperation and Development
PFZ	Philippine Fault Zone

PHISTA	Philippines International Sisterhood and Twinning Association
PHIVOLCS	Philippine Institute of Volcanology and Seismology
PLCA	Product Life Cycle Assessment
SCP	Sustainable Cities Programme
TMG	Tokyo Metropolitan Government
UEMRI	Urban Environmental Management Research Initiative
UNCED	United Nations Conference on Environment and Development
UNCHS (Habitat)	United Nations Centre for Human Settlements
UNCRD	United Nations Centre for Regional Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific, and Cultural Organization
UNICEF	United Nations Children's Fund
UNIDO	United Nations Industrial Development Organization
UNU	United Nations University
WACLA	World Assembly of Cities and Local Authorities
WHO	World Health Organization

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Cities and the Environment: New Approaches for Eco-Societies owes a great deal to the continuing efforts of the Tokyo Metropolitan Government in the area of environmental management. These efforts included the conference, co-sponsored with the United Nations, under the theme ''Cooperation of Cities and Citizens: Eco-Partnership Tokyo,'' and held on 26–29 May 1998, in Tokyo, Japan. The ethos that lay behind this conference and informs the work of the Tokyo Metropolitan Government in this area is that the environmental challenges inherent in large cities can only be addressed through wide partnerships that embrace all actors in society. All tenets of governance – which in its broadest sense includes government, market actors, non-governmental organizations, and citizens – must together play a role in this. Moreover, these partnerships must extend beyond national borders. Indeed, the experiences learned as communities address the challenges of the urban environment are forming the basis of partnerships between, as well as within, cities across the world.

It is difficult to acknowledge everyone who has supported this research. We can begin by thanking Yukio Aoshima, Governor of Tokyo Metropolitan Government from 1995 to 1999, and United Nations Secretary-General, Kofi Annan, for the support of the Tokyo Metropolitan Government and the United Nations. Credit is also due

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Preface

Yukio Aoshima

Japan's relationship with nature

The late nineteenth-century writer Katai Tayama talked extensively about the relationship between the Japanese and nature. He stated: ''There is probably not a people anywhere that lives in as close contact with nature as we Japanese. You can see it from our poems. You can see it from our literature. You can see it from our houses.'' As Tayama observed, Japan was once a place where food, clothing, and shelter all came directly from the bounties of nature, where children's playgrounds were brooks and fields, where nature, untouched and untainted by human hands, played a deep and integral part in our lives. Obviously, the lives of the common people then were nowhere near as materially rich as our lives are today. Indeed, from the physical perspective it was a hard life. But spiritually they were much richer than we are today, because of the bounties brought to the heart by close contact with nature.

Post-war Tokyo: The distortions of urbanization

After the Second World War, there was an influx of people into Tokyo from all over Japan, coming in search of jobs and new opportunities. In the two decades following the end of the war – the years

from reconstruction to the peak of post-war growth – Tokyo's population more than tripled. In this process, we somehow found ourselves living in a forest of high-rise buildings, streets continually congested with cars, and many other blights of urban excess. To put food on the table and achieve remarkable national economic growth, the Japanese sacrificed their home lives to their work, and consciously or unconsciously created, and tolerated, a host of problems that have continued to plague us: garbage, air pollution, water shortages, cramped living conditions, uncomfortable commuting conditions, and a shortage of natural spaces. New problems have continued to sustain the list of concerns. Indeed, more recently, we have been faced with toxic pollutants like dioxin, and endocrine disruptors – "environmental hormones" – that threaten the future of humanity.

Today, the population of Tokyo is nearly 12 million. During the daytime hours, about 3 million people pour in from neighbouring communities to work and study, giving us a daytime population of about 15 million. This huge figure has ecological repercussions. The activities of these people result, for example, in about 5.43 million tons of garbage – ordinary, not industrial, waste – thrown away in the city over the course of a year. That is enough to fill the Tokyo Dome sixteen times over. The average speed of cars on Tokyo roads is 18.6 kilometres an hour, about half the national average. This results in the emission of large amounts of carbon dioxide and nitrogen oxides into our air, which both contributes to global warming and damages our health. For the past thirty years, pollution and environment have been the top policy priorities of the Tokyo Metropolitan Government. These are areas in which we have been active and assiduous in searching for solutions. Those efforts have paid off. We have substantially overcome industrial pollution, for example. But the solution to urban pollution – household waste and pollution from daily living – is not so easily found, because both the perpetrators and the victims are residents of the same city. We have not even made it halfway to a satisfactory solution. However, Tokyo society is entering a maturation phase, and this presents us with a marvellous opportunity to change radically the directions in which the city has been going, in an effort to address urban environmental problems.

The urban roots of global environmental problems

As we look around the world we can see that all cities, no matter what path they took to development, share many of the same urban

environmental problems, such as garbage, toxic waste, and air and water pollution. These are issues of great concern to all involved in urban administration.

In recent years, global environmental problems have become so serious that they have sparked worldwide collaborative efforts to find solutions. The sources of these problems are roughly the same throughout the world: urban development, urban transportation, and lifestyles and production structures that emphasize, and rely upon, the mass consumption of resources and energy.

When dealing with global environmental problems, it is necessary for us to ''think globally and act locally.'' This holds true for urban environmental problems as well. Urban environmental problems have a significant impact upon global peace and prosperity. Global environmental problems have already become major international political and economic issues that impinge on the peace and prosperity of all humanity, and it is the production and consumption activities that take place in cities that have the largest impact on the global environment.

It is projected that the majority of the world's population will reside in cities in the twenty-first century. Therefore, how cities deal with environmental problems will, through the impact on the global environment, be one of the largest factors in the future peace and prosperity of our nations and communities. Moreover, these are issues on which the cities of the world must join together in collaborative, sharing initiatives.

Urban environmental problems, and by extension global environmental problems, are a dimension of what is internationally referred to as the ''North–South problem'' – the gap in wealth and power between the rich industrialized countries and the poor countries of Africa, Asia, Latin America, and the Pacific. Likewise, within the ''North'' and the ''South,'' economic gaps between cities and rural areas and poverty issues are partly behind environmental problems. From this perspective, therefore, urban environmental problems are a reflection of the domestic and international socio-economic issues that countries face.

Tokyo's extensive experience in dealing with the "brown agenda"

For the past two decades, the focus of the world debate on the environment has been on ozone destruction, global warming, and acid

rain – the so-called ‘‘green agenda.’’ In recent years, however, the growing seriousness of urban environmental problems has brought new attention to local problems of garbage, air pollution, and water quality, issues that form the so-called ‘‘brown agenda.’’ Japan, and especially Tokyo, have long been beset with pollution problems which have afforded them a wealth of experience and achievements. The ethos of ‘‘thinking globally and acting locally’’ sounds attractive, but what does it mean in practice? It means that urban environmental problems are not just something to think about. Cities must take the initiative, they must take concrete steps to solve these problems locally. These issues reflect uncertainty and extreme gravity, and require a shift in attitudes regarding three principles:

The principle of action

Clearly, international networks of cooperation are important in any effort to deal with environmental problems. But our actions as cities are more directly responsible for protecting our own environments and also, in turn, play an extremely important role in the solution of global problems. When we consider the extensive decay that has already occurred in our environment and the enormous amounts of time and effort that will be required to restore it to its original state or at least to some form of balance, the urgency of the situation becomes clear. Discussion is important, but discussion must lead to practical, results-oriented projects. And we must ensure that action is ongoing.

The principle of comprehensive response

It is essential to study problems scientifically and create a policy agenda as comprehensive as possible. This agenda should also be made available to the world at large. Accomplishing this will require stronger ‘‘civic governance’’ – governance which embraces citizens’ participation, so that citizens take an active part in the expansion in our cities’ ability to govern themselves. We must improve the level of our research into environmental technology and make better use of the technology we have. And we must apply the so-called ‘‘principle of prevention’’ by taking preventive measures. A comprehensive approach thus embraces prevention, management, and remedy, with the input of all actors and agencies involved in the urban space.

The principle of partnership

The third principle is partnership. We must be aware that urban environmental problems are extremely difficult, global-scale problems, and based on this awareness we must forge partnerships, networks of cooperation, and alliances among the world's cities and the United Nations, NGOs, and civic groups. Though Tokyo still needs to address the ''brown agenda,'' we have much knowledge and experience in dealing with these issues, which we have a duty and responsibility to share with other cities around the world.

Creating an "eco-society"

The Tokyo Metropolitan Government has tried to embody these attitudes and principles in a basic policy goal that we call ''creating an eco-society.'' We are currently directing all our efforts towards the achievement of this goal. Let me outline for you what it entails. What is an ''eco-society''? There is no clear, accepted definition of the term. Yet we in Tokyo consider an ''eco-society'' to be a society that cares for sunlight, air, water, land, greenery, and other natural blessings; a society that restrains the mass consumption of resources and energy and the generation of waste, that endeavours to recycle and use resources effectively; a society that endeavours to return to a natural cycle the waste that is ultimately discarded after treatment to minimize the burden on the environment.

Tokyo has become more convenient and easier to live in – after years of hard work – but the flip side is the environmental burden. Development, transportation, and amenities are available to most inhabitants. Our rail lines are increasing, with more train carriages and stations air-conditioned and given escalators for further comfort. In terms of our personal lives, the size of our homes may still be a problem, but there are more homes available, most of our households have their own cars, and there are televisions and air-conditioners in every room. In the immediate neighbourhood you will find vending machines and 24-hour convenience stores, where you can easily buy food and necessities whenever you wish. Our city has indeed become a more pleasant and convenient place to live. But all this comes at a price: economic and social structures that lead to the wasteful consumption of resources and energy.

It behoves us to consider what is behind our comfortable, conve-

nient urban lives, and whether our valuable resources and energy are being consumed efficiently. Take, for example, the estimated 5.44 million vending machines in Japan. Every day they consume as much energy as 2.6 million households. Then there is our diet. As our incomes have grown, so have our waistlines. But even so, we still put more food than necessary on our tables, and what is left over we find very easy to throw away. When we throw away just one bowlful of miso soup down the drain, it takes about four bathtubs full of water to return the water quality in our rivers to the point where fish are able to live there. When we go shopping, our purchases are wrapped, packaged, and bagged for us, but we bring the packaging home and it immediately goes into the garbage. This is the sort of garbage that clogs our landfills, and when it is burned it gives off dioxin, raising a host of other problems.

These are just a few examples of how, while squandering our resources and energy, we place loads on the environment that exceed its ability to clean and restore itself.

Changing lifestyles is not easy

Having grown used to comfort and convenience, it will not be easy for us to give up these lifestyles. Let me digress for a moment. About thirty years ago I wrote the lyrics to a hit song called *Sudara-bushi*, which was sung by Hitoshi Ueki. It was heavily promoted, and the saying used to be that you might go a day without hearing the crows caw, but nowhere in Japan could you go a day without hearing *Sudara-bushi*. At the time, we were in the midst of our growth spurt, and people were much more cheery and open than they are today. The song described, with a slightly comical touch, the saga of a happy-go-lucky salaryman who is unable to avoid the temptations of drink and gambling. One line in the song really rang true with the people of the time: ''I know it's wrong, but I can't give it up.''

I think that describes us quite well. We know it is wrong, but we cannot give up our convenient, comfortable lives so easily. We have spent several decades creating a society and economy oriented towards mass production, mass distribution, mass consumption, and mass waste. We know something is amiss, but we are so caught up in it that we cannot give it up.

The eco-society seeks to rethink from the bottom up how we live our lives, promoting the reuse and recycling of our valuable resources and handing down the bounties of nature to future generations. The

goal is to become so proficient at recycling that we ultimately achieve a ''zero-emission'' society, a society in which all resources are completely reused and no waste generated. I believe that the twenty-first century will be the time when the world comes together to create an eco-society, a society that is truly able to achieve sustainable development. The twenty-first century will be the age of the people, of those who live in, work in, and support this society.

The Action Plan for an Eco-society

Let me briefly outline for you some of the efforts that the Tokyo Metropolitan Government has made so far. The Metropolitan Government has been active in dealing with environmental problems, and particularly pollution, ever since 1969, when it issued the Tokyo Metropolitan Anti-pollution Ordinance. In more recent years, we have witnessed the growing recognition around the world of the gravity of global environmental problems, and, in light of this, we enacted a new Tokyo Metropolitan Basic Environmental Ordinance in 1994, reinforcing and expanding the efforts previously made. In February 1997, the Metropolitan Government formulated a ''Priority Plan for a Resident-Friendly Tokyo'' in which we list the ''creation of an eco-society'' as one of our highest priority goals. In February 1998, we formulated an ''Action Plan for the Creation of an Eco-society'' to serve as the general plan for the achievement of an eco-society.

The draft plan is made up of five sections: (1) resources and recycling, (2) water recycling, (3) energy, (4) transportation demand management, and (5) promotion of environment education. It contains actions for each area that it is possible to take right now. For example, in the field of resources and recycling, the Metropolitan Government has announced its intention in principle not to use anything but recycled products. We will also be taking steps to recycle any waste generated by construction projects ordered by the Metropolitan Government, to reuse any construction-related soil, and to compost the food waste from cafeterias run by the government. We have also asked residents and businesses to cooperate with garbage sorting, resource recovery, active use of recycled products, and selection of goods that will not soon turn into garbage.

In the area of energy, we have long promoted energy conservation, and we are also actively installing and using new alternative energy sources, such as ''garbage power,'' solar power, and ''co-generation.'' In the transportation area, we are actively installing transportation

demand management systems and building more effective road networks.

The Action Plan for residents

We see these efforts not just as something for the Metropolitan Government. It is extremely important that residents and businesses become involved too. We are seeking opinions and proposals concerning the plan from residents and businesses, and we hope to finalize an action plan that will cover the entire city. The Action Plan may not be decisive in remedying urban environmental problems or solving global environmental problems, but I am confident that it represents an important and certain first step.

As part of this process, certain issues must be addressed:

Market failures

It has been popular lately to talk about ''using market principles'' or ''respecting market mechanisms.'' Deregulation and administrative reform are being pursued largely within this context, and that in and of itself is fine. But we must also remember that environmental problems are the result of ''market failures'' and their solution will require that central and local governments intervene in the markets with regulation and incentives, that they influence the economy of the private sector. Indeed, it was just such interference that enabled Japan to achieve its considerable results in conquering pollution.

Government failures

On the other hand, the collapse of the bubble economy has reduced people's confidence in the government sector in general. The public has taken an unforgiving view of ''government failures.'' ''Markets may fail, but governments fail too,'' is a common sentiment. The environmental policies of both central and local government will thus be held up to close and sceptical scrutiny.

Administrative reform

It is therefore important for us to create mechanisms that minimize and overcome both types of failure. The Tokyo Metropolitan Government is currently moving forward with an overhaul of city gov-

ernment. This reform reaches right down to the basic concepts and organizations of administration, and I will be providing our residents with specific, concrete proposals for reform that will reorient government processes towards the environment and enable us to give a strong and efficient push to the creation of an eco-society.

Culture and eco-societies

The Japanese have always loved nature and lived in harmony with it. We consider mountains, rivers, trees, and plants all to have life and to be worthy of respect. At the same time, nature has also been an object of fear for us. Nature is mighty. It has the power to uproot and erase our lives in an instant. At the heart of our view of nature we have always held to the idea that nature is not something that humanity can dominate. Rather, humanity is itself a part of nature. But we have for a very long time ignored this relationship with nature, and in our lust for material wealth and convenience we have continued to act in ways that violate natural cycles. Indeed, that is what ''modernization'' is all about; it is the crystallization of ''contemporary society.'' This, of course, is in no way limited to Japan.

Faced with threats to the global environment, we have a duty and responsibility to adapt our ways of living and our industrial activities to natural cycles, to minimize the burden on the environment, and to strive towards ''sustainable development.'' We must seek to create a civilization that values nature and spiritual wealth above all else, and we must marshal all the wisdom and power at our disposal to commit ourselves to that goal and act towards its achievement.

1

Introduction: Cities and the environment – towards eco-partnerships

Takashi Inoguchi, Edward Newman, and Glen Paoletto

Cities are a focus of human endeavour, culture, and creativity. They reflect the vitality and opportunities of human society, and epitomize social and economic progress. Public amenities, health and welfare services, recreation, employment, education, and democratic participation are enjoyed by millions, perhaps billions, in the urban setting. Cities are also concentrations or nodes of political and economic power and form the engine of development and economic growth. Evolving socio-economic patterns have resulted in a rural exodus of huge proportions, and population increases are likely to be focused in urban areas. According to estimates, more than half of humankind will live in urban areas by the end of the century, and 60 per cent by 2020.[1] In absolute terms, projected increases for population in general and urban population in particular reflect an equally sharp trend. According to the Habitat Agenda, by the year 2000 three billion people will live in urban areas, the greatest increases being in cities. Moreover, the most pronounced increase is tending to be within the cities of developing countries. By the end of the century it is projected that 11 of the 15 most populous urban agglomerations will be in countries now considered to be developing; in 2010 the projected figure is 12, and by 2015 it is expected that 13 out of the 15 biggest cities will be in the developing world.[2]

Despite the economic and social opportunities of cities and the attractions that clearly underlie the demographic trends, the problems and challenges inherent in large urban communities are self-evident. The benefits come at a great cost, and they are not equitably enjoyed. Cities are indeed an enigma. They are a microcosm of the problems, in addition to the opportunities, of human society as urban communities grow inexorably larger and denser. Human interaction with the natural environment and the man-made environment lies at the heart of the quality of life for millions – perhaps billions – of people around the world, and experiences are mixed. The adverse environmental consequences inherent in large urban centres are well known and well documented. The problems represent huge challenges with direct and fundamental consequences for human existence. Cities are a burden upon natural resources and pollute the air and water, contributing to environmental pollution at the local, city, national, and global levels. Urban development clearly destroys the natural environment and areas surrounding cities. Urban populations present enormous demands – often unmet – for the provision of clean water, sewerage systems, waste management, housing, and safe, equitable transportation. Throughout the developing world, it has been estimated that at least 220 million urban dwellers lack access to clean drinking water; more than 420 million do not have access to the simplest latrines; between one and two thirds of the solid waste generated is not collected; and more than 1.1 billion people live in urban areas where air pollution exceeds safe levels.[3] Cities are also a focus of poverty, social dislocation, homelessness, social inequality, and crime. Projected increases in urban populations point to an escalation of these problems and challenges.[4]

The fact is that the promise of cities is not being realized in many cases owing to poor environmental management, destructive and unregulated commercial and industrial practices, rampant production and disposal, inadequate public planning, and a failure of urban actors to work together to address problems in a spirit of community and unity of purpose. Solutions have often proven to be elusive because of conflicts of interest among disparate actors, market-oriented pressures upon production and consumption patterns, closed or corrupt local governance, public ignorance or the absence of public leverage in market trends and public policy, and priorities in local government which have privileged economic and development interests over the environment. Even as urban environmental problems have become explicit, these priorities have continued to prevail. The

assumption is often that the urban environment is a zero-sum game; that the environmental agenda and other needs are incompatible. Individual and corporate freedom, and market-oriented production and consumption, have been considered sacrosanct. The end of the Cold War proved to strengthen this ethos.

The globalization of this thesis, with the commensurate pressure to deregulate, open national markets, and meet standards laid down by international financial institutions, has similarly not always been conducive to the environmental agenda. There is a dialectic that has not been fully resolved. Economic growth, production, consumption, and freedom are the underlying causes of many urban environmental problems, yet they are central to the pervading political ethos of the market and democracy. In developing countries the tension between the environment and other priorities is particularly pronounced. Significant sections of society are preoccupied with day-to-day survival, whilst public policy revolves around the precarious management of economic growth and meeting basic human needs. The urban environment has tended not to be prioritized.

Eco-societies

There is a growing belief that this dialectic can be settled. Energy use, consumption, production, individual and corporate freedom in a free market can be reconciled with urban environmental respect. This rests upon the assumption that environmental concerns, in the context of all the other pressures of urban life, can be approached as a non-zero-sum equation – a win-win situation. This commitment embraces the goal of sustainable eco-societies: addressing the problems which clearly exist and threaten to worsen, and making cities safe and pleasant places in which to work, live, and raise children, without undermining the ability of future generations to do likewise. The goal of eco-societies rests upon the coexistence of humankind – and more specifically, certain human activities – with natural cycles as far as possible, and upon prioritizing environmental concerns in urban governance. The modalities of this are widely acknowledged: there is a pressing need to minimize the environmental burdens inherent in large conurbations, to reduce pollution to air and water, to minimize and manage household and industrial waste better, to manage water systems efficiently and fairly, to maintain pleasant natural areas of recreation, to develop transportation systems which are efficient and socially equitable, to minimize the vulnerability of all

citizens to natural disaster, to plan housing around human needs, and generally to emphasize human welfare and ecological sustainability in urban governance.

Sustainable eco-societies: The challenges

The path to eco-societies requires a parallel two-track approach: firstly, addressing the pressing environmental problems that exist, and secondly, addressing the underlying social, economic, and political factors that form the root causes of urban environmental decay. Both tracks rest firmly within the framework of collaborative partnerships amongst a variety of actors and institutions.

Waste management

Waste now constitutes a large-scale urban problem for both developed and developing nations. Waste problems in cities include the increasing difficulty of acquiring new land areas for disposal, the generation of pollution from waste and from the processes of waste treatment and disposal, disposal-caused resources depletion, and the huge cost involved in waste processing. Urban waste problems are not confined just to cities themselves: they also greatly affect peripheral regions as the demand for disposal spills over into an ever wider area. The search for solutions sets the goal of a society oriented towards reuse and recycling, where all possible means of restricting the generation of wastes are pursued and innovative mechanisms provide viable solutions which embrace all actors. Technological and legislative approaches to recycling, a market system that supports a recycling-oriented society, the encouragement of community-based recycling initiatives, and a shift in public attitudes towards consumption and disposal through public information and education are some methodologies which combine ''top-down'' and ''bottom-up'' approaches.

Pollution

Closely related to waste, pollution takes a variety of forms at a number of levels. Of particular concern are the pollutants that cause harm to urban inhabitants and eco-cycles, generated through the incineration of garbage, industrial emissions, and automobile exhaust. As the health impact – especially from toxins such as dioxin and

hormone disrupters – has become increasingly clear, there has been pressure from several directions. Enforceable legislative standards, non-governmental scientific watchdogs, and public pressure have played particularly important roles.

Transportation

Automobile transportation has enhanced people's mobility and contributed to economic progress. Yet there are obvious negative repercussions in the form of traffic accidents, social inequality, congestion, and air pollution. There is a growing movement in favour of reducing excessive dependence upon private automobiles, and especially those that use gasoline. This movement is reflected in the development of low-pollution cars, the encouragement of public attitudes that rely less on private transport, legislative efforts to minimize the environmental impact of traffic, and collaborative initiatives between government and industry towards making cars less destructive and more recyclable. There is greater political support for large-scale public transport and ''car-free'' zones, and urban planning similarly plays a central role in designing cities to shift transportation towards public, equitable service.

Water resources and the ecosystem

By the early twenty-first century both water shortages and damage by flooding will become serious problems in many cities of the developing world. It is often suggested that water will replace petroleum as a focus of political tension. Historically, the capacity of a city would be constrained by its available water resources. However, big cities located downstream from water resources have removed this restricting factor by constructing huge dams upstream, to the detriment of the upstream areas. Some cities which have ample rainwater construct dams upstream rather than formulate water sustainability. In the future, in order for upstream and downstream areas to coexist, cities may have to give more attention to sustainable water supply. A further concern, especially in developing countries, is the flooding which results as rainfall does not penetrate into the ground, owing to rapid urbanization, and excessive drawing off of underground water, ignoring the regional water circulation and causing ground subsidence. A number of issues make it clear that the huge demand for clean water posed by cities is not being met in many cases.

Resources and energy

Cities are key centres of economic activity and production, both in developed and developing countries. As cities pose a massive water demand, they also impose enormous energy demands that in turn contribute to local, national, and global environmental deterioration. The generation of carbon dioxide and sulphur dioxide are clear problems. The goal of eco-societies is to embrace the ethos of ''energy-saving cities,'' involving conservation and reuse at a number of levels. The modalities are similarly multifaceted: technological innovations have been at the forefront of developing sustainable energy generation and low-energy approaches to transportation, household needs, and industrial needs; international agreements on pollution emissions have imposed standards upon national energy policies which require a great many adjustments at a number of levels; and public attitudinal changes are increasingly seen to be central to shifting society to a more conserving basis. Yet the implications of reducing the society's reliance upon energy and the concept of a ''low-energy society'' are politically sensitive and strongly contested.

Eco-partnerships

This volume will demonstrate how such challenges are being addressed on the basis of partnerships and joint initiatives among urban actors, in particular local government, national government, NGOs and citizens' groups, commercial and industrial interests, international actors, and academic and scientific agencies. It will illustrate how the evolving dynamics that underlie the interaction between these actors reflect innovative approaches to the urban environment. These dynamics indicate how issues are addressed, why certain issues reflect greater progress than others do, and how and why friction has accompanied urban management in some cases. Indeed, while a great deal of progress – albeit geographically and socially uneven – has been demonstrated in these matters across the world, vying agendas, competing interests, and political tensions are still reflected in environmental governance. These issues can be as politically sensitive as any other area of local, national, and perhaps international governance.

Urban environmental management has reflected certain patterns that appear – to a greater or lesser degree – to be common to cities around the world. These patterns indicate the extent to which urban environmental concerns have moved to the forefront of the political

agenda as an issue area closely related to ''good governance'' and changing attitudes towards, and expectations of, leadership and authority. In this sense urban governance, including the environment, reflects the wider shift towards democratization, accountability, and transparency in governance at all levels. In addition, cities are increasingly receiving attention, locally and internationally, as the key centres of economic growth and decision-making. To a large degree, the future of economic development and human welfare will be within the urban context. Indeed, the World Bank has estimated that up to 80 per cent of future economic growth in developing countries will be in towns and cities.[5] Moreover, as cities are a major factor in transnational and global environmental degradation, such as global warming and the depletion of the ozone layer, and as environmental issues have become prominent on the national and international agendas, cities have become a focus for remedial action.

Finally, a further source of changing patterns of urban environmental management relates to a shift in emphasis in economic and development policies and attitudes. There is a growing movement in favour of human-centred development, as a counterbalance to purely free-market principles. Thus, economic growth is increasingly seen in the context of human welfare rather than abstract economic indicators. This shift has undoubtedly been accompanied by a greater emphasis upon the environmental implications of economic growth and development, with the result that environmental sustainability is now a familiar – if still problematic – concept. Momentum and motivation for initiative are therefore strong at a number of levels: at that of the neighbourhood, with a community interest in dealing with local problems and having a more pleasant environment; at the city level, with a host of challenges; through to the global level, which presents much wider problems exacerbated by cities. Clearly, tensions still exist between the environmental agenda and economic priorities, particularly in developing countries. Nevertheless, the debate is wider, there is greater public input into policy formulation, and all actors – although for differing motives – are embracing environmental issues.

These developments are reflected in the emergence of certain trends in the manner in which urban environmental issues are addressed around the world. These trends are examined in many of the chapters of this book. Firstly, partnerships among various actors or groups characterize urban environmental management across the world. Most problems require a broad-based approach, balancing

''top-down'' legislation and ordinances with ''bottom-up'' community and private initiatives. Some environmental issues can be addressed by single groups, but most require collaborative initiatives involving a fair distribution of burdens and rewards amongst various actors. Secondly, this implies an increasing prominence for civil society in urban environmental management, in developed and developing societies alike. NGOs and citizens are becoming involved in policy formulation and are crucial actors in rectifying environmental problems and in making initiatives workable. Partnerships among actors, and the growth of civil society groups, have also highlighted a process of decentralization, and thus the increased relevance of local, community-based solutions. Whilst these have been described as ''alternative approaches,''[6] they are becoming increasingly more mainstream.

Simultaneously, however, and thirdly, urban environmental issues are increasingly the subject of transnational networks and collaboration, giving meaning to the ethos of ''think globally, act locally.'' Many cities have been developing transnational ties for some time, and the environmental impact of cities is obviously transnational. Moreover, it is clear that cities around the world face common environmental challenges. These tendencies have given momentum to international interaction focused upon the urban dimensions of the environment. The United Nations Conference on Human Settlements in Istanbul in 1996 (Habitat II) was a culmination of this, and was followed by a process of consultation and collaboration. The World Bank's ''Liveable Cities for the Twenty-first Century'' project is an example. The ''Eco-partnership Tokyo'' conference in May 1998 was also a major forum based upon the concept of cities and citizens' groups directly sharing experiences and policy options.[7]

Fourthly, the theme of ''stakeholding'' is strengthening in urban environmental governance, through broader participation in policy formulation and the implementation of initiatives. As a corollary of the partnership ethos, stakeholding implies a unity of purpose within communities and among citizens' and other groups. Everyone has a stake in the quality of the environment and it is logical to work in cooperation, within a communitarian framework, in the interests of sustainability. Clearly this optimism has not been borne out in many cases, and friction continues to characterize urban environmental management in many cases. Nevertheless, the stakeholding ethos is increasingly underpinning broad-based collaborative initiatives.

Fifthly, innovative approaches to problem-solving have been at the heart of urban environmental progress in recent years. Such

approaches will continue to be crucial to future endeavours. Making the market work in favour of the environment, encouraging changes in attitudes towards consumption, collaboration among disparate groups, and technological advances are some examples of such innovation.

Within this context progress is being made toward meeting the demands and challenges of the urban environment. Resource and energy conservation, recycling and reuse, limitations upon air and water pollution, gearing market actors towards ecological considerations, devising new ways to address environmental problems, raising public awareness, and generally shifting urban governance and culture towards environmental sustainability have been the result of fruitful eco-partnerships around the world. A partnership is a joint endeavour entered into voluntarily and on the basis of mutual benefit, and in the spirit of cooperation and reciprocity. An eco-partnership recognizes that environmental challenges are complex and require a multifaceted, concerted response on the part of numerous actors and agencies, based upon an equitable apportionment of burdens and rewards. Such activities vary widely according to the issue at hand: local arrangements between consumers and supermarkets to recycle packaging; wider recycling and waste systems initiated by local or national government and embracing manufacturers and retailers; collaboration between universities, public research institutions, and major commercial companies; the development of ecologically friendly technology on the basis of public and private funds, and a host of other initiatives. A balance – and often a combination – of ''bottom-up'' and ''top-down'' action is reflected in a matrix of cooperative networks and initiatives. This is the essence of partnership. However, we should not be too sanguine, for sensitive decisions have to be made, and not always to the liking of everyone. In local government positive and negative sanctions and incentives, in addition to enforceable ordinances, legislation, and planning laws, are also essential.

Levels and thrusts of eco-partnership

Challenges and problems of the urban environment can be seen within the framework of *levels of eco-partnerships* – such as neighbourhood, city, country, international – and *thrusts of problem-solving*. Different thrusts at different levels reflect the dynamics of particular issue areas and communities. For certain issues, such as industrial pollution and waste disposal, a strong ''top-down'' thrust is

essential. For other issues more market-oriented solutions are better suited, and the market is shifting towards ecological practices in production, retail, and life-cycle patterns. A further thrust might be thought of as a ''communitarian'' approach to problems which are reflected at the local level, where citizens take it upon themselves to care for their own environment in a direct, community-based manner. In addition, a technological thrust is often emphasized, where progress is based upon new scientific approaches to problems, such as the introduction of CFC substitutes, lead-free petrol, and reuseable electrical components. In practice, the different levels, dimensions, and problem-solving thrusts tend to be interconnected and often mutually dependent: hence the partnership ethos underlying the whole movement.

Frameworks for eco-partnerships

The first part of this volume deals with frameworks for eco-partnerships. It analyses the dynamics, processes, and difficulties of urban eco-partnerships at a number of levels. The institutional, social, technological, and political contexts of urban environmental problems and solutions are examined, highlighting the bases for partnerships and the rising momentum behind the environmental agenda. Ernest Callenbach's chapter on ecological rules argues that ''social codes of conduct,'' which embrace individuals and corporate actors, are fundamental to the creation of an eco-society. Social codes of conduct have become weakened in modern industrial countries and now reflect commercial interests and market forces. The social rules which are essential for an eco-society often conflict with these pervading norms, and the successful forging of new norms demands a concerted effort by educators, writers, the media, government, and NGOs. Callenbach clearly argues that an eco-society rests upon a fundamental shift in social tenets. Hari Srinivas puts urban environmental management into a ''Partnership Continuum,'' a framework which embraces a comprehensive range of actors and forces and identifies resources and linkages behind partnerships. This is useful for identifying the shortcomings, gaps, and mismatches in environmental management, and how partnerships can best be geared to overcome them. Again, his chapter points to a broadening and deepening range of activities behind these partnerships. Voula Mega's chapter, ''The Concept and Civilization of an Eco-society: Dilemmas, Innovations, and Urban Dramas,'' illustrates the development of

innovations for urban environmental governance in the European context and the foundations of social partnerships in the creation and coordination of eco-projects. Her chapter is supported by a great deal of empirical material which demonstrates the variety of collaboration efforts, including initiatives under the umbrella of the European Union, which are having a direct effect.

Edward Newman's chapter, ''Sustainable Urban Societies: A Technological or a Political Goal?,'' identifies and explores the political dynamics which lie behind urban environmental issues, with an emphasis upon Japan. He identifies the various groups and vying agendas, priorities, and solutions. Whilst the processes which lie behind the governance of this issue are inevitably political, he argues that this process is moving towards a ''legitimate-politics'' rather than a ''power-politics'' process. The political framework is shifting in favour of the environment, and in favour of the groups most vulnerable to environmental conditions, the citizens. Various actors are pushing the urban environment onto the agenda and progress is being made in a number of areas as a result of bargaining between interest groups and the rising consciousness of the public.

Together, these chapters highlight the evolution of partnership upon the basis of increasingly solid foundations. These are conditioned and mediated by market pressures and political debates centred around issues such as state intervention, burden-sharing, and individual freedom.

Partnerships in action

Part II deals with partnerships in action, analysing a number of issues and specific examples of environmental action in a variety of contexts, within the evolving frameworks illustrated in part I. Ooi Giok Ling's chapter, ''Civil Society and the Urban Environment,'' demonstrates how the global ''associational revolution'' of NGOs has been playing a role in urban growth and environmental management, particularly in Asia, where the role of the state has been dominant in development. The non-government and non-profit sector has contributed to the improvement of environmental management and the planning of cities. In the process, a number of issues and implications have arisen, indicating both the opportunities and constraints faced by the non-government sector. In a different context, but in a region which shares similar challenges, Daniela Simioni's chapter examines the growing importance attached to social, environmental, and hous-

ing issues in urban planning in the context of development pressures and priorities. As city environmental problems have become critical, the effective management of urban environmental issues at a regional level is essential under the auspices of the Economic Commission for Latin America and the Caribbean (ECLAC).

James Nickum, in ''After the Dam Age is Done: Social Capital and Eco-partnerships in Urban Watersheds,'' examines the growing need for collaborative arrangements among citizens, NGOs, business, and local authorities to secure water supplies for urban areas, on the basis of local ''self-organization'' and ''social capital.'' The chapter by German T. Velasquez, Juha I. Uitto, Benjamin Wisner, and Shigeo Takahashi also identifies community-based action within the framework of neighbourhoods, NGOs, local government, and national government. Their ''New Approach to Disaster Mitigation and Planning in Mega-cities'' examines how natural disasters affect social groups differently and in complex ways: age, gender, class, ethnicity, and disability have a great influence on the chances of recovery after a disaster. This chapter describes new approaches to disaster mitigation and planning through the use of unconventional methods towards vulnerability reduction. These include new methods in the implementation of existing technology, effective awareness education and training, solving the root causes of social vulnerability, and networking. Monte Cassim's chapter, ''Life Cycle Assessment: Its Prospects as a Tool for Creating a Sustainable Economic System,'' demonstrates genuine progress in ''greening the market'' through the use of ecological accreditation. Assessments of the environmental impact of all aspects of business practices are increasingly significant in the market. International standards, such as the ISO 14000, and national standards form an environmental accreditation system which is educating and motivating commercial actors to pay attention to environmental issues. This chapter demonstrates how local accreditation systems can also be fruitfully organized. Klaus W. König similarly presents a persuasive argument for a practical innovation. His chapter outlines the potential for the reuse of rainwater by households as a major recycling opportunity which offers a decentralized and efficient solution to some water management challenges. Lyuba Zarsky and Jason Hunter conclude part II with a ''new model'' of environmental management. Their chapter, ''Communities, Markets, and City Government: Innovative Roles for Coastal Cities in Reducing Marine Pollution in the Asia–Pacific Region'' argues that coastal cities could play a pivotal and creative role in financing water infrastructure and

regulating water pollution by industry. Although coastal cities are part of the problem, they could be a large part of the solution, as they have advantages over national governments in taking action on coastal marine pollution: they tend to be more open to civic groups and other NGOs, and they show how action is most effective when based upon local approaches and solutions.

International and future dimensions

Part III embraces the international and civilizational dimensions of urban eco-societies, exploring the widening international networks, exchanges, and joint initiatives between cities, citizens, and other actors within and across national borders. It also examines the social patterns and trends which must be addressed if the world is to move effectively towards sustainable eco-societies. In this context Nitin Desai's chapter, ''Cultivating an Urban Eco-society: The United Nations Response,'' explores the various levels of activity and collaboration relating to urban environmental management, focusing upon international efforts. Jusen Asuka-Zhang also points to innovative measures in ''An Economic Assessment of China–Japan cooperation to Address Acid Rain.'' Japan and China have mutual incentives to cooperate in identifying the extent of transborder pollution and formulating a joint initiative on cost-effective action. Toshihiro Menju illustrates how the framework of collaboration for urban environmental issues is becoming wider, in his chapter, ''A New Paradigm of North–South Relations: Implications of International Cooperation by Local Authorities in Japan.'' He observes that since the 1950s international contact in the form of sister-city affiliations has been a central part of local authority activity in Japan, pointing to a widening and deepening international network of cities, citizens, and NGOs, based upon sharing ideas and policy collaboration. This type of activity also highlights growing grassroots partnerships linking people beyond national borders. Glen Paoletto's contribution, ''Urban Governance in the New Economy,'' argues that past development patterns cannot be repeated or sustained if we are to have economic growth and viable cities in the next century. Fundamentally new and innovative approaches are required to three issue areas: governance, education, and technology.

A central theme running through these contributions is the mobilization of resources through institutional coalition formation. The effective mobilization of the ideas and resources of government

administration, business, and citizens – as an ''ABC coalition'' – is at the root of this. The success of these partnerships will determine lifestyle quality and choices for generations to come.

Notes

1. World Resources Institute, ''World Resources 1996–97: A Guide to the Global Environment: The Urban Environment,'' Internet site. See also Nancy Yu-ping Chen and Larry Heligan, ''Growth of the World's Megalopolises,'' in Roland J. Fuchs, Ellen Brennan, Joseph Chamie, Fu-chen Lo, and Juha I. Uitto (eds), *Mega-city Growth and the Future* (Tokyo: United Nations University Press, 1994).
2. Population Division, United Nations, *World Urbanization Prospects: The 1994 Revisions. Estimates and Projections of Urban and Rural Populations and of Urban Agglomeration* (New York: United Nations, 1995), pp. 4–5. It is projected that the 15 most populous cities in 2015, in declining order, will be Tokyo (28.7 million), Bombay (27.4), Lagos (24.4), Shanghai (23.4), Jakarta (21.2), São Paulo (20.8), Karachi (20.6), Beijing (19.4), Dhaka (19), Mexico City (18.8), New York (17.6), Calcutta (17.6), Delhi (17.6), Tianjin (17), and Metro-Manila (14.7).
3. World Resources Institute, ''A Guide to the Global Environment: The Urban Environment.''
4. Recent surveys of the broad issues and challenges presented by burgeoning urban communities, especially in the developing context, are: Carole Rakodi (ed.), *The Urban Challenge in Africa: Growth and Management of Its Large Cities* (Tokyo: United Nations University Press, 1997); Fuchs et al, *Mega-city Growth and the Future*, including G. Shabbir Cheema, ''Priority Urban Management Issues in Developing Countries: The Research Agenda for the 1990s''; Fu-chen Lo and Yue-man Yeung (eds.), *Emerging World Cities in Pacific Asia* (Tokyo: United Nations University Press, 1996); Alan Gilbert (ed.), *The Mega-city in Latin America* (Tokyo: United Nations University Press, 1996).
5. Carl Bartone et al., *Toward Environmental Strategies for Cities: Policy Considerations for Urban Environmental Management in Developing Countries*, Urban Management Programme Policy Paper no. 18 (Washington DC: World Bank, 1994), pp. 9–10.
6. Yok-shiu F. Lee, ''Myths of Environmental Management and the Urban Poor,'' in Fuchs et al., *Mega-city Growth and the Future*, pp. 407–8.
7. See also Oran Young, *Global Governance: Drawing Insights from the Environmental Experience* (Cambridge, MA: MIT Press, 1998); Lynton Keith Caldwell, *International Environmental Policy from the Twentieth to the Twenty-First Century*, 3rd edition (Durham, North Carolina: Duke University Press, 1996); World Bank, *Mainstreaming the Environment: The World Bank Group and the Environment since the Rio Earth Summit* (Washington DC: World Bank, 1995); Philip Shabecoff, *A New Name for Peace. International Environmentalism, Sustainable Development, and Democracy* (Hanover, NH: University Press of New England, 1996); Daniel Sitarz, *Agenda 21. The Earth Summit Strategy to Save Our Planet* (Boulder: Earthpress, 1993); W.M. Adams, *Green Development. Environment and Sustainability in the Third World* (London: Routledge, 1990).

Part I
Frameworks for eco-partnerships

2

Ecological ‘‘rules’’ of a sustainable society

Ernest Callenbach

Every society possesses ‘‘rules’’: widely shared views on the proper ways to conduct our personal life, business life, and government activity. These rules are sometimes consciously acknowledged; at other times they may be unspoken and not directly perceived. But they embody the accumulated wisdom of a people, and tell us much about a nation’s character. Moreover, although this is too seldom recognized, such cultural patterns limit and shape the application of technological solutions: it is much easier to invent new machinery than it is to change widespread social attitudes. In the final analysis, therefore, although technical innovations are important, an eco-society will only be created if a new set of ‘‘rules’’ becomes dominant. It is crucial for all players – government planners and officials, NGOs, scientists and technologists, political figures, and active citizens – to understand the primacy of cultural attitudes if they wish to steer change in ecologically sensible directions.

In practical daily life, the mutually understood operating rules of a society are essential, since we do not have the time to work out specific decisions every day for each situation we confront. More than 2,000 years ago, the Jews codified their basic rules in the Ten Commandments, still a prominent feature of both Judaism and Christianity. Jews also developed elaborate rules for proper diet, kitchen

operations, bodily health, and many other things – many of which were originally adopted for ecological or health reasons. In Asian religions too, codes of proper ways to eat, dress, and deal with other people have been developed.

While different classes within a culture usually have slightly different rules, cultures overall are surprisingly unified. They have shown remarkable consistency over the centuries, even during political upheavals that are classified as ''revolutionary.'' Attitudes toward work, food, relations between the sexes, financial responsibility, and child-rearing are very deep-seated. And, although it is seldom noticed, all such attitudes have ecological consequences – some positive, and some negative – with policy implications.

However, in all modern industrial countries, traditional rules about behaviour have been greatly weakened. For one thing, the choices offered us in foods, goods, entertainment, jobs, and possibilities for personal behaviour are far more varied than in traditional societies. Perhaps even more important, many of the old rules have been largely displaced by the economic rules of corporate behaviour, particularly in the United States. Traditional rules originated in village life. As has been written about rice-growing Japanese villages, pre-industrial villages often embodied principles of mutual dependence, emotional sympathy with others, and a deep concern with future generations. These principles have come to seem meaningless or irrelevant in the harsh, impersonal environment of international business, where profit and power are the only really important considerations. This situation is both a predicament and an opportunity.

The new rules which are essential for an eco-society will often conflict with the rules of corporate behaviour, again especially in America, where the dominance of corporate ideology is particularly visible and unchallenged. Everywhere, new rules will undoubtedly evolve slowly, and perhaps in the context of painful global crises. I can try here only to sketch out the main features of some sample rules necessary if an eco-society is to be sustainable. (I provide a more complete, fictionalized portrait in my book *Ecotopia*.)

It is important to employ the term ''sustainable'' in a quite rigorous sense. An ecosystem or a society is only sustainable in a medium-to-long run (of 100 years or so) if it recycles almost all ''nutrients'' (and materials) and uses energy with high efficiencies similar to those of living systems. Although we are at present relying on and using up the stored energy of oil, gas, and coal that was captured over millions

of years by solar-driven photosynthesis, this strategy is necessarily temporary. The ''overshoot'' or excess growth of human population and consumption which the use of fossil fuel has permitted will almost certainly be corrected by our running out of fossil fuels, together with other natural limitations. Over the longer run of 500 years or more, humans, like all other species, will only exist through the use of incoming solar energy, which drives all life processes.

Fortunately, what we might call an ''eco-ethic'' is evolving all over the world, as people try to apply the new findings of ecological science or as experience shows them that the old rules have damaging consequences. In the growth of these new rules, all stakeholders in society have a role to play. Industrialists must become aware that, as German capitalists are fond of saying, ''Without sustainability, there will soon be no profits.'' Insurers need to understand that global warming and other ecological impacts produce profound negative effects on buildings, facilities, and human lives. Planners and other officials need to explore how ecological awareness will affect their proposals for meeting demands in such areas as transportation, dwellings, retail establishments, water and sewage handling. Perhaps most important of all, ordinary citizens, including housewives, need to pay close attention to how old rules fail to produce satisfactory personal lives and how new ones can bring perceptible improvements.

Of course, new attitudes by themselves will not create an eco-society. In the language of logic, we must say that they are ''necessary but not sufficient.'' The transition to an eco-society will also require a wholesale reinvention of technology, a rebuilding of substantial parts of car-dependent cities (especially in America), and fundamental reforms of agriculture, forestry, and fisheries. But without basic attitude changes, none of these other transformations can happen. To illustrate the extent of the cultural change we confront here, I will sketch out some brief comparisons between old rules and new, with some remarks on why new rules are needed if an eco-society is to arise:

Waste

Old: In the prosperity of the 1960s and 1970s, an ethic of wastefulness developed. For example, people increasingly thought of life mainly in economic terms and felt that it was cheaper as well as easier to buy paper napkins and throw them in the garbage than it was to use cloth

napkins that could be washed and reused. (They were wrong about the cost, incidentally.) Drinks were sold in ''disposable'' cans rather than returnable and reusable bottles. The amount of packaging on goods increased. The traditional rule was ''Buy it cheap and throw it away,'' and producers soon learned that this enabled them to raise profit levels.

New: Since in reality there is no ''away'' to which anything can be thrown on this finite planet, we must learn to think in terms of cycles, imitating nature's own processes. All ''wastes'' and materials, including asphalt or concrete as well as glass, plastic, and metals, must be recycled. In addition, the energy consumed in recycling (or reuse) must be minimized. Under ''zero-emissions'' planning, the wastes of every industry must become the raw materials of others. The new rule must be: waste nothing; achieve 100 per cent recycling. Ecologists, educators, and NGOs must help governments and corporations understand this new imperative, and how they can prosper economically under it.

Costs

Old: The only cost of an object, process, or material was its economic cost – what you paid for it in the market. Ecological, social, and psychological costs were, to use the economists' expression, ''external'' to corporate calculations and thus thought to be irrelevant. People believed they could rely on the market to make all important decisions. The traditional forms of rule: ''Trust the market,'' ''Everything has its [money] price.''

New: Costs include all environmental impacts of production, use, and disposal. There are also social and psychological costs: the private car, for instance, incurs heavy costs by systematically isolating people from each other and by increasing the need for police, courts, jails, accident-treatment facilities, and repair shops, as well as the direct physical costs of additional streets, highways, bridges, and so on. Market prices are only one component of real costs, and political and governmental mechanisms must be deployed to achieve realistic solutions. The new rule: ''Count all the costs, biological and social as well as economic.'' Politicians must learn that it is irresponsible of them to act as if short-term economic benefits for their campaign funders are the dominant consideration. Citizens must organize to elect new politicians if the old ones do not change.

Population

Old: More people are desirable, since they provide growing markets, labour forces, and (in some religions) souls to save. Therefore, population growth should be encouraged. The traditional rule: ''Go forth and multiply.''

New: Growth in population puts additional strain on natural resources and waste-disposal capabilities, degrades the environment through increased pollution, and causes increased crowding. People should be discouraged from having an excessive number of children. The new rule: ''Stop at two.'' When laws force community officials to accept or encourage growth in population or development, these laws must be changed, or the whole society suffers.

Energy

Old: Fossil-fuel energy was relatively cheap – especially when compared to labour – so it did not matter much if it was wasted. It was easier and cheaper to build houses, cars, and machinery with high energy consumption and high pollution output. The traditional rule: ''Always do the cheapest thing, no matter what the consequences may be.''

New: The traditional production and use of energy always involves significant ecological impacts, whether it is from large hydroelectric dams destroying farmland or fisheries, coal mining destroying the land surface, oil burning polluting the atmosphere with carbon dioxide and smog-producing emissions, or subsidized nuclear power accumulating radioactivity and risking grave accidents. We should hasten the transition to using energy from sources which can be harnessed with the least impacts (in the production of wind-turbines, for instance, or in electricity transmission lines). The new rule: ''Use solar, wind, biomass, or geothermal power.'' Sometimes governments need to subsidize new energy technologies modestly for a time, as was done in California for wind power in the 1960s and is now being done in Germany and other countries. This is a far preferable alternative to continuing subsidies for the fossil-fuel or nuclear industries.

Happiness

Old: Happiness was to be obtained by the purchase of goods. Individuals judged themselves and each other by how many consumer

objects they could buy. The traditional rule: ''The person who dies with the most toys wins the game.''

New: Happiness basically comes from good relations with our families, friends, co-workers, communities, and nature. According to survey research, people in very poor cultures are just as happy as those in rich, industrial countries; in addition, individuals do not actually become happier as they become richer. Moreover, traditional societies enabled people to feel at home in the universe and in their communities. To call someone a ''consumer'' is really an insult. Working only to buy things is a waste of one's life. The new rule: ''Honour love, commitment, honesty, fairness, creativity, sensitivity, and spiritual feeling more than possessions.''

Our relationship with other species

Old: The riches of the earth are here only to be exploited by humans, and particularly by corporations. No other species have rights or claims to existence. The traditional rule: ''Only humans matter.''

New: We survive solely because of our interdependence with the rich web of microbial, plant, animal, and even insect life which supports us. If we act thoughtlessly and selfishly, we endanger or distort the entire web. The new rule: ''Don't drive other species to extinction: protect their habitats.''

The future

Old: Only present generations count, since the ''discount rate'' means that future values have almost no economic significance in present time. Our descendants will just have to take care of the problems we leave them. The traditional rule: ''Let the future worry about the future.''

New: As in American Indian tradition, the new rule should be: ''Consider the effects of any action on the seventh generation.''

If new rules such as these must be accepted in order for an ecosociety to develop and persist, how can the old, deep, well-established social attitudes be displaced? Major crises such as wars or depressions can bring rapid change in popular beliefs, as happened after the great plagues in medieval Europe. Today's prevalent consumerist attitudes might be suddenly replaced by new rules along the lines

described above if the integrated global economy suffers a severe economic crisis which reminds people that biological survival is more important than economic growth. Experts differ about the likelihood of another drastic world depression, though the history of capitalism suggests that one is probable sooner or later.

Although non-crisis change generally requires several generations, it can be influenced by deliberate policies, and perhaps speeded up. For an instructive although unfortunate example, it is well documented that in America just after World War II, new consumerist attitudes were deliberately promoted by the advertising and public relations industries. Immense amounts of corporate money and talent were deployed to increase advertising in magazines and newspapers and later in television, fostering ideas of fashion cycles, ''planned obsolescence'' of goods, status-competition through purchases, and the like. This campaign has been a great success, especially in indoctrinating young people, with effects now over most of the planet. A throw-away culture has displaced the thriftier, more durability-oriented, more agriculture-conscious and community-based culture of earlier periods.

What lessons can we draw from this example? A concerted campaign for eco-society values using well-known techniques of advertising and ''public relations'' would be desirable, but the only source of funding for such work is skimpy corporate foundation donations. It is likely, therefore, that promulgation of the new values must be the responsibility of individual writers, religious leaders, ecological thinkers, educators, and the network of NGOs which increasingly link forward-looking people throughout the world, enabling them to bring concerted pressure to bear when opportunities arise. If new attitudes spread and deepen sufficiently, it will force elected officials to respond with legislative and administrative innovations. At present, especially in countries like the United States which lack competent government bureaucracies, they tend to respond almost solely to greed from corporate sources. This results in actions that not only suck wealth from ordinary citizens and give it to the rich, but create severe ecological problems, which also mainly affect ordinary people.

Change toward eco-society attitudes will also be driven by the increasingly obvious consequences of ecological destruction. Some examples include overfishing of the oceans, which causes fish prices to rise; global warming, of which we are beginning to observe the consequences in increased cyclone activity; and ozone depletion, causing more cancer and other health problems. Consequently, people may

gradually adhere to the ecological principle of ''sustainable yields'' for renewable resources such as fish and forests, and favour the reduction of carbon dioxide and chlorofluorocarbon (CFC) emissions.

Similarly, world population will continue to rise but world grain production will rise more slowly; thus, per capita grain availability will decline and grain (along with the meat and farmed fish derived from it) will become more expensive. While this will initially put the heaviest pressure on poor countries, it will ultimately compel most countries to think in terms of greater food self-sufficiency, and also population limits. In time, the truly ecological attitude – that we must live within the limits of the renewable bounty provided by solar input – will come to prevail.

While all citizens will participate in the process of attitude change, government officials and politicians need to be particularly aware of the ecological impact of policy choices, as well as their economic and social impacts. They also need to be aware that giving an irresponsible example – by driving large, gas-guzzling cars or living a high-energy-consumption lifestyle – shows they are not genuinely concerned with the future welfare of their people. Unless ecological impacts are seriously considered, a wide range of policies will usually have unintended and unfortunate consequences. In Europe, therefore, many cities have developed Green Plans (or Sustainability Plans) to coordinate changes toward sustainability on the urban level. To date, only a few US cities have such plans: Portland, Oregon; Seattle, Washington; Chattanooga, Tennessee; and Austin, Texas. But such plans will probably soon be adopted in many more American cities. For instance, in my metropolitan region, the city of San Francisco has recently begun implementing such a plan.

The gestation of this plan is typical of how the new eco-society ethic takes political form – in the case of San Francisco, in a city with a long history of environmental activism. In the first stage, which lasted about 20 years, local NGOs steadfastly proposed the idea of a Green City. These groups, supported by ardent volunteer work and small donations, plus a few small foundation grants, included an organization called Green City, whose director and leading spirit was later hired by the city government to implement the plan. Another example was the bioregional organization Planet Drum, which ran an extensive series of focus groups and published a small book setting forth its recommendations. In addition, there were Urban Ecology, a group advocating non-car transportation, ''access by proximity,'' and infill development in vacant or underused land, and, finally, the Re-

source Renewal Institute, which served as a conduit for Green Plan ideas coming from Europe and Canada. Gradually educators, religious leaders, union leaders, and citizens generally became conscious of green alternatives to business as usual. Large environmental organizations such as the Sierra Club were also important; although their agendas are national, the local chapters also supported Green City ideas and helped transmit them to the people at large.

Gradually politicians, including the new and charismatic mayor Willie Brown, were won over to the programme, and its elements also became familiar to the city bureaucracy. This series of developments, from NGO innovation through cooptation by the city administration, finally permitted official adoption of the plan. The elements of this, for the coming 10 years, include both city and people's activities:

- *Integrated pest management.* Instead of relying on chemical pesticides to protect the city's parks and street trees, new methods of biological control of pests will be implemented. Citizens will also be urged to minimize the application of chemicals in their private gardens.
- *Green building standards*. In the construction or remodelling of city buildings, embodied energy will be minimized to provide an ongoing example to private developers. In the mild climate of San Francisco, air-conditioning is seldom necessary, and heating of water and interior space will be made more energy-efficient.
- *Effects of chemicals on human health*. Waste chemicals from industry must be mitigated, usually through removal of contaminated soil. Emissions of new chemicals from industries, including electronics companies and dry-cleaning companies, will be further controlled, and the health effects of emissions will be analysed.
- *Air quality*. Automobile emissions continue to be a serious negative factor in air quality, and the city bus and trolley system will increasingly turn away from diesel toward electric propulsion. Under the US political system, it is difficult for cities to take strong steps to minimize the impacts of automobiles, but an understanding of these effects is growing, even among ''traffic engineers,'' whose priority has always been to make life easy for cars (which is hard on pedestrians, cyclists, and residents near high-traffic roads.)
- *Biodiversity*. The city will inventory its natural areas and existing biodiversity, and strive to prevent invasive exotic species from being introduced or spreading.
- *Energy, climate change, ozone depletion*. Since a large city has sub-

stantial effects on the atmosphere, programmes will attempt to minimize overall energy consumption, decrease emissions of the greenhouse gases carbon dioxide and methane, and stop illegal uses of CFCs, in which a considerable black market exists.

- *Food and agriculture*. The city will promote additional ''farmers' markets'' which bring vegetables and fruits direct from farms to consumers. It will construct gardens for residents in all new public housing projects.
- *Hazardous materials*. Attempts will be made to locate and remove radioactive or carcinogenic materials, and to dispose of new hazardous materials, such as hospital wastes, more safely.
- *Human health*. Contaminated areas will be identified. Immunization against common diseases will be extended to those parts of the population not yet covered.
- *Parks, open spaces, and streetscapes*. All natural habitats will be mapped, and plans made to protect them.
- *Solid waste*. Salvaging and reuse of building construction and demolition materials will be carried out. The city now diverts 60 per cent of its wastes, though only 43 per cent of paper is recycled. The plan aims to increase recycling substantially.
- *Transportation*. The city's goal is to greatly reduce entries of single-occupancy vehicles into the city (which is the hub of its region), although person-trips will probably increase. Interconnections between transportation systems, which are uniformly very poor in the United States, will be improved.
- *Water and wastewater*. A management plan will be developed for the city's park lakes. To improve water conservation in homes and businesses, tax credits and other financial incentives will be used.
- *Energy and economic development*. A city-wide network of ''neighbourhood boards'' will be developed to stimulate local enterprises. These boards are groups of citizens concerned about the livability and futures of their neighbourhoods; they are, so to speak, government-endorsed NGOs, and have been active in curbing neighbourhood crime and vandalism, and in facilitating agreements between quarrelling neighbours. Tourism facilities (tourism is now San Francisco's largest industry) will be encouraged toward eco-tourism standards in water and energy use, transportation use, etc.
- *Environmental justice*. People from poor or minority neighbour-

hoods must be represented on decision-making bodies, especially when polluting activities are involved. Poor or unemployed people must be trained for jobs in sustainable industries.

- *City expenditures*. Life-cycle costing is to be adopted for all city-government capital expenditures, again as an example to private firms. Better maintenance programmes are planned for such things as city buildings, transportation equipment, and office furniture.
- *Public information and education*. A clearing-house of information for organizations and individuals is to be established. (All state schools now have an environmental curriculum.)
- *Risk management*. This includes better fire safety regulations and better plans to contain and clean up oil spills in San Francisco Bay or small waterways within the city.
- *Indicators*. This includes a system of collecting and publicizing information more significant in judging human welfare than the GNP or GDP. For example, respiratory problems reported at public clinics; energy cost/tax dollars; tons of waste landfilled; ratio of highest neighbourhood unemployment rate to full employment rate.

Starting in January 1996, this plan was developed through the work of 400 volunteers from universities, NGOs, city agencies, and more than 100 businesses. Such city programmes have an important part to play in the process of adopting new ecological rules. They have valuable indirect educational effects, affecting citizens who have not previously been reached. But before such programmes are likely to be adopted, broad changes of attitudes among the people as a whole are required. In bringing about these changes, many important roles must be played.

Educators need to instruct students from elementary school through university in the principles of ecology. It is just as important for all of us to grasp an ecological vocabulary and methods of analysis as it is for us to understand arithmetic. Teachers must advance beyond the ''charismatic megafauna'' stage and help their students to grasp the systemic lessons of ecology.

Writers and others in the cultural world, while avoiding boringly didactic novels, poems, songs, and so on, need to reflect ecological realities in their work. In subtle or blatant form, all such works convey attitudes and rules. Hitherto these have been mainly consumerist. Many new possibilities exist for exciting innovations, such as the anime films of Hayao Miyazaki. One of my own contributions along

these lines is the following, written in 1990, which has been published as a poster that people can put up on their walls:

Earth's ten commandments

Thou shalt love and honor the Earth
for it blesses thy life and governs thy survival.

Thou shalt keep each day sacred to the Earth
and celebrate the turning of its seasons.

Thou shalt not hold thyself above other living things
nor drive them to extinction.

Thou shalt give thanks for thy food
to the creatures and plants that nourish thee.

Thou shalt limit thy offspring
for multitudes of people are a burden unto the Earth.

Thou shalt not kill
nor waste Earth's riches upon weapons of war.

Thou shalt not pursue profit at the Earth's expense
but strive to restore its damaged majesty.

Thou shalt not hide from thyself or others
the consequences of thy actions upon the Earth.

Thou shalt not steal from future generations
by impoverishing or poisoning the Earth.

Thou shalt consume material goods in moderation
so all may share Earth's bounty.

Media creators need to pay attention to ecological problems, impacts, and reform possibilities in preparing scripts for their broadcasts, films, and other works. News programme writers and producers need to understand the ecological issues that lie behind headline stories, and help people to understand these implications.

NGOs need to continue their essential work of influencing governments to focus on neglected issues and adopt new sustainability-oriented policies. They are the motor that drives the whole process of moving toward an eco-society.

All this work is urgent, since without success in propagating new ecological rules among the industrial peoples of the planet, we face a future of increasing ecological degradation or even catastrophe. Left to operate by its own rules, industrial civilization will not survive. It must be replaced by an eco-society if we wish to assure a safe and

healthy future for the human species. We are now in the midst of a long and difficult struggle, and the outcome is certainly in doubt. Whether humanity will survive in some degree of dignity or suffer catastrophic ecological and social collapse depends on our success in adopting and promoting new attitudes and the rules of living which go with them.

3

Urban environmental management: a partnership continuum

Hari Srinivas

Cities and towns in most countries around the world have been gaining considerable attention owing to the large number of individuals and households migrating to urban areas and the consequent negative environmental pressures.[1] On the positive side, the demographic trends have reflected the centrality of goods and services that cities offer, having emerged over the last few decades as the major form of human settlement. By the turn of this century, we will be witness to a ubiquitous scenario where more people will live in and around cities than in rural areas. In 1800, only 50 million people lived in towns and cities worldwide. During 1975, there were 1.5 billion, and by the year 2000, this will be 3 billion – more than the entire population of the world in 1960.[2] Proximity to decision-makers and financial markets, large pools of skilled and unskilled workers, and other amenities have made urban areas the engines of growth for the countries and regions where they are situated. For example, despite the environmental and social problems that it is facing, Bangkok's contribution to the national gross domestic product (GDP) has been estimated to be more than the combined output of all other cities in Thailand.[3]

This explosive growth of urban areas has brought with it a host of negative effects. Increasing population concentration in small areas of land has caused a drastic decline in the quality of living on both the

Box 3.1: Urban growth dimensions in India

Urban areas in developing countries have been growing very fast. It is estimated that by the end of this century, 50 per cent of the population will live in urban areas, which occupy only 3 per cent of the total land mass. In the current decade, at least 80 per cent of population growth has occurred in towns and cities. The situation is more alarming in developing nations, which will be home to 80 per cent of the total population of the world within the next 25 years. Of the 20 largest cities, 17 will be in the developing world by the end of this decade.

City authorities in India and other developing countries have been under tremendous pressure to provide residents with basic infrastructure and services. In most of the larger cities, 30–60 per cent of people live in unserviced squatter settlements. The population density in older parts of some cities is approximately 2,500 persons per hectare. Nearly ten hectares of fertile land is encroached upon by urban development every day, yet there are areas in cities such as Delhi and Calcutta where population density is more than 150,000 persons per square kilometre. The walled city of Delhi alone has a density of 166,300 persons per square kilometre. Some of the urban agglomerations today have a population of more than 10 million. According to a recent estimate, by 2015 India will have 34 cities with populations of 1.5 million and above, four of which will have passed the 10 million mark. The city of Mumbai (Bombay) will have the largest concentration, at more than 27 million. The population of these 34 cities altogether will still be increasing at an average annual rate of about 2.8 per cent. Such concentration trends in the demographic scenario in India would subject its cities to greater risk to human health and property, owing to the extreme environmental stress entailed and the resultant man-made disasters.[4]

residential and work fronts. Cities have, in effect, become a barometer of humankind's progress into the twenty-first century, whether this is an upward or downward trend. Such scenarios have had ripple effects on a variety of other sectors such as education, health, labour/job markets, and economic activities.

The World Resources Institute's report for 1996–97 focused on urban environments. In its executive summary, the report illustrates the problems:

Burgeoning cities are expanding into fragile ecosystems . . . Cities sometimes deplete nearby areas of water and firewood, rendering them less capable of

supporting rural populations and thus adding to the pressures for urban migration. Air pollution already exceeds health standards in many megacities in developing countries. Sewage and industrial effluents are released into waterways with minimal or no treatment, threatening human health and aquatic life. Some urban environmental problems such as access to safe drinking water improve with economic growth, while others tend to worsen. Thus in the absence of policy reform, stronger institutions, and enlightened political leadership, economic and population growth in developing countries in the near term may lead to a deterioration of the urban environment, both physical and social. Stresses on the global environment from urban activities are also likely to accelerate. A major share of greenhouse gas emissions already comes from the use of fossil fuels in wealthy urban areas, especially in the developed countries.[5]

Such a characterization of urban environments calls for a deeper and broader understanding of the causes and effects of urban activities. Fundamental questions relating to issues such as urban lifestyles, market-oriented economies, and consumerism need to be raised for this purpose. How can we characterize urban environments?

Urban environmental dynamics consist of resources, processes, and effects. Resources include human and natural resources such as sunlight, land, water, minerals, electricity, energy, and finance. Processes include manufacturing, transportation, construction, migration, and population growth. Effects are outcomes, either negative (air/water/noise pollution, waste generation, congestion, overcrowding) or positive (value-added products and services, education, access to goods and services). In a very broad sense, urban environments can be defined as an intersection of the natural environment, the built environment, and the socio-economic environment.

Taking any one dimension at the exclusion of the other two poses the inevitable danger of missing the forest for the trees. The interdependence and interdisciplinarity of the three dimensions have to be fully understood in the development of coherent and sustainable policies and programmes for the urban environment. This is particularly true given the multiplicity of actors and activities: there has been a growing realization, for example, that state agencies and activities are but one part of a spectrum of agencies and activities that are involved in the urban environment.[6]

This paper explores the issues related to urban environmental management by first outlining the scope and scale of urban problems. This picture is then placed within a policy and programme framework. A Partnership Continuum is developed using dual axes where

Box 3.2: The natural, built, and socio-economic dimensions of urban environments

- Natural environments consist of resources, processes, and effects related to flora and fauna, human beings, minerals, water, land, air, etc.
- Built environments consist of resources, processes, and effects related to buildings, housing, roads, railways, electricity, water supply, gas, etc.
- Socio-economic environments consist of resources, processes, and effects related to human activities, education, health, arts and culture, economic and business activities, heritage, and urban lifestyles in general.

the various actors and stakeholders in the urban area are positioned. This helps us to understand the roles, strengths, positions, and networks necessary to mitigate negative environmental pressures on urban areas. The paper concludes with an example of an environmental partnership for sharing information on urban issues, by profiling the Urban Environmental Management Research Initiative (UEMRI).

Understanding the scale of urban problems

The socio-cultural, economic, and environmental effects of an urban area cannot be limited to its administrative boundaries. A large amount of the resources consumed by its population is derived from outside; and garbage and wastes are discharged into the air, water, and land, affecting areas far beyond its boundaries. An illustrative example is that of the Greater London area. The land mass that generates the resources necessary to sustain the population of London, called the ''urban footprint,'' was calculated on the basis of consumption and waste generation patterns. Area required for food production, forest area for wood products, and land area for carbon sequestration was added to it. The resultant footprint of Greater London was slightly less than the entire land area of the United Kingdom![7] This illustrates the complex interrelationship and interdependence of urban areas and their surrounding hinterland.

According to the Earth Council's report, ''Ecological Footprints of

Box 3.3: Spatial impact of the Netherlands

Netherlands uses a great deal of space abroad. Some 15 million hectares of agricultural land beyond its borders are used: 5 million hectares for consumption and 10 million hectares for agricultural products. A further 6 million must be added for imports of timber. The spatial impact of the Netherlands on agricultural land and forests in other countries is therefore five times the size of the Netherlands itself. This represents a grave threat to global biodiversity, as a result, for example, of transformation of tropical rain forests into land for cultivation of tapioca for meat production, and the use of primary forests for the production of timber and paper.[8]

Nations,'' lifestyles in Japan generate a demand for 6.25 hectares per capita for resources such as energy, arable land, pasture, forest, and built-up areas. But the supply has been only 1.88 hectares per capita. This leaves an ''ecological deficit'' of 4.37 hectares per person, which has to be met from outside the country. In 1995, the conurban region of Tokyo had a population of 26.8 million. For Tokyo alone, this ecological deficit is equal to 116,242,000 hectares, or 3.07 times the total land area of Japan.[9] This becomes 9.2 times the land area of Japan if productive land only is taken into account (excluding mountainous areas and bodies of water).

Some of the negative effects of urban activities have, in many cases, outweighed the relative advantages of agglomeration and the centrality that they offer. Thus, along with the benefits of agglomeration and urbanization come environmental and social ills, including lack of access to drinking water and sanitation services, pollution, and carbon emissions. A wide variety of urban problems can be observed, grouped under two broad and contrasting classes: those associated with poverty and those associated with economic growth and affluence.[10]

A key to effective policy formulation and allocation of resources to projects is to understand the scale of urban environmental problems. This helps us in a variety of ways: to identify the causes and effects of environmental problems, to collect appropriate data and information at the appropriate level, to allocate resources and stakeholders that function and are involved on the particular scale repaired, and to formulate policy and take appropriate action at the appropriate level.

Environmental problems can be scaled by using a spatial scale, which includes household, community, city, and region/nation. At each level of the spatial scale, the characteristic problems and the related infrastructure and services needed to address such problems need to be specified. The consideration of the spatial scale of impacts reveals several important issues:[11]

- health impacts are greater and more immediate at the household or community level and tend to diminish in intensity as the spatial scale increases;
- equity issues arise in relation to (*a*) the provision of basic services at the household or community scale and (*b*) intertemporal externalities at the regional and global scale – particularly the intergenerational impacts implicit in non-sustainable resource use and global environmental issues;
- levels of responsibility and decision-making should correspond to the scale of impact, but existing administrative arrangements often violate this principle.

In many cases, a combination of direct and indirect causes results in an environmental ''problem.'' In developing countries, the most commonly cited is that of squatter settlements. Between 30 and 60 per cent of the population in urban areas live in squatter settlements. But squatter settlements are not ''problems'' that have to be ''solved''; rather, they are a result of lopsided and vested policies and market forces, which prevent the equitable distribution of land and other infrastructural services.

A range of urban problems, and the levels at which they occur, is given in table 3.1. It is clear from the list that many problems extend across several levels, or may have broader effects over several levels.

A deeper understanding of urban problems and their causes and effects allows – or helps – us to develop appropriate management options for the problems. For example, the pollution and depletion of groundwater resources constitute an urban problem facing many cities in developing countries. The effects of groundwater pollution include human health problems, reduced water quality from saline intrusion, and biochemical seepage; the responses entail the economic costs of additional treatment, finding new sources of supply, and health costs. Some of the causes of these problems are pricing policies, unclear property rights, poor regulations and/or enforcement, unsustainable extraction, poor sanitation, poor municipal and industrial waste disposal practices, and poor demand management.

Box 3.4: Defining squatter settlements

A squatter settlement can be defined as a residential area that has developed without legal claims to the land and/or permission to build; from the relevant authorities. As a result of their illegal or semi-legal status, infrastructure and services are usually inadequate. There are essentially three defining and interrelated characteristics – physical, social and legal – that help us understand squatter settlements.

(*a*) *Physical characteristics:* A squatter settlement, owing to its inherent ''non-legal'' status, has services and infrastructure below the ''adequate'' or minimum levels. Such services can be both network and social infrastructure, such as water supply, sanitation, electricity, roads, and drainage; schools, health centres, and market-places. Water supply to individual households may be absent, for example, or a few public or community standpipes may have been provided, using either the city networks or a handpump itself. Informal networks for the supply of water may also be in place. Similar arrangements may be made for electricity, drainage, toilet facilities, and so on, with little dependence on public authorities or formal channels.

(*b*) *Social characteristics:* Most households in squatter settlements belong to the lower income group, working either as daily waged labour or in various informal-sector enterprises. On average, most earn wages at or near the minimum wage level. But household income levels can also be high, if there are many income earners and part-time jobs. Squatters are predominantly migrants, either rural–urban or urban–urban. But many are also second- or third-generation squatters.

(*c*) *Legal characteristics:* The key characteristic that delineates a squatter settlement is its lack of ownership of the land parcel on which the house has been built. Land could be owned by the local government, or it could be marginal land, such as railway setbacks or undesirable marshy land. Thus, when the land is not under ''productive'' use by the owner, it is appropriated by a squatter for building a house. It has to be noted here that in many parts of Asia, a landowner may ''rent'' his land for a nominal fee to a family or families, under an informal or quasi-legal arrangement which is not, however, valid in law.

In general, there are several attributes that act as generative forces and determine the quality and size of a squatter settlement. Such attributes could be either internal to the settlement (ethnicity, workplace, place of origin, language, length of stay in settlement, investment in housing, construction activity, or presence of renters) or external (landowner, security of tenure, municipal or city government policies, or length of stay in city).

Table 3.1 **The scale of urban problems**

Level	Urban problems
Household	Household and human health; garbage generation; air/water/noise pollution; spread of diseases
Community/neighbourhood	Polluted land; inappropriate and inadequate technology use; lack of understanding of environmental problems; natural disasters such as flooding and storms; noise pollution; waste and garbage dumping
City/town	Amenity loss; traffic congestion; loss of heritage and historical buildings; reduced property and building values; inadequate tax/financial revenues; lack of, or inappropriate, legislation; overcrowding; misguided urban governments and management practices; inadequate supply and transmission loss of electricity; water/air/noise/land pollution; loss of agricultural land and desertification; toxic and hazardous wastes/dumps; flooding and surface drainage; accidents and disasters
Region/nation	Water pollution; loss of habitat; biodiversity and species endangered; soil erosion; increased salinity, toxic runoff and acid rain; natural and man-made hazards and disasters; land clearance; loss of forest cover; effects of climate change and global warming

Management options available to solve these problems include regulations, standards, and licensing; waste management; appropriate technology; demand management; controls on land use; and education and awareness generation.[12]

Urban environments: A framework for policy and practice

It is clear from the previous section that there is an urgent need to develop an effective response to the myriad urban environmental problems and challenges. This response should take place within a coherent framework for policy and practice, where urban problems can be identified and tackled. The urban environmental framework being presented here has a threefold objective: (*a*) to develop awareness and educate on issues related to urban environments; (*b*) to assist in policy and programme development; and (*c*) to facilitate

Table 3.2 **Estimated GDP of selected urban areas as percentage of national GDP**[14]

Country/territory	Estimated urban GDP (%)
Bangladesh	32
China	48
Fiji	34
Hong Kong	99
Indonesia	37
Korea, Republic	79
Malaysia	37
Myanmar	54
Pakistan	47
Philippines	53
Singapore	100
Sri Lanka	42
Thailand	41

monitoring and evaluation. The target audience of this framework, in terms of the actors and stakeholders in the urban arena, is kept broad so as to increase participation in, and the utility value of, the framework itself. They include government agencies, planners and planning bodies, NGOs, donor agencies, community groups, and academics. The framework was developed using case studies, reports, and other information collated and analysed by members of the Urban Environmental Management Research Initiative. An online version of the framework is further expanded with examples, documents, and other information, and can be viewed on the World Wide Web.[13]

- **Urban environments pose a challenge for effective distribution and management of global resources**

The density and population of today's urban areas necessitate the equitable distribution of the resources that are needed for the various activities of those areas. As mentioned earlier, it is necessary to understand the effects of an urban area not only within its immediate boundaries, but also within the region and country where it is located, owing to the large amount of resources necessary to sustain cities. At the same time, we must also realize that urban areas generate a GDP very disproportional to their share of population.

- **There is a need to strike a balance between natural and built environments and between ecological and economic objectives**

Agglomeration and the centrality of resources and skills that an urban area offers should not be ignored, but should be balanced with the natural environment and natural resources such as air, water, land, and minerals. The economic objectives of job creation and of income generation and distribution, particularly for developing countries, will have to be tempered with the ecological objectives of sustainable living. The priority placed by developing cities on economic development and income distribution over environmental issues must be understood from the larger perspective of long-term human development. For example, more than 41 per cent of Thailand's GDP is generated in Bangkok and other major cities (see table 3.2), but at a huge environmental cost.

- **There is a need to develop a structure of goals and visions and a methodology to achieve it in order to identify the action that is necessary**

A structure of goals and visions for sustainable urban living that can easily be understood by ordinary citizens should be developed. This will allow communities and governments to discuss how goals can be achieved at a very tangible community or household level. Goals and visions will also give legitimacy and currency to the problems faced in urban environments and will set the platform on which these problems can be addressed. The scale of urban problems should be understood, so that appropriate action can be taken at the appropriate level.

- **Steps must be relevant in the short term in order to gain wider acceptability, but also directed towards long-term goals**

Goals and visions must be divided into immediate, intermediate, and eventual goals, so that the issues are better understood and tangible and visible results are achieved. This will also ensure stronger long-term participation from all stakeholders. Sharing and cooperating on essential lessons, practices, and technologies are critical to achieving such goals.

- **Accessibility, sharing, and dissemination of information must be prioritized in order to achieve greater understanding of the issues involved**

The cause-and-effect reasoning of local action has to be understood from a regional and global perspective. For example, what is the effect of drinking a cup of coffee on coffee growers in South America?

The key to achieving this understanding and exploration is information and the availability of easy, adequate, and immediate access to it. Timely and effectively packaged information is key to influencing local decision-making processes, which, on a cumulative basis, have global repercussions. Appropriate communication and information technologies should also be encouraged, including the widely used Internet.

- **Collaborative efforts in "knowledge transfer" at the city-to-city level have to be encouraged, particularly between developed and developing cities**

Collaboration with institutions and governments in developed and developing countries for the transfer of urban "software" (inspiring ideas and innovative technologies, practical solutions, including rules, regulations, legislation, and ordinances) has to be encouraged. This should cover, among other issues, policies, programmes, skills, and local and city governance. The feasibility and transferability of such "software" will have to be studied in depth before collaborative projects are launched.

- **There is a need to understand and implement the concept of sustainable development and sustainable living, in all its varied definitions**

Wider participation to achieve the goals of sustainable development and living must be encouraged. This must involve the community, local government, and the whole range of non-governmental organizations (including the private sector). The development of environmental consciousness, education and training, capacity-building, and environmental governance need to be considered. Sustainable living should become a way of life, rather than a fancy concept that is espoused by an "enlightened" few.

- **The development of new technologies that are clean, green, and practical should be encouraged and exchanged between national and city/local governments in order to address environmental problems**

The environmental consequences of current technologies must be assessed, while the transfer of environmental technologies has to be enabled through a variety of governmental and non-governmental forums, including online Internet networks. Collaboration among universities and research think-tanks must be enabled so that appropriate technologies can be quickly developed.

The partnership continuum

While the contents of a framework provide a broad vision, its applicability lies in establishing policies, programmes, and projects that operationalize the objectives in the long term and set up mechanisms to monitor and evaluate at every stage.

The Urban Environmental Framework outlined above is constructive in developing an overall agenda and plan of action aimed at mitigating problems associated with urban environments. The key to effective action lies in bringing together the various stakeholders, both governmental and non-governmental, and in developing a united front to solve the problems. A common denominator that links actors and actions, causes and effects, is that of appropriate and innovative partnerships.

A partnership can be defined as ''collaborative activities among interested groups, based on a mutual recognition of respective strengths and weaknesses, working towards common agreed objectives developed through effective and timely communication.'' Thus, a partnership occurs where groups with common objectives agree to undertake activities that build on each other's strengths and help overcome apparent weaknesses. Overcoming apparent weaknesses may involve a sharing of expertise, knowledge, or experience by one or more groups amongst the other groups. Partnerships are undertaken for the purposes of implementing objectives that have been agreed to by the groups involved. The objectives are ideally developed through a process of communication that is acceptable to all actors involved. Actors may include NGOs, local governments, labour unions, research groups, agriculture and development NGOs, corporations, and national governments.[15]

The Field Guide to Environmental Partnerships makes the following observations on partnerships:

- Partnerships are formed among organizations, but succeed because of individuals.
- A successful partnership usually has a strong leader who champions the partnership projects and goals with vision, energy, and enthusiasm.
- Partnerships involve people directly affected by a partnership – they are usually the ones most willing and able to work for it.
- Shared agendas, joint decision-making, and mutual benefit constitute a partnership; money facilitates the projects.
- A visible senior-level support lets a partnership operate easily

within the organization, and displays the organization's commitment to other partners and to the general public.
- Organizations should be willing to consider new ideas and approaches, share responsibility, and enter partnerships with the intention of being an active part of the process.
- A partnership is an opportunity for organizations to work together beyond business-as-usual, day-to-day activities.
- Most partnerships are proactive, and involve action beyond what is required by regulation or policy.[16]

In order to understand the organizations, roles, interrelationships, and actions of urban environmental activities, a dual-axis continuum can position actors within a coherent framework, which we will call the Partnership Continuum. The continuum was developed using information contained within the NGO Cafe[17] and the organizational and operational descriptions of members of the Climate Action Network (CAN).[18]

The Partnership Continuum has two axes, an *x*-axis and a *y*-axis. Along the *x*-axis is the organizational continuum, ranging from a ''fully'' non-governmental organization through semi-NGO and semi-governmental to ''fully'' governmental organizations. Along the *y*-axis is the spatial continuum, ranging from local to provincial, national, regional, and international spaces.

Positioning the different actors on the continuum depends on various factors: nature and size of the organization; type of membership; if applicable, type, location, and range of programmes and projects; sources of funding; legal and legislative backing for the organization or operation. Thus, the position of an organization is not a precise point, but an area that may transcend several quadrants. Moreover, the position or area occupied by an organization on the continuum may change over time as the policies, programmes, and projects change. A sample of organizations is shown on the continuum in figure 3.1. The advantage of the continuum is the ability to position on it different actors and organizations ranging from informal community-based organizations to the United Nations.

On analysing the positions of the environmental actors around the continuum, each of the four quadrants $(+,+)$; $(-,+)$; $(+,-)$; and $(-,-)$ shows clear characteristics and strengths:

1. The $(-,-)$ quadrant: Actors and actions positioned in this quadrant have a clear community and grassroots relevance. Activities have a greater degree of independence and flexibility in operation. Education and awareness-building are major foci of activities.

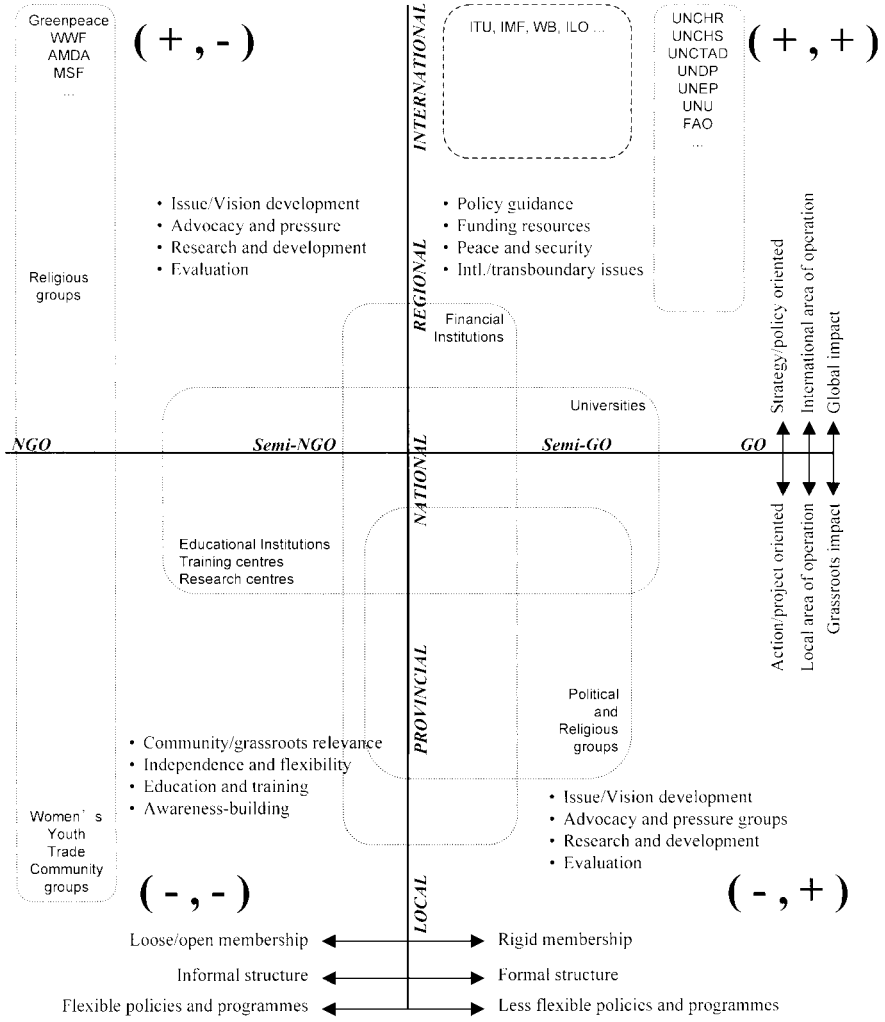

Figure 3.1 **The Environmental Partnership Continuum.**

2. The $(-,+)$ quadrant: Actors in this quadrant work on the development of legal and legislative frameworks and instruments. They also engage in regulatory issues, including enforcement and compliance. Actors in this quadrant, in particular, play a mediation role in resolving environmental disputes.

3. The $(+,-)$ quadrant: Actors in this quadrant focus on issue and vision development for sustainable development. The major mode of operation that these actors use is advocacy and pressure. Actors in this quadrant also engage in extensive research, monitoring, and evaluation.
4. The $(+,+)$ quadrant: Actors in this quadrant are primarily involved in policy development, funding, peace and security, and so forth. International and transboundary issues are covered in this quadrant. This is done through conventions, treaties, agreements, etc.

An interesting set of organizational and operational distinctions can be made along the *x*-axis and the *y*-axis, which help us in further understanding the actors and their activities.

- Organizations on the left side of the *y*-axis have loose and open membership, an informal structure, and flexible policies and programmes. In contrast, organizations on the right side of the *y*-axis have a more rigid, closed membership, formal structures, and less flexible policies and programmes.
- Organizations below the *x*-axis focus on actions and project activities that have grassroots relevance at the local, community level. In contrast, organizations above the *x*-axis focus on strategy and policy orientation, essentially with global relevance.

By positioning an organization on the continuum, the relative strengths and weaknesses of the organizations can be understood. It is useful to categorize the deficiencies or problems being addressed as a ''lack'' (something that is not there), a ''gap'' (something of which there is not enough), or a ''mismatch'' (something which is not right). This knowledge is critical in developing horizontal, vertical, and diagonal partnerships along the continuum's four quadrants. Depending on the environmental problem being studied, appropriate actors in each of the four quadrants can be identified and partnerships instituted to develop appropriate action. Partnership activities can encompass such activities as funding, programmes and projects, training and education, research, and information dissemination.

The Partnership Continuum presented here is a two-dimensional construct, with an *x*-axis and a *y*-axis. Its validity can be further enhanced by introducing a third dimension along a *z*-axis. Such third dimensions can take into account continuums for the size of the organization, size of funding, source of funding, and action orientation.

The Urban Environmental Management Research Initiative (UEMRI)

The Urban Environmental Management Research Initiative (UEMRI) was established to meet the need for networking in order to share success stories and best practices, to point to the deteriorating urban legacy, and to link up information generators and users. UEMRI was created by a group of urban researchers who met in Japan in 1997 for a conference. It was introduced to explore and analyse the problems of urban environments using electronic mail as a means of communication and information exchange, and the World Wide Web to ''package'' the research results. The 14 members of UEMRI come from all over the world, each representing the country and region where they are located.

UEMRI places importance on urban environmental management because the causes and pressures of any of today's global environmental problems can be traced back, directly or indirectly, to urban areas. The processes that constitute ''urban activity'' have far-reaching and long-term effects not only on a city's immediate boundaries, but also on the entire region in which it is located.

The objectives of UEMRI are threefold:

- *Awareness:* to explore and identify the values, principles, and practices of sustainable urban living.
- *Assessment:* developing resources and tools for various stakeholders to monitor progress and track sustainable practices in the region that UEMRI members represent.
- *Action:* promoting wider community participation in decision-making, implementation, and monitoring.

UEMRI, in essence, is an ''information partnership'' where a dispersed group of researchers has banded together globally to discuss, debate, and disseminate knowledge on the urban environment. It has explored and researched widely on themes such as capacity-building, urban governance, environmental impact assessment, local Agenda 21 and eco-tourism. The research outputs from UEMRI's activities are made freely available on the Internet to enable wide dissemination.[19]

Notes

1. This chapter draws upon the online resources of the Urban Environmental Management Research Initiative (UEMRI), which the author coordinates. Details of

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15. Personal discussion with Glen Paoletto on environmental partnerships, 1997.
16. Management Institute for Environment and Business, *Environmental Partnerships: A Field Guide for Government Agencies* (Washington DC: MIEB, 1994).
17. ⟨http://www.soc.titech.ac.jp/ngo/⟩.
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4

The concept and civilization of an eco-society: Dilemmas, innovations, and urban dramas

Voula Mega

The European cityscape and the challenge of an eco-society: Visions and perspectives

The city is a dynamic and complex socio-economic and human ecosystem, a place of encounters, challenges, sociability, confrontation, dialectics, and emotion.[1] According to Aristotle, the city is ''built politics'': there is high interaction between its form and the political values predominating in its governance. Vitruvius wanted the city to be solid, beautiful, and useful. Levi-Strauss proclaims it to be the human invention ''par excellence.'' Jacobs defines the city as a settlement that consistently generates its economic growth from its own local economy, and Mumford defines it as the form and symbol of an integrated social relationship. Preceding all of them, Alcaeus suggested in the seventh century BC that ''not houses finely roofed nor the stones of walls well built nor canals nor dockyards make the city, but men able to seize their opportunities.'' This last definition reminds us of the one given by Geddes: ''City is a dramatic action.''

Europe is first and foremost urban. According to the European Commission's *Green Paper on the Urban Environment* (hailed as the first sign of interest in cities on the part of the European Union), as we move towards the twenty-first century cities will continue to be

the main centres of economic activity, innovation, and culture.[2] Cities are increasingly strong on the European scene, they compete more, but they also collaborate more. They all want to win the battle of sustainable development and to become more attractive to people and capital. But cities are becoming more ambivalent: there are cities that include but also exclude, that assemble but also divide, that integrate but also disintegrate, that enrich but also impoverish, that fulfil but also drain potential. Turning problems into opportunities is a paramount challenge for all actors and decision-makers.[3]

At the dawn of the twenty-first century, the European urban network appears more balanced in terms of demographic growth. However, new migration waves are appearing on the horizon. Urban continuums develop, and networking is a must for cities willing to build upon each other's experience. Environmental problems and social shock waves prevent large cities from continuing to grow. Potential is increasing for intermediate cities which combine the advantages of small and large cities and offer citizens more harmonious environments. In fact, Europe is the continent of small and medium-sized cities. By the year 2000, none of the 20 largest cities of the world will be in Europe. Last but not least, the united Europe is not the unique Europe. The North–South and East–West divides are also sources of enriched dialectics.[4]

Sustainability has been the most popular and emblematic term in recent years. ''Sustainable development'' succeeded the concepts of holistic, integral, or endogenous development. The principle of urban sustainability links cities to the destiny of the planet. It projects them onto the world stage of the future. The concept has been defined more and more as a process and not as an end-point, as a journey rather than a destination. It might be a journey to Ithaca. According to the European Commission, environmental sustainability cannot be envisaged without social equity and economic sustainability.[5] It has been defined as ''equity extended into the future.'' The Charter of European Sustainable Cities describes sustainability as a creative, balance-seeking process extending into all areas of local decision-making. A healthy environment, social cohesion and economic efficiency, harmonious co-evolution, based on an active citizenship, are the pillars of urban sustainability.[6]

The achievement of an eco-society presumes an urban regeneration and renaissance. Cities should not simply invest in a better environment, but should be recreated as *Civitates*, places of civilization.[7] Expressions like ''the martyr city'' or even ''urban genocide'' are

significant, but the city at least has the capacity to renew itself.[8] Urban renaissance is needed to bring back harmony to cities often suffering from schizophrenia and a deep divide between the historic core and the dispersed-homes, dispersed-jobs, overwhelmingly car-dependent satellite suburbs. The renaissance cannot be perceived without an overall rethinking of the city, its form, and its functions.

The last UN Summit of the century, Habitat II (Istanbul, 3–14 June 1996), preceded by the first World Assembly of Cities, offered a panorama of the problems and challenges of our rapidly urbanizing world. Dissemination of practices and sustainability indicators were suggested as two important instruments for a qualitative leap forward. The development of indicators is linked to the search for a new measure of progress. Indicators can measure the success of one course of action and even stimulate action, but they do not indicate what kind of action to take. Decision-makers can avail themselves of a large choice of instruments for urban intervention, and good practice guides can inspire them. Moreover, they should be able to define actions which lead to a targeted goal. Actions in the atoms (material and immaterial) that constitute the complex molecule of a city might be reflected in indicators, but their aggregation into a unique urban sustainability index has to take into account the whole complex composition of the molecule.

Cities are networks of networks and at the same time the poles of global networks. Society is based on networks (networks of everything) and local actors constitute the diversified poles of the global networks. Technology, information, and markets are global, but people are local. Information technology provides the infrastructure for the integration of the global system. The space of flows (global) is in interaction with the space of places (local) and the cities gain an increasingly dual (global–local) function.[9] Competition is geographically uneven and new technologies have the power to shrink distance and to extend geographical distribution. Both the vanishing city and the omnipotent city are possible, depending on the actors and the policies.

A kaleidoscope of innovations for European cities and citizens: Highlighting partnerships

Cities are palettes of possibilities; huge, untapped reservoirs of ideas, enthusiasm, commitment, and labour. They are wholly existential; their being and the sources of their growth lie within them. Cities do

not grow as an enlargement of what is essentially already there, but by processes of gradual diversification and differentiation. Linear evolutionary change is not enough for making qualitative leaps towards an eco-society. Innovation has to be born and nourished. ''Adding new work to older work proceeds vigorously and creates possibilities for change.''[10] The European Foundation's project on urban innovation seeks to promote and facilitate the sustainable city, highlighting innovative actions in all member states of the European Union. It has been an odyssey into urban sites of the future.

Innovation is a creative destruction. It is a process comprising invention at the one end and transformation at the other. An old world of principles, ideas, and practices dies, while a new one is born. Innovation involves a dramatic and thorough change that opens up the horizon of capabilities and a catalytic organizational restructuring that allows the new product, concept, or idea to bring about the desired transformation. Invention is often identified with the research and development of a concept, while innovation includes all the politics of its implementation. Their articulation needs planning, foresight, and strategic choices. Progress in technology opens up new horizons, since hypermedia create a new global social fabric. In an increasingly digital world, intrinsically scaleable innovations involve all scales of coalitions and transformations. The success of innovations is never a certainty, but not undertaking innovation is certainly a failure. Sterile cities stagnate, fertile cities progress. Each innovation is a challenge.[11]

A European kaleidoscope has been composed out of innovative integrated approaches for the multifunctional, multicultural urban space, where growth and decline often coexist. It includes projects already implemented or at an advanced planning phase, aiming at protecting and enhancing the most vulnerable elements of the urban environment or urban social groups with specific needs (children, the elderly, the disabled). The most successful projects proved to be the results of broad partnerships and of well-integrated approaches, combining environmental achievements with economic benefits and favouring social integration and local democracy.

Tomorrow will be much less like yesterday.[12] At the turn of the century, the world seems to be in the middle of a hurricane of transformations. Geopolitical dynamics offer the opportunity for many more cities to become world players. Globalization may trigger a process of change which cannot be influenced by peripheral local communities but which can reshape them against their will. The re-

inforcement of the local social fabric through partnerships may well be the best way of meeting the new challenges emerging with globalization.[13] The interrelated social dimensions of sustainability and globalization also seem to be of primary importance to European cities, which are trying to manage change with more determination and understanding of both the competitive pressures and their social implications.

Innovation and sustainability share a desire for immortality, a quest for perfection. With advancing globalization, shifts in the economy could be swift and lethal for institutions which do not innovate. Sustainability demands adroitness in maximizing minimal environments, chances, and skills. Cities, as very complex systems, are, by definition, organizations where many new ideas, concepts, and products are created, but where the difficulties of implementation also abound. In European cities all forces emulating innovation try to focus on the future. The future, however, is shifting terrain. Should one concentrate on the immediate future and the next generation, or look further ahead? All approaches require vision and tactics, design of tools and methods, information and organization. They need cooperation and concerted action. There has never been a technical invention or gadget capable of changing the face of civilization to the extent that people uniting to enhance their opportunities have done.

Change is inevitable, but the challenge is how best to manage that change to ensure a beneficial outcome. Cities must harness the power of new technologies to explore their ''truly endless frontiers''[14] and optimize their condensed knowledge.[15] Very often, established administrative and financial structures constrain the potential of innovations. Discrimination is another major prohibitive factor. Nobody holds the monopoly on innovation. It can come from every individual or collective actor, but it usually needs many more actors to lead it to success. Much depends on the maturity and the cohesion of the community, the quality and commitment of human resources, and political will. A division of labour is not always clear or pre-established. If anything is clear, however, it is that governments, at all levels, are becoming enablers much more than providers, but, equally, are initiators and stimulators of innovation. By studying problems and options for solutions, they can provide the means for an innovation to address specific problems. They can offer criteria for choosing from a myriad of innovative options. The social partners can co-initiate innovations, make them grow, finance activities, stimulate other actors, and create a social climate of acceptance. All actors share the

responsibility of making a city able to extend the limits of the possible and build a better future.

Charting the way towards environmentally sustainable cities

Europe is a land of cornucopia and overconsumption. A European city of one million inhabitants consumes every day, on average, 11,500 tonnes of fossil fuels, 320,000 tonnes of water, and 2,000 tonnes of food.[16] Stabilizing consumption should be a major objective for cities which wish to resist the dictatorship of the present. The Charter of European Sustainable Cities and Towns recognizes that decreasing consumption levels in the greedy cities seems idealistic. The North, with 25 per cent of the world population and 75 per cent of resource consumption, has an ecological footprint (the biophysical capacity of land surfaces required to produce the resources necessary for cities and to absorb their waste) six times heavier than the South. If the South were to increase its consumption by 50 per cent, the North would have to decrease its consumption by 15 per cent, which would represent a drastic change in habits and patterns. But there is no other possible way towards a global eco-society.

Environmental plans and charters are being prepared by many European cities through strategic partnerships. More and more cities recognize the need for integration and proactive, rather than reactive, policies leading to the conception of new systems of production and consumption. The term ''Green City'' does not simply mean green spaces, grass roofs, timber-frame constructions, improved energy systems and water cycles.[17] A deep cultural reform is needed to underpin technical achievements. Implementing Local Agenda 21 is an important part of this goal. In Finland, the Lahti Environmental Forum, established in 1993, tries to bring together the different parts of society in order to promote sustainable development in the Lahti area. The commitment of all is a key concept. In France, environmental charters constitute contracts between the state and each city. The Charter of Mulhouse is a clear example of a strong will to improve the environment and public health through the integration of socio-economic objectives and citizen participation.[18]

Improving the environmental performance of cities requires new management instruments and tools. These include sustainability accounting and reporting, indicators, strategic environmental assessments, sustainability appraisals, and eco-auditing.[19] Environmental auditing in the public sector and especially among local authorities is

a recent but rapidly expanding phenomenon that has important implications. Cities and enterprises are embracing various methodologies of environmental auditing. The environmental balance sheet of Sundsvall with the accounts of stocks and flows of environmental resources, the monitoring and challenging of all urban activities in Igualada, and the richness of the components of environmental auditing in Kirklees offer a range of models and lessons at the vanguard of urban eco-auditing.[20]

Cities compete with each other to gain environmental credentials. It is a healthy battle when translated from words into deeds. Many cities declare themselves ''Green City'' or ''Sustainable City.'' Leicester was the first British city to be given the status of Environment City and is trying to become a national and international model of excellence. Leicester Environment City is assisted by the Business Sector Network to bring together ideas from the city's commercial sector and provide assistance to businesses, while Environ, a non-profit-making company, has been set up to provide local organizations with access to environmental audits and advice.[21] The city is also worth mentioning for other achievements, for instance, its achievement of solidarity through the harmonious coexistence of various ethnic groups. Indeed, sustainability means the integration of cities as places of culture and citizenship.

In Germany, environmental awareness has often been linked to socio-economic change, first and foremost in the cities which have been the scene of many socio-political transformations. Urban ecology in Berlin – often called the ''recycled city'' – is an important element for the ''renaissance'' under way in the city. The often derelict space adjoining the former wall became, once again, a central space for creation and innovation. In Kreuzberg, Block 103 is an interesting example, highlighting links between social well-being and environmental upgrading. Former squatters of the block have been given the opportunity to own the space they occupied and, at the same time, they have been trained to convert the houses into ecological modern buildings. Special emphasis has been placed on energy, water, green spaces, and new materials and techniques. Another complex has been the field of innovation for alternative water systems. The project emphasizes the learning and communication process and allows 50 per cent savings on water, while the residents' association participates in the technological monitoring.[22]

Progress towards sustainable energy consumption and production patterns can be crystallized if there is efficient and increasing use of

renewable energy resources (solar, wind, water, biomass), more environmentally sound fuels, and innovation in local energy provision, such as decentralized heat and sewerage plants. The mini-centre for the co-generation of electricity and heating in Milan tries to develop specific scientific and engineering knowledge in a local context and stimulate the interest of potential users.[23] The introduction of photovoltaic cells for combined production of electric and thermal energy is also gaining ground in Mediterranean cities. In the German Länder, energy-saving measures include the introduction of an ''energy pass'' to optimize the energy conditions of houses. Energy budgets highlight the large share of transport in energy consumption and indicate where improvements are necessary.

Concerning waste management, it has been suggested that the term be replaced with ''resource management.'' Reconsideration of the urban metabolism puts increasing emphasis on waste prevention before the waste is generated, even if investments still concentrate on the recycling end. Once generated, waste has to be considered as a resource. Everywhere, innovative actions are being taken for the prevention of industrial waste and the avoidance, reuse, and recycling of domestic waste. In Parma, plastic waste is being transformed into building materials and in Rimini, organic waste from hotels into agricultural compost. Each citizen contributing to the latter highly environmental process is rewarded with a plant. An eco-station has been created and its management has been entrusted to former drug addicts. The municipality of Oeiras, in the metropolitan area of Lisbon, set up a programme for backyard composting of organic waste aiming at dramatically reducing the amount of waste the municipal services collect, transport, process, and dispose of. It gives inhabitants the possibility of producing a high-quality fertilizer for their gardens and increases people's awareness of urban environmental problems.

All over Europe, cities are becoming laboratories of ecological innovation, with high experimental value. The Understenshöjden ecological village in Stockholm is a good example of improving urban metabolism, with ecological self-building and local participation with the design. Schwabach, a small, self-sufficient German city, offers an example of the efforts to implement an urban ecology planning strategy. The city has been selected by the Federal Ministry because of its unified, dynamic local government and its ecological achievements, especially in waste management. The basic principles are that nothing is impossible and everybody has to participate. The pilot

study aims to introduce ecological concepts and actions to a normal city, under normal conditions and with normal funds. After the study, the city council issued guidelines for action and translated them into a concrete programme in its 1993–2003 Model Urban Development Strategy, leading to Schwabach Ecological City.

Environmental problems in European metropolitan areas do not come just from production; they also come from consumption and from traffic.[24] Transport policies are being accused of leading to an unsustainable future.[25] Traffic congestion represents a loss of 3 per cent of GDP in the countries of the European Union, and traffic infrastructure covers 10–15 per cent of the urban space.[26] Mobility has long been regarded as a cardinal urban value, but ''mobility at any price'' can no longer serve the objectives of urban quality of life. Replacing the focus on accessibility seems a possible alternative. The distinction between access and mobility is not a trivial one. Unlike sheer mobility, access means not only getting people where they need to go, but also getting to them what they need, and new information technologies may play a major role in that process.[27] Traffic provisions are like arteries: they should facilitate the flow of vitality and not dominate the body of the city. The urban renaissance of spaces and functions is best illustrated by efforts to decrease unsustainable mobility, thus favouring public transport over the private car and giving priority to the pedestrian and the bicycle[28]

The private car is considered to be the single most destructive factor for cities. According to the European Commission, a ''car-free city'' could be composed of various small units, accessible on foot from one end to the other, separated by green spaces and united by high-speed public transport. The car-free city seems to be not only ecologically efficient, but also even economically efficient, as it appears to be two to five times less costly. In such a city, enterprise has new local challenges to meet, as job creation is essential for the self-sufficiency of each small urban unit. The city of Amsterdam, following the example of cities such as Bologna, conducted a referendum on the restriction of the private car and organized the conference ''Car-Free Cities?'' in 1994. On that occasion, the Car-Free Cities Club was launched by cities committed to promoting policies discouraging the use of private cars.[29] The European Foundation's study on transport and public spaces also highlights the passage from car-occupied spaces to citizen-occupied spaces.[30]

The human leg is the only sustainable means of transport. A pedestrian-friendly city is more human. Copenhagen has been a pio-

neer city in recognizing the social value of pedestrian streets. When the main street was pedestrianized in 1962, there was a heated discussion; however, it became a great success almost immediately. Pedestrianization continued over a period of 30 years and the downtown parking policy aimed to remove 2–3 per cent of the parking spaces per year. With the improvement of the public transport system and the enlargement of the bicycle network, more and more space has been taken away from traffic and given to people who started returning to the city centre, leaving behind anonymous peripheries and making it again the centre of gravity and attraction. Experiences abound throughout Europe and expand even in the periphery of cities (Oulu, in Finland, is extending its pedestrian zone, which is proving to be very successful, even in temperatures of −30 °C). Italian cities (Perugia, Bolzano, Spoleto, Rome) have been pioneers in creating pedestrian cultural environments. In Naples, places like the Piazza del Plebiscito are rediscovering their former splendour after the removal of private cars. And Venice remains the archetype of a car-free city.[31]

Cycling is the only other sustainable mode of transport, after walking. Is it an urban paradox that both walking and cycling have been more developed in northern, rather than in southern, cities, where climate allows more outdoor activities? Is culture stronger than nature and climatic conditions? Amsterdam is the European city with the most elaborate bicycle network, complementing the road and canal routes.[32] A pilot project in Delft indicates that up to 55 per cent of all urban trips may be done by bicycle.[33] In Copenhagen, Münster, Erlangen, and other cities, up to 35 per cent of all transport needs are satisfied by bicycle, while in cities of the former German Democratic Republic, such as Dessau, the use of the bicycle is falling. Cities such as Basle can be traversed and enjoyed by bicycle, while the cities of Zürich and La Rochelle lend bicycles free to citizens and visitors.

A single authority for public transport and private car parking could internalize more equitably the environmental costs of private motoring and improve public transport. In Evora, one of the World Heritage cities, the new traffic plan includes the creation of large car parks outside the city walls, a high-quality public transport system with mini- and microbuses, well adapted to the existing narrow medieval streets, and the creation of pedestrian streets and bicycle paths. In Orvieto, the alternative mobility system has been created out of the need to improve urban life and the will to revitalize the old

funicular railway. With the completion of the system, all cars will be parked in large car parks at the foot of the Orvieto hills, the funicular railway will take all passengers to the top of the hill, and a system of minibuses will take them around the city. This system will be completed with the creation of escalators through the rocky caves. The town of 10,000 people is expected to be less affected by the 2 million visitors it receives per year.[34]

In Germany, the concept of ''short distances'' is gaining ground in many cities. Heidelberg and Freiburg have been pioneers in introducing low-noise vehicles in noise protection districts and eco-tickets for public transport. Clean, silent, fast tramways are gaining acceptance in European cities. Nantes, Grenoble, and Strasbourg introduced from 1985 onwards three technological generations of tramway. In Valencia, the new tramway is called ''a tramway named Desire.'' Moreover, a combination of means is highlighted in many innovative projects. In La Rochelle, a new multi-optional concept (Autoplus) has been introduced through a partnership between municipalities, the semi-public company responsible for public transport, taxi owners, two private bus owners, one ship owner, hotel owners, and a bank. Campaigns have as their objective the limitation of the use of the private car. In Toulouse, the municipality, a semi-public enterprise for public transport and the community have created project for the readjustment of the transport services to people's needs.

Fast, clean, comfortable, flexible, easily accessible, and pleasant public transport is a precondition for persuading citizens to use fewer private cars. Examples at the leading edge include experiences from Swiss cities (Zürich, Basle, Berne) and German ones (Freiburg, Bremen, Aachen). Zürich is one of the few cities that have developed a coherent solution to the problem of traffic build-up at intersections. Preserving and upgrading the tram system and rearranging the bus lines were the key elements. The particularity of the system is its ability to deal with each public transport vehicle individually, allowing it to cross intersections without stopping. Deregulation progresses slowly in Europe and subsidies will continue to be needed in order to combat the attractiveness of the private car.

Advancing towards economically sustainable cities

Cities are engines and catalysts of economic growth. The global economy is becoming stronger with the strengthening of creative

interdependent city economies. The increased importance of urban economic activity in national and world production is a challenge for cities to improve their productivity. Improved macroeconomic management is a necessary, but not sufficient, condition to improving productivity at the city level. The productivity of the urban economy depends greatly on institutions and infrastructures. Deficiencies in info- and infrastructures, the heavy cost of inappropriate urban regulatory policies, and financial and technical weaknesses in municipal institutions are important constraints whose cumulative effects drain the potential for urban economic development. Strengthening the management of urban infrastructures, reinforcing the institutional capacity, improving the financial and technical capacity of municipal institutions, and creating an enabling policy environment for more productive urban economies are cardinal common priorities for cities.

With the progressive globalization of the economy and the advancing international division of labour, many European metropolitan cities are becoming control and command centres. Intelligence is the main asset and value, and cities are the places where the world's invisible production chains interlink. Cities are the only places where economic flows can be decoded, condensed, converted, and metabolized; the places where decision-makers and entrepreneurs and citizens congregate. Synergetic effects are much more important than accumulative ones. Competition can no longer be an impediment, it can become an incitement. A diversified urban economic basis is considered to be a must for entrepreneurial flexibility, irregularity, and fragmented demand. The role of enterprises in the shift from goods handling to information handling is essential. Large enterprises may lead to the ''edge city,''[35] but small and medium-sized enterprises (SMEs) have potential in revitalizing the city which does not accept its urban life being organized around megamalls. Partnerships are linked to a shift in public policies from direct interference to indirect (or conditional) policies (incubation and innovation).[36]

Cities of bits, technoburbs, and business parks are mushrooming throughout Europe and provide some interesting examples of public–private partnerships for turning areas of blight into healthy spaces and areas of positive environmental and economic profit.[37] Stockley Park, a former derelict rubbish tip within the green belt to the west of London, sets an inspiring example. A partnership between the developer, the local authority, and the university created an international business park and public parkland including recreational facilities. In exchange for the right to construct the business park over

36 hectares, the developer guaranteed the reclamation of the whole site (140 hectares), removal of groundwater pollution, environmental enhancement, and landscaping. At all stages of the construction of Stockley, local residents were involved in the process through extensive community consultation.

In the Ruhr valley, the IBA Emscher Park has initiated a new era for urban development and ecological renewal. Experts from ten European cities, together with the cities and industries of the Emscher region, work for the modernization of coal-mining settlements and the creation of new housing, the development of fallow land, and the promotion of attractive locations for industry and services. The preservation and reuse of industrial monuments, the landscaping of the Emscher area into a park, the ecological restructuring of the Emscher river, and the protection of the water environment are leading to a healthy space. New dwellings have been created on fallow land using environmentally friendly materials. High-quality locations for industry and services have been given value. Contaminated areas are insulated and reused. ''Working in the park'' is possible through the enhancement of the quality and attractiveness of the area.[38]

Economic regeneration aims at revitalizing the whole urban fabric, both its software and its hardware. The objectives of the programme to revitalize and regenerate Dublin city centre were to redevelop dilapidated areas, halt population decline, strengthen the area as a centre for business and services, and create a climate of confidence to stimulate and win back investment. In 1986, a survey revealed that out of 1,000 hectares, 66 were underused (derelict buildings, waste ground, and land used as car parks). For over 20 years there had been no new private developments on the quays. The Dublin City Development Plan was published in 1991, after six years of preparation and consideration of 21,000 representations and objections. It provided a framework, but the municipality had limited resources (and powers) to implement a programme of that magnitude. The scale of the programme required action by the government, which reacted with major initiatives, including the designation of assisted development areas, the establishment of the International Financial Services Centre in a derelict dock area, and the creation of the cultural quarter Temple Bar.[39]

The rehabilitation of the commercial and waterfront area of Galway also offers interesting lessons. As economic activities relocated to sites outside the city (or disappeared altogether) a central area was

left abandoned and dilapidated, being used for marginal activities (warehousing and open-air parking). The 1986 Urban Renewal Act designated this a priority assisted development area. Economic measures were introduced, promoting rehabilitation as well as new building. The major objective was that any new building should reflect Galway's unique character and atmosphere and promote a mixture of the functions considered essential for the vitality of the city centre. By the end of 1992, all the derelict space had been rehabilitated and a balance created between shops, services, offices, and dwellings. The construction of housing units (much more suited to Irish culture than apartments) on the terrace roof of the city's main shopping centre is a good example of mixed functions within one building.

The conversion of waterfront areas, seasides, and riversides is a major feature of several European cities. As a result of economic and technological reforms over the last few years, city-centre ports have disappeared, leaving behind the husk of an infrastructure in need of a new role. Disused dock buildings are being turned into exhibition halls, shops, craft workshops, and centres for cultural activities. The Salford Quays development on the Manchester Ship Canal came about through the will to turn derelict space into the ultimate leisure area, respecting the environment and promoting culture. In Turku, the metamorphosis of an old industry and harbour area into a new arts centre is an inspiring example. The conversion of the old harbour area in Gothenburg into a mixed-use city, after the closing down of shipyards, transformed the abandoned area of four square kilometres into a multifunctional city through a multi-partnership between the city authorities, the architects, the former shipbuilding companies, and the public. Formerly industrial buildings were given new, intelligent functions.[40]

Innovations towards the socially sustainable city

Cities are becoming increasingly fragmented, a far cry from the European urban archetype or the great urban utopias. The ''Balkanization'' of the urban fabric – cities torn to pieces – and the cumulative spiral leading to poverty and distress are becoming obstacles to the creation and distribution of urban wealth. Unequal distribution has draining effects on the vitality of urban activities and is a source of both unsustainable lifestyles and obstacles to cultural change.[41] European cities that are showcases of financial power will never become sus-

tainable if they hide social micro-jungles. This is not just the ransom to be paid for success, it is an obstacle to success. Urban renaissance must regenerate all these micro-jungles, their spatial webs and their social fabric. The social city, ''the city of solidarity and citizenship,'' cannot be perceived without equity, otherwise it will be the poly-segmented city (Moss) or the city of forced solidarity (Durkheim). Social justice is a precondition for sustainable wealth. Harvey reminds us that there is nothing more unequal than the equal treatment of unequals.[42]

The spirals of unemployment and exclusion constitute severe problems for cities, threatening to create dual cities.[43] In the 1990s, the European Union has stepped up the pace of its action for the disadvantaged and the excluded. In this vast and vague category, one should include the more than 52 million people (15 per cent of the European Union's population) estimated to live below the poverty line, the 18 million unemployed, and the more than 3 million homeless. Identifying sources of employment in cities is not an easy task. The need is pressing and the achievements not always promising. The European Commission's report on local development and employment initiatives identified urban fields as potential sources for job creation.[44] Services improving everyday life and the quality of the environment, as well as services of leisure and tourism, have an important potential for employment and enterprise creation. Most schemes include training, enhancing the ability for reconversion, professional guidance and orientation.

The improvement of housing environments, the living cells of a city, leads to the coherence of the urban fabric. Mass housing has often created social tensions on the urban fringe. It has often been paternalistic, large, remote, uniform, collective, anonymous, and devoid of management, and it has failed. In many European cities, housing is now beginning to be self-regulated, local, personal, individualized, and proactive, with corporate neighbourhood space and responsive local management. It has to provide proof of vitality of work and enterprise and to allow personal identity. Vibrant local communities are replacing empty or lifeless neighbourhoods. A new human face is judged necessary in most of those built quickly and cheaply after the war as if to house interchangeable people. The Mascagni development in Reggio Emilia shows how a multifunctional urban space can be created from a rigid series of anonymous buildings, a functional marriage between old and new, with integrated public services and schemes to create local business.[45]

In Finland, the Top Toijla project tried to activate and strengthen tenants' potential and engagement for the improvement of the Rautala housing area. Ambitious renewal has been achieved with a modest budget. A ''community theatre'' has been created to identify and solve problems and nourish visions and actions. In Sweden, the Athena Housing Project in Örebro creates high-quality housing environments. The project group, consisting only of women for the design, building, and ownership of the housing, insists on the role of participation in order to make changes inexpensive. The renewal of the Holly Street Estate in East London provides an interesting example of the transition from derelict, high-rise environments into vibrant mixed neighbourhoods. In Vienna, the Urban Gürtel Plus project aims at improving living and income conditions in the western Gürtel area, where 34 per cent of the population are foreigners. The revitalization of the local economic structures and the creation of 400 new jobs are considered a necessity.[46]

Protecting people and urban spaces is a precondition if cities are to thrive. An innovative integrated approach to fighting graffiti in public spaces has been developed in Maastricht. The project includes extra means to trace offenders, education programmes to improve and re-direct the skills of the graffiti ''artists,'' and an anti-graffiti bus with formerly unemployed people specialized in removing graffiti. The city made a wall available to all citizens wishing to express themselves by means of graffiti. Within two years the damage caused by graffiti pollution decreased considerably (by 80–90 per cent, at the railway station). The results of prevention are always hard to prove, but it is clear that graffiti have decreased considerably in Maastricht. Tracing and conditional or alternative punishment have a noticeable effect on preventing recidivism, while there are former offenders who, after their artistic training, have become famous artists.[47] The project is now expanding in the region.

Planning for a European urban eco-society

Braudel called cities the ''greenhouses of civilization,'' and Levi-Strauss, ''objects of nature and subjects of culture.'' They have unique aesthetics, character, and culture. The notion ''Euro-aesthetics'' does not exist but might be considered. EFILWC's study on aesthetics and the functionality and desirability of the sustainable city shows a number of ways to understand a city's soul, to appreciate the desires of its citizens, to listen to its heartbeat. The study suggests itineraries

that can be metronomes of desire in various cities. From Fornovo di Taro to Poundbury, there is a common quest for urban beauty, the ultimate antidepressant. Long rejected as a sign of frivolity and élitism, concern for the beauty of cities, made up of asymmetries, paradoxes, and contradictions, is returning to the urban stage.[48]

The city is ultimately complex; to intervene in its operation requires an understanding of complexity. It is composed of relationships and conflicts, convergences and divergences, myths and legends, with not additive but synergetic results.[49] Creating the quintessential City Urbane demands both science and art. The art of creating the sustainable city can only produce prototypes. Design involves responsibility for the appearance of a city. It needs strong leaders and enlightened private developers. It should take into consideration efficiency, flexibility, and imagination and deal with land management, building masses, preservation, and enhancement of core urban elements and citizens. Planning should enhance continuity and change, reveal the potential of a city's physical and cultural assets and portray humanistic values. Functional coherence should be achieved through various land uses to make a city more efficient and enhance its aesthetic quality. Landmark projects could become a ferment for the whole urban fabric.

''Building Eutopia''[50] is a sustainable planning aim; it now embraces the notion of eco-Eutopia. There is a growing consensus about the need for urban mix,[51] reflecting a need for ''a little of a city everywhere in the city.'' The preference for the compact city, as a contrast to the diffuse city, is gaining ground. The dense, compact city has the advantage of integrating structures and providing shorter distances between home and work or leisure. But the compact city might not necessarily be energy-efficient and may not correspond to lifestyle preferences either. Owens suggests that a sustainable urban form on a regional scale would contain many relatively small settlements, some clustered to form larger settlements of 200,000 and more people on the subregional scale. It would consist of compact settlements, probably linear or rectangular in form, where people could both live and work. The interrelated questions of density and compactness have quite interesting contributions to make to reconstruction and sustainability. Reconstruction schemes, more than the Second World War, have destroyed cities. ''High density'' should be distinguished from ''high rise.'' Correa suggests ''high density low rise'' as an ideal option.[52]

Preservation versus new development is a Janus-faced dilemma.

Most cities give the answer: renewal rather than expansion, consolidation of the urban fabric, and improvement of the suburbs. The ''soft urban renewal'' in Vienna includes block improvement schemes, enhancement of public spaces, and ecological measures. The social criteria insist on avoiding segregation or gentrification. Soft renewal allows inhabitants to remain in place and enjoy a range of resident-friendly measures.[53] In Barcelona, the rehabilitation of the Ciutat Vella, comprising four quarters in the historic centre, is an unprecedented and unique event, in terms of dimension, timing, and civic spirit. Following the reconciliation of the city with the sea and the creation of the Villa Olimpica, the whole urban fabric is changing, with the gradual injection of improvements. Selective renovation, rehabilitation, construction, pedestrianization, and greening are the visible elements. Civic centres have been created and have become points of multiple encounters and cultural reference. Strong neighbourhood groups have become partners with the authorities and have played a pioneering role in the attribution of new housing and services, the dismantling of unsound activities, and the whole change of social climate.[54]

Cities open to the future cannot be conceived without the regeneration of the suburban areas, the places where one does not know if one is ''in'' or ''out.''[55] This entails recreating the economic diversification, the social heterogeneity and cultural diversity in the periphery. In the south of Stockholm, the Huddinge Centrum is a successful experiment in transforming a suburban shopping centre into a town square, focal point, and meeting point for the community. The location, next to the train station, generated the creation of new offices and apartment units and the whole area has been redesigned on the model of the old medieval city of Stockholm. The Donau-City project in Vienna aims to create a new skyline to the north-east, across the River Danube, and a new mixed-use waterside quarter.

Public spaces belong, by definition, equally to everyone. What Koolhas describes as fortresses of freedom[56] have great potential as islands of urbanity in the archipelago of the city.[57] Public space is not just the space ''left'' after construction; it should be given major importance as a civic space and shaped as a priority. The unification of the archaeological spaces in Athens and their functional and aesthetic links to green spaces is expected to create a high-value public space. Inviting public spaces may foster democracy. In many cases, ''standardized'' public space cannot meet its challenges of space for ''nego-

tiating'' democracy, and becomes space of confrontation and of exclusion. Setting up qualitative recommendations for the functional, environmental, cultural, and aesthetic character of the spaces, roads, and pavements, roadside plantations and public lighting is very important in forging cultural identity. In Brussels, the *Manual of Public Spaces* is a good example.[58]

Along with urban planning, structural projects contribute to shaping the image of cities, provide landmarks, and symbolize their dynamic forces. Often, these structural projects are linked to particular events that act as catalysts for the future restructuring of the cities and the regions (EXPOs, Olympic Games, etc.). Other projects, such as ''Seine Sud-Est,'' result from a determined, well-planned effort to re-equilibrate the urban fabric. In order to meet their objectives, the projects must synchronize their long-term potentials for continuity and flexibility. Flexibility is imperative for adapting the project to market fluctuations, while continuity is linked to a vision for the future of the infrastructures. In the most closely studied projects, the trend is towards guaranteeing an optional multiplicity of land use and a good spatial, functional, and economic integration in order to enhance the vitality and livelihood of the whole area. Stable financial structures for the long-term implementation of major projects are of the highest importance, while the cost of land and infrastructures is a key issue for economic equilibrium. Consultation and partnership become important on several levels, vertically and horizontally. The success of the projects greatly depends on a constant and affirmed political determination, withstanding changes in elected representation.[59]

Eco-citizenship and solidarity in the city of tomorrow

Citizenship means participation. It must be dynamic, forward-looking, and interdependent. It is a precondition for the construction of the political identity of the European Union. There is a unanimously recognized trend: city dwellers are increasingly invited to act as partners rather than protesters.[60] Very different projects, ranging from the improvement of exceptional vernacular architecture, for example in Otranto and Bari, to the layout of the new metro routes in Valencia, have been crowned with success thanks to the active participation of residents. Efforts to create resident-friendly and environment-friendly cities expand. The passage from ego-citizens to eco-citizens

will certainly need a lot of mobilization, education, and culture. But major decisions concerning the future of cities are no longer taken without the search for a well-defined civil consensus.

Decision-makers should become change-makers. Decentralization, empowerment, and devolution are preconditions for meeting the challenges of change. A non-participatory community is inherently unsustainable and citizens' participation is a common denominator for projects initiating the new era. Citizens with conflicting interests come together to prepare environmental laws and charters. In Barcelona, hundreds of associations participated in the preparation of the economic and social strategic plan. In Brussels, the consultation procedures for planning introduced new participation concepts. In Reggio Emilia, citizens participate in the compiling of the city budget. Cities like Evora, Siena, or Galway have hundreds of citizens' associations committed to cultural activities or voluntary action.[61] In Dunkerque, neighbourhood committees with young people from the age of 12 have proved to be promising for the future of the city.

Civil society, including women's associations, NGOs, and universities, has great energy to invest in urban renewal. Scenario workshops try to bring together different local groups, that are traditionally opposed, on ''neutral ground'' and on ''equal terms,'' to formulate consensus on a vision of a sustainable city. Action planning schemes introduced in the United Kingdom, but also in Eastern Europe, involve the organization of carefully structured collaborative events in which all local stakeholders participate. Urban regeneration is not about places but about people, and these kinds of event proved to unlock individuals' creativity, to articulate collectively a sense of vision, and to create a momentum, a thrust for the future. Among them, the action planning weekends from London to Moscow nourished visions for places ranging from redundant railway lands to docklands.

The ''charette'' method – which demonstrates the public ''pulling together'' – inspires and teaches. In the resort town of Saltsjöbaden, in Sweden, a proposal for a new modern hotel has been the cause of strong public reaction. Citizens decided to put forward alternative plans respecting the town's historic and cultural character. Public hearings were organized, exhibitions and alternative evaluation reports were presented, and all the actors sat down together to arrive at a new, pragmatic vision for the whole area. The committee, formed by all interested parties, put together a plan for a multifunctional leisure and living area, with respect for tradition.[62]

Promoting art and culture in cities is a joyful and purposeful means of participation and cooperation. From the Kemi snow castle to the Phaliron art project, actions highlight a festive presence, a panegyric iconography. Forms that evoke memory and stimulate imagery will always foster local communities.[63] A festival for the return of the citizen to the city was suggested by UNESCO in its preparatory work for Habitat II. Helsinki's light festival or Rochefort's ''Nuits du patrimoine'' contribute to the rediscovering and the reappreciation of nature and culture.[64]

Urban democracy, representative and direct, is a key element of the existence of cities and their capacity for sustainability. Cities have promoted open democracies since the age of Pericles. But democracy may be fragile. It needs an constant reaffirmation of civic values, an ongoing reinforcement of the civic bond. It has to precede any gestation of visions and plans and touch the heartbeat of the city. Citizens should be transformed from mere users and consumers into city actors and should rise to the new challenges of urban governance.[7] Cities must endow themselves with strengthening civic action in local communities. The Finglas enlivenment project embodies a strong community planning approach which creates self-reliance.[65] Among the various developments in Europe it is worth highlighting a symbolic one: the recent opening of an Embassy of Local Democracy in Sarajevo.

The art of co-governing cities with all actors – institutions, civil society, and the voluntary sector – is confronting new challenges. Institutional innovations are needed to provide fertile ground for improvements and creativity. Future citizens have to be given high priority. The ''Cities in Schools'' project in the United Kingdom addresses the multiple needs of persistent truants and underachievers.[66] The ''Children as Urban Planners'' project in Kitee aims at educating active citizens in environmental awareness and responsibility for their built and natural environment. Nine hundred schoolchildren studied the urban history of Helsinki and then redesigned Helsinki city centre.[67] Hundreds of cities are establishing municipal councils of children. Cities are generating new identities. New visions are emerging, with a human face for the urban environment.[68]

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5

Sustainable urban societies: A technological or a political goal?

Edward Newman

Power politics or legitimate politics?

The challenges and problems that urban communities face are well known, often through bitter experience. The Declaration of the United Nations Habitat Agenda stated (chapter 1, paragraph 8):

> The most serious problems confronting cities and towns and their inhabitants include inadequate financial resources, lack of employment opportunities, spreading homelessness and expansion of squatter settlements, increased poverty and a widening gap between rich and poor, growing insecurity and rising crime rates, inadequate and deteriorating building stock, services and infrastructure, lack of health and educational facilities, improper land use, insecure land tenure, rising traffic congestion, increasing pollution, lack of green spaces, inadequate water supply and sanitation, uncoordinated urban development and an increasing vulnerability to disaster.

Projected trends for population increase in general and urban population in particular point to an escalation of these problems.

The goal of ''sustainable eco-societies'' is to manage, reduce, or reverse some of the worst problems manifested in burgeoning urban communities, which are – although to various degrees – shared amongst city dwellers across the world. That goal is simple: to make

cities safe and pleasant places in which to work, live, and raise children, without undermining the ability of future generations to do likewise. The modalities of achieving this goal are also widely acknowledged: there is a pressing need to minimize the environmental burdens wrought by large cities, to reduce pollution to air and water, to minimize household and industrial waste, to manage water systems efficiently, to maintain pleasant natural areas of recreation, to develop transportation systems which are efficient and socially equitable, to plan housing around human needs, and to prioritize human health and welfare in urban governance. The methods most appropriate to accomplishing these goals are not so simple, however. The various thrusts of solutions – market-based, technological, and communitarian approaches, for example – present a variety of approaches which are sometimes complementary and sometimes in competition. Indeed, at the heart of urban governance – including environmental issues – lies a discourse on the role of government, the tension between intervention and the market, the nature of production and consumption practices, the role of political leadership, the rights of the individual and corporate actors, the needs of society, and – perhaps ultimately – human nature. The urban environment is not apolitical; it involves a conflict of interests, compromises among disparate groups, priorities in public policy and allocation of resources, and the thesis of the ''greater good.'' This political space sometimes involves winners and losers. The basis of urban governance is partnership between actors which have diverse activities and interests. Yet many partnerships are conditioned by power and authority, and reflect a trade-off or compromise. Cities are, by their nature, concentrations of power and wealth, and this fact underpins the political reality.

However, whilst the path to sustainable eco-societies is inevitably political, it need not be purely *power*-political, where governance is a reflection of zero-sum contests in which the narrow interests of groups which have a structural monopoly upon power prevail. The only way for the environment and the parties most vulnerable to the problems of the urban environment – the citizens, and in particular the poorer communities – to have credible leverage in the political trade-off is for urban governance to be conducted on the basis of *legitimate* politics and equitable partnerships. Legitimate politics involves a wider input into governance and public policy, broad-based and local problem-solving, and it embraces the values of accountability, representation, consultation, redress, and transparency.[1] Ul-

timately, it results in the empowerment of those most affected by the quality of the urban environment: a civic, inclusive democracy, involving non-zero-sum – ''win-win'' – compromises wherever possible. Urban environmental management is therefore inescapably linked to wider issues of governance and to the changing attitudes towards authority occurring at all levels.[2]

It is possible to depoliticize this agenda to some extent. By emphasizing improvements in the generation, use, and conservation of energy, in waste disposal, and in the control of solid and atmospheric pollution, a technological approach to the urban environment can be focused upon. Many of these issues are addressed by adjustments in business practices, recycling initiatives, and local government ordinances, and are managed without causing stand-offs. Technological innovations offer solutions to many problems, and these are embedded in the market. Innovative lifestyle changes are similarly becoming popular.[3] The ''common-sense'' reasoning minimizes the political implications: it is in the interests of every group within urban societies to make their environment as safe and pleasant as possible, for themselves and for their future generations. Usually, the logic and necessity, and the shared benefits, of this ethos outweigh the costs attached to environmental management on the part of the urban actors. Burden-sharing partnerships and initiatives are thus developed and cover a wide range of urban environmental issues. However, the solution is not always so easy. In particular, when the issues are more sensitive, when the costs and burdens inherent in solutions are greater, the stakes are greater, compromises are more elusive, and the partnership principle will become strained.

In the case of cities in Japan – in common with cities worldwide – the structural political complexion is weighted in favour of certain groups more than others, and economic interests have clearly been privileged at the cost of the environment. The evolution of this political structure, and most notably the increasing emphasis upon transparency and civil society, is at the heart of changing attitudes and approaches to the urban environment across the world. However, waste production, pollution, and burdens upon natural resources are still considered to be secondary issues which must be managed as a form of ''damage limitation.'' If current trends continue, however, greater sacrifices will be necessary on the part of certain groups, and a more interventionist stance on the part of government may become unavoidable. The modalities of legitimate politics will be stretched to the limit. In fact, if the governance of the urban environment is to

create truly sustainable societies, we must recognize that it may be difficult to satisfy every party in the short term. And long-term thinking does not always come naturally. The tension, or dialectic, between the ideal of sustainability and the reality of mass production, mass consumption, and mass disposal may not be fully resolved by legitimate politics, but there is no alternative.

Political approaches

There are some harsh realities to be faced. The sources of many urban environmental problems – which in turn contribute to global environmental degradation – are ingrained in human society as the lifeblood of development, modernity, and freedom.[4] There is a fundamental dialectic which is yet to be settled. Maximum economic growth, production, and consumption are the root causes of many urban environmental problems, such as air pollution, solid waste, declining natural resources, yet are central to the pervading political ethos of the market, democracy, and progress. It is nowhere more evident than in Japan that livelihoods, employment, prosperity, and recreation are dependent upon these basic assumptions and the practices which stem therefrom. The prominence of materialism in our lives, and the global triumph of the free market over communism, have bolstered these assumptions. In the late 1990s the tension between the environmental agenda and political/economic structures has become particularly pronounced in Japan. In the context of recessionary pressures in Japan and economic instability throughout east Asia, there was enormous pressure upon the government to "kick-start" the economy in order to stimulate the domestic and regional economic environment. This has involved tax cuts and a range of measures designed to promote consumption. Thus Japanese politicians accept the need to prioritize the reinvigoration of the economy, and give commitments to a range of environmental issues, without identifying the tension between these two imperatives or offering an explanation as to how the two may be reconciled.

The main approaches to urban environmental management also reflect a political discourse with clear policy implications for urban governance. Political thinking may be roughly categorized around three loose viewpoints. First, according to radical green thought, nothing short of a reassessment of fundamental social premises, com-

bined with structural change in the way national economies operate, can hope to result in genuine improvements in urban environments. This entails a variety of government interventions involving positive and negative sanctions aimed at constraining certain consumer and business practices and empowering citizens to have greater input into the public decisions affecting their communities. This approach explicitly or implicitly rejects the mainstream liberal approach as inadequate, arguing that public consciousness and mainstream representative politics cannot alone overcome systemic or structural resistance to change. The urban environment is inseparable from socio-economic conditions – in fact, social justice – and only a readjustment of the norms and structures of society can bring meaningful redress. Ultimately, this means a shift to a low-energy, low-consumption, low-growth economy. Anything short of this is argued to be mere ''damage limitation'' aimed at appeasing domestic and international interest in the green agenda, or a ploy devised by élites to pre-empt significant change. Clearly, the radical approach strikes at the heart of the prevailing political and economic bases which lie behind most political communities.

Second, at the opposite extreme, the libertarian approach would oppose any intervention, arguing that the various actors will devise certain standards and rules – the result of interest bargaining in the context of the free market – in the interests of urban governance and the environment.

Finally, the mainstream liberal approach, which underpins many national and international initiatives on the urban environment, is that economic growth, freedom, production, and consumption *can* and *must* be reconciled with the concepts of environmental sustainability, human welfare, and aesthetics in urban communities. That is, the adverse consequences of urban dwelling can be managed and minimized. This belief is based upon a combination of ''top-down'' interventions in the form of positive and negative sanctions, voluntary initiatives on the part of citizens and private interests, and partnerships among the various actors which cohabit the urban political space. In particular, collaboration within the triangle of government, civil society, and business is seen as offering the most viable solutions. Notably, the mainstream approach believes that the market is basically neutral and can be harnessed in favour of the environment, in contrast to the radical view that the market is unavoidably the enemy of sustainability. The mainstream approach is the basis of ''equitable

and sustainable human settlements,'' promoted by the UN Habitat Agenda.[5]

Urban actors in Japan: The basis of partnership

The development of policies and initiatives relating to the urban environment in Japan provides a useful demonstration of the interplay between technological and political forces, and the vying agendas of the various actors. A number of characteristics and forces are apparent, and common – to various degrees – to cities around the world: the balance between ''top-down'' and ''bottom-up'' initiatives, the growing role of civil society, the dynamics which lie behind the various partnerships, and the friction that sometimes results from vying approaches and interests. Japan is an example of the difficulties of environmental management in a political context where economic growth, production and consumption have for long been considered as both an individual right – especially after past hardships – and inseparable from the national interest. Indeed, a culture of materialism, mass production, and mass consumption – and commensurate mass disposal – continues to be a part of Japanese lifestyles. Yet, through a combination of ''top-down'' legislative ordinances and ''bottom-up'' voluntary civic and business initiatives, a great deal of progress is being made in Japan's urban environments. Various actors are pushing the urban environment onto the agenda. Initiatives and policies cover many environmental issue areas as a result of bargaining between interest groups and the rising consciousness of the public. The drive towards accountability and transparency in governance and business in Japan is also legitimizing the politics of the urban environment. Citizens' groups are given greater opportunities for redress and for having an input into urban governance, increasing the networks of genuine partnerships. More businesses and business associations are voluntarily observing standards in the interests of the environment and forging partnerships with local government and ministries in order to develop environmentally sound production practices and more efficient recycling processes. Naturally, markets are both responding to and stimulating the growing demand amongst consumers for a greater availability of environmentally sound products. Japanese local government, such as the Tokyo Metropolitan Government, has been proactive in channelling and guiding public consciousness and partnerships between the private sector, government, and citizens' groups.

Before looking closely at these trends, it is worth identifying the various actors which cohabit the Japanese urban space. These actors are similar, to various degrees of influence, to those in cities around the world.

National government

Japan's comparative advantages would appear to be well suited to the management of eco-societies; in particular, its technical expertise and a development strategy which has adapted in response to, and in anticipation of, necessity.[6] Furthermore, despite the economic downturn which Japan has suffered, in absolute and relative terms the Japanese economy is healthy enough to make the long-term decisions, experimentation, and improvisation necessary to take a leadership role in this area. Some have also argued that Japan's culture is conducive to sustainable lifestyles. However, potential leadership is not always transformed into real leadership at the national level. The political landscape of Japan is such that progressive and internationalist policies have to overcome structural obstacles: powerful industrial, bureaucratic, and therefore political forces exist at the heart of the policy-making process. The absence of transparency and the diffusion of power in this structure obscure the reality from the public. This political complexion has been central to Japan's momentous economic growth,[7] but it is not readily conducive to consistent, forthright, and creative leadership in the interests of the environment and consumers. In much of the literature on Japan the power of the bureaucracies, the rivalry between individual ministries, the triangular relationship between the bureaucracy, the ruling Liberal Democratic Party, and big business, and political factionalism are criticized for entrenching a conservative aggregation of special interests and a lack of coherence in political leadership.[8] Because power is diffused over a number of organs and interest groups, with no single point of ultimate authority, consensus politics involves a process of satisfying every party, but in particular the parties with the greatest political weight. An extreme view holds that Japanese politics therefore reflects a bureaucratic process masked by pork-barrelling party politics rather than a political competition between elected politicians with vying political agendas. In historical terms there is a legacy of an aristocratic Confucian tradition combined with a Meiji emphasis upon bureaucratic government and respect for public authority. Representation and accountability have arguably been weaker prin-

ciples. In this context, remarkable economic growth and construction were arguably prioritized over the environment. In particular, it is widely believed that collusion between government (both national and local), ministries, and big business resulted in enormous infrastructural development which was more a reflection of these political relationships than a service to the public.

However, the political system is clearly changing. There is a growing emphasis upon transparency and accountability, and upon serving consumers as well as political élites. In this context, national government in Japan has been fairly active in environmental issues both domestically and internationally. In practice the government has been undertaking a number of initiatives, independently and in cooperation with other actors, in recent years. The government is responsible for general welfare, safety and legal standards which apply nationally, allocating resources for certain projects, and coordinating Japan's environmental agenda with international initiatives. Japan's government alone can enter into international legal environmental obligations, a circumstance which commits the government to concentrate its efforts in cities, because urban areas are the key determinants in global as well as local environmental issues. Given the other priorities of the government, such as maintaining employment, economic stability, and balance of payments health, this puts the government at the centre of the tension between the environmental agenda and other national interests. The government is also, theoretically, chief arbiter amongst the various actors engaged in urban governance. The approach of government has involved channelling and adjusting legislation – such as the Home Appliance Law, the Container and Packaging Recycling Law – which has often been formulated by ministries. National promotions have also been important, such as the transformation from a ''throw-away society'' to a ''recycling society'' as a part of the Container and Packaging Recycling Law.

Bureaucracy

Governmental ministries may appear to belong to ''national government,'' yet it is important to delineate the different power centres that ''national government'' denotes. The agendas of ministries have not always been identical, for the ministries reflect particular interest groups which hold differing attitudes towards urban governance.

The main public institutions which have bearing in Japan are: the Environment Agency, the Ministry of International Trade and Industry, the Ministry of Finance, the Health and Welfare Ministry, the Transport Ministry, the Ministry of Construction, and the Ministry of Agriculture, Forestry, and Fisheries. Most of these ministries have environmental committees or subcommittees, such as the Global Environmental Problems Subcommittee of the Transport Ministry, which are dedicating a lot of energy to the improvement of urban environmental standards, even though they have differing priorities and approaches. The ministries tend to have an organic link to their respective constituencies in the private sector. This has been criticized as a challenge to transparency and accountability, yet it has proved to be essential for the ministries' collaboration with big business interests in developing major environmental initiatives.

Local government

Local government is closely involved in urban environmental issues as the central actor in urban governance.[9] Local government has the task of balancing environmental issues in the context of other pressures upon urban politics; budgetary health, electoral pressure, the need for an adequate transportation system, health and welfare, social problems, and interest-group lobbying all compete for time and resources. In practice, local government has also been an important actor in representing, and to some extent empowering, public concerns over the environment. It has channelled environmental interest into initiatives and collaborative projects involving a variety of actors. This has involved planning and coordinating projects, and sometimes regulating the activities of other actors and mediating between different and sometimes competing interests. Difficult and controversial decisions are unavoidable. The Tokyo Metropolitan Government has been exploring the best combination of ''top-down'' enforced legislature and ''bottom-up'' initiatives and voluntary regulation on the part of citizens and commercial actors. In this, local government has to confront the most sensitive issues in this policy area: the utility of intervention in the governance of urban environmental issues, priorities in resource allocation, and the mix of interests which must be balanced and satisfied. A number of instruments are employed: positive and negative tax sanctions/incentives, subsidies, financial penalties, enforceable ordinances, planning laws, publicity campaigns to

encourage and facilitate community-based approaches, and promoting and facilitating urban networks and partnerships around environmental issues. The approach of local governments has tended to be a balance between ''stick'' and ''carrot,'' but with the emphasis increasingly upon the latter.

The focus upon local government has become increasingly important for a number of reasons. Public awareness of environmental issues has increased. Moreover, there have been changes in practices in, and attitudes towards, governance across the world. Pressures for greater representation and transparency, deregulation, decentralization, privatization, good governance, changing leadership expectations, the blurring distinction between ''public'' and ''private,'' have influenced attitudes and expectations towards government at all levels. Simultaneously, local and national (and perhaps even international) governance have been conditioned by pressure to improve performance and cost-efficiency, coupled with greater workloads: thus, the need to ''do more, with less.'' All of these trends point to increasing decentralization and thus the increasing relevance of local government in cooperation with other urban actors, in the interests of efficiency and good governance. This logic appears to have been embraced by the Tokyo Metropolitan Government in a number of partnership initiatives, with the result that there is a greater input into public policy at the grassroots and entrepreneurial levels. There is little point in issuing an ordinance governing the recycling of plastic bottles, for example, without the full involvement of the parties whose participation is essential for the success of the policy, or without the awareness amongst the public that recycling is an important civic duty. We should not, however, paint too rosy a picture. Despite the winds of change in local and national government in Japan, certain actors clearly have more influence upon local government than others, and transparency and accountability are values that the public continue to fight for. This wider movement is inseparable from the environmental debate, and in particular the movement for environmental transparency, redress, and consultation.

International agencies and networks

International agencies and networks include international intergovernmental organizations, non-governmental organizations, and networks between citizens' groups, governments, local authorities,

and scientific and academic communities. They are increasingly prominent in local, national, and international environmental issues. In terms of urban environmental governance, there is a functional logic to this increased relevance: many of the challenges faced in cities are shared throughout the world, and the sharing of experiences, policies, initiatives, and resources can yield real results. The emphasis is upon ties between local authorities and non-governmental groups, rather than governments, in order to promote interaction between groups and people who are actively involved in urban environmental issues. In terms of international organizations the United Nations Conference on Human Settlements in Istanbul, 1996 (Habitat II), established a process of collaboration. The World Bank's ''Liveable Cities for the 21st Century'' project is a further example.

Business

Commercial businesses are obviously central actors in the urban environment, as the engine of production and economic growth. Their production and disposal practices are directly linked to the quality of air and water, the availability of environmentally sound products, and the feasibility of urban recycling systems. Many businesses have been shifting their practices towards the environmental agenda for some time, in response to market demands and official requests, and in some cases in anticipation of, and in compliance with, legislation. Clearly, the overriding motivation for commercial activity is profit. It is not always in the interests of companies to extend the life-span of their products, to make their products easier to repair, for example. Business is instinctively averse to constraints which hamper productivity, competitiveness, and the free run of the market. The increase in foreign competition that has accompanied deregulation and liberalization in Japan has sharpened this instinct. Nevertheless, great progress has been made in gaining the cooperation of business in terms of voluntary restraints and in participating in local authority projects for reuse and recycling, and in developing new products such as the hybrid car.[10] Japanese manufacturers are establishing their own reclamation and recycling facilities, in a type of innovation which only the private sector can efficiently achieve. A number of commercial consultancies has also appeared in Japan, to meet the need for ''green marketing'' and green production techniques.

Whilst the emphasis has been upon voluntary partnerships between

business, local government, and consumers, there has also been the necessity for legislation and sanctions. Urban policy must try get the market working in favour of the environment – and this is essential if progress is to be made – but we cannot leave everything to the market. Tax breaks and subsidies to encourage certain practices, and penalties and legislation to discourage others, are essential, and so is enforceable legislation. This has been the most troublesome aspect; generally, business has not welcomed legislation, preferring the voluntary path, yet the voluntary path has not always proved adequate. Indeed, some would argue that the voluntary path reflects an attempt to pre-empt more stringent obligatory standards.

Business associations

Business associations are barely distinct from businesses, yet they have proved to be significant points of contact in forging urban partnerships and in promoting the use of environmentally sound business activities and the production of eco-products. The Japan Federation of Economic Organizations (Keidanren) embraces all of the major industrial associations and represents enormous business influence. Their cooperation has in many cases been essential for environmental initiatives. Of course, such associations have also been a focal point of commercial opposition and resistance to certain environmental standards, and especially to legislation and local ordinances. But generally there has been a great deal of positive activity on the part of industry. In 1991, in the context of its ''Global Environmental Charter,'' Keidanren observed that ''grappling with environmental problems is essential to corporate existence and activities.'' The organization launched a collaborative private-sector exercise to encourage environmental standards across the commercial spectrum: an ''appeal on the environment.'' The outcome was the 1997 ''Keidanren Voluntary Action Plan on the Environment,'' reflecting the participation of 29 industries represented by 131 organizations (see below). Clearly there must be discussion on the methodologies and even motivations which lie behind the voluntary initiatives; industry encourages voluntary efforts rather than legislation, and would prefer to pre-empt enforcement where possible. The Keidanren initiative must be seen in this light. Nevertheless, this is a major development which must be closely analysed. If the result is a better environment, it may not matter whether the motives are less than pure. That is the nature of politics.

Consumers

Consumers do not represent a coherent or monolithic group, yet consumer behaviour is critical in promoting environmental thinking within commercial circles and generally shifting the market towards green production, consumption, and reuse/recycling. Consumer activity is also essential in supporting environmental initiatives – in particular those related to conservation, reuse, and recycling – and partnership networks. In theory, consumer behaviour is the most powerful form of leverage; business adapts to, and anticipates, the laws of the market more efficiently than it does to governmental ordinances. However, in many countries, and certainly in Japan, a consumer-led green ''revolution'' in urban governance and market dynamics has largely failed to occur. The Japanese consumer is slowly coming around to an environmentally sound lifestyle, but it is for the most part not instinctive; the consumer has been led. Japanese society still reflects some extremely unsound activities, such as gratuitous retail packaging, admiration of big and powerful cars, mass consumption and disposal, and tolerance of huge amounts of household garbage on the street. One suspects that for a substantial section of society eco-friendly products are attractive as a fashion, in the same way that fashions are such a powerful incentive in the Japanese market. Given that a consumer-led greening of the market – something which relies upon wide shifts in public consciousness – would seem unlikely in the immediate future, a little help is necessary. This may involve positive efforts, such as public promotions, tax breaks, and subsidies, to bring eco-products into shops.

Civil society

Citizens' groups, NGOs, and ad hoc issue-based citizens' movements, in contrast to consumers in general, have become increasingly active in Japanese politics, including the politics of urban governance and the urban environment. Citizens' movements have formed around a host of issues, and are certainly becoming more assertive and critical of local and national government. Indeed, in a number of examples groups have held politicians to account – including undertaking litigation – for their public conduct, and such groups are an integral part of the movement towards greater accountability and transparency in Japanese politics. This is nowhere more visible than in the issue of the urban environment. Citizens' groups have focused opposition to

environmental threats, raised public awareness of environmental issues, and demanded accountability and consultation in public policy and planning where it influences their environment. Certain initiatives, such as recycling and neighbourhood cleaning, have also been spearheaded by citizens' groups as a form of community-based action. If this activism is channelled productively, and if it is aligned with other actors, such as local governmental and business, it can be the basis of fruitful partnerships.

Ad hoc groups have formed to seek redress for environmental wrongs suffered at the hands of business and government negligence and mismanagement. Ad hoc groups have also formed as protest movements resisting perceived environmental threats. Civil society is thus often diametrically opposed to business practices and governmental policies. Resistance to the construction of waste incinerators, public works, and other urban development – common forms of ''not in my backyard'' citizen activism – can and do put citizens at odds with other actors, undermining the ethos of partnerships. It is difficult for every issue to find a compromise, and for every party to be satisfied. Nevertheless, the growing prominence of citizens' groups is a further indication of a legitimizing of the politics of the urban environment. In response, an increasing number of mechanisms is being created to facilitate public consultation in urban governance, promoting the principles of transparency and participation.

Organized crime

Organized crime is not spoken about much in civilized Japanese society. Nevertheless, it is a small – and probably increasingly weak – actor in urban governance in Japan, as in cities across the world. Often allied to other actors, such as development and construction interests, crime groups have sometimes played a role in suppressing local citizens' opposition to development projects and in influencing local authority planning. A number of such cases have come to light. In one example, west of Tokyo, a controversy erupted over the sale of town property for a waste disposal site, and a referendum was to be held in order for the local community to express its attitude. The mayor, who was campaigning to reject the waste site, was physically attacked and was hospitalized for several weeks. Although no one was apprehended for the assault, it is widely believed to have been the work of a local crime group tied to the construction industry. Similar cases have arisen elsewhere.

Semi-governmental organizations, universities, and academic associations

These actors have been significant in assisting with the scientific dimensions of urban environmental issues, in collaboration with local and national government and non-governmental organizations. However, whilst the scientific community has often worked in parallel with official actors, there have been situations where scientific institutions have brought issues to the public agenda independently and have challenged official policies.

The media

The media play a critical, if intangible, role in moulding public attitudes and consumption patterns, disseminating environmental issues and raising public awareness, and supporting environmental projects such as energy conservation and recycling. The media are also often a vehicle of public opposition to governmental or business mismanagement or negligence in environmental issues.

The dynamics of urban environmental governance: Partnerships and politics

The dynamics which underlie the interaction amongst these actors indicate why certain environmental issues have reflected positive partnerships and progress, and why others continue to be a source of friction. An examination of a number of issue areas and examples of collaboration will also display the widening sphere of legitimate politics. Indeed, environmental transparency, disclosure and redress are increasingly acknowledged as integral to urban governance. Accountability in local government and business is steadily improving, civic awareness in issues of the urban environment is rising, and this is resulting in a greater public input into urban governance and more effective mechanisms for redress. Moreover, legitimate politics is also served by the matrix of partnerships which is increasingly underpinning initiatives in the urban environment. A number of areas can be identified: waste management, recycling and reuse, the conservation of energy and resources, innovation of eco-products, and the reduction and management of waste and pollution.

In light of the mass consumption patterns in Japan, and the commensurate disposal problem this has created, waste management and

recycling have been a major focus of national and local governance. These issues also serve as a good illustration of the dynamics of urban partnership. Successful recycling/reuse mechanisms rely upon the participation of a chain of actors; the whole process is only as strong as the individual links. Yet the successful participation of the relevant actors – and therefore the success of the whole system – depends upon a sensitive distribution of the burdens and costs of the recycling/reuse mechanism. The nature of this distribution has had a strong bearing upon the feasibility of recycling and waste management projects. These issues also reflect the difficulty of finding the best balance between ''top-down'' legislation and ordinances and ''bottom-up'' civic and business initiatives. In a major partnership initiative, Japan's Home Appliance Law will require home electronics manufacturers to recycle discarded appliances, with the cooperation of the public. The objective is to reduce illegal dumping, encourage reuse and recycling in the manufacturing process, reduce the amount of waste involved in manufacturing, and extend the life cycle of electrical products. Under the plan the consumer will take discarded appliances to retail stores, which will accept them for a fee. Alternatively, the stores will collect. The appliances are then collected by manufacturers for recycling. The law will apply initially to televisions, refrigerators, washing machines, and air conditioners, and will be expanded to include other appliances. The sticking points are the likely continuation of illegal dumping and the rather high cost of collection to be borne by the consumer; the two problems are obviously connected. The collection cost may be reduced as manufacturers and shops, in the interest of competition, offer to defray some of the cost in order to attract custom for new appliances. It is hoped that the law will come into effect in 2001; an experimental system commenced in the summer of 1998.

In anticipation of legislation several large electrical companies have begun the development of recycling infrastructure. A major electric industrial company announced its decision to begin verification and feasibility tests in February 1998 for the recycling of electrical home appliances in Osaka city. Televisions will be the initial focus, followed by air conditioners, refrigerators, and washing machines. Similarly, one of Japan's largest computer manufacturers will begin to utilize reclaimed plastics in all lines of the personal computers which it manufactures. During 1998, the company aims to use such plastics for as much as 10 per cent of the plastics which it uses in its personal computers. The company plans gradually to raise the rate of recycled

plastics used, and the development of its own reclamation facilities is central to this.[11]

In another joint public–private initiative, the Home Electric Appliances Association opened its ''home appliance recycling demonstration plant'' in Ibaragi prefecture in 1997. The venture has reflected the involvement of government agencies, local government, scientific research institutions, and a number of private companies. The plant will concentrate on the four items classified as disposable home electric appliances: televisions, refrigerators, washing machines, and room air-conditioners, and will cost a total of 5 billion yen. The handling capacity of the plant is said to be sufficient for a city of about 1 million, and the plant will be able to process about 200 television sets, 150 refrigerators, 160 washing machines, and 100 air conditioners daily. At a total of 620 units per day, the plant should be capable of handling 150,000 units annually.[12]

These activities are reflective of a much wider environmental mobilization on the part of the private sector in response to various stimuli. Most directly, government legislation – or the anticipation of legislation – and local ordinances, consumer behaviour, and international business trends have prompted industries to embark upon unilateral and collaborative voluntary measures in the interests of the environment. The motivations and the adequacy of these initiatives will doubtless be questioned by the environmental lobby. Nevertheless, the breadth and depth of the initiatives are a major development, according to Keidanren, towards ''the gradual development of a recycle-based, energy-saving society.''[13] Following Keidanren's ''Global Environment Charter'' and its ''Appeal on the Environment,'' the ''Voluntary Action Plan on the Environment'' was launched in 1997. Thirty-six industries wrote action plans, in cooperation with 137 industrial organizations, covering every area of commercial and industrial activity. It is worth noting some of the participating organizations which have obvious relevance for the urban environment: Japan Federation of Construction Companies, Federation of Paper Manufacturers in Japan, Japan Chemical Industry Association, Petroleum Association of Japan, Japan Rubber Manufacturers Association, Flat Glass Association of Japan, Cement Association of Japan, Japan Iron and Steel Federation, Japan Aluminum Federation, Japan Society of Industrial Machinery Manufacturers, Japan Electrical Manufacturers Association, Japan Automobile Manufacturers Association, Japan Auto Parts Industries Association, Japan Association of Rolling Stock Industries, Japan

Foreign Trade Council, Japan Department Stores Association, Japan Chain Stores Association, Japan Trucking Association, Japan Gas Association, and the Three-Airlines Liaison Committee on Environmental Problems.

Each of these, in addition to others, has devised guidelines covering all dimensions of the environmental impact of the production, transportation, packaging, construction, life-cycle, retail, energy-use, and disposal activities of their respective business members. Keidanren is quick to observe that this is entirely voluntary, ''free from compulsion by any government or regulatory body,'' and that it includes quantitative targets. It is also possibly correct in observing that the initiative is unique in the world in embracing such a wide spectrum of private actors.

A few areas of the Action Plan require elaboration. The contribution of the Japan Automobile Manufacturers Association involves a number of measures and targets. It commits its members to a timeframe for fuel efficiency and carbon dioxide standards, the production of low-emission cars, educating the public to energy-saving driving, recycling and disposal standards, and the certification of the ISO 14000 standard to cover the manufacturing, use, disposal, and recycling of automobiles. The Japan Auto Parts Industries Association has committed itself to various targets and measures to support this. The Japan Electrical Manufacturers Association similarly embraces a broad agenda which could have a substantial impact upon urban environmental governance. It commits itself to energy conservation targets in production and for the use of electrical household appliances, and to developing and supplying power generation machinery which uses non-fossil fuel. The electrical manufacturers commit themselves to clear targets in waste disposal, reuse, and recycling, such as encouraging standard materials, making appliances easier to dismantle, reducing the use of non-recyclable materials, and generally prioritizing reuse and recycling in production and salvaging. Again, the third-party standard of the ISO 14000 is cited as an objective. The Japan Department Stores Association and the Japan Chain Stores Association have an enormous impact upon environmental issues. Both have drawn up guidelines covering energy use, waste, and packaging in stores, encouraging environmentally conscious consumer attitudes and behaviour, supporting recycling programmes, and promoting the availability of environmentally safe products. Amongst the remaining components of the Voluntary Action Plan, the guidelines and objectives relating to housing, con-

struction, and transportation have particular relevance for the urban environment. Whilst the Action Plan is highly significant in its breadth and depth, it is too early to make an evaluation of it. Politically, the Plan reflects the irreversible intrusion of environmental issues into the market and as such points to a strong ground-level movement towards a better management of urban environmental issues. The question of whether voluntary initiatives, partly designed to pre-empt enforced measures, are adequate remains to be seen.

In an initiative starting in the year 2000, government agencies plan to begin the collection of CFC alternatives used for automobile air-conditioners, which are considered greenhouse gases. This will cost the consumer, and the partnership principle is central: the collection will be the responsibility of the Ministry of International Trade and Industry (MITI), the Japan Automobile Manufacturers Association, and the Japan Automobile Federation. The collection and processing of freon will also be a part of the forthcoming ''automobile manifesto.'' Under the plan, car makers and distributors, and car air-conditioner manufacturers, will share the infrastructural costs of the collection, transport, and transfer of freon. It is hoped that fees for the collection of the gas can be levied on the owners who trade in their used cars.

In addition, on the heels of the Home Appliance Law, MITI is also considering the establishment of an Automobile Recycling Initiative. In cooperation with the car industry MITI proposes three pillars of action: the introduction of a system for managing the processing of discarded cars, guidelines for recycling objectives, and the establishment of an automobile recycling information centre. Car makers would be required to recycle all parts of disposed automobiles, although this is likely to be even more difficult to negotiate. Some government agencies and industry actors take a cautious position on legislation to recycle cars. Obviously, car manufacturers are a powerful lobby, and the imposition of recycling costs upon the consumer would slow down consumption of new cars. An ''automobile manifesto'' is also being prepared for launch by the end of 1998, which will outline what can be salvaged from cars and explore prospects for the development of recycling mechanisms.

A major challenge in the governance of urban environmental issues has been the promotion of environmentally sustainable purchasing and the shifting of the market in favour of the environment. This rests upon raising environmental consciousness among the public, raising awareness of environmentally sound products in shops,

and promoting the production of environmentally sound products. The ideal of maximum public awareness is not effective unless environmentally friendly products are available in the shops at competitive prices. This involves a delicate intervention into the market in favour of certain production techniques and manufactured goods, in order to shift market forces behind environmental concerns. As a beginning, various parties have fought to introduce greater transparency into the environmental consequences attached to production, packaging, use, life cycle, and the disposal of products.

In such an attempt to ''green the market,'' the Environment Agency is examining ways of attaching labels to products on the basis of their impact upon the environment. The ''Eco-mark'' would be awarded on the basis of environmental standards, based upon quantitative indicators. The objective is to stimulate a consumer-led shift in the market: instead of imposing sanctions, manufacturers would be given market incentives to observe environmental standards as consumers are increasingly drawn to the Eco-mark. In time, manufacturers and retailers will view environmental issues as indispensable market elements. Indeed, it has been reported that approximately three quarters of the well-known firms in Japan are interested in obtaining certification under an environmental standards programme administered by the International Standards Organization (ISO), and this reflects potential for the Eco-mark project. The ISO framework would be embraced as a third-party benchmark for standards and in devising a formulation for standards and labelling. The Japan Environmental Cooperative began working on the development of an Eco-mark in the early 1990s, with the hope that it could be applied to a wide variety of products and promoting transparency.

A similar project is the Green Purchase Network, a creation of the Environment Agency, local governments, citizens' groups, and major companies. This publishes a consumer guide to help people make environmentally friendly purchases. The guide includes office paper, copiers, air-conditioners, refrigerators, detergents, building materials, and cars. Similarly, the Environment Agency published a ''Household Eco-account Book,'' a checklist by which individual households can check their impact on the environment. When families keep track of everything they purchase and consume, built-in calculations show the resulting carbon dioxide emissions. The ''Household Eco-account Book'' also stresses the money that can be saved by cutting down on electricity or hot water use, and the cumulative benefit of small everyday considerations. The agency has distributed copies to local

governments, consumers' groups, and other organizations. Eco-account books are also printed by a number of local governments.[14]

Similarly, a ''transparency database'' for assessing the environmental impact of manufactured goods is planned in a project run by a public science and technology agency. The database will make it possible to calculate and compare the quantity of noxious chemical material, carbon dioxide, and waste discharged during the life cycle of products from their manufacturing to their disposal stages, and the quantity of energy used in their manufacture. This is a further step in the direction of ''environmental disclosure'' and transparency regarding the burdens attached to manufacturing, consumption, and public policy. In the case of manufacturing, the system will tie in with marketing patterns and lean the market in favour of more efficient, less wasteful practices and products, and will help in the ''labelling'' of products.

Similarly, the Environment Agency is examining guidelines for a possible environmental assessment law, provisionally named the ''Environmental Impact Evaluation Law.'' This would require that an agency examine, estimate, and evaluate the environmental consequences of large projects such as dams, highways, and airports. Under the assessment law, public projects will require the Environment Agency's approval. Reflecting growing public concern and civic activism on urban development, local residents would have an input during the assessment period. There has been disagreement concerning the scope of the assessment law. Some industrial actors – and perhaps some bureaucratic interests – oppose further legislation, and this is a subject which continues to reflect political tension.

Efforts to encourage recycling, reuse, and conservation cannot keep up with the household waste generated in Japan's cities. In December 1997 the Tokyo Metropolitan Government established a plan for a domestic waste processing system, based on the revised Law Concerning Waste Disposal and Public Cleanliness (Waste Disposal Law) of 1991 and Tokyo's Waste Disposal and Recycling Ordinance. It also embraces the Law to Promote the Use of Recycled Materials (1991) and the Law of Interim Measures to Promote Business Activities Relating to the Use of Recycled Materials and the Rationalization of Energy Use (1993). The plan involves reducing waste over the 15-year period from 1997 to 2012 to 10 per cent below 1995 levels, approximately 3.65 million tons. This target is a commitment to the various programmes on conservation, recovering resources, and recycling and reuse. In terms of waste disposal, the plan

is a response to the need for much better incineration plants so as to achieve a reduction of toxic emissions. Again, whilst the impetus has come from the top down, cooperation among the residents of Tokyo, private enterprise, and government will be fundamentally important.

Japan burns more household waste than any other country in relative and absolute terms, in incinerators often adjacent to schools, homes, and farms. It was relatively recently that city authorities became fully aware of, and were willing to act upon, the dangers of this incineration, and in particular the highly toxic dioxin. In 1996 the director general of the Environment Agency said in a news conference that Japan must regulate dioxin, and finally the Environment Ministry designated dioxin as a chemical to be subject to the Air Pollution Control Law (in 1998). In addition, the Health and Welfare Ministry drafted a law which requires emissions from commercial incinerators to be measured and to meet a certain standard, and initiatives are afoot to build larger incinerators which burn on a 24-hour basis and are more efficient. These rather belated measures have benefited from the input of non-governmental organizations, which have raised public concerns and demands for greater regulation. According to one report, the government was aware of the high levels of dioxin around incinerators in 1996, but did not release the results of a survey until a private group presented its own report and the issue became a major public concern and began to be debated in the Diet.[15]

The Container and Packaging Recycling Law went into effect April 1997. Under its ordinances, beverage and container manufacturers carry the responsibility of recycling glass and PET bottles into new products, in a system which is relying upon the cooperation of consumers. However, there are uncertainties regarding the feasibility of the system and the apportionment of collection and recycling costs. In advance of the Container and Packaging Law, the beverage and container manufacturers established the Japan Container and Packaging Recycling Association. The Association is responsible for receiving the collected containers from local authorities and recycling the material for the industries. The ethos of the Container and Packaging Law is ''Reconstructing a Recycling Society from a Throwaway Society.'' This is a matter of some urgency. It is said that about 50 million tons of ordinary waste are produced every year and that current landfill sites will be sufficient only until the end of the century. The recycling initiative relies upon the cooperation of thousands of retail outlets participating in the store-based collection programme,

which act as points of collection for recyclable materials. In contrast to this, at supermarkets in some areas citizens' recycling groups have begun deposit systems for recyclable drink bottles.

Although Japan has an extremely high level of garbage combustion and this has raised worries regarding the emission of toxins such as dioxin poisons, local and national authorities are striving to harness some of the energy produced in this process. The Ministry of International Trade and Industry has also been investigating the possibility of waste power generation in recent years. The technologies currently being developed include thermal recycling schemes and the use of solidified fuel created from waste materials (Refuse Derived Fuel or RDF). There have been proposals that RDF has the potential to produce 2 million kilowatts by 2000, and 4 million kilowatts by the year 2020. In addition to the generation of energy from waste, other innovations have arisen. Japan's first practical plastic oil recovery plant, the Niigata Plastic Oil Recovery Centre, was completed by the Plastics Treatment Promotion Association and other organizations under the auspices of government agencies.[16] Another industry initiative was reflected in the establishment in 1996 of a third-party organization focusing on the recycling of packaging waste. This consists of 30 organizations from the beverage, food, beer, and materials industries, to cover all packaging waste and to deal with industries and municipalities.[17]

The new Air Pollution Control Law of 1996 raised a number of issues relating to government intervention for the public good. Reportedly, there was much private resistance to a stricter law during the review process; even the existing law is very narrow in scope in comparison to the US Clean Air Act. In a better example of urban partnership at work the Kitakyushu city government and 60 local companies launched an initiative to combat pollution and clean up the environment. In the 1960s, steel, chemical, and other heavy industries in Kitakyushu caused severe pollution, and the city passed some of the first clean-air measures in Japan. Kitakyushu is subsidizing a study group which will promote anti-pollution technologies and focus on cleaner manufacturing practices. Other local governments, including the cities of Nagasaki and Nagoya and Yamaguchi and Niigata Prefectures, are following suit. Soon a national network of city and prefectural governments may be formed to exchange clean technology on a wider scale.[18]

Private automobiles and commercial traffic have a major impact upon the urban environment throughout the world, contributing di-

rectly to air pollution, congestion, urban sprawl, and many forms of waste. In Japan, after years of liberal car emissions regulations a draft report of the Environment Council called for a 70 per cent reduction in nitrogen oxide, which would be the highest standard in the world. The Environment Agency began to revise the standards for the atmospheric pollution prevention law towards the end of 1998 and aims to have new regulations in place for the year 2000. The level of such pollutants as nitrogen oxide, small particle matter, and photochemical oxidant emitted by automobiles and factories remains high, and many urban and prefectural regions had pollution densities which surpassed regulated standards.

Low-pollution cars have been a high-profile innovation with obvious implications for the urban environment. The Environment Agency is promoting the development and marketing of such vehicles, including electric cars, hybrid cars which combine electric and internal combustion engines, and gas-powered cars. These cars have not proved to be very popular, particularly given the high retail cost. Whilst the Agency plans to promote their use through production quotas, there is still doubt regarding the best means of promoting these cars. Clearly, the car industry is huge in Japan, and the development of new cars and restricting some of the excesses of conventional cars is raising political friction.

An obvious instrument at the hands of local and national government is the tax system for motor vehicles. The issue has been discussed by the Global Environmental Problems Subcommittee of the Transport Ministry, with a view to discouraging the use of larger passenger cars by increasing the tax on cars with larger engines. Another obvious instrument is the price of petrol in Japan, which is relatively cheap (in April 1998 the average was 90 yen per litre). Increasing tax upon petrol – as a form of green tax – would discourage the use of large-engine cars. For a number of years various ministries have been considering a carbon tax to reduce greenhouse gas emissions and encourage environmentally sound consumer and business practices, and this would have direct effects upon car production and use. This would assist in Japan's international pollution limitation commitments in addition to improving the urban environment, as well as raising tax revenue for other environmental projects. In 1994 a law was passed to reduce diesel exhaust, but improvement has been slow. In addition, the Tokyo government has been asking large truck companies to reduce nitrogen oxide exhaust output voluntarily by 10

per cent over the five years from 1996. About 650 companies, each owning more than 50 trucks, are targeted.

The political implications of punitive fuel taxing are delicate. Among many other problems, such measures would have repercussions upon car retail patterns and small business, and few politicians could afford to embrace measures of this kind in a manifesto. There have clearly been positive signs from the car industry. The ''green car'' is the most obvious example. In addition, the Japan Automobile Manufacturers Association has compiled an Action Plan, with reference to ISO standards, to lessen pollution and prevent global warming. In a different approach, a number of prefectures have prohibited engine idling except of private cars. Nationwide, the Environment Agency is leading a voluntary ''Stop Idling'' campaign, together with the Japan Trucking Association, a taxi association, and other organizations.[19] The response to all such initiatives has been mixed, and this issue presents the methodological contrast between enforced legislation and voluntary methods. The best method is to raise public consciousness so that legislation is unnecessary, but consciousness campaigns are proving to be slow to take effect. In addition to air pollution, more than 5 million automobiles are discarded every year in Japan. The Discarded Vehicle Recycling Subcommittee of the Industrial Structure Advisory Committee, MITI, is spearheading an initiative to encourage greater recycling of materials, and although the impetus is top-down, a number of industry initiatives are developing.[20] The bases of partnerships are thus forming. However, given the huge burden imposed upon the urban environment by cars, the partnership ethos – that is, voluntary initiatives and collaboration – may not be adequate.

An important element of progress in production, consumption, and disposal is the development of ''green technologies,'' and this is something that requires impetus. In one example, MITI, along with other ministries and agencies, has begun research into environmental fields. At the July 1997 UN General Assembly Special Session on Environment and Development, Prime Minister Hashimoto proposed a green initiative that targets the progressive development of global environment-related technologies such as energy conservation, new energies, reforestation, and forest preservation, through communication among the national research institutes affiliated with governmental ministries and agencies. MITI requested a budget of 400 million yen for 1998. This research will feed back into Japan's cities, as

well as serving the country's international agenda. There is an overlap. Japan is facing a difficult task in trying to reduce its CO_2 emissions to 1990 levels on the basis of cutting back energy consumption, so the development of efficiency measures and technologies is essential.[21] Some green technologies are emerging in response to obvious needs. For example, the Environment Agency has been promoting the development of solar-powered vending machines, and there is government pressure upon refrigerator makers to cut the power usage of their products. Recently manufacturers have been developing, and have introduced on the market, energy-saving devices as selling points. MITI is attempting to encourage this trend, yet has not left the environmental factor entirely to the market. Again, it is a delicate intervention. Similarly, tax benefits are being considered for products that promote the conservation of resources and energy in the home.

An example of this sort of positive assistance is the ''zero pollution industrial complex'' theme being developed by a number of local authorities. This is based upon the idea of industrial complexes which are self-contained with respect to waste management; there will be no external pollution. It is hoped this will stimulate commercial research into waste management and processing. This is a direct attempt to introduce commercial competition into environmental technologies, which will in turn affect industry practices and standards in cities across the country. Model ''zero pollution complexes'' are being developed in Fukushima Prefecture at Shirakawa City, where construction will begin during 1998, and Hiroshima Prefecture, where the prefecture would like to attract industries to the complex which could process waste emitted by existing factories. A similar model idea is represented by the ''Eco-Town Project'' areas with a target of zero regional waste emissions for four regions.

In addition to widespread measures to govern consumer waste, such as the Home Appliance Law and the Container and Packaging Recycling Law, bureaucracies are developing tighter regulations for industrial waste. This has followed the research of the Committee to Investigate Standards for Recycling Industrial and General Waste. Taking up governmental promptings to improve disposal practices, the Japan Federation of Construction Companies compiled guidelines for processing waste. The guidelines spell out requirements for processing waste from construction-related work and promote the use of recyclable material in the construction business. The Ministry of Construction and the construction business have also been work-

ing together to compile a programme to promoting the recycling of construction material.[22]

''Legitimate politics'' involves a movement towards greater transparency, disclosure, and systematic mechanisms for public consultation and redress. This movement is making progress, although it is often manifested as protest and resistance. Whilst this is a form of confrontation, it is indicative of a growing awareness of environmental and governance issues in Japan. Civic action – and in particular litigation – has been aided in Japan by a fund established to give advice and defray the legal costs of individuals and organizations filing lawsuits to protect the environment. The Fund for the Rights of Nature was formed by lawyers, academics, and NGOs.[23] In a further attempt to strengthen environmental disclosure, the Japan Lawyers Federation proposed in October 1996 the establishment of a new law requiring the assessment of the environmental consequences of large-scale construction projects. Moreover, the Japan Environment Corporation, a non-profit organization affiliated with the Environment Agency, has given substantial funds to environmental groups. The money comes from a fund set up by public and business contributions.

The movement toward greater environmental disclosure and transparency has also been supported by more ''establishment'' actors. The Central Council for Environmental Pollution Control has recommended environmental assessments for large-scale developments and public works. Similarly, some prefectural governments have begun to open up public input into local authority planning.

However, such progress is slow. It is increasingly common to see public demonstration and litigation, both as a sign of political change and as an indication that environmental respect was neglected in Japan's governance in the past. In a typical example from Osaka, in 1996 air pollution victims won billions of yen in damages after a 17-year legal struggle against companies, the national government, and a public highway corporation. Reportedly, factories and the expressway contaminated soil and released high levels of sulphuric acid and nitrogen oxide into the air, and the case was the first in Japan in which auto emissions have been linked with respiratory illness. The 350 plaintiffs still living suffer from chronic respiratory diseases. They have established the Centre for the Redevelopment of Pollution-Damaged Areas in Japan, which will help with clean-up and will work with other pollution victims in Japan and South-East Asia. Moreover, the group planned to spend 1.5 billion yen of their settlement to im-

prove their district's environment. On a wider scale, the Centre has co-sponsored, with the city of Osaka and the Environment Agency, symposia on how to heal pollution-damaged areas.[24] All over Japan, there have been numerous similar cases where residents have successfully fought and won legal battles against local governments and companies on the basis of liability for environmental damage, especially pollution. It is notable that a key aspect of this litigation has been the citizens' demands that companies and government observe more effective environmental standards.

In a similar form of civil action, citizens have been increasingly vigilant against perceived environmental threats, organizing petitions and demonstrations to oppose certain development projects. This resistance has gained ground in local politics as it becomes increasingly mainstream rather than merely peripheral ''activism.'' Referenda on local environmental issues are increasingly common in Japan, as is the election of local politicians on environmental mandates of local concern. Indeed, there have been a number of *causes célèbres* opposing the construction of waste disposal incinerators, electric stations, dams, and other projects with major environmental consequences. In response to increasing civic interest and activism towards public works, a dam review panel was established by the Construction Ministry to give local people a voice before dams are approved. The process is slow, but the public voice is growing louder and having more impact.

Conclusion: Legitimate politics and the urban environment – partnerships, decentralization, accountability

The preceding discussion indicates a number of trends in the governance of urban environmental issues, from which a number of recommendations stem. Clearly, urban governance is political: not always in an ideological sense – although it often is – but as an issue which reflects the vying interests of actors, competing priorities, the allocation of resources, trade-offs, and alliances. These dynamics have resulted in progress in the governance of environmental issues in Japanese cities, in the context of wider social and political changes in Japan. Changing attitudes and expectations towards leadership and authority in Japan – and across the world – are inseparable from the dynamics of the urban environment. The most perceptible change is the shift towards legitimate politics. National government, local government, consumers, and commercial actors are participating in

collaborative partnerships which are producing concrete results. The market is beginning, rather slowly, to embrace the principle of environmental sustainability in production, packaging, retailing, and recycling practices. The voluntary initiatives on the part of numerous businesses and business associations, whatever the motives behind them, are a clear indication that the most important market actors recognize this. This is being aided by a movement towards greater transparency in the environmental consequences of mass production, consumption, and disposal.

The themes of transparency and disclosure have extended throughout the public and private spheres of urban governance; as a result of a rising awareness of the environmental impact of lifestyles, commerce, and development, political legitimacy is strengthening. People are having a greater input into the public policies and business activities which affect the environment of their communities. Citizens' groups, non-governmental organizations, and other civil society actors are giving the public greater leverage in urban governance, holding business and local authority to account, and monitoring standards. There are greater opportunities for public consultation in public planning policies, and greater opportunities for redress when people feel that they, or their living space, have suffered as a result of the environmental negligence of others. The various actors – and most critically national and local government – have come to accept the logic that decentralization and community-wide approaches are essential for the urban environmental agenda to have genuine support. Public consciousness, and the concept of every party having a stake in the issue, are at the root of this.

Notes

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Part II
Partnerships in action

6

Civil society and the urban environment

Ooi Giok Ling

In identifying the kinds of strategies which are now more likely to be successful in addressing major environmental problems in the cities of developing countries around the Asia–Pacific Region, the focus is on channelling more support directly to citizen and community action groups. This approach not only delivers immediate benefits to lower-income urban communities more cheaply and effectively than state actions, but also strengthens society by developing partnerships between community-based organizations, NGOs, and municipal governments.[1] The movement to reorient development around citizens' groups has come in the wake of a number of successful projects introduced and managed by third world NGOs. These groups have worked with low-income citizens and their community organizations to improve environmental health as well as install the necessary urban infrastructure and services.

However, identifying these needs for a more participatory approach appears to be far simpler than reorienting the development agendas of national governments or changing the attitudes of professionals such as engineers, architects, and planners in favour of working with citizens' groups in third world cities. This is particularly the case in many countries where policy decision-making on land-use and development issues in cities remains highly centralized. Citizens' par-

ticipation remains minimal even where a majority of people are living in the most abysmal conditions. Yet, if there were improvements in their capacity to build or to work with local, city, and national governments, they would have the greatest influence in improving the environment of many of the cities in developing countries.

Reliance upon the central state over the last few decades has resulted in rapid economic growth concentrated in the largest cities and also in a proliferation of the many problems already faced by many of the lower-income citizens living in the cities of the developing world. Yet many citizens' initiatives in planning, building, and developing their own homes and neighbourhoods remain outside of the realm of legal urban planning and the development effort generally undertaken by state authorities.

This chapter addresses the extent to which citizens' participation – in fact, civil society – can contribute towards solving the environmental problems facing most cities in developing countries. Even in cities where urban environmental problems have been successfully addressed and managed by the state, the need is growing for greater citizen participation to keep down the costs of environmental management for the state. In a globalizing world, civil society organizations, which are non-governmental and non-profit, hold great prospects for a participatory approach to urban governance in the cities of developing countries. They offer cross-border cooperation with greater ease than government-to-government arrangements, and since environmental pollution and degradation can transcend national boundaries, the global and regional roles of civil society organizations will grow in importance in the future.

Many civil society organizations engaged in environmental work are headquartered in cities. This is not surprising considering that cities are major centres of both production and consumption as well as seats of government. Cities are where foreign and local investments tend to be concentrated, not only because of the potential market for goods and services in these cities but also because of the labour pool and the concentration of infrastructure such as banks and office facilities. At the same time, cities are also where environmental problems are posing the greatest challenge to further economic growth. Large metropolitan areas such as Bangkok and Metro-Manila face major urban transportation problems that threaten their economies as much as the shortage of water has done in Kuala Lumpur recently.

The following discussion relates to the growing role of civil society

in developing Asian countries, particularly in the areas of urban environmental management, in the context of the huge challenges to governance posed by environmental problems in major cities. A basic belief is that much of the future economic growth will continue past patterns of being concentrated in cities. Yet cities, each generally with a narrow resource base within territorial limits, including land for landfills, will continue to rely on resources in their hinterlands and beyond for their development. The very notion of sustainable urban development relies upon a shift in urban society and civil society towards sustainable production and consumption patterns.

A global "associational revolution"

The proposal that a global ''associational revolution'' is taking place has proven to be as intriguing as the suggestion that this revolution ''may prove to be as significant to the latter twentieth century as the rise of the nation-state was to the latter nineteenth century.''[2] The term ''associational revolution'' refers to a massive array of self-governing private organizations, not dedicated to distributing profits to shareholders or directors, but pursuing public purposes outside the formal apparatus of the state. The proliferation of these groups may be permanently altering the relationship between states and citizens.

In the areas of urban growth and environmental management, this global associational revolution has interesting implications, particularly in Asia, where the role of the state has been dominant in development. The city-state of Singapore has been described as the archetypal example of the developmental state.[3] Such a view suggests that the economy of Singapore would not have existed without the intervention of the state.[4] The focus of the state on cities and their development is not without basis considering that much of the economic growth has been concentrated in these cities.

Considering the dominant role of the state in urban development in Singapore and elsewhere in the region, the question arises whether there is indeed any role left for the associational revolution that has apparently become the international trend and is poised to have a major impact upon international politics. The answer would be yes, if the question were posed to environmentalist groups and the intellectual communities in and around Singapore. Given the persistent atmospheric pollution being experienced in many cities in South-East Asia because of forest fires in the countries of Indonesia, Malaysia, and Brunei, together with the seeming impotence of governments in

finding a solution, citizens' groups and the citizenry appear more open to mobilization in one way or another than ever before.

Yet there is a certain degree of romanticism about the claim that a great associational revolution is sweeping the globe. Studies of the non-government and non-profit sector in much of Asia justifiably argue that considerable tension exists and persists in the relationship between the government and the non-profit sector.[5] Indeed, the view is that there are many constraints on the activities of non-government organizations, independent research institutions, and organized philanthropies, the critical issue being the autonomy of the non-profit-sector organizations. It can be added that the contribution of this NGO sector is increasingly being recognized as the best way to find solutions to the problems facing cities that are ensnarled in problems ranging from environmental degradation of key resources such as water to inadequate housing and immobility due to severe traffic congestion.

The following discussion will identify the areas in which civil society organizations have contributed to improvements in environmental management and in the planning of cities in South-East Asia, and specifically in Singapore. In the process, the issues and implications which have arisen will be discussed with the aim of elaborating on the constraints faced by the non-government and non-profit sector highlighted in various studies which have been conducted.

Urban and environmental issues in Singapore and South-East Asia

In the largest cities in South-East Asia and also in much of the developing world, a variety of environmental problems is commonly experienced. City governments, however, are likely to have a number of other priorities on their agendas. An estimate in 1990, which was based on several national and city studies, highlighted that at least 600 million urban dwellers in Africa, Asia, and Latin America live in ''life- and health-threatening'' homes and neighbourhoods because of poor housing and living conditions and the inadequate provision of safe and sufficient water supplies and sanitation, drainage, waste management, and health care.[6]

In Jakarta, as in many other cities which have grown to mega-city proportions, a majority of the population lives in housing without piped water and many continue to rely on vendors for water which ultimately costs five times that of piped water. Among other prob-

lems is the lack of a waterborne sewage system in the city. This means that some 25 per cent of the city's population use septic tanks but the remainder are likely to be relying on pit latrines, cesspools, and ditches along the roadside. At the same time, many still rely on drainage canals for bathing, laundering, and defecation.

Studies associate the problems with a lack of political will and commitment to implementing workable solutions on the part of the local and national authorities. The solutions which have been tried are generally assessed to have been too little, too late, especially given the flow of migrants to the cities and burdens they impose urban infrastructure. At the core of the limited impact of many schemes (and indeed of other government initiatives to guarantee poorer groups access to legal housing solutions) was the failure of government to ensure a larger and cheaper supply of legal land sites for housing. In market or mixed economies, official government reports or United Nations reports are almost unanimous in pointing to high land costs and the lengthy procedures involved in public land acquisition as the major constraint on any programme to provide legal, affordable alternatives to squatter settlements or illegal subdivisions.[7]

The state has often been found to be reluctant to implement the most cost-effective measures to acquire the land needed for public and low-cost housing programmes. In Indonesia, one of the greatest constraints on the national housing agency responsible for sites and services projects has been land availability. While the government has powers to condemn land, it is reluctant to do so and relies on negotiating purchases with landowners. This means that the lowest-cost land available is not always the most appropriate for a given facility. Problems are compounded, moreover, by the poor state of cadastral records in the country.[8]

According to several studies, the economic burden of illnesses and health problems can be largely attributed to deficiencies in both water supply and sanitation, particularly among poor people living in the most poorly served areas of cities in developing countries. Almost all the different kinds of housing used by poorer or low-income households in cities reportedly share environmental problems that are due to the lack of infrastructure, services to remove and dispose hygienically of human wastes and garbage collection, and available drinking water. Among the largest cities in South-East Asia – Bangkok, Jakarta, and Metro-Manila – inadequacies in water supply and sanitation prevail and remain increasingly and mutually reinforcing as major environmental problems. The untreated wastewater from

households as well as effluent from cesspools in Bangkok are discharged into stormwater drains and canals. Similar problems can be found in the other major cities. Apart from the health problems due to the lack of infrastructure for waste disposal and for the supply of adequate drinking water, conditions are aggravated by overcrowded and otherwise inadequate educational, community, and health services.

The ideals of urban management aim to manage our cities to be homes within which life can be socially just, ecologically sustainable, politically participatory, economically productive, and culturally vibrant.[9] Approaches through which some of the ideals can be realized are seen by some organizations to lie in strengthening the urban management capacity involving civil society groups, local authorities, and central governments. There is also seen to be a need for urban networking and supports of technical cooperation, sustainable urban environmental policies, and practices which embrace the involvement of non-governmental organizations in all aspects of urban management programmes.

The emphasis by a major United Nations programme upon civil society organizations which can address the needs of people in cities in many developing countries gives rise to several questions. How can civil society organizations in the cities of developing countries work with international agencies to provide for the needs of the people for housing, health care, and environmental services? How do these relate to the local and national authorities in the effort to provide for the needs of people? Can civil society organizations ultimately be more effective in meeting the needs of the people in cities than the local and national authorities? In a globalizing world, how can civil society organizations develop international partnerships in order to organize the resources they would need to do their work more effectively?

The prevailing view holds that information on environmental problems in developing countries has been relatively scarce. It is particularly the case, so the views go, that there are very few developing countries in which a range of citizen groups work on environmental issues in a manner comparable to what can be found in developed countries in Europe and North America and in Japan.

This view has been particularly relevant during the past few years, when cities in South-East Asia have experienced atmospheric pollution almost every year because of large-scale land and forest fires in Indonesia, eastern Malaysia, and Brunei. With governments opting to give less priority to solutions to the environmental problems arising

from such fires, the expectation would have been that non-government or civil society organizations might step in to bridge the gap; but such action has not been forthcoming.

In developed countries, environmental problems have been highlighted by individual activists, citizen groups, and non-governmental organizations, and while "First World governments have been slow to react, the fact that most have taken some action despite the opposition of powerful vested interests is a demonstration of democratic processes at work."[10] On the other hand, the belief generally is that such democratic processes are strongly controlled or even repressed in many third world nations, as reflected in the small number of NGOs and the severe lack of funds to develop these organizations and support their activities and efforts in environmental protection.

The media in Singapore, for example, have been credited with giving priority to "what the Government says and does, that is, official campaigns such as tree-planting during the annual Clean and Green Week."[11] According to Lim,

> the local media tend to react to or merely follow the Government's lead, especially on sensitive environment issues. ... The forest fires in Indonesia which cast a long spell of haze over Singapore ... [in 1994 were] sketchily reported and insufficiently analysed. At the beginning, there was little information on the source and causes of the fires and the haze. Readers had expected the media to give a more comprehensive account of the haze problem and what could be done to tackle it.[12]

The rather negative assessment of the contributions of civil society in developing countries, that is, NGOs working on environmental issues, has not taken into consideration the work of nature conservation groups in cities such as Singapore, where there is a highly centralized approach to urban planning and environmental management by an extremely efficient state. According to Offe's argument, as the functions and responsibilities of the state expand, its authority – its capacity to make binding decisions – is debased: political authority can be stable only as long as it is limited and thus complemented by self-sustaining non-political spheres of action which serve both to exonerate political authority and to provide it with sources of legitimacy.[13]

Cities, development, and environment

If it has been argued that cities are catalysts of development and the centres of the economic, social, and cultural changes seen in South-

East Asian countries, this argument has been countered by the view that cities also reflect the national economy, society, and polity. There has been intense debate on the role which cities and the societies living in them have contributed towards economic development and modernization in Asia and South-East Asia.[14] In short, cities may well be the points of concentration or focus of much of the economic growth and wealth generated in the countries in which they are located, but they are also the outcome of such growth and development in these countries as a whole. Cities have been considered the barometers of all economic, political, and cultural landscapes of their countries.[15]

The traditional view of cities and their prosperity being determined by the wealth of their hinterlands has been more or less relegated to the past; the more so since the present is a world dominated not only by major globalizing forces, such as the trend of the associational revolution, but also the transnationalization of industrial processes and hence the growth of multinational business firms. Increasingly, world cities which are both industrial and post-industrial are growing on the basis of the resources to be found not just in their hinterlands but globally. Their hinterlands are not confined to an immediate environment. Most contemporary cities are global cities. Their hinterlands are transnational, the world is their hinterland. The population, wealth, and quality of life that global cities have is largely measured by the extent of trade they can garner from the international community.[16]

A strong correlation has been found between developing countries with the fastest-growing economies and those with the largest increases in their level of urbanization.[17] Following this same report, the countries with stagnant economies were not urbanizing as rapidly during the 1980s. Hence, rising levels of urbanization are strongly associated with growing as well as diversifying economies. The developing countries with fast-growing economies that have been the envy of other countries in the last one and a half decades also saw the most rapid increase in their level of urbanization.

However, the link between cities and economic growth is far more interesting in terms of the growth in the scale of urban poverty in many developing countries in the 1980s. This was the period when the developing countries were experiencing serious economic problems and facing a slowdown in both the rate of growth of their urban populations and the rate of increase in their levels of urbanization.[18] Yet analyses such as these fail to establish whether the economic

slowdown could be attributed to the fall in the rate of urbanization and the growth of urban populations. The indication in a few migration studies done in developing countries is that growing problems with providing for urban basic needs have led businesses and urban residents to resort to coping measures such as circulatory migrational trends for urban workers and the search for alternative business locations.

Considering that environmental quality – of air, water, and living space – is increasingly becoming important to businesses and populations living in cities in developing countries, it is understandable why more city governments are addressing environmental management needs more seriously than ever before. If the rapid economic growth of the last few decades has resulted only in producing a far larger scale of urban infrastructural problems, there should be even greater concern now about the impact of the economic slowdown on the urban population, much of which remains trapped in poverty and wretched living conditions that threaten both their health and their safety.

The role of the state in urban environmental management

If the role of the state has been important in terms of urban growth and development in South-East Asia, then it appears that it has been reflected far more in urban development than in urban environmental management. In the aftermath of their emergence as new and independent nation states following colonial rule, the focus of many of the national governments was on the development of their countries' economies. Even environmental concerns have been largely focused on soil erosion, deforestation, floods, and droughts in rural areas of South-East Asia. There has been less effort to understand, and hence address, the needs arising from urban–environmental relationships. These needs now range from vehicular pollution to industrial and domestic waste, water quality, and garbage and sewage disposal.

The rural–urban divide is an important dimension to development and environmental issues in South-East Asia, including approaches to urban eco-management. In considering urban ecosystems, there is a need to view these at two levels: the intra-city level, and the level of the city in relation to the wider ecosystem of which it is a part.[19] Savage argues that at the intra-city level, the human–environment relationship will depend largely on the urban authorities' success with managing the urban population growth rates within the city limits, as

well as developing the necessary urban infrastructure to meet the needs of the urban population.[20] It is, however, difficult to separate the city physically or geographically from the larger ecosystem of which it is a part. Hence, urban–environmental relationships encompass not only environmental management issues arising from the growth of cities but also the impact of such growth and the cities on their hinterlands and the surrounding region in which they are located.

Some local and central governments have demonstrated little effectiveness in solving their cities' growing needs for basic urban infrastructure, such as sewage and piped water, even though ''urban planning [has been considered] a sine qua non for any healthy and sustainable urban environmental system.''[21] The reasons are that cities are basically human constructions within which a mentality of laissez-faire prevails: ''each urban dweller seeks to maximize his own economic, biological and cultural existence without concern for the common urban community. This intense competition for land can result in territorial competition based on class distinctions, racial differences and cultural divisions. Only a strong urban government/authority can be in a position to ameliorate such territorial and environmental conflicts within urban systems.''[22]

Yet years of urban planning have illustrated the limited ability and political will which city authorities have been able to organize in the effort to meet the people's basic needs. In Bangkok, urban and environmental plans are drawn up quinquennially. In effect, these plans remain little more than blueprints and proposals, due in part to the volatility of the political structure and hence a lack of political will to implement the plans effectively.

In Singapore, the urban land-use plans have legislative backing, which means that if strong vested interests do try to reverse land-use decisions, this has to be done at the legislative level. This, in part, may have contributed to the successful implementation of not only a large-scale public housing programmeme but also the development of the basic infrastructure for environmental management. Indeed, ''Many serviced-site schemes have suffered from exactly the same kinds of problems that public housing projects experienced, being too expensive for poorer groups, in the wrong location and with plot sizes and site layouts which were ill-matched to the needs and priorities of the intended beneficiaries.''[23]

As regards national housing authorities the National Housing and Urban Development Agency (PERUMNAS), which was working in

tandem with the settlements upgrading programme, targeted some 30,000 housing units annually in its Five-Year Plan for 1979–1984. The problem has been that, even if the target had been met, the housing units would have made only a small dent in housing needs, with the growth of the population in Jakarta estimated at 250,000 inhabitants annually.[24] Furthermore, with the difficulty in obtaining low-cost land for building its housing units, the authority was ultimately unable to provide low-cost solutions to the housing problem and many of the solutions the agency provided were not allocated to low-income groups. Consequently, illegal squatter settlements continue to proliferate, often on prime agricultural land.

The problem with obtaining sufficient land for housing at costs that are affordable to the poor is complicated by the need to find such land in suitable locations that would not require long commuting distances to work and hence higher transport costs. Land availability is a constraint facing state housing agencies in the cities of the Philippines, Thailand, and also Indonesia. In the Philippines, government resources will never be sufficient to maintain a continuous subsidy for housing for low-income families, and there is a need for policy reinforcements especially in the matter of land acquisition and strategies to lower the cost of housing in order to make it accessible to the poor.

Increasingly there is also recognition of the many other constraints preventing the state and its policies from providing more comprehensive solutions and widening the coverage of the efforts which have been successfully implemented so far. Commenting on new attitudes and policies for housing the poor, Hardoy and Satterthwaite pointed out that leaders such as Julius Nyerere, the former president of Tanzania, had astutely observed that nations are far too large for people at the centre to understand local problems and to sense the urgency of these problems.[25] Yet all the power remains in the centre, so it is not surprising that local problems persist because local people who are aware of the problems are prevented from taking the initiative, or are powerless to take it.

Civic participation and the involvement of the citizenry

Most municipalities in Asia have apparently recognized, after considerable ‘‘pain and cost … that a centrist, top-down approach to service delivery without the support from other actors is unsustainable.’’[26] There are exceptions where relatively centralized policy decision-making has proven to be successful in providing solutions to

urban needs for basic infrastructure and housing, although these may be few and far between. City-states such as Singapore and Hong Kong have demonstrated that centralized decision-making can also successfully contribute to meeting the needs of urban people for housing, transport, and health care. At the same time, the provision of urban facilities and housing has been linked successfully to economic growth.[27]

On the other hand, self-help programmemes, supported in one way or another by professional groups and consultants, have actually proven to be highly effective in improving the environment in which a large number of urban people live in South-East Asian cities. In part owing to the success of a number of projects initiated by professionals but involving direct participation by the beneficiaries, city governments are being urged to look more favourably on participatory, self-help, and community programmes in exploring different modes of urban service delivery.

Mutual assistance provided the force through which a new neighbourhood was developed in Bangkok, in a project known as Building Together. In the project, residents purchased their own land, planned the site, financed the project, and eventually built themselves homes.[28]

Non-government organizations (NGOs) have similarly achieved success in other South-East Asian cities. In Manila, an NGO called Freedom to Build had in the mid–1970s succeeded in implementing the Dasmarinas Resettlement Project outside the city, where some 4,000 evicted squatters had been relocated. The NGO ran a building supply store for the settlers to construct their own homes, as well as providing other forms of assistance. According to Yeung, the success of many so-called aided self-help projects highlights that the common basis for success is the organization and management expertise provided by NGOs in rallying citizens to a common goal. His view is that ''the NGO not only provides the initial spark of interest in crystallizing a critical problem but sees the project to its completion. Essentially, the people themselves would do the work but the NGO provides a vital institutional framework with which to reach a common goal. Recent experience speaks well for this approach in Asia.''[29]

The role of non-government organizations in Singapore

To quote a report by an Inter-Ministry Committee in Singapore for the UNCED Preparatory Committee, ''Prior to 1980, Non-Government

Organization (NGO) activity in the environmental arena was minimal.''[30] According to this report, the growth of NGO numbers and activities paralleled the development of Singapore's economy. The rise of NGO activity has been attributed to the prosperity and increase in the level of education among the people in Singapore.

NGOs and environmental management

Environmental management in Singapore is characterized by a top-down approach, albeit a successful one.

> A healthy environment has been kept up by thorough government planning and rigorous implementation of these plans, decades of institution building, regulations and the respective enforcement of tough laws as well as years of government campaigns to educate citizens. In contrast to other countries, efforts to protect the environment followed a top-down approach, a rather successful one nonetheless. ... Singapore has forced producers and consumers to behave responsibly or face fines. The clearing of slums and squatter areas, phasing-out of some pollutive businesses (e.g. pig farming, backyard trades) and roadside hawkers and resettlement of families from the Singapore river were prerequisites for improved environmental standards, but they were not met with enthusiasm by the people affected.[31]

The non-government institutions argue persuasively that there are many areas in environmental management and planning which are best left to the non-governmental or non-profit sector. Indeed, ''localisation, decentralisation and increased participation are the characteristics of a modern democratic society.''[32] NGOs engage in activities such as preventive action, research, information, participation, and the inculcation of the sense of shared responsibility. Voluntary channels and initiatives, according to the non-government and non-profit sector, can disseminate information to society in meaningful ways, and these ways can be far less costly than if the state were to undertake the work.

Evaluation of NGOs on the environment in Singapore

International environmental NGOs such as Greenpeace, Friends of the Earth, and the World Wide Fund for Nature have no equivalent in Singapore, which perhaps has led to the assessment that ''Singapore can claim no environmental movement in the sense of a broad

coalition of urban or rural citizen action groups fighting against pollution, environmental degradation or the inequitable allocation of natural resources.''[33] Does this mean that there is no civil society action to speak of in the area of environmental management and planning? The existence of groups such as the Nature Society (Singapore) suggests otherwise, in part because of the success that this civil society organization has had in nature conservation work and also because of the background of the organization itself.

The Nature Society (Singapore) and nature conservation

The Nature Society is one of the longest-established civil groups concerned with the environment. This organization was part of the Malayan Nature Society, which was established in November 1954. Its early beginnings were linked more to the expatriate community in Malaysia and Singapore, being motivated largely by the love of nature. Since this early start, the organization has evolved into a nature conservation group which has sought to play a role in contributing to decision-making on city development as it encroaches on nature reserves and habitats of wildlife.

The Malayan Nature Society had some 200 members, mainly expatriate, in the 1960s. The current membership of the Nature Society (Singapore) is closer to 2,000, with more locals. Backed by members from the academic community of the local universities, the society has in the last decade contributed valuable input into policy decision-making on land-use development in the city.

Apart from raising awareness among the public of environmental issues, the society has had success in its recommendation for the government to set up a bird sanctuary in a site of disused ponds previously used for prawn farming. The society's ''Master Plan for the Conservation of Nature in Singapore'' was based on research by its members and listed some 11 high-priority and 16 less crucial sites.[34] Other reports have contributed to other policy decisions, such as the postponement of golf-course development in nature reserves in the city-state.

The instruments on which the society has relied in its work with the state are environmental impact assessment reports and other research papers. To engage the public, the society has organized field trips, lectures, seminars, clean-up campaigns, and reef-rescue operations, and it has actively participated in forums as well as public discussions.

Singapore Environment Council – the umbrella organization

This organization, which started out as the National Environment Council, was renamed in the last two years in a bid to distance itself from the state, which had initiated the council in 1990. This move was aimed at generating environmental awareness through education and information-gathering among groups with an interest in environmental management and protection, including private-sector businesses. Hence, the council's board comprises representatives from business, government agencies, and academia. Of the 366 members, however, there are only 46 corporate members. Similarly, only four of the directors of the council are elected by these members. The majority, that is the remaining 11, are actually appointed by the patron-in-chief, who is the Minister of the Environment.

The council is acting in the capacity of an umbrella organization for non-government and non-profit groups doing environmental protection work. Although the focus is on businesses, environmental auditing, and voluntary commitment to environmental impact assessment, the council targets ''a broad audience in schools, institutions of higher learning, the media, other green groups, community centres, and especially youth and women.''[35]

In an assessment of the environmental work contributed by the council, the council has generally been successful in working on projects such as the promotion of recycling, conducting surveys, and organizing World Environment Day celebrations. However, the government agencies have been less forthcoming when the council has broached policy-related matters such as the evaluation of the implementation of regulations against the trade in endangered species.[36] This evaluation has been repeated in a review of the work contributed by other non-government groups working on the environment.

Other organizations

Many of the other organizations have been recognized by the Ministry of the Environment as having contributed to Singaporeans' growing environmental consciousness. Organizations such as the Singapore National Forum of Environmental Journalists (formed in December 1990), while recognized as having an interest in environmental issues, are not necessarily groups which have been formed expressly with the aim of promoting environmental awareness or the

protection of fauna and flora. Many appear to have adopted environmental work as one of a range of activities in their agendas.

The characteristics of the groups voluntarily formed to work on environmental issues are similar in that they are small, are predominantly college- or school-based, and started in the 1990s (see table 6.1). Clearly, there are so far no broad-based environmental groups working exclusively on the environment in a way which seeks an input into policy decisions.

Urban environmental behaviour: The role of the urban citizenry

The experience of cities in developing countries generally suggests that the role of the urban citizenry is increasingly important in the management of the impact of urbanization and the meeting of basic urban needs. Much of the contribution by citizens' groups is encouraged by the inadequate provision for their needs in the cities of many developing countries. According to Hardoy and Satterthwaite, the possibility of tackling health problems arising from the inadequate provision of basic environmental infrastructure to meet needs such as drainage and waste handling, depends on cooperation between local government and community-based or neighbourhood-based citizen groups.[37] Much of the success with aided self-help programmes has involved partnerships between local government and urban communities.

There are several levels of environmental management effort to which citizens' groups can contribute. While the more basic level concerns encouraging communities to participate in providing for their own needs, more affluent urban communities can contribute at the level involving greater environmentally conscious consumerism. Here consumers and groups comprising such members of the community can contribute significantly towards influencing businesses and their effort in managing their impact on the environment. Many firms have taken initiatives in introducing clean technologies because of the concerns about reducing costs and, more importantly, maintaining or even increasing market share.

The participation of the citizenry in promoting more environmentally conscious levels of consumption requires, however, effort as regards raising environmental awareness among the citizens. This is the opportunity for environmental groups which are working on educational programmes and campaigns.

Table 6.1 **Selected environmental groups in Singapore**

Group Name	Founded	Members	Type/Link
Applied Science Club; Environmental Subcommittee	1992	25 subcommittee members	University-based
Baha'i Office of the Environment	1991	3 committee members	Religious
Campus Green Team	1992	25	Polytechnic
Conversation Club	1991/92	45	College-based
Environmental Forum for Communicators of Singapore	1993	400	Professionals in communications
Earth Shield	1990	10	College-based
Engender (Centre for Environment, Gender, and Development)	1992	n.a.	Regional network
Environmental Rangers Society	1992	15	Polytechnic
Green Guards	1991	12	College-based
Green Link	1991	30 or more	College-based
Humane Ethics for Animal Life	1991	10	
Help Everyone Love Our Planet	1994	77	Based in Institute of Education
Singapore Manufacturers' Association Environmental Committee	1994	13	Corporate sector
Singapore Association for Environmental Companies	1994	10	Corporate sector
Society for the Prevention of Cruelty to Animals	since the 1800s	4,497	
Students against Violation of the Earth	1992	60	University-based
Temasek Polytechnic Green Nature Club	1991	100	Polytechnic

Source: Makani and Stengel, "The Role of NGOs and Near NGOs," pp. 294–5.

In the cities of developing countries, and in particular South-East Asia, there has been a lamentable lack of environmental consciousness among the citizenry in terms of its demand on business to meet at least the basic standards of environmental management. Many industries in the cities of South-East Asia have been disposing of their wastes untreated into rivers, canals, and other water bodies so that ''[while] in the past, industries yielded substantial organic loads into rivers, reflecting the predominance of food processing industries such as sugar refineries and fish processing plants,'' now ''with the proliferation of textile, electronics, chemical and petrochemical industries, non-degradable inorganic and hazardous wastes are finding their way into rivers. In Kuala Lumpur, for example, heavy metals such as lead, zinc, copper, and cadmium have recently been detected in the Klang River, which has been classified by the Department of Environment as one of the three most polluted rivers in the country.''[38] More can be done in terms of giving the citizenry access to information which can help raise environmental awareness and help form and channel the contribution consumers can make.

Clearly, in the case of major urban problems such as the traffic congestion faced by many cities in developing countries, there is more that can be achieved through a change in the behaviour of consumers. Apart from the role the authorities can play in investing in public modes of transport in contrast to the private modes for which many have opted, the public has to agree to use public transport services when these are available. The process of converting consumers can be an uphill struggle, judging from the findings of surveys that have been conducted with the aim of assessing public consciousness of environmental needs and willingness to translate these into everyday practices.

Surveys which provide views on the effectiveness of the government campaigns in the city-state of Singapore, as well as the introduction of programmes such as the Green Labelling Scheme, suggest that these have had limited impact. Messages such as those against littering, being disseminated through government campaigns, appeared to have had little impression upon young people surveyed by Savage and Lau.[39] More revealing was the finding that knowledge of environmental needs does not necessarily translate into practices and everyday behaviour. Consumers surveyed about the Green Labelling Scheme similarly showed relatively little interest in products which were so labelled because, while 51 per cent of households re-

cognized the label, only 3 per cent looked for it all the time and 12 per cent most of the time.[40]

Environmental economists have, however, advanced the view that consumer behaviour and the economic behaviour of people generally have been greatly misunderstood, particularly in the shaping of policies meant to influence such behaviour.[41] The presumption is to equate the maximum sum a person would pay to acquire an entitlement with the minimum amount required to give it up. Studies have found, on the contrary, that mitigation measures might be valued more because they reduce losses, while compensation awards might be heavily discounted by people because they fall within their domain of gains. Yet the usual economic critique and prescription assumes that people should favour money compensation over either other forms of compensation or prescribed mitigation measures.[42] This may make for inefficient environmental policies, since the economic analysis and prescription do not take into account people's preferences. Civil society organizations focused on environmental work are in a better position to identify such preferences more closely and in this way contribute to the policy decision-making process. Since these organizations work more closely with consumers and urban residents, strengthening their resources and expertise can help provide more information about the public's preferences and its views of policies which will work.

Clearly, policies involving big changes in behaviour with environmental consequences, such as waste minimization, recycling, and resource conservation in the use of water or energy, rest upon the support of consumers. The limited success of such environmental management projects in most cities of the developing world reflects in part the limited scale of the work contributed by civil society organizations.

Conclusion

The argument for greater civic participation in urban environmental management has been based on the greater efficiency and lower costs involved in using voluntary channels, in contrast to government channels, in many areas of work related to environmental education and consciousness-raising. Many of the civil society organizations at the national level can be strengthened in terms of resources and information with which to act, by networking with parallel organiza-

tions in cities of other countries. More importantly, successful experiences can be shared so that civil society organizations can concentrate their resources and energies on key areas of environmental work in cities and among urban consumers as well as businesses.

Cities continue to pose the greatest challenge to environmental management since they are centres of both production and consumption. Population numbers and densities in most Asian cities remain high, so the demand for infrastructure to manage the impact of urban growth and expansion is likely to grow. Civil society organizations and civic action in Singapore and many other cities have already illustrated the role that they can play towards providing solutions to many of the worst environmental problems experienced in cities of developing countries. Contributions from civil society can be made at various levels and also in many aspects of the urban environmental management effort. While many civil society organizations, such as environmental groups focused on influencing consumer behaviour, can contribute generally to raising consciousness and awareness of urban environmental issues, there are also organizations which can bring about collaboration between professional groups and urban residents in order to tackle major environmental needs.

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7

An institutional capacity-building approach to urban environmental governance in medium-sized cities in Latin America and the Caribbean

Daniela Simioni

Sustainable development of human settlements in Latin America and the Caribbean

The 1980s are often called the ''painful learning decade'' in Latin America, owing to the revisions that were needed in various areas of public policy as a result of economic adjustment policies. In the wake of this experience most Latin American and Caribbean countries set themselves the task of dealing with the effects of these policies on their communities. In the first half of the 1990s, these countries began to focus on urban and housing processes, placing greater emphasis on social, economic, and environmental aspects.

Urban poverty, segregation, and housing deficits were and still are among the basic concerns of the public and private bodies associated with these issues. In their search for efficiency and effectiveness, the countries moved towards a high degree of specialization in government sectors and sophistication in their implementation. At the same time, in view of the profound transformations experienced by the economies of the countries, there was growing awareness of the importance of cities and urban systems as spaces and territories whose attributes and processes can be either favourable or unfavourable to

economic progress. The Latin American urban population growth rate fell from 2.2 per cent a year in the period 1970–1980 to 1.8 per cent between 1990 and 1995, and the high degree of urbanization in the region was no longer regarded as a negative aspect. Meanwhile, from an economic standpoint, the efficient management of human settlements came to be seen as an essential goal.

In the second half of the 1990s, interesting changes of emphasis can be observed in human settlement policies, which are reflected in the Regional Plan of Action prepared by the governmental institutions of the urban and housing sector and presented at the United Nations Conference on Human Settlements (Habitat II), held in Istanbul in 1996. The agreements adopted by the countries of the region in order to achieve sustainable development in their human settlements fall into five subject areas:

1. Achieving social equity and alleviating urban poverty, for example by increasing the number of housing units so that they at least match the formation of new households; expanding programmes to provide sanitation, shelter, regularization of tenure, and access to public infrastructure; establishing programmes to maintain and upgrade existing housing; moving towards subsidies that are procedurally clearer and more effective; and promoting rural settlements and housing.
2. Increasing the productivity of human settlements to improve people's quality of life and opportunities for economic, social, and environmental progress; developing the competitiveness and productive potential of cities; putting integrated management of urban systems on a sounder footing; correcting deficiencies in the urban and productive infrastructure of cities; and using policies relating to housing, services, and access to public infrastructure to foster the formation of human capital.
3. Improving the urban environment by engaging development organizations in an effort to achieve environmental sustainability; modernizing the legal and regulatory framework governing the ownership and trading of land; tackling road congestion and transport and the lack of sanitation.
4. Improving governance and participation by establishing coordination between sectoral agencies and local governments; furthering the decentralization of the state; and strengthening the administrative, technical, and financial capabilities of local governments.
5. Achieving policy and management efficiency, by administering the areas of territorial management, urban development, and housing

in an integrated fashion; establishing a regulatory framework for the contribution made by the private sector to the production and operation of urban services and housing; and fostering the use of reliable and comparable statistics, including censuses.

As this suggests, the debate about managing urban and housing problems has incorporated the environmental aspect more decisively. This is due in part to the worsening of environmental problems in most cities, which are endangering not only the quality of life of their inhabitants but productivity and competitiveness as well. As high levels of urbanization are attained, the concentration of people and activity in urban spaces means that air pollution, vehicle congestion, and waste disposal are issues that must be tackled with some urgency. As citizens have perceived these problems, management of the urban environment has taken on great political importance.

Thus, the importance of environmental issues in urban development and housing policies means that new forms of action are arising in the sector in this second half of the decade. In fact, although certain environmental problems are particularly harmful to lower-income groups, others do not distinguish between rich and poor, for instance vehicle congestion and air pollution.

Hitherto, the difficulties that governments have encountered in incorporating environmental objectives into their human settlement strategies have been of a political rather than a technological kind. Social and political agreements have been difficult to reach in areas that are especially sensitive to special interest groups. This is the case with regulation of the land market because of the construction and real-estate interest groups, the control of industrial pollution because of urban businesses and industrialists, and measures to control vehicle congestion because of the groups and individuals that might feel the effects of these.

Owing to such factors, there has been considerable delay in adjusting institutional mechanisms of control and management that make it possible for the private sector to share in the responsibility for the environmental costs arising from its own production and real-estate activities. On the other hand, in most cases it has proved less difficult to tap into the technologies, knowledge, and national and international experience required for specific urban environment issues to be tackled.

Generally, for the urban environment to be improved, all citizens need to be involved, and the different sectors need to be united

around a common programme of action. In this context, the role of local government, with its ability to administer the urban space, coordinate sectoral initiatives, and open up opportunities for inhabitants to share in the management and progress of their city, has grown in importance. There is a range of initiatives that can promote participation by users in decisions relating to the management of their neighbourhood and city. These practices need to be incorporated into institutional models capable of being applied on the massive scale that characterizes the cities of Latin America and the Caribbean. The aim of these initiatives is to develop new forms of management able to take a concerted approach in identifying the problems faced by cities and then establish permanent working and decision-making spaces for the different actors on the urban scene.

As the decade nears its end, analysis of the progress achieved through urban and housing policies suggests that there is still a great deal of work to be done in increasing both the scope and the degree of specialization of action in the financial, social, and institutional areas, among others. In the future, the need for progress in the management of human settlements and in achieving greater effectiveness and efficiency will depend on the ability to embrace and complement the different aspects and levels that make up the life of human settlements. Only in this way is it possible to create the cumulative and synergetic effects required for sustainable development of the Latin American and Caribbean habitat in the coming years.

Supporting urban management in medium-cities in the Latin American region

The Economic Commission for Latin America and the Caribbean (ECLAC), through its Environment and Development Division, is carrying out the project ''Urban Management in Selected Medium-sized Cities of Latin America and the Caribbean'' with financial support from the government of Italy. The aim of the project is to assist local governments in six selected cities of the region (Córdoba, Argentina; Cusco, Peru; Manizales, Colombia; Ouro Prêto, Brazil; Port of Spain, Trinidad and Tobago; and Valdivia, Chile) to identify technical assistance needs in the local administration of urban development and to strengthen the municipalities' urban management instruments and mechanisms. The purpose is to contribute to horizontal cooperation between local governments and to formulate recommendations which are of general application. The general objec-

tives of the project are to increase productivity and efficiency in the use of scarce resources, to contribute to reducing poverty, and to encourage an appropriate environmental balance at the local level.

Improving productivity and urban efficiency

An objective clearly associated with the role of the municipality, as it is most frequently perceived, is that urban management should seek to raise urban productivity to the maximum extent possible. Viewed from this perspective, the city basically constitutes a support system for the functions of social production, whether it be of products, goods, or services. In addition, the city is the major setting in which society reproduces itself, in all its cultural, political, biological, and economic dimensions. This objective therefore includes all the efforts the municipality undertakes to make productive and social agents more effective, including providing the city with the necessary infrastructure for this purpose. Associated with the concept of productivity is the requirement of administering all the resources at the disposal of the local authority, and by extension of the locality, as efficiently as possible, as well as that of seeking mechanisms to guarantee the provision of basic levels of infrastructure and public services. The contribution to development is therefore measured by the standards of provision, speed of implementation, and distribution of development efforts.

Seen from this perspective, the city is the result of a gradual process of population concentration, for the purposes of increasing the production and circulation of goods and services and of improving living conditions. This process carries with it the logical need to construct and equip the city, and for the resources with which to do so. In other words, in order to support efficient production and to improve the standard of living of the population, the city, as a system, requires operating resources and a system of administration that is itself efficient.

The physical elements of the locality, along with the set of regulations and procedures laid down for its administration, together constitute a complex system. Both these dimensions, the ''hard'' and the ''soft,'' are of specific concern for urban administration and management. The administrative and management processes associated with urban development can thus be conceptualized as the contribution that the local government or public administration makes to national growth and development. This perspective should contribute to a

reassessment of the importance and priority assigned to systems for monitoring, financing, and implementing action in the urban setting, particularly as the cost of production functions in inefficient urban administration can be very high, even to the point of discouraging new investments.

Thus, two urban support systems can be distinguished: a physical support system and a legal–institutional–administrative system. The interrelationship established between them is vital to management and, for that reason, to the purpose of this project.

The physical system is composed of the elements of material support of the urban environment, such as basic services (water, sewerage, electricity, gas, telephone); transport systems and networks; availability of land for development; buildings; and recreation areas and open spaces. The non-physical or administrative system is composed of urban legislation; public and private administrative institutions; regulatory, implementation, monitoring, and evaluation procedures; databases; mechanisms and instruments for project financing and follow-up; statutes and ordinances; information (land registries, censuses, records, archives, maps); and similar items.

The physical and the administrative dimensions are superimposed on the functioning of the local government, which must seek to achieve efficiency in both spheres and in this way increase urban productivity. Decentralization of functions is based *inter alia* on the supposition that the centralized administration of the localities has not been able to meet the demands for support to production or for the purposes of development.

It is therefore essential to review the administrative processes with a view to increasing the efficiency of the support systems, both physical and non-physical.

Overcoming poverty and promoting economic and social development

The local public administrative apparatus has not only to undertake efforts to provide the community with infrastructure and services, but must also take special initiatives to seek and allocate investment for production at the local level in order to achieve economic growth. The final objective is to contribute to global economic growth, thereby contributing to the reduction of the poverty indicators at the local level and in the society as a whole.

This implies that local management should give priority to identi-

fying the development and social assistance needs of the locality in order to set up specific local development programmes (training, employment generation, vaccination of the sectors of the population at risk, attention to handicapped people, campaigns against drug addiction and alcoholism). In this respect it is essential to determine how the municipality is incorporated in the social and economic development strategies proposed by the national government, both to establish the local specificities and means of financing and to consolidate the system for the local administration of these functions.

From the point of view of the municipality, poverty is a primary challenge. First, poverty restricts and places conditions on traditional urban management because it constitutes a continuous drain on public resources; it presents difficulties for planning and monitoring; it involves short-term goals and recurring requirements; the diagnostic methodologies do not necessarily lead to proposals for direct implementation; and it has its roots at levels that are beyond local control. Second, poverty and its effects on the locality demand rapid responses on the part of the administrative system, in the form of specific actions aimed at the elimination or reduction of critical indicators such as insufficient service provision, associated infant mortality, and high local unemployment. Third, in addressing the issue of poverty, local management can capitalize on poor people's own efforts at self-sufficiency as a resource which, when duly organized and with appropriate advice, can lead to a reduction in the demands on the local administrative apparatus and can also help to generate means of combating the environmental problems that are rooted in the local community. A fourth dimension of the problem is that poverty places a heavy burden on the public sector and on the locality itself because of the environmental degradation that results from the lack of capacity of the population to assume even the minimum costs of constructing and maintaining their milieu.

The local authority has a crucial responsibility with regard to the use of the urban environment. The costs to the public sector of adapting urban areas should be generally known and clearly administered, with the aim of improving the demand–dependency relationship that a large part of the urban population has towards their environment and those who administer it. To sum up, the incorporation of development issues into the outlook of local administration, especially with regard to reducing poverty, requires that the municipality assume new tasks, handle new information, and work along non-traditional lines using non-conventional methods. It also involves

coordinating efforts that are generally dispersed, evaluating urban management using non-physical and even non-quantifiable indicators, drawing up projects with specific social development objectives, and evaluating the social cost-effectiveness of public investment in the local area. It also means that the local authority has to give priority to action for the poorest, using for this purpose its own capacities and the opportunities provided by the locality itself and its potential for economic growth. The equitable distribution of growth in the urban context should be established as an additional responsibility of local management.

Ensuring sustainable urban development

One of the most critical consequences of the rapid growth and development of medium-sized and larger cities in Latin America is the deterioration in the people's immediate environment. This presents important management challenges, but in addition, it goes hand in hand with a deterioration in the quality of life in the settlements themselves.

The problem is a special one in that it presents various levels of aggregation and complexity which, because of their systemic nature, merge into one another. Beyond the need to draw up national policies for the administration of resources, it is important to establish what room for action the local administration has in this particular field. A first general observation to be made is that there are generally no environmental databases. Where they do exist they are organized by sector, which makes them difficult to use for programming and project purposes. In addition, local governments generally lack monitoring systems, the capacity to implement legislation, regulations, as well as the ability to establish standards adapted to the characteristics of the local area.

The most traditional dimension of the environmental problem for local management is sanitation. Tasks at the local level include garbage collection, septic tanks, sewage disposal, rat extermination and dog vaccination campaigns, cleaning of streets and open-air markets and by extension the paving of streets, control of gas emissions, certification and inspection of slaughterhouses, restaurants, and cafeterias, the administration of cemeteries, and monitoring of drinking water quality. Other responsibilities affecting the quality of the habitat are: maintenance of green spaces and recreation areas, tree

planting, the issuing of licences to sell alcohol, and campaigns for upgrading public buildings and places.

The main challenge in this management area consists of creating administrative systems that introduce the concept of the quality of life into the environmental dimension, beyond the traditional concept of the standard of living, thus encouraging a dynamic relationship with the environment that allows for the redirection of local development, with appropriate management of the environmental resources, costs, and benefits that this development brings with it. This is very closely bound up with the local government's role of leadership in generating public awareness concerning the environment, either through organizing information campaigns or organizing the community itself to manage the environment.

Methodology

The current work on urban issues has strengthened the perception that urban management in the region should be viewed in the context of the process of decentralization, in which local governments play a key role. Despite the many imperfections of the decentralization process, it is undeniable that most countries have embarked on, or are seriously considering, its implementation. It is expected that this process will continue and deepen in the future, in view of the generalized efforts to restructure the public administration and to consolidate the democratic institutions with augmented citizen participation. Decentralization on its own is not the solution to the management problems of the cities in the Latin American region, but it is an important element in the achievement of this goal. Furthermore, current developments in the region stress the opportunity offered by decentralization as a strategy for development. This is even more the case at the level of intermediate-sized cities, which are rapidly becoming the fastest-growing echelon of the human settlements in the region, and where the benefits of regional and local economic development are not yet counterbalanced by the negative externalities of metropolitan agglomerations.

The widespread crisis of the public administration system and the contraction of national governments to the extent that they can attend only to short-term priorities is forcing local governments to assume the role of protagonists in urban development. As a result of the above, citizens' demands are also increasingly directed at local

authorities. Despite the limited capacity of local governments to assume this task, it is clear that they are at present among the only institutions that offer better opportunities to develop a system for the administration of urban renovation and social and economic development. This is mainly due to their existing mandates and their insertion in the community. While it is common to see countries where local authorities have on paper the main responsibility for urban management, in practice they are unable to discharge their duties to implement appropriate urban planning and management systems. This common situation has been unfairly used to focus criticism on local governments, ignoring the fact that it is more the result of inadequate or non-existent policies to strengthen the management capacity of local governments than of failure of the principles behind the municipal management of urban development.

The project ''Urban Management in Selected Medium-sized Cities of Latin America and the Caribbean'' aims to provide urban managers with instruments to overcome the obstacles to the achievement of better urban management. In particular, it emphasizes improving productivity and urban efficiency, overcoming poverty and promoting economic and social development, and ensuring sustainable urban development. The improvement of urban productivity and efficiency relates, in general terms, to the traditional perception of urban management that normally falls within the legal responsibilities of local governments. However, in the case of this project, urban management is the efficient provision and management of those physical and procedural elements that make the city work and stimulate further development. These include such elements as the urban infrastructure and basic services, the use of the land, legal and institutional instruments, and operation and maintenance routines.

The second objective, to promote economic and social development, is not currently clearly perceived as a task of local government. However, in the future, local authorities will need to think of the city more in terms of a cell of economic and social development that contributes to overall national development. Thus, the urban administration will need to assume a leading role in areas such as the promotion of investments in the productive sector and other economic activities, the implementation of social programmes, and the strengthening of economic links with the city's outlying districts as well as with the nation as a whole.

Finally, in ensuring the sustainability of urban development, local authorities will need to navigate uncharted waters. The links between

urban activities, the environment, and quality of life are only beginning to be clearly understood. Local governments will be asked to ponder both the qualitative relations between these aspects and the mechanisms used to implement and achieve an equilibrium.

Working with the various actors within local government, the project focuses on the obstacles to efficient urban management and then acts upon proposals which are directed at a more effective form of municipal management. The methodology is based on case studies, which inform the local governments of, first, advancements in the decentralization process; second, the global coherence of the process in relation to the national administration's policy; and third, the principal stumbling blocks that need to be overcome in order to strengthen both local government and its system of urban development.

The activities of the project were carried out in two phases. First, diagnostic and comparative studies of urban management development were carried out in six cities: Córdoba, Argentina; Cusco, Peru; Manizales, Colombia; Ouro Prêto, Brazil; Port of Spain, Trinidad and Tobago; and Valdivia, Chile. The studies were carried out by teams of national consultants in cooperation with the local authorities of the cities. The intention was to carry out the case studies ''within'' the municipalities. The resulting evaluations served as an accurate diagnosis of current urban management conditions, as well as strategic instruments to be used by the local authorities for defining priorities that strengthen their management capabilities and orient their development strategies.

At the end of each case study, national workshops were held to evaluate the results. They prioritized areas for intervention and made proposals for the technical cooperation activities to be carried out in the second phase of the project. In addition to local authorities, the workshops were attended by other agents who participate in urban development: private-sector actors, community organizations, politicians, academics, and central and regional agencies.

The national workshops were followed by a Regional Meeting to evaluate the overall results of the project's first phase. The main objectives of the meeting were to compare the results obtained in the case studies, to carry out a critical and comparative analysis of the work methodology followed by the research teams and local authorities, and to identify and prioritize common areas requiring external assistance. Furthermore, the meeting helped to define the most effective ways for providing technical assistance in the following stage of the project.

Based on the conclusions of the case studies and the recommendations of the Regional Meeting, the second phase involved undertaking specific works in the six cities in order to design urban management systems and models appropriate to their specific requirements. The project provided direct technical support to the cities in upgrading their management processes according to project findings. However, the implementation and improvement of the systems designed remain the task of the local governments.

The project activities focused on the following areas of intervention to address the process of sustainable urban development:

- Rationalization of the decision-making process of the municipal planning department, especially in relation to monitoring the implementation of policies, programmes, and projects contained within the municipal plan of development;
- Contribution to the deconcentration process of municipal management based on a decision-making system that grants a more equitable hierarchy of decision-makers;
- Improvement of municipal management through the design, empowerment, and implementation of a number of components, processes, and instruments that form part of an integrated system of intervention aimed at addressing the deteriorated habitat;
- Conducting of preliminary on-site strategic planning which permits greater participation on the part of beneficiaries in the decision-making process, and streamlining of the processes and procedures involved in the distribution of municipal services;
- Coordination of the actions of the institutions responsible for the implementation of municipal plans and programmes as well as other public institutions with whom they have affiliations. Organization of and collaboration with the actions of public institutions at all levels;
- Facilitation of the control, evaluation, tracking, and monitoring of the divers phases of development plans by means of urban and environmental indicators and the construction of a multi-purpose land register.

In accordance with these areas of intervention, the project developed specific activities such as the design of:

- A public–private agency for local development and a city marketing plan for Córdoba, Argentina;
- A process of strategic planning and an institutional re-engineering plan for the local waste management agency in Cusco, Peru;
- A system for monitoring the implementation of the city's develop-

ment plan for the 21st century and a system of diffusion of the plan between different sectors of citizens in Manizales, Colombia;
- A municipal intervention system in the impoverished peripheral areas of Ouro Prêto, Brazil;
- A municipal information system for Port of Spain, Trinidad and Tobago;
- A public–private agency for local development and a revision of the decision-making process in physical planning in Valdivia, Chile.

Since the provision of technical assistance to the cities was based on the practical needs of municipal implementation, the project outcome had the following components:
- The elaboration of management instruments and procedures in the form of manuals, guidelines, and/or software;
- Direct technical support to the local authorities in the introduction and application of such instruments, and in improving management procedures;
- Technical assistance in the elaboration of funding requests in order to have a broader implementation of improved management procedures.

The project was officially completed at the end of March 1998; the municipalities involved affirmed their commitments to put into effect the proposals and recommendations emerging from the technical assistance provided by ECLAC.

Basically, the purpose of this project of cooperation with municipal governments was to design and implement an urban management system that can help to overcome the shortcomings and limitations of the cities in the region. The outputs are expected to contribute to the establishment of a series of tools which, when adapted to the particular features of different situations, should provide a solution to general problems of environmental and urban management in the Latin American area.

What is needed now is the design and implementation of a programme of empowerment that can be articulated and disseminated and that gives public officials the knowledge and skills to operate these policy guidelines. With this knowledge, public officials will be able to provide these newly developed management systems with the support necessary to assure their effectiveness and durability.

8

After the Dam Age is done: Social capital and eco-partnerships in urban watersheds

James E. Nickum

There is a growing recognition of the need to form collaborative arrangements among citizens, NGOs, the business sector, municipal governments, and other public authorities to secure and dispose of water supplies for urban areas in an environmentally and socially resilient way.[1] This awareness stems in part from the unsustainability of the traditional reliance on large, supply-side, capital-intensive projects such as dams, diversions, and even integrated sewerage and treatment systems. In the United States and some parts of Europe, dams and dykes are being literally deconstructed for environmental purposes. The reasons for this sea-change defy enumeration, but include escalating capital and operating expenses, the vanishing of unclaimed clean and accessible water sources, growing sensitivity to social and environmental costs, the recognition of the complex causes of water degradation, and the inflexibility and often corrupt nature of the project culture.[2]

Soft measures such as the law have not had a satisfactory track record recently either. Indeed, some of the fundamental principles of environmental law, including water law, are now being re-examined. Europe and America, where much of this law was pioneered, have entered a period some have characterized as "the end of environmental law."[3] Here I delineate some of the contours of the nearing of

the end of the state-driven ''dam age'' in Japan, using the Lake Biwa–Yodo River Basin in western Japan as a case study. I contextualize this picture in terms of the impasse in environmental law and explore one of the approaches being raised as an alternative for the future – that of ''self-organization,'' which, it seems, depends on the local capacity for self-organization, or ''social capital.''

The likelihood of success in building new broad-based partnerships for urban environmental governance based on civil society will, I hypothesize, depend crucially on the quality of existing – sometimes even pre-existing – social capital. Social capital is accumulated over time, dimming prospects for places with no history of self-organization. This asset, like the environment, has in recent decades often been ignored, and even repressed, by a state-driven project culture that by focusing on the ''supply-side'' has been able to insulate the construction bureaucracy from the wider civil society. Demand management and, beyond that, forging genuine partnerships with members of society outside the pork barrel, requires a new, more flexible and open mode of government operation that can be of mutual benefit: places with large amounts of social capital also tend to have more effective and engaged governments.

In the case of Lake Biwa–Yodo, there are fortunate indications that the inherited level of social capital is quite high, but it has been distorted the past few decades by a project culture, embodied in the Lake Biwa Comprehensive Development Plan (LBCDP, 1972–1997). With the end of the plan, it is necessary and opportune to identify and build on the evolved capacity for self-organization outside the received formal administrative framework. Before turning to this case, however, it will be useful to review the general state of affairs in water policy and environmental law, with a focus on the United States and Europe.

The clash of imperatives in water policy

It is almost trivial to note that the need to find more resilient approaches to water extends beyond municipal boundaries. In his review of the history of water policy in the United States, Peter Rogers, a professor of environmental engineering at Harvard, claims that there is a clash between scientific, economic, technological, and political ''imperatives.''[4] In water-quality policy in the United States since the 1970s, as in water development before then, technological and political, including administrative, imperatives have gained pre-

cedence over scientific or even economic ones. In particular, clean-up efforts have been directed at partial, localized, point sources in a static framework rather than at watershed dynamics, the hydrological cycle, and non-point sources. For example, in the fifteen years from 1972 to 1987 the city of Milwaukee spent US$900 million on water pollution control in order to clean up its waterfront for recreation and tourist development, but failed because of the pollution from non-point sources well outside the city's jurisdiction.[5]

According to Rogers,[6] technological imperatives have the following dysfunctional characteristics (for both water quantity and water quality):

- Large economies of scale that lead to overcapacity and encourage excessive use;
- End-of-pipe regulation rather than process regulation, and end-of-pipe standards rather than ambient environmental standards, owing to the difficulty of measuring and monitoring ambient water quantity, quality, and environmental impacts;
- Bias towards capital expenditures using standard technologies, supported by subsidies, as opposed to unsubsidized operations and maintenance costs, non-construction approaches, or innovative technologies such as recycling wastewater;
- Skewed distribution of benefits to the wealthy and well-positioned, to ''iron triangles'' of legislators, bureaucrats, and interest groups, and to land speculation and development, creating suburban sprawl;
- Loss of decision-making power by local citizens and governments.

Many of the dysfunctions of the technological imperative have also plagued the LBCDP over the same time period. Take excess capacity, for example. The Plan was premised on a pressing need of the downstream Osaka–Kobe (Hanshin) megalopolis for a significant increase in its water supply (up to 40 cubic metres per second) to support its rapidly growing industrial economy. This premise did not anticipate either the economic slowdown that came with the oil shocks of the 1970s or the decoupling of industrial output in particular from water demands – total industrial demand has even declined.

The Plan also had a strong capital expenditure bias, being more or less an aggregation of standard design construction projects intended first of all to increase the lake's discharge capacity, reduce flood damage, and compensate Shiga Prefecture indirectly for the withdrawal of water. Environmental and quality factors, although a nominal tack-on to the original plan, were of secondary albeit growing importance. Administrative and political imperatives, including those

of the iron triangles of the developing authorities, mainly the Ministry of Construction, had clear priority over ecological or economic imperatives. The water quality of the lake has not improved substantially, largely because to do so would require control over non-point sources such as watersheds.

Returning to Professor Rogers, what solutions does he propose? At a scientific level, he suggests that considering the ''simple and powerful'' imperatives of the hydrological cycle ''could give coherence to many policies for resource use and management'' and ''should help clarify the relative magnitude of contributions to the environmental problems.''[7] Nonetheless, he also recognizes that both perceptions of problems and the problems themselves are changing continually, sometimes in unpredicted ways; hence, ''it is important to create solutions that are self-limiting and self-correcting,'' that are at the same time grounded in ''historical successes.''[8] His suggestions, many of them drawn from the recommendations of review commissions over the past decade, include the following:

- Centralizing data-gathering systems within one existing agency;
- Legal reforms to reduce incompatibilities between state-based systems and ''to facilitate interstate compacts *and other arrangements*;''[9]
- Intersectoral coordination of land use to preserve wetlands and address non-point source pollution;
- A shift in focus from effluent standards to ambient quality;
- Improved inter-agency coordination;
- Adoption of the ''beneficiary pays'' principle while recognizing the financial difficulties of communities in carrying out mandated improvements;
- Greater reliance on privatization and market solutions, based on well-defined property rights that address the concerns of third parties.[10]

The failure of environmental law in the United States

Environmental law may be of little use in promoting the reforms proposed by Rogers. A. Dan Tarlock of the Illinois Institute of Technology, Chicago–Kent, one of America's most established environmental law professors, has proclaimed that ''environmental law is a lush canopy with shallow roots,'' ''a lush but weak legal regime,'' ''essentially a parasitic field of law,'' ''marginal both within the legal systems of the world and within the context of environmental imperatives.''[11] In particular, the common-law principles of private prop-

erty, limited standing, and tort provide little support for legislation aimed at protecting species, wetlands, and coastal areas or imposing uniform discharge standards, or the adoption of a ''margin of safety'' from toxic substances for the most vulnerable members of society. In addition, the ''hard look'' standard (*Scenic Hudson Preservation Conference* v. *Federal Power Commission*, 384 U.S. 941 [1966]), which allows judicial and citizen review of administrative actions, premised on a perception that agencies are ''captured'' by those they regulate, runs counter to the New Deal presumption of the validity of agency actions.[12] Michael S. Greve goes so far as to claim that environmental law has actually led to perverse environmental effects, and that private orderings governed by common law would be more effective in dealing with the complexities of environmental problems.[13]

Because it lacks constitutional foundation, environmental law has turned to environmentalism for its legitimacy and its fundamental principles of protection from risk and biodiversity protection. Yet ''environmentalism requires a fundamental redefinition of the traditional relationship between the individual and the physical world.''[14] In particular, it relies upon Aldo Leopold's ''land ethic'': ''A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise.''[15] If this redefinition were solidly grounded in scientific imperatives, it would be reasonable to hope that the legal system would adjust to the science. Unfortunately, the relevant science, ecology, ''has not provided the models to generate the information needed to manage stressed resources.''[16]

Tarlock finds that ''environmental law is entering a critical phase because environmentalism is at a turning point.''[17] Even more disconcerting, the ecological models that form the basis for the classical environmentalism of Aldo Leopold, Rachel Carson, and others, which in turn legitimates environmental law, are no longer accepted by mainstream ecologists.[18] The balance of nature, basic to concepts of preservation and restoration, has been supplanted by models of open systems that change in space and time, with continuous disturbances of biological populations and geological processes, even in the absence of human intervention.[19] The idea of fragile webs and chains of life is being replaced in most ecosystem analyses by functional redundancy – often, even dominant species can easily be replaced, sometimes by a biologically more diverse group of species. Contemporary ecologists would also disagree with a third concept derived from classical environmentalism, that, since ecological relationships are so complex that

they are totally unpredictable, highly conservative precautionary principles are in order.[20]

Tarlock sees environmental law as evolving ''in the direction of a more rational risk assessment process for toxic substances, a more science-driven, experimental, and technological approach to biodiversity protection, and sustainable development.''[21] Of these, sustainable development is likely to be the most problematic, as its implementation ''challenges almost every aspect of the present global order.''[22] The more libertarian Greve hails the ''judicial demise of the ecological paradigm'' and calls for reliance on ''the discipline of private orderings,'' or, failing that in the real world, to recognize that even environmental politics are interest group politics:

> Our politics will be less edifying but more realistic. In time, we may yet come to realize that things that once seemed hopelessly complex are in the end quite manageable, that everything has its price, and that the risks of ordinary life may pale against the risks of politics.[23]

The end of environmental law in Europe

These words resonate on the eastern side of the Atlantic. Lindsay Farmer and Gunther Teubner, respectively lecturer in law at Birkbeck College and professor of comparative law and legal theory at the London School of Economics, declare that the end of environmental law is at hand. They provide two major reasons for this:

> the commonly perceived failures of the existing ''command'' and liability-based regulatory structures and ''the demand for a more responsive, and effective, form of ecological regulation, as the extent of the damage to the natural environment has become clear'' over the past decade; and the ''irreducibility'' of uncertainty about ecological risks, invalidating all before-the-fact legislative strategies.[24]

The alternative they propose, at least for economic organizations, is ''externally induced, internal self-organizing processes,'' which they term ''ecological self-organization'':

> Its message is this: try to avoid catastrophes and learn by trial and error. Self-organization in these terms does not favour the blind self-reproduction of closed systems. The guiding idea is that of setting up a network of self-organizing forms of co-operation between political institutions, the setting of legal norms, economic and technological action, all of which is subsumed under the ecological imperative.[25]

More specifically, they suggest that environmental law should not prescribe technologies and behaviour but ''‘irritate’ economic and technological practices and induce them to produce new ecological knowledge.'' It ''should systematically favour those legal institutions that try to combine external constraints with the internal potential of producing ecological knowledge,'' specifically, through institutions such as ''ecological accounting, environmental officers, ecological contracts and covenants, [and] liability rules.''[26] Possibilities of success are seen as improving because the organizational form of the enterprise and, possibly, those of other social institutions such as the government are changing towards more flexible, ''organic'' decision-making. At the same time, it should be pointed out that the recent discovery of the self-organizing (''autopoietic'') capabilities of firms and government towards the environment may be as much a reaction to the failures of the regulatory system as an identification of a genuinely significant shift in corporate or official behaviour. Furthermore, even if decision-making has become more organic, there is no assurance that it has turned ''green.''[27]

Social capital

Still, arguments such as the above, especially those by Rogers and by Farmer and Teubner, build upon a growing, and very influential, literature in economics and law[28] and political science[29] indicating that self-organizing or voluntary approaches to the management of resources are more effective than was previously appreciated. The commons does not (always) have to be ''tragic'' in the absence of government intervention.

Much of this literature goes one step further and seeks to establish the conditions that determine successful self-organization.[30] Based on her review of a number of case studies, Elinor Ostrom drew up a speculative list of ''design principles'' illustrated by long-standing institutions managing common-property resources. These principles are:

- clearly defined memberships;
- rules of use that are related to local conditions;
- participation by most affected individuals in modification of operational rules, ensuring high levels of compliance;
- monitors accountable to the users, or who are the users themselves;
- assessment on violators and graduated sanctions depending on the seriousness and context of the offence;

- rapid access to low-cost conflict resolution arenas to resolve disputes among users or between users and officials;
- rights of appropriators to devise their own institutions unchallenged by external governmental authorities;
- in more complex systems, nesting of multiple layers of appropriation, provision, monitoring, enforcement, conflict resolution, and governance.[31]

Many of the above characteristics, notably the first and perhaps most important, apply primarily to small, closed systems, leaving open the question as to how applicable they can be to large, open urban areas. Yet Ostrom has moved somewhat towards bridging the problem of scale with her final characteristic, suggesting that complex systems could have layers of self-governance components. Oran Young has noted that many of the characteristics of self-governance identified by Ostrom also apply to international and transnational regimes.[32] The challenge is to fill in the more complex intermediate scales.

One characteristic not explicitly mentioned by Ostrom, but implicit in her list of design principles, is a long history. It would seem that the most successful systems are those that have evolved, with some or considerable ''learning'' experience. In a pathbreaking study comparing local governmental institutions in northern and southern Italy, Robert Putnam, a political scientist at Harvard, finds that government is most effective, and the economy most prosperous, where the ''civic community'' is most highly developed (in Italy, the north) in terms of associationism, trust, and cooperation – what he terms ''social capital.'' More precisely, he defines social capital as ''features of social organization, such as trust, norms, and networks, that can improve the efficiency of society by facilitating coordinated actions.''[33] Put another way, it is what lowers transaction costs.[34]

Social capital is analogous to other forms of capital. It can be a prerequisite for productive action on social welfare and the environment as well as in the economy. It would seem also to be accumulated over time, yet presumably it needs to be upgraded to meet the challenges of new technologies, economic developments, and social change.

Bringing together the ideas of ecological self-organization and social capital, we can see that the capacity for self-organization may be expected to differ from place to place, depending on the level of social capital. While still attached to place, however, the idea of social capital allows us to focus on the intermediate scales such as urban areas that elude the common-property governance analysts such as

Ostrom and Young. The parties in a network of trust can be mobile and quite widespread, certainly extending at least in principle to areas as large as an urban watershed. At the same time, historical conflicts between source and city can create a large reservoir of mutual suspicion and ''negative'' social capital. Both legacies, cooperation and conflict, are present in the Yodo river basin.

Social capital in Shiga Prefecture

If, on balance, the inherited level of social capital is high, the possibilities for success are high of a legal framework aimed at ''irritating'' flexible economic and technological responses to ever-changing ecological crises. The problem in our context then is whether the level of social capital in the Lake Biwa–Yodo region is high, as in northern Italy, or low, as in southern Italy. The level of social capital, in the sense of inherited self-organizing capability, seems to be quite high within the Lake Biwa area, although it may have been attenuated by the LBCDP. Indicators of this from the historical record are as follows:

- *Case 1: Omi merchant class*. The development of the Omi merchant class on the periphery of the centre of economic power and the way it spread its influence into other regions is reminiscent of the development of the merchant classes of northern Italy, such as those in Lombardy. Although the Tokugawa government exerted some influence, it tended to be hands-off, even in providing a facilitating framework such as enforcing contracts among merchants.
- *Case 2: Farmer rebellions*. It is claimed that the number of farmer rebellions (*ikki*) in Omi was below the national average.[35] Perhaps (this is just a preliminary speculation) the lower level of rebellion in Omi was a sign not of a lack of organizing capacity on the part of the farmers but of conflict resolution capacity in society at large.
- *Case 3: Seta River dredging*. During the Edo Period, the Seta River was dredged five times below the Lake Biwa outlet in an attempt to reduce the threat of flooding in the lakeshore area. The first two times, in 1670 and 1699, the dredging was directed by the state (*bakufu*) as *kuniyaku fushin* (construction supported by state levies), the last three times, in 1737, 1785, and 1831, it was locally organized as *ji fushin* (construction supported by self-levies). With 200 *mura* (villages) along the shores of Lake Biwa, 600 *mura*

downstream with material concerns about the possible displacement of floods into their territory, and a sometimes reluctant *bakufu* concerned about military security implications, the coordinating costs of organizing a dredging locally were extraordinarily high. Despite this, and recurrent problems over cost-sharing, it proved possible to mobilize large numbers of labourers (30,000 in 1785, 50,000 in 1831) and other resources, indicating a growing local capacity that we could count as ''social capital.''[36]

- *Case 4: Kyoto diversions*. The diversions to Kyoto (*Biwa Sousui*) are more complex, involving two prefectural-level units and a large project that has endured for over a century while changing its function considerably. Yet in some ways they provide a model for comparison and contrast with the LBCDP. At first the diversion plans met with fierce opposition from the preservationist Governor Koteda Yasusada of the newly established Shiga Prefecture, and Shiga did not acquiesce until Koteda was replaced by the more development-oriented Nakai Hiroshi. The water itself was diverted uncompensated for the first few decades, but after 1928, Kyoto began to pay a water use fee and has continued to do so, with periodic adjustments in the amount and what it is called. This currently amounts to about 10 yen per user per month and is earmarked for watershed protection in Shiga. Thus there has been an evolution towards a relationship of mutual exchange and trust between the prefecture and the municipality.

In several important arenas, however, this depth of social capital in Shiga Prefecture has been constrained in recent years. For example, the agricultural sector is inhibited from developing good horizontal relationships by the preservationist barriers of non-transferable water rights and high subsidies. Watershed management involving agriculture usually requires further subsidization, necessitating the maintenance of hierarchically dominated transactions that tend to suppress social capital or, in the terms of this project, the formation of eco-partnerships. The ''Soap Council'' established in 1978 forged a ''tense unity'' between those who criticized the agricultural cooperatives over their government subsidies and the agricultural groups who threatened to walk out if the question of agricultural wastewater was put on the table for eutrophication control measures (more on this movement below).[37]

Even more directly related to the topic at hand is the Lake Biwa Comprehensive Development Plan. The accomplishments of the

LBCDP are significant to both Shiga Prefecture, especially in reducing its vulnerability to floods, and the downstream Hanshin area, in providing it with the capacity to draw upon more water if needed. Yet, as previously noted, in retrospect the Plan also exhibited many of the flaws of American water projects of the time – what I have summed up elsewhere as the "project culture."[38] As its name implies, a project culture is characterized by its focus on projects, usually engineering projects, which can be divided up among development agencies as discrete units with minimal adjustment or coordination necessary once the plan is agreed to. The project culture of the LBCDP led to a resort to technological imperatives, the use of off-the-shelf designs without regard to the local ecology, inflexibility in responding to new information, and the heavy involvement of a subsidy-laden, revenue-sharing central government that overwhelmed much of the local capacity for self-organization.

By contrast, environmental considerations did come into play in the *ex ante* manoeuvring. Shiga Prefecture was successfully able to use ecological arguments, backed by the opinions of outside experts, to stop a project proposal by the Ministry of Construction to cut the lake in two.

The LBCDP did not entirely rein in the self-organizing capacity of the population of Shiga Prefecture. Indeed, by establishing the Lake Biwa Research Institute in 1982 as part of the first of two renewals, a commitment was made to providing an open-access archive and research organization for generating new information. Open information is a critical element for sustaining social capital in the contemporary era. By promoting policy and institutional responses in light of new scientific knowledge, the institute itself acts as a catalyst of social capital.

An example of one of these institutional responses, created in large part at the urging of the Lake Biwa Research Institute, is the recent establishment by Shiga Prefecture of the Lake Biwa Department of the Environment (*Biwako Kankyoobu*). Establishing an integrated department such as this, with no direct hierarchical linkage with the national government, is an example of a local government initiative to establish a basis for the development of social capital among government departments.

During the period of the LBCDP, but quite outside it, an eco-partnership was forged between the prefectural government and various civil society groups during the 1970s to reduce the use of phosphate-based synthetic detergents. At the time, nearly a fifth of

the phosphorus flowing into Lake Biwa was estimated to come from these compounds. Inducing housewives to convert to soap was considered to be one of the most effective, and politically feasible, means of stemming the eutrophication and the red tides, which were becoming increasingly severe.[39]

Women's organizations themselves, notably the mainstream Federation of Local Women's Associations (*Chifuren*) and the union-based local labour councils (*Chihyou*), took the lead in launching an environmental movement to ban synthetic detergents in 1970–71, based on health concerns as well as eutrophication. The *Chihyou* became involved in nationwide anti-detergent campaigns closely linked to opposition politics. In 1975, the *Chifuren* formed a ''Water and Life Network,'' encompassing a wide range of establishment citizens' organizations, primarily women's groups, in Shiga Prefecture. The newly elected governor, Takemura Masayoshi, expanded and to some extent coopted this base to create a 20-member Synthetic Detergent Countermeasures Council in 1977, drawing on industry, government, academia, consumer organizations, and citizen groups. The following year he pushed for the establishment of the ''Soap Council'' (Prefectural Citizens' Movement to Protect Lake Biwa and Promote Soap Use), with 119 different member organizations: ''women's groups, consumer groups, business groups, soap wholesalers and retailers, agricultural cooperatives, fishing cooperatives, labor organizations, and more.''[40]

With this local support base, together with some judicious lobbying in Tokyo, Governor Takemura was able to get the prefectural government to pass the innovative Ordinance for the Prevention of Eutrophication of Lake Biwa in 1979, over the strong objections of the detergent manufacturers. By keeping the focus narrowed on phosphate detergents produced outside the prefecture, Takemura was able to establish his environmental credentials without having to tackle the more formidable interests behind the LBCDP or local agricultural, industrial, and municipal phosphate generators. Very quickly, the manufacturers began selling reformulated detergent, the eco-partnership faded into disuse, and the lake continued to show signs of eutrophication, although perhaps at a reduced rate.

As an aside, it is interesting to note that in its ordinance, Shiga Prefecture exercised a right of local governments, established through precedent rather than law, to set higher standards (*uwanose*) than the national government and to regulate in areas not covered by national legislation (*yokodashi*). The exercise of this right in a largely cen-

tralized administrative system is not very common among Japan's 47 prefectures, and indicates a high level of social capital at the local level. One of Putnam's insights in proposing the concept of social capital is that its presence can be seen in more effective and engaged local governments. The more progressive prefectures have also pioneered the widespread use of ''extralegal'' or ''supralegal'' techniques for environmental management in Japan – such as legally unenforceable but apparently effective pollution control agreements.

With the end of the LBCDP there have been encouraging signs that government bureaux are reaching across their borders. For example, the Ministry of Construction and the Ministry of Agriculture, Forestry, and Fisheries, traditional rivals for construction projects, are collaborating on restoring the ecology of a portion of the lakeshore. This is an encouraging sign of the development of bureaucratic ''social capital,'' which, if successful, will serve as a model for further strengthening the currently weak coordinating mechanisms, in both government and society, that result from divisive territorial (*tatewari*) hierarchies.

Examples of evolutionary self-organizing structures

If we widen our lens beyond Shiga Prefecture, it is possible to find some examples of self-organizing structures in the remainder of the Yodo River basin and elsewhere. Although it is important to take the hydrological cycles into full account, in general, it would seem that the most effective self-organizing structures are those that evolve with existing administrative boundaries as the basic unit, rather than, say, on a strict river basin basis. Rogers calls this ''problem-shed'' organization, ''where small areas with common water problems are aggregated into larger regions.''[41] Here I will consider examples of such regional organizations, one from the lower Yodo River basin and one from North America.

The Yodogawa Suishitsu Kyougikai (Yodo River Water Quality Consultative Association)

There are a number of coordinating associations in the Yodo River basin that are based on administrative boundaries. For the most part, these are ad hoc or organized by hierarchical and sectoral organizations, such as the Kinki Regional Bureau of the Ministry of Construction, rather than being self-organized. While these bodies play

an important role in areas such as emergency communication for accidents affecting water quality and the promotion of public education, they do not appear to have the strong self-governing properties that might allow for a great deal of flexibility in response to issues as they come up. The Yodo River Water Quality Consultative Association, formed in 1965 by downstream water supply bureaux, appears to be an exception. It has combined monitoring and research with lobbying activity, both with the national government and with upstream Kyoto and Shiga. Its negotiation with Kyoto City Sewerage Bureau to reduce the concentration of ammonic nitrogen discharged by the bureau into the Yodo River during winter months is a model of successful bargaining on behalf of members. Its studies of water quality have brought greater attention to the problems of many previously unstudied pollutants and their source distribution.[42]

The Great Lakes

In many ways, the Great Lakes mirror and magnify the problems of Lake Biwa–Yodo in that they involve a number of major jurisdictions: eight states, at least one Canadian province, and many of the largest and most industrial of the cities in North America. Although the International Joint Commission (IJC), an official body of six commissioners, was set up as early as 1909 by the Boundary Waters Treaty between the United States and Canada, its interventions have been relatively infrequent, albeit influential. In particular, its reports on water quality in the Great Lakes of 1918, 1950, and 1969, focusing on municipal discharges, industrial discharges, and eutrophication respectively, helped specify problems in a way that promoted subsequent policy responses.[43] For the most part, according to Terence Kehoe, state regulators operated in a regime of ''cooperative pragmatism,'' primarily with industry, that ''was based on the principles of voluntarism and informal cooperation, administrative expertise, and localism.''[44] This type of expertise-based, cooperative but closed-door regime was similar, at least at a certain level of generalization, to those of countries such as the United Kingdom and Japan, which some analysts have argued are at least as effective as the one that has dominated in the United States since the early 1970s.[45] That system, sometimes described a bit too simply as ''command-and-control,'' is characterized with more nuance by Kehoe as:

> The nationalization of public policy, expanded opportunities for organized groups of all stripes to shape public policy, the breakdown of trust in insti-

tutions, and a greater reliance on formal legal mechanisms to resolve conflict and perceived injustices.[46]

Hence, Kehoe's analysis would indicate that in the United States, no less than in the Yodo River basin, there has been an erosion of existing relations of trust in the past quarter-century, not only between the citizenry and its governing institutions, but perhaps even within the citizenry itself. In our terms, there has been a decline in social capital. Kehoe, like Greve, attributes this decline to perversities in environmental legislation and administration, including providing ''public interest'' groups too much access to decision-making. At the same time, he notes that the perception and, sometimes, the reality of the water quality problems of the Great Lakes tended to overwhelm the capacity of the state-bound, closed-door ''cooperative pragmatism'' of the past.

For example, the scientific uncertainties regarding the causes and treatment of eutrophication forced regulators to confront policy decisions that were as political as they were scientific. In the case of phosphate detergents, there are many parallels with the tale of Shiga Prefecture, including the initiation of citizen action by housewives' groups (notably in Buffalo in 1970), stubborn resistance by the manufacturers, and the passing of the strictest regulations first at the local level. One difference is that an official body, the IJC, placed the issue firmly on the agenda with its 1969 report. Another is that regulations limiting the phosphate content of detergents were produced more quickly in most of the Great Lakes region than in Japan: Canada (1970), Indiana (1971), New York (1971), Minnesota (1977), Michigan (1977), and Wisconsin (1978). Only Illinois, Ohio, and Pennsylvania lagged.[47]

The puzzle this kind of analysis poses for the creation of eco-partnerships is that it indicates that there may be trade-offs between closed and open systems of decision-making. Furthermore, those trade-offs may not yet be fully understood.

A first step at understanding, as in the case of the Yodo River basin, may be to look at how a pre-existing, long-lived voluntary inter-jurisdictional body has fared over the decades. Has it developed its own stock of social capital, similar to the Yodo River Water Quality Consultative Association or the Lake Biwa Research Institute? The prime candidate for review is the Great Lakes Commission.

The Great Lakes Commission was established in 1955 by the eight coastal US states in response to a perceived need for interstate co-

operation on the use and conservation of the waters of the Great Lakes. The original intent of this compact was to include the two Canadian provinces sharing the ecosystem as full compact members. Objections from the US departments of state and justice to a non-federally based formal state/provincial relationship forced the Canadian parties to accept an informal but fully participatory observer status, however. The Commission's purposes have been to generate and share information, carry out investigations, coordinate state/provincial positions, and act as an advocate *vis-à-vis* the national governments on those positions where there is agreement. In its activities over the years, it has combined economic development and natural resource management in one body. Some of its principal interests, by decade, have been:

- *1950s*. Advocate the building of major structures (seaway lock system, power station, bridge), at the same time promoting a lampricide campaign to control infestations of sea lampreys in the upper lakes.
- *1960s.* Concern over record low water levels, alewife population, congressional consent legislation (passed in 1968). By-laws expanded to include water recreation, shoreline use, and wildlife.
- *1970s.* Implementation of the Clean Water Act, lobby of new Environmental Protection Agency to ban PCBs, push for federal subsidies to sewage plant construction. Sport fishing renewed through restocking programme.
- *1980s.* Concern over watershed degradation (soil erosion, sediment loads). Observer programme expanded to include regional organizations, both national governments, and tribal authorities. Creation of a water-use database. Led in the construction of a 10,000-km designated scenic road system, the Great Lakes Circle Tour, around the lakes.
- *1990s.* Establishment of an ecosystem-based policy framework under initiatives such as the ''Ecosystem Charter for the Great Lakes–St Lawrence Basin'' and the ''Declaration of Indiana'' maritime agreement. Creation of federal/state/university research partnerships in the face of government restructuring and downsizing.[48]

Perspectives differ on how effective the Great Lakes Commission (GLC) has been as an integrated framework for governance. Rogers cites it as a successful example of a coordinating body based on a ''problem-shed'' rather than on purely hydrological river basin boundaries.[49] On the contrary, Kehoe devotes merely a single paragraph and one footnote to it, noting that cooperation within the commission

was made difficult because of a conflict in the low-water 1960s between Illinois and the other states over diversions from Lake Michigan through the Chicago Sanitary and Ship Canal.[50] A number of factors may explain this difference in perception. The period investigated by Kehoe, 1960–1972, was one when the GLC was still relatively new and state autonomy was still at its strongest, although increasingly being attenuated by federal intervention. With the end of the divisive drought and the accumulation of experience, it is possible that the GLC has helped its members build up relations of trust, or social capital. Also, Kehoe's focus is on pollution control; this has been but one of the interests of the GLC, although it did become more active in this area in the 1970s. A final reason for the difference in perspective between Rogers and Kehoe is, well, a difference in perspective. How one judges the performance of coordinating institutions like the GLC evaluations remains largely a matter of judgment.

Implications for eco-partnerships

This study has explored the issue of forging eco-partnerships in urban watersheds (or problem-sheds) from a relatively theoretical and historical perspective. It has not sought to address the specific problems of water environments of cities, from source management and acquisition through treatment, allocation, delivery, and disposal. These vary from situation to situation, and different components may be more or less amenable to eco-partnerships. It will be necessary to investigate many more cases in detail before coming to more specific conclusions.

Perhaps the most important insight from this study is the depth of the problems that confront environmental governance in the current era of globalization and deregulation. We must turn to a closer investigation of self-regulatory properties and social capital, even in areas that remain primarily in the public domain, but the ways these can be brought into play are very complex and tortuous. We cannot and should not restore the closed-door ''cooperative pragmatism'' regimes of the past, but we need to draw on their strengths in forging new, more resilient alliances.

The idea is to identify, encourage, and to some extent (but not primarily) create institutional mechanisms that are responsive and at the same time accumulate experience and develop relationships of trust – an indirect but more sophisticated way of looking at the long term. Critical to this effort is information, in particular the need to

make as much of it as possible less private and more accessible to the public.

All this suggests a few desiderata in forging eco-partnerships in urban watersheds:

- The analytical framework should start out by looking at the entire hydrological cycle, in particular at means of controlling the watershed through activities such as land-use planning and inter-agency coordination.
- At the same time, practical action should be based on ''problemsheds,'' not watersheds. This is particularly important for most large cities, such as Tokyo, which draw their water from parts of a number of different watersheds.
- Policy should incorporate insights from the newer ecological paradigms, even though these may be difficult to implement using traditional policy instruments.
- Possibilities for self-organization should be identified and stimulated where they are likely to be beneficial to the management of urban water.
- Self-organization efforts, especially among parties with a clear material stake in the outcome, should be given wide latitude in deciding their own rules, but ''irritated'' to generate and disseminate ecologically relevant information.
- At the same time, it should be recognized that social capital takes time to accumulate; hence, existing organizational structures may have more likelihood of success (at least initially) than new forms.
- It may be necessary to revisit the governance regimes that existed before the past quarter-century of environmental regulation and heavy government subsidy, to combine the best of the old and the new.
- Ways need to be found to stimulate the generation, standardization, updating, and sharing of information – basin-wide, city-wide, and problem-wide.

Notes

1. This musing builds on my September 1997 paper for the final report of the Study Group on the System of Environmental Law for Lake Biwa, ''Ecology, Law, Social Capital, and Lake Biwa after the Plan.''
2. This has been stylized elsewhere as a ''maturing water economy,'' where water supply becomes inelastic, the social cost of subsidy for increased water use rises, facilities age, competition between uses grows, and aquifer depletion and water pollution become more salient. James E. Nickum and K. William Easter, ''The

Maturing Metropolitan Water Economies,'' in James E. Nickum and K. William Easter (eds), *Metropolitan Water Use Conflicts in Asia and the Pacific* (Boulder: Westview, 1994), pp. 1–17.

3. Lindsay Farmer and Gunther Teubner, ''Ecological Self-Organization,'' in Gunther Teubner, Lindsay Farmer, and Declan Murphy (eds), *Environmental Law and Ecological Responsibility: The Concept and Practice of Ecological Self-Organization* (Chichester: Wiley, 1994), pp. 3–13.
4. Peter Rogers, *America's Water: Federal Roles and Responsibilities* (Cambridge MA: MIT Press, 1993).
5. Rogers, *America's Water*, p. 84.
6. Rogers, *America's Water*, pp. 113–15.
7. Rogers, *America's Water*, p. 84.
8. Rogers, *America's Water*, pp. 204, 213.
9. Emphasis added. Note that the idea that there are solutions are ''self-limiting and self-correcting'' may be a mental holdover from the ''old'' ecology with its emphasis on equilibrium states.
10. Rogers, *America's Water*, pp. 199–216.
11. A. Dan Tarlock, ''Environmental Law, But Not Environmental Protection,'' in Lawrence J. MacDonnell and Sarah Bates (eds), *Natural Resources Policy and Law: Trends and Directions* (Washington DC: Island Press, 1993), pp. 162–92 (quotations from pp. 164, 166) .
12. Tarlock, ''Environmental Law,'' p. 170.
13. Michael S. Greve, *The Demise of Environmentalism in American Law* (Washington, DC: AEI Press, 1996).
14. Tarlock, ''Environmental Law,'' p. 166.
15. Aldo Leopold, *A Sand County Almanac* (New York: Oxford University Press, 1949), pp. 224–5.
16. Tarlock, ''Environmental Law,'' p. 178.
17. Tarlock, ''Environmental Law,'' p. 189.
18. Daniel B. Botkin, *Discordant Harmonies: A New Ecology for the Twenty-first Century* (New York: Oxford University Press, 1990). The classical environmental works cited are Leopold, *A Sand County Almanac*, and Rachel Carson, *Silent Spring* (Boston: Houghton-Mifflin, 1962). J. Baird Callicott, a proponent of Leopold's ''land ethic,'' contends that the land ethic can be modified to accommodate the more dynamic new paradigms of ecology: J. Baird Callicott, ''Conservation Values and Ethics,'' in Gary K. Meffe and C. Ronald Carroll (eds), *Principles of Conservation Biology*, 2nd edn (Sunderland, MA: Sinauer Associates, 1997), pp. 29–55.
19. William Holland Drury Jr., *Chance and Change* (Berkeley: University of California Press, 1998).
20. The three dimensions of difference between classical and contemporary ecology are from Willett Kempton, James S. Boster, and Jennifer A. Hartley, *Environmental Values in American Culture* (Cambridge MA: MIT Press, 1995), pp. 50–3.
21. Tarlock, ''Environmental Law,'' p. 190.
22. Tarlock, ''Environmental Law,'' p. 188.
23. Greve, *The Demise of Environmentalism*, p. 137.
24. Farmer and Teubner, ''Ecological Self-Organization,'' pp. 3–4. They delineate three ''legislative strategies of ecological sustainability'': expanded cost-benefit

analysis to include non-economic factors, multiple objective optimization procedures, and expanded participation in ecological decisions.

25. Farmer and Teubner, ''Ecological Self-Organization,'' pp. 4–5.
26. Farmer and Teubner, ''Ecological Self-Organization,'' p. 8. Some of the 20 lawyers and sociologists contributing to their volume feel there is great potential for environmental law in this area, while others are quite sceptical.
27. François Ost, ''A Game without Rules? The Ecological Self-Organization of Firms,'' in Teubner, Farmer, and Murphy, *Environmental Law*, pp. 337–61.
28. Notably the classic by the Nobel Prize-winning economist Ronald Coase, ''The Problem of Social Cost,'' *Journal of Law and Economics* 3 (1960), pp. 1–44, and more recent development of his insights by Oliver Williamson in, e.g., *The Economic Institutions of Capitalism* (New York: The Free Press, 1985), and *The Mechanisms of Governance* (New York: Oxford University Press, 1996).
29. See Elinor Ostrom, *Governing the Commons: The Evolution of Institutions of Collective Action* (Cambridge: Cambridge University Press, 1990); Peter M. Haas, *Saving the Mediterranean* (New York: Columbia University Press, 1990); Elinor Ostrom, Larry Schroeder, and Susan Wynne, *Institutional Incentives and Sustainable Development: Infrastructure Policies in Perspective* (Boulder: Westview, 1993); Robert D. Putnam, *Making Democracy Work* (Princeton: Princeton University Press, 1993); and Oran R. Young (ed.), *Global Governance* (Cambridge MA: MIT Press, 1997).
30. There was a large pre-existent literature in irrigation management, much of it being generated at Cornell when I was there in the early 1980s, exploring the conditions for self-governance on this topic, although not phrasing or generalizing it with the same level of sophistication as Ostrom in particular.
31. Ostrom, *Governing the Commons*, pp. 90–102.
32. Oran R. Young, ''Rights, Rules and Resources in World Affairs,'' in Young (ed.), *Global Governance*, pp. 1–23.
33. Putnam, *Making Democracy Work*, p. 167. The concept apparently was devised by Glenn Loury and applied to infrastructure policies by Ostrom et al. in *Institutional Incentives and Sustainable Development.*
34. Economists have long puzzled over the nature of the ''missing ingredient'' that allows ''total factor productivity'' to be greater than the sum of the productivity of labour and capital inputs. They have sought explanations in improvements in knowledge (''human capital'') and in technology (''technical advance''), but have largely left institutional factors out of their analyses, except in terms of the impact of legal and regulatory frameworks on property and other economic rights of legal persons. See Arnold C. Harberger, ''A Vision of the Growth Process,'' *American Economic Review* 88 (1998), pp. 1–32 (''a sound legal and institutional framework in which individuals are protected against arbitrary incursions on their property and other economic rights''). ''Social capital'' focuses on the private orderings that work to ensure against such incursions, but is not yet widely accepted as a legitimate construct by most economists.
35. Hatanaka Seiji, Ido Shouzou, Hayashi Hiromichi, Nakai Hitoshi, Fujita Tsuneharu, and Ikeda Hiroshi, *Shiga Ken no rekishi* [A history of Shiga Prefecture] (Tokyo: Yamakawa Shuppansha, 1997), p. 254. James W. White, *Ikki* (Ithaca NY: Cornell University Press, 1995), p. 131, identifies Omi's ''total magnitude of contention'' from 1590 to 1877 as ''medium low,'' the same as Yamato (Nara)

and Harima (Hyogo). Other parts of the Yodo basin were ''medium high'' (Yamashiro) or ''high'' (Tanba, Settsu, Kawachi).

36. Kada Yukiko and Furukawa Akira, ''Mizu to mura'' [Water and the village] in Torigoe Hiroyuki and Kada Yukiko (eds), *Mizu to hito no kankyoo shi* [Water, people, and the environmeat: A history] (Tokyo: Ochanomizu Shoten, 1984), pp. 31–4. In addition to flood control, the shoreline *mura* sought to lower the water level to reclaim new farmland. Ironically, one of the eight largest floods of the latter half of the Edo period occurred the spring after the 1785 dredging. Hatanaka Seiji et al., *Shiga Ken no rekishi*, pp. 249–52.
37. Steven M. Hoffman, ''The Influence of Citizen/Environmental Groups upon Local Environmental Policy Process in Japan,'' Ph.D. dissertation (University of Wisconsin, Madison, 1996), p. 186.
38. James E. Nickum and Daniel Greenstadt, ''Transacting a Commons: The Lake Biwa Comprehensive Development Plan,'' in John Donahue and Barbara Johnston, *Water, Culture and Power: Local Struggles in a Global Context* (Washington DC: Island Press, 1998), pp. 141–61.
39. Eutrophication is a process whereby lakes become increasingly loaded with plant nutrients (phosphorus, carbon, and nitrogen) causing algal blooms, oxygen depletion, and general deterioration of water quality. Although the exact mechanisms triggering eutrophication are still not completely understood, phosphorus has been strongly implicated as a probable key cause. The principal sources of phosphorus are sewage, industrial effluent, farm runoff, and natural soils.
40. Hoffman, ''The Influence of Citizen/Environmental Groups,'' p. 165 (for the quote), pp. 149–299 (for a detailed description of the Shiga soap movement).
41. Rogers, *America's Water*, pp. 14–15.
42. Nakamura Masahisa, ''Water Quality Management Issues in the Kansai Metropolitan Region,'' MS prepared for the UNU, 1997.
43. Terence Kehoe, *Cleaning Up the Great Lakes: From Cooperation to Confrontation* (DeKalb: Northern Illinois University Press, 1997), pp. 21ff.
44. Kehoe, *Cleaning Up the Great Lakes*, p. 5.
45. David Vogel, *National Styles of Regulation* (Ithaca: Cornell University Press, 1986).
46. Kehoe, *Cleaning Up the Great Lakes*, p. 1.
47. Kehoe, *Cleaning Up the Great Lakes*, pp. 145, 172–3.
48. ''Great Lakes Commission 1995 Annual Report: A 40-Year Retrospective,'' 〈http://www.glc.org/docs/anreport/95/history.html〉.
49. Rogers, *America's Water*, p. 15.
50. Kehoe, *Cleaning Up the Great Lakes*, pp. 27–8.

9

A new approach to disaster mitigation and planning in mega-cities: The pivotal role of social vulnerability in disaster risk management

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A review of data from the past three decades shows that disasters affect social groups differently and in complex ways. Differences in age, gender, class, ethnicity, and ability appear to have a great influence on the chances of recovery after a disaster. This chapter first discusses two case studies: a developed-country city (Tokyo) and one in a developing country (Manila). It then describes new approaches to disaster mitigation and planning through the use of unconventional methods towards vulnerability reduction. These include challenges to the implementation of existing technology, effective awareness education and training, solving root causes of social vulnerability, and networking. Specifically, this paper tries to outline differences between the applicability of different methods to developing and developed countries while considering the costs and benefits of each method.

Background

In the past 20 years, some three million lives have been lost owing to natural disasters and some 800 million people have been affected. The present annual death toll due to natural disasters now stands at around 250,000, with about 95 per cent occurring in the third world

countries, where more than 4.2 billion people live. Natural disasters divert much-needed resources from other purposes, thus hampering an already difficult development process, especially in the poorest countries.

Recently, most industrialized countries have noticed that, although the death toll and overall damage due to natural disasters seem to be increasing, the damage-to-destructive-force ratio of specific disasters, which can be measured in the impacts on the socio-economic systems, has been decreasing. This may be attributable to the fact that in most of these developed countries, improvements in methods of disaster mitigation and prediction, coupled with good planning, have greatly reduced people's vulnerabilities and risks. However, this is not the case for most third world countries. In part this is due to the lack of proper mitigation programmes.

The term ''mitigation programmes'' refers to two stages of planning: pre-event planning for disaster management, which includes disaster mitigation and planning activities; and post-event planning and actions, including rebuilding of damaged infrastructure, city re-planning, improvement of technical standards, and medical and financial aid to victims. In most cases post-event programmes enjoy more political appeal and financial support, even though it seems clear that pre-event programmes for disaster management should carry more weight in planning and nation-building. Because developing countries have limited resources, a proper balance between these two actions should be struck so that inefficient programmes do not waste these resources.

Focusing on cities

The past several decades have seen a proliferation of cities and towns around the world. It is estimated that by the end of this century, more than half of the world's population will live in cities, and by the year 2025 more than two thirds of the population will do so, with the highest growth rate in Latin America, Asia, and Sub-Saharan Africa.[1]

In the past thirty years, 94 per cent of Latin America's population growth has been in urban areas. In Africa, a demographic surge of cities is under way, driven by drought, famine, and civil conflict. In the past fifteen years, Asia's urban population has increased from 22 per cent to 41 per cent of the global population.

Developing countries have more than their share of very large cities – mega-cities. In fact it is estimated that by the year 2000, there

will be more than 20 cities with a population of more than 10 million people.[2] Of these, an estimated 17 cities will be in developing countries. What this means is that such a growth will bring tremendous stress and pose formidable problems of social and institutional change, infrastructure investment, pollution control, and disaster management.

The vulnerability of cities

The United Nations agenda on the environment is governed by Agenda 21.[3] Within this document, natural disasters are touched upon in chapter 7, ''Promoting Sustainable Human Settlement Development.'' This is not surprising, for it is in cities, with their large collections of human habitation, where disasters can cause the greatest damage. Death tolls from recent urban earthquakes have been large. The 1976 Tangshan earthquake in China reportedly killed 250,000 people. The 1990 earthquake in Tabbas, Iran, killed 40,000 people. The 1991 earthquake in Spitak, Armenia, killed 20,000 people.

Earthquakes are not the only deadly natural phenomena. In 1992, Hurricane Andrew brushed Miami and caused US$22 billion in damages in the area. Had the hurricane struck 30 kilometres to the north at the centre of the city, then the damages could have been several times greater. This situation was exacerbated by the extensive development of the coastal regions of Florida since the 1940s (where the Hurricane Andrew disaster highlighted a number of interesting issues[4]). Indeed, the problem of disasters does not concern developing regions alone. However, the impacts of disasters are greater on developing regions compared to areas in the developed world.

In areas such as Mexico City, Manila, Lagos, and Accra, development has caused the city to grow in a way which exacerbates disasters because it forces more and more people to live in hazardous or disaster-prone areas. An example of this is the hurricane which visited Caracas, Venezuela, in 1993. The disaster caused by this hurricane resulted in deaths and destruction along the city outskirts, which were mainly areas of poor and squatter settlements. These and many others are repeat occurrences – 1989 in Caracas, 1998 in Rio de Janeiro, and 1987 in Medellín, Colombia.[5] In 1997, the service workers who live in the hills behind the resort city of Acapulco, Mexico, were devastated by a hurricane and associated floods, mud, and debris slides, while the tourists were unharmed. Although there are also mitigating aspects with respect to living in a city and surviving disasters, these

positive aspects, such as the existence of facilities and the abundance of supplies, are usually cancelled out by other factors such as overcrowding, poor infrastructure, and the existence of more man-made hazards, such as dangerous materials and chemicals.[6]

In developed countries, these shortcomings are offset through intensive planning. However, as seen in areas such as California and Kobe, sometimes even well-developed countries are subject to nature's powers and no amount of planning could have foreseen the dangers that were in store.

Vulnerable people means a vulnerable city

There are different measures of vulnerability depending on the physical, economic, and social state of a city. In a developed city like Tokyo, the definition of a vulnerable group depends on who is defining this phrase. If we define vulnerability as the capacity to overcome disasters and return to a state of life before the disaster, then some local governments in Tokyo may be right in saying that the homeless are not actually vulnerable as far as earthquakes are concerned. In fact, for them, homeless people are resilient and have few possessions and little property to replace. If, however, we define vulnerability as sustaining damage in the event of a disaster, then the homeless would be vulnerable because they are often located in dangerous areas to begin with. Also, from the point of view of long-term recovery, it is by no means clear that the homeless are resilient. For example, following the Loma Prieta earthquake in San Francisco (1989), the inexpensive residential hotels that had been a hub of homeless men's activities were condemned and demolished. This made the long-term plight of the homeless in San Francisco worse, as much pre-existing shelter had disappeared.

For developing countries, the definition may be different again. In the case of Manila, vulnerability may mean losing one's livelihood or not being able to eat in the event of a disaster.

Is rich safe?

At present, more than 95 per cent of all disaster-related deaths occur in developing countries, even though most economic damage is suffered by developed countries. This does not say much about the underlying differences between the two. We can attribute the differences in deaths to factors such as differences in population density, differ-

ences in earthquake frequency and size, or differences in construction methods and practice. However, another important aspect of these differences is in the mitigation programmes and research programmes that exist or are undertaken. If we compare the hazard mitigation efforts of developed and developing countries, we see that most mitigation research is done in developed nations, while only 2 per cent is done in developing nations.

From these data, we see that even though in the next century the area of greatest need for disaster mitigation research is in developing countries, most research attention is focused on areas within developed countries.

Another aspect that contributes to disaster resilience is relative wealth. As world statistics show, at the present, the fiscal impact of earthquakes is growing, especially for developing countries. In the past 30 years alone, damage due to earthquakes has increased fourfold.

Developing countries are less economically resilient to disasters simply because the effect of damage represents a greater percentage of their gross national product (GNP) than similar or bigger losses in developed countries. For example, the 1986 earthquake in El Salvador caused US$1.5 billion worth of damage, representing about 31 per cent of the country's GNP. On the other hand, the 1989 Loma Prieta earthquake in the United States cost US$8 billion in damages, representing just 0.2 per cent of the country's GNP.[7]

New perspectives in studying vulnerability

In a 1994 paper, the World Bank's Chief of Environmental Policy, Mohan Monasinghe, stated: ''The impacts of environmental catastrophes fall disproportionately heavily on the poor – they do not have the financial resources to absorb the damages, their housing is often of inferior quality which cannot withstand disaster, and they often live on marginal lands which are the most vulnerable and exposed to natural shocks.''[8]

This is most apparent in the developing world, especially in cities, where there is at present a trend of mass inward migration by rural populations looking for livelihood. Unfortunately, most analyses of disaster management do not consider such social aspects of disaster vulnerability. Often the focus of disaster managers worldwide is on the physical aspects of vulnerability, reasoning that a resistant city means resistant infrastructures.

Even as we find ourselves at the end of the UN International Decade for Natural Disaster Reduction (IDNDR), there is still a scarcity of programmes that deal with the social aspects of vulnerability leading to risk. To fill this need, the United Nations University (UNU) started a programme on understanding the social aspects of vulnerability. The UNU's comprehensive approach to these problem places natural disaster risk management within the context of sustainable development and this would put into balance the different aspects of development, including the social aspects.[9]

The project constitutes the UNU's response to the ongoing IDNDR.[10] The research activities focus on the study ''Geography of Urban Vulnerability,'' under which disaster vulnerability, with emphasis on the variability of vulnerability over geographical areas and socio-economic groups, is studied. The project also attempts to develop methodologies for the analysis of vulnerability. Another important topic is capacity-building and dissemination of knowledge through the Global Network on Natural Disaster Risk Management (GLO-DISNET).[11]

The project is designed to take the experience of prior project research in a number of mega-cities, including an in-depth case study of Tokyo, and derive from these data a set of guidelines for assessment and mitigation of urban social vulnerability. These guidelines will be field tested in Mumbai, Los Angeles, Mexico City, Manila, and Johannesburg. The resulting lessons will be presented to the final conference of the UN Decade. The contribution will be a combined one, drawing on the insights provided on sustainable resource management.

The following sections of this chapter report on the preliminary work that has been carried out under the project. Reference is made especially to two case studies, one each from a developed and a developing country. Conclusions are drawn on the basis of this analysis.

The case of a developed country: Tokyo's vulnerability

Background of the study

During July and August 1997, interviews were conducted with officials of the Tokyo Metropolitan Government and of the 23 central wards (*Ku*) as well as with non-governmental organizations (NGOs) concerned with the environment and social services. Preliminary

results of this study of provisions made for high-risk social groups in Tokyo were presented to the International Geographic Congress in The Hague in August 1996.

This phase of the project has identified as very critical to effective disaster mitigation a strong link between municipal government planners and NGOs. This result is consistent with the general experience of successful eco-restructuring in mega-cities, which emphasizes the importance of citizen participation and public–private partnerships. Likewise, these results are also consistent with the lessons of work on sustainable resource management, which has identified local knowledge and stakeholder participation as keys to sustainability.

Further city case studies are planned in Johannesburg, Mumbai, Manila, Los Angeles, and Mexico. The results of these case studies are intended to be a complement to the IDNDR RADIUS project, which focuses only on the physical aspects of vulnerability and earthquake risk.

Hazards and vulnerabilities

Tokyo, and Japan in general, are faced with the constant threat of earthquakes. This threat stems from the geotectonic and geological characteristics of the Japanese archipelago. There are two main earthquake generators in Japan. One is the subduction type of earthquake and the other is the local, or fault type. The sliding of the Pacific Plate and the Philippine Sea Plate under the Japanese archipelago causes the subduction zones near Japan. This movement pulls in also the edge of the Eurasian Plate and the strain energy between them accumulates gradually. When the strain limits are reached the plates snap back to their original positions and an earthquake occurs. The strain that is built up in the subduction zone also propagates within the plates, creating faults. In Japan, the most renowned earthquake generator lies just a few kilometres off Suruga Bay, south of Tokyo. This area is predicted to be the source of the Tokai earthquake.

In the autumn of 1976, during a conference of the Seismological Society of Japan, Katsuhiko Ishibashi, then assistant at the Earthquake Research Institute of the University of Tokyo, reported that an earthquake of an approximate magnitude of 8 with a hypocentre off Suruga Bay, several kilometres to the south of Tokyo, could occur. This was the beginning of the Tokai earthquake theory.[1 2]

This theory was based on the history of the advent periods leading

up to earthquakes, the existence of an earthquake gap, and the situation of crustal deformation. In October 1976, Toshi Asada, then Professor of the Faculty of Science at Tokyo University, supported this claim at the House of Councillors Budget Committee meeting. Since then, this scenario has become a large social issue in Japan, especially in the Tokai region. Aside from this threat of a large earthquake affecting the Tokyo area, there are other earthquake generators near the city, including faults and the subduction zone just off the Bay of Tokyo.

To strengthen earthquake disaster countermeasures in the areas that would possibly be affected, the Large-Scale Earthquake Countermeasures Act was enacted in June of 1978. Although Tokyo is not one of the cities considered to be ''Areas under Intensified Measures against Earthquake Disaster,'' it is also considered that the effects of the earthquake would have severe consequences in the Tokyo area.

Even before the passing of this measure to protect against the Tokai earthquake, several laws providing for disaster countermeasures were already in place in Tokyo. One notable measure was the Tokyo Metropolitan Earthquake Disaster Prevention Regulations, established by the Tokyo Metropolitan Government (TMG) in 1971. These regulations consist of seven sections, which highlight the responsibilities of the city mayors, local governments, citizens, and enterprises in case of a disaster. The regulations also prescribe the implementation of area vulnerability assessment every five years and the promotion of disaster-proof urban planning.[13]

Even with these preparations, due to the ageing infrastructure and overcrowded streets and roads, present earthquake scenarios for Tokyo show that there would still be considerable damage and destruction in case of an earthquake.

Social aspects

In an effort to determine the disaster management planning of local governments in Tokyo, disaster managers in all 23 major wards were interviewed from July to August 1997. The interviews were made in order to determine the preparations being made by the wards for different groups of people in the city, especially the vulnerable ones.

The definition of vulnerable groups

Every ward mentioned the elderly and the disabled in one way or another. However, there was variation in the level of detail. For ex-

ample, only 14 wards specifically mentioned the bedridden elderly and only 11 single out elderly living alone. Another unexpected result was that only14 wards specifically mentioned infants and a mere three mentioned pregnant women as among those requiring special care in disaster situations.

Most wards specifically ruled out any help for the homeless or illegal foreigners. Since in the whole area covered by the 23 central wards there must be several thousand people who fall into these two categories, it is unknown how the needs of these people would be met, if at all.

Finally, no ward mentioned low income as a risk factor that might lead to increased vulnerability to disaster or more difficult recovery following a disaster. Definitions centred on biological risk factors such as chronic disease (the ''internally disabled''), age, and so on, and to some extent social isolation (for example, tourists or registered foreigners who may not understand Japanese, or elderly people living alone). It is unclear whether there are difficulties or obstacles that make it hard for wards to extend their definition of vulnerability to include economic factors such as the lack of income to make the home safer.

Measures to protect the vulnerable

No matter how vulnerability was defined, very few measures were mentioned for helping vulnerable people to prepare for a disaster. Three wards mentioned formation of a specific section to deal with the needs of the vulnerable. Two others have formed a committee to study these issues. Other measures mentioned include holding a symposium on vulnerability, checking evacuation routes for wheelchairs, increasing the amount of information on the vulnerable in the ward's written manual, and providing assistance to the elderly in securing windows and furniture against movement and damage in the case of an earthquake. Are there additional measures that are planned but were not mentioned in the original interviews? Are there measures that would be possible if more staff or money were provided? What would these additional measures be?

Secondary shelter

Concerning secondary shelter, 13 wards have designated spaces and another six have them under consideration. Although it is still unsure whether the present temporary shelters would be sufficient, there seems to be a mixed placement of priority on the matter.

Sources of information on the vulnerable

All wards expressed explicitly or implicitly the difficulty of using data that welfare departments have for disaster planning purposes. Many wards mentioned the problems created by considerations of privacy. In cases where wards use a voluntary registration process (''show of hands'' method), no more than 10 per cent of the estimated vulnerable population has come forward.

Neighbourhood-level associations

In seven wards lists of vulnerable people have been created by some neighbourhood groups. In another six wards the ward office created a survey that was distributed through neighbourhood groups. Moreover, there is general agreement at the ward level that active and energetic neighbourhood associations are the keys not only to planning for the needs of the vulnerable but actually helping them (for example, search and rescue). Herein seems to lie a very serious problem, because several wards (13) mentioned problems with inactive neighbourhood groups.

Only four wards reported that their neighbourhood groups are ''relatively active.'' Specific problems were mentioned: for example, the problem of attracting young adults into the neighbourhood groups, or of some groups being really only ''shells.'' There seems to be a very large number of neighbourhood groups, but quantity does not necessarily mean quality. The problem remains concerning what can be done to increase the activity of these groups (five wards mentioned provision of tools, equipment, financial support to groups, two mentioned weekend drills, others mention recruitment of young people, incorporation of the PTA, etc.).

In Tokyo, neighbourhood groups have a long history of existence, and traditionally they had significant social functions, since mutual help was essential for the social life of ordinary citizens. This role has become less important as urbanization has proceeded. Now many people do not know who their neighbours are, and there is less need for mutual help as many social needs have been fulfilled by commercial services. For example, instead of having neighbours organize a funeral ceremony, we can purchase funeral services. The neighbourhood groups have a dark side in their history, too. During wartime, they functioned as watchdogs for the government, reporting to the authorities any behaviour that did not comply with government orders. This history might have provided additional incentives to

avoid participation in neighbourhood groups after the war. In any case, neighbourhood groups are less attractive these days, especially among younger generations, and they are not functioning in many parts of Tokyo even though the framework of organization may remain.

However, as many ward officials mentioned during the interviews, the neighbourhood group is a feasible organization to carry out various activities concerning the issue of vulnerable people. They may obtain information regarding the whereabouts of the people with special needs in the neighbourhood, and neighbours are the first people to conduct search and rescue after a disaster. Therefore, in our future study, we would like to look more into the potential roles of neighbourhood groups and possible approaches to encourage their active participation in disaster management activities.

Use of volunteer links with NGOs

Specific roles for volunteers were mentioned in only four wards. Three other wards stated that they would receive volunteers through the TMG. This poses the question as to why there is so little planning for the use of volunteers, and whether there are problems in absorbing their help. Only two wards mentioned that volunteers are difficult to use, while four said that they are very valuable.

Certainly the very large number of volunteers who came to the Kobe area after the Great Hanshin earthquake of January 1995 did cause problems of management. Unfortunately, there seems to be no move within Tokyo wards to apply lessons learned from Kobe regarding the use of volunteers.

The Red Cross and *Shakai Fukushi Kyogikai* (Consultative Committee on Social Welfare) were most often mentioned as NGOs that have connections with the wards (eight wards and seven wards mentioned them, respectively). Three wards said the NGOs are ''helpful'' or ''efficient,'' but there is no contact or no information available on contact with NGOs in eight of the wards.

Long-term recovery

Worldwide experience highlights the importance of planning for long-term recovery as part of the same process or cycle of disaster management. However our data reveal that 13 wards in central Tokyo have no long-term recovery plans (and another four wards report ''no information'' available on long-term recovery plans).

Long-term recovery measures that were mentioned by a minority of the wards include giving priority to the vulnerable for low-interest financial aid, priority for the vulnerable in obtaining temporary housing, home visits by health specialists, and mental health counselling.

Priority problems

Finally, the following were identified as priority problems: 12 wards mentioned some kind of *lack of resources*: (financial, staffing, lack of political authority). An even greater number of wards (14) mentioned some kind of *attitude problem* (tendency for the vulnerable to hide themselves from the public, for example). Eleven wards mention the issue of *privacy* as causing problems for their acquisition of data on the vulnerable. These three kinds of problem were the most frequently mentioned. A minority of wards (4–6) mentioned a variety of organizational problems (for instance, weak neighbourhood groups) or administrative problems (for example, ''old-style'' top-down administration) as among their top priority problems.

Discussions

During the Great Hanshin earthquake, there was no collaboration between the local governments and NGOs, nor were there any effective ways of handling volunteers and voluntary donations. There was no effective way of dealing with illegal foreigners, except through NGOs. In some cases small donations that came through the government could not be distributed to the earthquake victims because it would be unfair for the government to distribute goods of uneven quality to victims. However, there is no such problem for NGOs, nor is there any problem for them in dealing with illegal foreigners. Unfortunately no advantage was taken of this situation and, even months after the earthquake, many victims are still looking for help elsewhere.

With the Great Hanshin earthquake having received much press and attention, it would be only to be expected that the lessons learned from this earthquake would be applied elsewhere so that similar situations would not occur. Unfortunately, this is not the case. Even in Tokyo, the capital and the centre of activity of the country, it is nothing short of surprising to learn that most disaster managers are still using old-style techniques and plans for disaster mitigation.

The case of a developing country: Manila's vulnerability

Background

The Philippine archipelago, like many other countries that lie within the ''Pacific Ring of Fire,'' is prone to earthquakes and volcanic activity because of its geotectonic characteristics. Starting from the year 1600, at least 47 disastrous earthquakes have rocked the country, causing more than 7,000 deaths and costing hundreds of millions of pesos in damage to property. The two most devastating were the 1976 Moro Gulf earthquake and the 1990 Luzon earthquake. Figure 9.1 shows a map of the Philippines with a plot of destructive earthquakes associated with the Philippine Fault Zone (PFZ), also showing the seismic gap along this fault.

Metro-Manila, the Philippine capital, is not free from these hazards. Historical records show that the city has experienced more than 28 major earthquakes in the past. Because five seismic generators exist in proximity to the city or within the city's vicinity, the metropolis is statistically likely to be visited by a strong (Intensity VII) earthquake every 17 years. Considering a quake as strong as the 1990 Luzon Earthquake (Intensity VIII), Metro-Manila is likely to be hit every 79 years. For a totally devastating earthquake (Intensity IX), the estimated return period is about 112 to 350 years.[14]

Hazards and vulnerabilities

Five potential seismic generators consisting of four active faults and one subduction zone threaten Manila. These are the Marikina Valley Fault System (MVFS), the Philippine Fault Zone (PFZ), the Lubang Fault (LF), the Casiguran Fault (CF), and the Manila Trench. These earthquake generators produce several hazards that face the city of Manila and its vicinity, including ground movement, liquefaction, landslides, surface rupture, and tsunami.[15]

On the management and planning side, the Philippine disaster management system started in 1979 with the signing by then President Ferdinand Marcos of Presidential Decree Number 1566, which is a decree calling for the strengthening of the Philippine disaster control capability and establishing the national programme on community preparedness. Regarded as the basic law for disaster management in the country, it set the stage for more laws on mitigation and

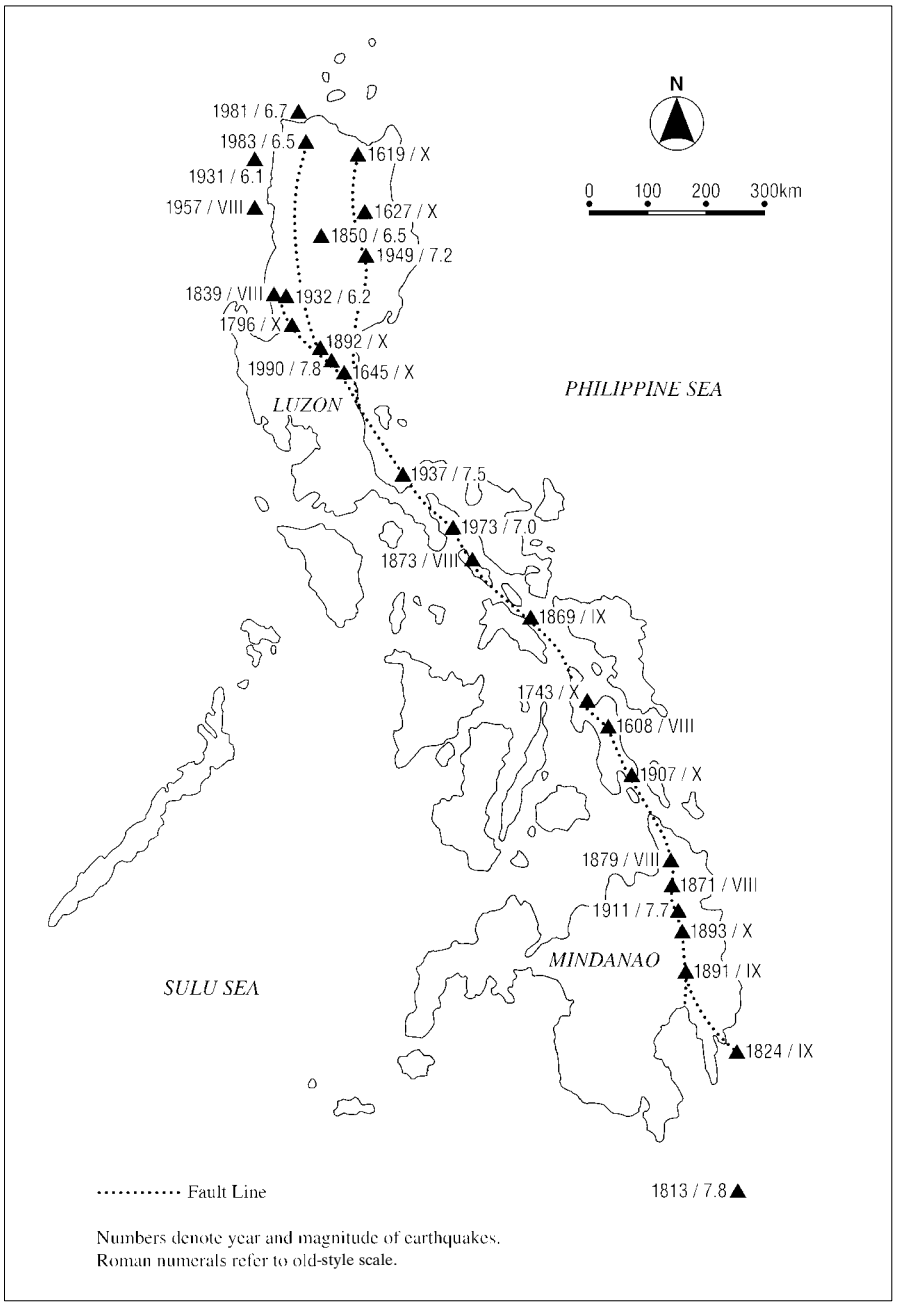

Figure 9.1 **Destructive earthquakes associated with the Philippine Fault Zone.**

preparedness, which then created official organizations to handle emergencies such as earthquake disasters. In Manila, there is the Metropolitan Manila Disaster Coordinating Council (MMDCC), which is composed of the regional directors of the different government departments and other bodies, including the police, fire department, civil defence, department of public works, department of transportation, department of health, and department of social welfare.[16]

The MMDCC is tasked to undertake vulnerability assessment, provide response capability, ensure food preparedness for the metropolis, provide disaster management knowledge and skills, manage funds for preparedness programmes, and provide close links with NGOs.

A city is vulnerable because of the structures that are in it and because people inhabit these structures. The National Capital Region (Metro-Manila Authority or MMA) has about one million buildings in a land area of 635 square kilometres (data as of 1990). Of this, 140,000 buildings are in Manila City, which has a land area of only 38 square kilometres, giving it a building density of about 3,500. According to a census in 1989, a majority of these buildings were built during the 1970s; they had one or two floors and were used mainly for residential purposes. This density, combined with the present construction system in the Philippines, which is mainly labour-based, creates a population which is very vulnerable especially to ground shaking and liquefaction.

The Philippine government currently undertakes several programmes for disaster mitigation and planning. The Philippines National Disaster Coordinating Council (NDCC) is currently undertaking one of these, which is a national campaign for increased disaster awareness through education. One activity in this programme is the ''Roving Seminar on Earthquake Preparedness and Disaster Mitigation,'' sponsored by the Philippine Institute of Volcanology and Seismology (PHIVOLCS), which was held nation-wide with a target audience of local and provincial officials.

This roving seminar was intended to strengthen local decision-making in the areas of disaster mitigation planning. It intends to provide local government officials with the basic knowledge and know-how on such topics as (*a*) what earthquakes are, what causes them and why; (*b*) earthquake mitigation and preparation measures; (*c*) disaster management programmes and techniques.

Social aspects

The population in Manila is increasing at about 2.8 per cent per year and was at 7.8 million in 1990. Squatters and slum dwellers constitute a large part of the population. UNICEF in 1986 estimated their number at 28 per cent of the total. The Presidential Commission on the Urban Poor, however, estimated this number to be 33 per cent of the total population, or about 2.4 million individuals. It was estimated that about 80 per cent of urban slum dwellers originally came from rural areas.[17]

Squatters and slum dwellers are particularly vulnerable because they are often located in the most hazardous places, such as clogged canals and the edges of waterways, and often do not have proper basic services. Not only are these settlements prone to disasters, but in some cases their existence hinders proper provisions for flood control and drainage.

From the slum and squatter population data, it should be noted that at least a third of the people in Manila live in depressed communities. In such depressed communities, preparation for events whose likelihood of occurring is small is not usually in the average person's mind. Another factor is the fact that community organizations like the *Barangay* (small public community organizations) are ineffective in supporting the most vulnerable groups, such as slum dwellers, because they are so loosely organized and their participation in disaster mitigation activities exists largely on paper.[18] As for community and grassroots-level training, often the trainers are not properly trained themselves, because of lack of funds. Drills are also not widely implemented because of the belief that we would survive whether we train or not. As for stocking of food, this is also highly unlikely because of limited resources.

If we consider the fact that the Philippines is by nature ''in harm's way,'' then we would guess that its inhabitants would be more adept at planning and preparation; but for those people in Manila who live ''by the day,'' tomorrow is just another difficult day, disaster or no disaster.

Incredibly, the Marikina fault, although lying just beside the city of Manila, lay undetected for years until recently. The fault recently showed signs of activity through surface ruptures along its trace. This has tremendous implications for the city, making study and monitoring of the fault of great importance. However, there are limits to the PHIVOLCS monitoring system, and at present there is not enough

equipment available to monitor this fault as well as the numerous other faults and volcanoes that dot the country.

In a recent review of the state of public awareness education programmes in the Philippines,[19] it was found out that, even though there are directives from the Department of Education regarding the conduct of earthquake drills in schools, they were never implemented because of the lack of funds and skills. It was also noted that there was no mention of disaster preparedness in the school curriculum.

This and other issues are not easily solved within the Philippine system alone. Since most of the technology and know-how is already available elsewhere, it would be ideal if aid agencies, international organizations, and government bodies placed more priority on these issues.

Disaster mitigation in the Philippines seems to be just a government affair, with little private participation. However, since disasters affect both the public and private sectors, it seems only logical to enlist the private sector to join in the efforts of the government in disaster mitigation and planning. This is one possibility, which could reduce reliance on foreign aid and support.

Discussion

Recently, there was news that houses and roads are cracking along the Marikina fault. This and the memory of the Luzon and Great Hanshin earthquakes have brought Manila to near-panic. Images of roads split apart and houses with cracks have prompted many well-to-do families to flee the city for ''safer'' ground.

The problem with this situation is that, in reality, the government authorities tread a very thin line between issuing an all-out warning declaration (and incurring the wrath of politicians for causing a panic and shooing away voters, and of land developers for bringing down land prices) and doing nothing (and incurring the wrath of politicians and the people if the earthquake strikes).

One solution is a campaign for preparedness *every day*. Not preparedness because there is an earthquake coming, but preparedness because it is part of good housekeeping and daily planning. Matters such as escape routes, meeting places for family members in case someone gets lost, stocking disaster/emergency/first-aid kits, and the like fall into this category. This campaign intends to make preparedness automatic and second nature. In this way people prepare not

only for earthquakes but also for typhoons, flooding, fire, and other emergencies.

Another solution would be to have better coordination between local government officials and NGOs, and to strengthen local NGO groups. If this can be done, then it may be possible also to improve the preparedness of the public through programmes carried out by these groups.

As the saying goes, the battle has just begun. Much still needs to be done in the Philippines: for instance, earthquake drill for schools, inclusion of disaster awareness in the basic curriculum, more training for public officials and teachers, better monitoring and warning systems, and more cooperation with other developed countries. It is our hope that through the will of the people of the Philippines and the cooperation of the international community these goals will be achieved.

New approaches

With these issues in mind we find ourselves thinking of ways to consider the differences, weakness, and strengths of our cities and still effectively mitigate against disasters that face them. In most countries, aside from the classical methods of physical mitigation, there are also several approaches that we should consider.

Considering social aspects

Since 1996, the UNU has been very active in the study of the social aspects of disaster mitigation planning and management. In a recent interview in Tokyo conducted as part of the study, we found that local government officials in the Tokyo area never considered the homeless as vulnerable to disasters, reasoning that, because the homeless are actually ''survivors'' in the sense that they are already living in such dire conditions, an earthquake would not change their living conditions much and they would be able to absorb damage better than others. The irony of this discovery was that, because most vulnerable groups such as the homeless live in dangerous locations to begin with, they are then doubly vulnerable especially during and immediately after an earthquake.

In most developing countries this situation is exacerbated by the fact that the vulnerabilities faced by the homeless are effectively shared by squatters and slum dwellers, who comprise a large portion of the population. These groups also tend to live in locations that are

prone to liquefaction and landslide, near active and visible fault lines, near the shore where tsunami is possible, and in conditions that make fire-fighting and rescue difficult, such as narrow streets and passageways. This segment of the population is also disaster-prone because of bad or faulty construction methods and the poor state of infrastructure, and because of their difficulty in coping with disasters owing to the lack of basic services.

This issue is important because in developing countries, most disaster planning should affect most of these people initially and directly. Provisions such as microzonation and land-use zoning, building code changes, and rescue operations at present may not affect the most socially vulnerable people.

Facing the root causes of vulnerability

"How do you get a 500-year earthquake?" asks a popular riddle in the Philippines. "If you trace the root cause of vulnerability to slavery, which goes back 500 years," goes the answer.

One aspect of the UNU project now under way is the determination and quantification of root causes leading to disaster vulnerability, such as economic injustice, caste, the oppression of women, and racism.[20] These are just some – certainly not all – of the causes that lead to increased disaster vulnerability. There are multiple cases that illustrate these root causes. Poverty in Venezuela and Rio de Janeiro, the caste system in India and Bangladesh, and racism in South Africa all cause marginal people to live in dangerous areas, prone to disasters and health hazards.

At the time of writing, the Japan International Cooperation Agency (JICA) is undertaking a very interesting project in the Philippines and in Nepal aimed at reducing the disaster vulnerabilities of whole communities by providing them with livelihood opportunities. The reasoning behind this train of thinking is that by providing people with livelihood we provide food on the table, money in people's pockets, and increased morale and self-respect. All of these contribute towards better preparedness, greater resilience, and better recovery after a disaster. Some would argue that there is no direct correlation between jobs and vulnerability, and that present data point away from a direct relationship. However, most of the available data leading to this conclusion relate to developed countries and there are no substantial studies yet on developing countries. Common sense and many anecdotal observations suggest that livelihoods, and in-

come, definitely enhance the capacity of people to strengthen their houses, store food and water, and do a variety of things that contribute to preparedness and mitigation.

Implementation of present technologies

For many years there have been debates about the ''appropriateness'' of some technology transfer to developing countries, for example the agricultural production technology described as the ''Green Revolution.'' Also in the field of disaster management, care must be taken to transfer the right technologies in the most effective ways.

If we look at an example of these technologies, we find Geographic Information Systems (GIS) coupled with complex earthquake models; hazard and vulnerability models; Remote Sensing (RS) systems using earth-orbiting satellites; earthquake microzonation maps; earthquake catalogues; and tens of millions of dollars' worth of monitoring systems and expensive prediction systems. All this is practically useless unless there is actually a method of applying these technologies at the local level. The problem is always implementation. What hinders implementation is uncertain, but there are some very strong candidates, namely economics, local or national politics, corruption, and/or lack of leadership. In most developing countries, economics, corruption, and politics play a very strong role, with economic factors leading the way towards lack of implementation.

Put in another way, it is like asking the following questions: What good is a building code if it is not properly implemented? What good is a national campaign for total household preparedness when people have barely enough to eat today, let alone tomorrow? What good is a microzonation map when people simply could not be relocated if necessary, and zoning laws cannot be implemented? What good is a GIS earthquake model when you don't have enough supplies, fire engines, or rescue teams to send to the areas that are predicted to suffer most? With greater development priorities looming in the mind and subconscious of every developing country planner, a very delicate balance has to be struck on the cost and benefits of high technology.

This is not an argument against the value of technology transfer. Yet there should be a more effective use of technology so that new technologies transferred from the developed world will have a real impact on the safety of the people. With this background, we see that

the important challenge which would face every developing country disaster manager at present is how to make present mitigation programmes work – and make them work well.

Effective education programmes

In the usual mitigation programmes, the most cost-effective method is public awareness education drives. This is because they target the populace and share with them the responsibility for preparedness. Such campaigns are also cheap and immediately effective.

In some cases, it is crucial to approach this method innovatively. In some areas, information becomes difficult to disseminate. In this case, different media and formats should be tested and the most effective used. For example, having realized the inefficiency of present materials for disaster education in Japan, the United Nations Centre for Regional Development (UNCRD) developed in 1995 a multimedia software for personal computers aimed at children in Japan. It was called "Quake Busters."[21]

If we are to make an effective education system, we should first consider a proper programme. There are several approaches towards disaster awareness education programmes, but the ideal programme would be to start by resolving the following:

The kinds of information the public needs

The information to be communicated to the public can be classified into various categories, such as basic or general information, information on government assistance programmes; or it can be classified based on the target audience, e.g. basic information for small children, intermediate information for middle school children, and so on.

The target audience

In developing the education programme, it should be noted that to be able to impart information, materials developed should be focused on creating a lasting impression on the particular audience. Usually, the best place to start disaster awareness education is in schools. School education does not simply mean education for children. In some societies with a high proportion of adult illiteracy, children in school may in fact be the only effective means of communicating more complex concepts to adults.

The information format
The format for communicating information to the public can vary. Some possible options are: (1) printed, as in books, posters, or pamphlets; (2) audio-visual, such as films, radio, or television features; (3) multi-media, as in computer games or computer-based education-entertainment programmes.

The information medium
The following are examples of channels that can be used to communicate information: (1) print (telephone directories, newspapers, and magazines); (2) broadcast media (cinema, radio, and television); (3) community and other groups (gatherings or meetings of various kinds, church or mission, and others).

Hazards, vulnerabilities, risks, and disasters in general are dynamic phenomena. Disaster awareness is also very dynamic, as people focus their attention just after a major disaster but tend to lose interest as time passes. For this reason, information imparted by programmes should also be checked and updated periodically to determine whether it is being received by the public in its intended sense.

Networking

If we think that no man is an island, then we should also think also that no city is an island. This is especially true as regards sharing disaster experiences. Since we do not want to repeat the mistakes made by others with regard to disasters – for mistakes usually take a large human and economic toll – then it is important to network effectively with different organizations and institutions and other cities and share with them experiences from disasters that we have suffered and how we coped with them.

This is part of the goal of the IDNDR project RADIUS, and it is also the goal of the UNU case study project on social vulnerability, through which the case cities learn from each other. It is also important not only to be a member of a network, but also actively to create networks. These can be networks of scholars, disaster managers, researchers, and other actors, who can help in times of disaster either by sharing information, provision of material aid, or technical know-how.

Institutional networking is also very important, since in most cases, owing to lack of instrumentation, manpower, or equipment, critical information can be obtained only from networked institutions.

Conclusions

The proliferation of large cities in the next century will pose a very big challenge to many city planners and local officials. With the strain produced in the social, physical, economic, and environmental infrastructure, we will be faced with more and more complex hazards, and even more complex vulnerabilities, leading to disaster risks that cannot be quantified. If we also consider the different situations that developing country mega-cities are in, and the imbalance in terms of disaster mitigation programmes and implementation in these countries, then it is not hard to realize that classical approaches to disaster mitigation, which focus on physical risks, will not be enough.

To face these issues effectively, we need to approach the problem of natural disaster management and planning in a different way, considering the social and political, as well as the economic, aspects and the root causes. We should also improve the implementation of present technologies before importing new ones, and develop better networks with individuals and institutions. Although we usually focus on the physical aspects of natural disasters, we often find ourselves faced with problems that we cannot explain or solve via the purely physical approach alone.

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10

Life Cycle Assessment: Its prospects as a tool for creating a sustainable economic system

Monte Cassim

UNCED 1992 and Agenda 21

Aichi prefecture has been Japan's leading manufacturing heartland for over two decades. It escaped the *sangyou kuudouka* phenomenon, where industrial hollowing-out characterized the manufacturing sector in many advanced industrial economies in the 1980s. It also came clear of *endaka*, the rising value of the yen which affected exports, by streamlining its manufacturing sector and raising its global competitiveness in both pricing and technological prowess. Chiefly because of its strongly rooted production base, it also largely escaped the ill effects of the ''bubble economy'' in which real-estate and stock prices rose until the ''bubble'' burst.

This production-oriented prefecture published, some years ago, a well-arranged booklet entitled *Local Agenda 21*, a document spelling out the environmental guidelines the prefecture advocated. It represented a local agenda following the principles proclaimed at the UN Conference on Environment and Development (UNCED) held in Rio de Janeiro in 1992. Most of the pages of this beautifully produced booklet urged the citizens of Aichi to reconsider their lifestyles: to refrain from using their personal cars, to reduce the volume of their garbage, to separate their garbage and facilitate resource recycling,

and so on. The messages were all praiseworthy, but one table pointed to a fly in the ointment.

This table indicated that the citizens of Aichi prefecture required energy equivalent to 27 million kilolitres of oil to sustain their current lifestyle. A closer look at the figures in the table and some rough calculations indicated that only about 6 million kilolitres of this was used to sustain daily life. Approximately 21 million kilolitres was used by industry, including production and services. What, one wonders, would be the message the local agenda held for the sector that was the major consumer of energy? Only two or three pages: perhaps 10 per cent of the booklet was addressed to the production sector. Such issues as in-house recycling, waste treatment technologies, and their transfer to less developed countries were the major themes in these few pages. The impression was one of mopping up after the damage was done, rather than addressing the structural causes of the problem at its roots.

Also missing was any reference to the promotion of nuclear power development in central Japan, and the longer-term hazards this might have on the environment. In fact, the global environment report of Chubu Denryoku, the dominant electrical power company in central Japan, is more frank about this issue. Chubu Denryoku openly argues its case for energy security through the use of nuclear power. It also makes a case for international cooperation through this path, ostensibly so that by curtailing carbon dioxide emissions in Japan, it would give the less developed world in the vicinity some respite from mounting pressures to change their smoke-stack industries to cleaner fuels overnight.

The long-term hazards of nuclear waste are not considered in the selection of energy options in Aichi's guidelines. Nor is there any mention of the ethical dilemma as to whether we should forfeit the security of future generations of mankind, and perhaps of all life forms on this planet, in order to meet the economic security and well-being the current generation demands right now. The thinking underlying all of this, however, is based on the ''pollute now, pay later'' principle. Clearly, there are no quick fixes and sacrifices will accompany the changes required. It is also necessary to find a solution that would address the problem more fundamentally and in a more structurally effective manner.

This chapter argues that Life Cycle Assessment (LCA), and in particular Product Life Cycle Assessment (PLCA), offers a basis for rethinking humanity's relationship with its surrounding environment.

LCA is a means of assessing a product's impact on the environment throughout its entire life-span, ''from the cradle to the grave,'' so to speak. It starts with raw material inputs, passing through processing, finishing, and assembly to distribution, consumption, and disposal. The focus is on the production system, where, as the Aichi prefecture example shows, much of our resource utilization originates. LCA also allows us to consider the broader environmental and societal implications of the production system. It is therefore imperative that the findings of LCA should lead to social discourse and consensus as to how best we can translate the findings of LCA into the realm of a sustainable development policy. With this objective at the core of its investigation, the chapter substantiates this line of thought with field experience from several case studies.

ISO 14000s, BS 7750, and EMAS

Although research and development of LCA indicators have been carried out for quite some time, LCA is now an integral part of the ISO 14000 series of product standards currently being formulated by the International Organization for Standardization (ISO). The organization was established in 1946 as an independent non-governmental organization that would provide the technical guidelines for product standardization at the international level. Accreditation, following these guidelines, is actually done by national organizations, which may be government or private-sector institutions. There are over 100 such national institutions representing their countries in the Geneva-based ISO. The American National Standards Institute (ANSI), the umbrella institute for ISO standards accreditation in the United States, is a private-sector organization. The national institution in the United Kingdom is the British Standards Institute (BSI), whose BS 7750 series is seen by many as the inspiration for ISO 14001, the environmental management standardization. The Environmental Management and Audit Scheme (EMAS) is the European Community's version of ISO 14001.

Tracing the evolution of the ISO standards indicates the initial concern over standardized dimensions through to the standardization of product quality. This greatly facilitated the internationalization of trade and production activities. However, the principal preoccupation was with the quality of the product *per se*. The change in scope came with the ISO 9000 series, which looked beyond the product itself into the production process that sustains the quality of the product. The

ISO 14000 series takes this one step further, beyond the production line to include considerations of the natural and social environment outside as well. It is made up of five components, namely:

1. Environmental Management System (EMS): ISO 14001 ~
2. Environmental Audits (EA): ISO 14010 ~
3. Environmental Performance Evaluation (EPE): ISO 14020 ~
4. Life Cycle Assessment (LCA): ISO 14030 ~
5. Environmental Labels (EL): ISO 14040 ~

As is evident from the above, a large number of documents is involved and the scope of the ISO 14000 series is extremely broad. This leads to confusion as to how one can register under ISO 14000. In actuality, with all the standards, which are currently in various stages of development and are interlinked, registration is quite simple. It is only required for the organization applying for registration to conform to a single document, the EMS document, ISO 14001.

It is important to realize that ISO 14000 does not set universal prescriptive standards like the earlier generation of product standards. Developing the concepts drafted in its successful ISO 9000 series, it is best described as a set of tools and systems for the management of numerous environmental obligations and for conducting product evaluations without prescribing what goals the organization must achieve. The ISO 14000 series, taken as a whole, is a guide for developing a comprehensive approach to environmental management by standardizing some key environmental tools of analysis. Life Cycle Assessment and Environmental Labelling (EL) are two prominent examples of this effort.

Perspectives on Life Cycle Assessment

LCA in the ISO 14000 framework

The ISO 14000 standards are a process rather than a product. Moreover, they are not all-encompassing in that they do not insist on conforming to a prescribed performance norm, unlike EMAS. They require only a continued commitment to improvement. Within this framework, of the five components mentioned earlier, three are oriented towards improving organizational performance regarding the environment (the management specification, EMS, ISO 14001 ~; the audit specification, EA, ISO14010 ~; and the performance evaluation specification, EPE, ISO 14020 ~). The remaining two (LCA, ISO 14030 ~, and EL, ISO 14040 ~) are indicators of product quality.

The move towards standardizing the analytical tools, particularly LCA and EL, is welcome. Since concern for the environmental impacts of our production systems and lifestyles began to spread, several indicators, following different methodologies, have been adopted. In the past product comparison was impossible because of the different assumptions, definitions of scope, and calculation processes. Under the ISO 14000 series, there is a serious attempt to standardize LCA and EL methodologies, although some still believe this to be impossible. This chapter is based upon the assumption that whatever method is adopted for calculation, particularly in the case of LCA, transparency in the method of calculation and the methodology adopted is most important. Without doubt, the guidelines embraced by ISO 14000 will facilitate a certain measure of comparability. Ideally, LCA will become the central tool for evaluating performance and accrediting environmental quality standards indicated by eco-labels. Much work remains to be done in this regard. What are the challenges we may envisage, how does LCA fare as a useful environmental management tool, and what are the limitations we face? These are some of the principal questions addressed in this chapter.

Within the framework suggested in the ISO 14000 series, LCA involves four steps:

1. Defining the objectives and scope of assessment;
2. Conducting the life cycle inventory (LCI);
3. Conducting the life cycle impact analysis (LCIA);
4. Suggesting and carrying out improvement measures.

Much of the debate on LCA starts with the definition of the scope and objectives. As will be seen from the case examples later, there is no way in which this can be universally standardized. The wide range of products addressed, peculiarities in the processes employed by different organizations (even for the same product), and the motivations of the organizations to undertake LCA or to conform to ISO 14000 are some of the reasons why it is difficult to establish conformity at the level of analysing the production processes within organizations. Since LCA involves analysis beyond the production process within organizations, both upstream and downstream, within a nation state's boundaries and beyond, the ramifications are quite complex. There are also more minute considerations in defining the scope. For example, when we consider a product like a window frame, is the glass to be included in the assessment even if it is manufactured by a different firm, or not? Should the adhesive which bonds the

frame to the wall be included or not? Given this range of complexity, transparency rather than comparabilty is the key underlying principle.

The life cycle inventory (LCI) is the next step. Within the scope of work defined in the first step, all the inputs that go into production, materials, energy, and labour, are computed, as are all the outputs, including solid wastes as well as liquid and gaseous effluents. Two methods are usually employed. One is called process analysis and the other input–output (I–O) analysis.

In process analysis, the weights and volumes of the inputs and outputs are recorded as meticulously as possible at each stage of the production process. Through this analysis, it is possible to record the flows of resources that are of significance to the production process. The problem becomes trickier with an analysis of the machinery, equipment, and manufactured components supplied from outside. The same holds for analyses of the downstream processes that bring the product to the end user, of its useful life, and of the way in which it is disposed. Unless we know the life cycle inventory of these products or components, can the analysis be considered complete? This is a major challenge in developing LCA indicators. Analysis based on the input–output (I–O) matrix of interrelationships among producers has been suggested to overcome these obstacles.

I–O analysis can be used to work out a series of coefficients mathematically, for use in computing the significance of the resources used in production. It involves, however, an extremely complicated calculation using inverse matrices, which is daunting even to the small number of people who do not shy away from figures and equations. Certainly, to the ''mathematically lay'' company president or line worker, it is gobbledygook. He or she just has to trust the expert in this matter. It is not a method that lends itself to a participatory approach when conducting LCA. Whichever method is used, an analysis of the impacts on the environment follows the inventory assessment. This is called life cycle impact assessment (LCIA).

LCIA is another area where standard procedures comparable across products are difficult to achieve. It makes no sense, for example, to compare the water used in a machine tools assembly plant with that used in the paper manufacturing industry. The large volumes used by the latter *vis-à-vis* the former does not make the latter less efficient in the use of water, because the intrinsic nature of paper pulp requires large volumes of water. What is important, then, is to

see how the water is used in the production process and how it is dealt with when it leaves the production plant. Also, the concerns of society at the time of analysis are likely to be reflected in the areas and the indicators chosen for analysis.

For example, in the wake of the Third Conference of Parties of the Framework Convention on Climate Change in Kyoto in 1997, popularly known as COP3, CO_2 emissions have gained popularity as an indicator of environmental impact assessment. At a time when metallic wastes in water plagued communities in Minamata (mercury poisoning) and in Toyama (cadmium poisoning), the concentration of noxious elements in water effluents was foremost in the public's mind. Neither of these indicators is less important because times have changed. Some form of macro-framework needs to be designed to fit in all these concerns when assessing environmental impacts.

Interpreting the findings of LCI and LCIA and effecting improvements to deal with adverse impacts on the environment is the last step of LCA. Here we look first at how improvements may be made in the production process under the direct control of the producer. Next, we extend the analysis upstream, re-examining procurement practices where necessary. For a hamburger manufacturer in country A faced with a choice of using local beef or beef imported from country B, the latter may be cheaper in purely economic terms. However, if the imported beef has led to the depletion of a vast area of pristine rain forest, causing a loss of biomass as well as species diversity, then the hamburger maker might rethink his (or her) procurement practice and opt for the ''greener'' local beef. The critical question here is: how will he (or she) deal with the price differential?

Initially, help can only come from an enlightened breed of consumers, willing to pay more for a product that is less of a burden upon the environment. However, public policy can support this to a great extent by fostering ''green consumption'' awareness campaigns and offering financial incentives in favour of ''greener'' practices while perhaps even punishing the converse. Eventually, as good practice becomes the accepted norm in society, the environmentally unacceptable product is likely to be shunned. This change in values is all-important. No one, then, will buy a rotten egg (metaphorically speaking) purely because it is cheaper if a perfectly sound alternative exists, accredited by society at large as desirable. LCA offers a means of substantiating this accreditation.

LCA in a broader societal framework

If LCA takes root, the implications for the way we run our societies will be dramatic. Right now, there is already evidence of a turnaround in the way manufacturers are selecting recyclable materials for their products. Many automobile manufacturers have begun to pave the way in this regard. But LCA can be a powerful indicator of much more than just this. In essence, the type of product that LCA would favour would be one that lasts longer per unit input of resource. Imagine if we were to attune our fiscal and financial incentives towards promoting such products.

Today, if one were to go to a bank for a loan for a durable consumer good, such as a set of wooden furniture, or even for capital goods, such as an NC lathe, the lender's point of view prevails. That is to say, the shorter the period of depreciation, the easier it is to get a loan for the purchase. Now, in an LCA-dominated world, the judgement has to be reversed: the longer the period of depreciation, the more worthy the product is to receive fiscal or financial assistance. It would also mean granting recognition of a second-hand goods market, with the purchase of used goods gaining favour over new goods in our system of incentives. This means a complete upheaval of the way we run the institutions which form the bedrock of our society and economy. The changes will create some losers and new winners.

For example, let us presume that there are 700,000 automated vending machines selling hot and cold drinks. If each of these machines consumes even 1 kilowatt of electricity, this alone means that 700,000 kilowatts of electrical energy are needed to sustain these machines alone at a minimum. This is the equivalent of the power generated by a fairly large thermal power plant. If a law were to ban such machines, or perhaps even phase them out with prohibitive energy surcharge taxes, one could argue that the energy from one thermal plant could be saved or put to some more rewarding use. LCA would substantiate such a policy decision from a technocratic standpoint.

One can imagine the furore that would result from a prohibition of vending machines. The bottlers of soft drinks would band together. Consumers who place a high premium on convenience might join them. Who could counter this lobby? A public making an informed judgement on the implications of vending machines upon a country's security needs – especially a country which imports energy – might be sympathetic. They might be joined by a new generation of commer-

cial beneficiaries, for example, an association of vacuum flask manufacturers. In the end, commercial losses sustained in some sectors are likely to be offset by gains in others. The critical point is, who will bell the cat? Government administrators and politicians will only move if they feel assured that the public is behind them. Business will only change its ways if it senses that the consumer is likely to abandon it. This is why an advocacy campaign, discussing the implications of LCA with the public at large, perhaps leading on to an social education programme, is important.

Thus, from a broader societal perspective, LCA has to be a technical tool with a social conscience, advocating its cause of environmental friendliness with considerable political skill. In this pursuit, independent and neutral third parties – such as universities and non-profit organizations – can play a critical role. They can initiate, promote, and sustain the socio-economic reforms and the institutional arrangements to which LCA analyses are likely to point. Attestation of the importance of this by international institutions, such as UN agencies, can spread the message further afield and give credibility to its global significance. The creation of an international network, discussing the policy significance of transnational experiences in implementing LCA, coupled with the establishment of field-based training systems directed particularly at small and medium-sized enterprises and local producers, would help to root this practice in local communities the world over.

Case examples of LCA

Roots of the Rits LCA Team: Regional development in Rikuzentakada, 1996

Since its establishment in June 1997, the LCA research team at Ritsumeikan University (the Rits LCA Team) has targeted small and medium-sized industry and local producers in its surveys and research programme. It aims to link academic research to practice in the field and intends to use this experience to design and implement a socially acceptable accreditation system for LCA. It has also tried to see how LCA can be extended beyond ISO's current focus on the manufacturing industry.

In fact, the origins of the Rits LCA Team can be traced back to a survey of agricultural and fishing communities in the late summer of

1996. It was conducted in Rikuzentakada city in the Kesen district of the Tohoku region, north-eastern Japan. The region was characterized by consistently poor economic performance throughout the post-war years. Nevertheless, there were indications of a rather high quality of life. Could this be because the region's true worth could not be assessed by the performance indicators currently used in economic analysis? Arguing on these lines, it was decided to see whether energy analysis could be used to assess development performance. LCA was chosen as the methodology and life cycle inventories (LCI) were begun in an apple farm, an oyster culture farm, and a soy sauce and pickles manufacturer. This survey was not carried out to completion as initially envisaged, but it did lay the foundations for the approach that the Rits LCA Team adopted subsequently.

Among the principles learned from this LCI survey, one of the first lessons learned acknowledged the obvious: that the producer knows the production process best, and much better than any external assessor. Thus, if any modifications to the production process, as well as to its upstream and downstream links, were to be made, they would require the producer's unreserved cooperation. This cardinal rule affected the methodology adopted. The team opted for the more painstaking process analysis, rather than resorting to I–O analysis. Simple arithmetic was all that was needed to inventorize the inputs and outputs, together with an energy conversion table. All assumptions made in the calculation were recorded.

In persuading the producer to undertake the survey, this transparency was a key factor. ''Imagine it to be like going to the doctor for a urinary test or a blood test,'' the team argued. ''You will then be able to then see where the circulation system is working well, where it has broken down, and why noxious elements are building up in some part of the production system.'' The underlying ethos was that resource circulation cycles, whether they were within or outside the bounds of the production process, were fundamental to the analysis, and environmental costs were seen to mount where the cycles broke down. The task of the assessment team was to bring this to the attention of the producer and see how best the problem could be resolved. In such a process the producer becomes an active party in seeking the solution and is not just a passive, perhaps even resentful, target of recommendations made by an external assessor.

At some point, it is important to acknowledge the significance of the producer's contribution to better environmental practice in broader social terms. The producer could use these findings to appeal

to the consumer directly through his (or her) advertising and merchandizing strategy. Advertising campaigns, brand names, commercially registered trade marks, and producer-initiated eco-labels could be used. In addition, independent third-party assessments are also important to enhance credibility. ISO 14000 accreditation and externally accredited eco-labels, directed at the consumer, are possible solutions. Whatever means is adopted, the establishment of an accreditation system, independent of the producer's own merchandizing effort, is important.

The institutional arrangements for such an accreditation system also need to be discussed. Should government be involved, and if so, to what extent? Should the responsible institution be an independent non-profit organization such as ISO? How can we mobilize technical experts from a wide range of backgrounds into this accreditation programme? Should a learned association be set up, like those in the medical, legal, accountancy, architectural, and engineering professions, for establishing codes of conduct for good practice? How can we establish national and transborder networks to exchange experiences and ideas?

Equally important is the establishment of a system of financial incentives to promote environmentally sound practice. In poorer regions, it is often common for localities to look to higher levels of government for subsidies to promote such practice. However, it is worth investigating a means of independently promoting environmentally friendly producers at the local level too. In Rikuzentakada and the Kesen district, the survey team noticed that the value of lending was only about 40–45 per cent of the value of savings deposits in the region, although the banks that were interviewed said they would be happy to lend 80 per cent of the deposits portfolio. The situation is likely to be similar in other economically backward communities throughout Japan.

The reason why there were no takers for the loans, despite Japan's remarkably low interest rates, was said to be that business risks are high. Perhaps this money could be mobilized and directed to local producers by offering support in the form of matching funds, interest rebates, tax incentives, and bankruptcy risk insurance from the public exchequer, thereby contributing to an overall reduction in risk. Some form of public benefit is usually anticipated from the direction of government subsidies, and job creation and strengthening the local economy has hitherto been the principal argument. Perhaps we could add environmentally friendly production to this list of public benefit.

LCA could be used as one of the criteria for directing public subsidies that would mobilize such latent capital deposits in local communities.

The Rikuzentakada survey also highlighted the importance of reviewing the value of traditional production practices, particularly those related to agriculture, forestry, and fisheries. The relationship between traditional ways of life and the environment was also evident in the food culture of the region. This was particularly relevant to Rikuzentakada because this was the sector that had imperceptibly supported the region's economy from the late 1950s through to the current period. This, incidentally, was the period when rapid economic and population growth in metropolitan areas such as Tokyo, Osaka, and Nagoya on the Pacific seaboard was offset by economic decline and depopulation in non-metropolitan areas such as northeast Japan, where Rikuzentakada is located.

Many public-sector industrial development programmes tried to replicate the successes of the Pacific seaboard in the non-metropolitan areas, but to little avail. In Rikuzentakada, too, such efforts were made to develop land and infrastructure to receive such industry in the early to mid-1970s. Two decades later we find that most of the industries have either fled or closed shop. Those that remain provide only low-level, uninspiring assembly-line work. Although a great deal of public subsidies went into these inland industrial estates, the support for the sector that has steadfastly provided both employment and income to Rikuzentakada over the years, the food processing sector, is much smaller in comparison.

Food processing in Rikuzentakada thrives largely because of the rich fishing and aquaculture breeding ground of Hirota Bay, which, incidentally, was saved from being filled in to develop coastal agricultural and industrial land by an active local citizens' movement. (If this too had been lost, Rikuzentakada would have had even less to fall back on than it does now.) In addition to these marine food products, Rikuzentakada also has a rich and varied food culture stemming from its traditional agriculture and forest management practices. The region is also known for its apples.

Half a million visitors come to Rikuzentakada's beaches every year. If each of these visitors could be made to spend an average of US$10 on sampling the culinary delicacies of the inland villages of Rikuzentakada, this alone would inject US$5 million into the local economy. What would attract these visitors inland? A safe, healthy ambience, environmental soundness, and appeal in terms of taste were selected as the criteria for appealing to potential tourists. LCA

was to be used as the criterion for determining environmentally sound practice. In conducting the impact assessments under an LCA, many of the tests used for verifying a safe and healthy ambience can be incorporated as well, particularly if the LCA accreditation can be linked to the public food and drug administration system. We are currently conducting investigations to see how the elements of taste can be dealt with, as will be indicated later on in this paper. What can be concluded from the Rikuzentakada survey is that LCA can also be used as a tool for promoting regional development.

The Rits LCA Team: Achievements to date since June 1997

Against the background of the myriad questions and challenges raised in the Rikuzentakada survey, the Rits LCA Team was set up in June 1997. In order to achieve its prime objective, to promote the furtherance of LCA, a two-pronged approach was adopted, consisting of: (1) weekly research meetings at Ritsumeikan University, and (2) periodic forays into the real world to conduct LCA using research commissions.

Weekly research meetings of the Rits LCA Team

The principal aim of the weekly meetings is to continually create a group of environmental assessors who can conduct LCA in the field, particularly for small and medium-sized businesses and local producers. Towards this end, the weekly meeting includes information exchange on a variety of matters in its agenda. Held at Ritsumeikan University in Kyoto, it keeps abreast of changes in ISO 14000 specifications development and also sees how the environmental management specification (EMS: ISO 14001) is currently being executed in Japan and overseas. It discusses the different components of ISO 14000 from the perspective of ideals and what is currently being achieved, and how this gap can be bridged. This task is central to the activities of the LCA team, including advocacy programmes targeting society at large.

Within two months of commencement, in August 1998, the team obtained its first LCA commission from a small manufacturer in north-eastern Japan. Since then several commissions have followed, from different parts of Japan. The sectors covered have gone beyond manufacturing to cover agriculture, fisheries, and the construction sector. In one instance, the commission is to advise a local government on obtaining ISO 14000 accreditation, much as Hereford County

Council has done in the United Kingdom. The weekly meetings provide the team with an academic base from which to design the work for the LCA commissions they receive and appear to give the team a measure of independence in dealing with their clients. The commissions are channelled through the Liaison Office of the university, which was established to promote partnerships between the university and the government, business, and civic sectors.

The weekly meetings are, in principle, open to anyone who is interested in ISO 14000, LCA, or any other aspect of the relationship between production and the environment. They help participants keep abreast with the current thinking and practice of LCA and the ISO 14000 series specifications in Japan as well as abroad. The numbers participating in the weekly meetings have grown from an initial core of about five persons to a roster of over 30 in the past year. The participants, who initially came from the College of Policy Science, Ritsumeikan University, now include students from other colleges of the university (economics, international relations, natural sciences) as well as those from other universities (Kyoto University, Konan University, etc.). Working in the team appears to enhance the job prospects of the students, too, although at present this seems to be more true of male students. Students who graduated in April 1998 and are now working in different fields continue to keep in touch. The task now is to build a network of these members for the mutual exchange of information and experience.

The agenda of the weekly meetings is gradually evolving. This has come about largely because of the influx of new members. Thus, in addition to the hitherto routine information exchange and discussions on topics of interest, senior members of the team now initiate new members through an orientation programme before assigning them any specific field tasks. This is likely to become the basis for the development of a training programme for environmental assessors using LCA. Requests are beginning to come in for such a training programme both from within Japan and overseas. At a special session of the Asia Information Technology Forum, held in Osaka in November 1997, representatives from the governments of Thailand and Sri Lanka expressed such interest and the first orientation seminar overseas was held at the University of Peradeniya, Sri Lanka, in February 1998. Periodically, the team organizes forums that draw a wider audience. In their current ad hoc form, they attract new members to the team and help to broaden the understanding of the implications of LCA.

However, activities need to be organized in a more strategic fashion, perhaps targeting specific audiences, if they are to fulfil an advocacy role for promoting LCA. Such a role is imperative if LCA is to realize its potential as a basis for accrediting what is environmentally friendly, for directing incentives, and for gaining consumer confidence.

Research commissions conducted by the Rits LCA Team

The research commissions conducted by the Rits LCA Team are characterized by their focus on small and medium-sized entrepreneurs, often in non-metropolitan localities, and in extending the scope of LCA application beyond the confines of the manufacturing sector. The team's first commission was from a manufacturer of a wood-extract product in Yamagata prefecture. This has since been followed by a commission to conduct LCA for a family-owned fishing enterprise and a cooperative processing organically grown tea in Minamata city, Kumamoto prefecture. The team has also been involved in advising the Minamata city government and local entrepreneurs in acquiring ISO accreditation since January 1997. An eco-friendly building completed in September 1997 has also been a target of the LCA team's work. A client in the food wholesale business has asked the team to conduct environmental and health checks using LCA to establish standards for identifying ''eco-friendly organic foods.'' Project documents are currently being prepared for a manufacturer of fuel oil from the waste treatment of polystyrene. Preparations are also under way, in collaboration with a Japanese NGO, Tools for Self-Reliance (Japan), for conducting LCA of small-scale, community-based natural energy options in Sri Lanka. They include wind, water, solar, and biomass-powered electricity generating systems. Several lessons have been learned from these field survey samples.

The first lesson comes in designing the scope of the survey. The surveys have tended to concentrate on building up the LCI, which represents the first two steps of the LCA process recommended under ISO 14000 specifications. Life cycle impact assessments (LCIA) and improvements, the remaining two steps of the four-step ISO 14000 series LCA, have largely been left as points of discussion with the client. Meanwhile, efforts are under way at the weekly study team meetings to draft a more universally applicable framework for impact assessment. The stages in which the LCA surveys should be conducted are also made clear to the client. The starting point, in the

case of production activities, is usually the production process *per se*, with upstream (raw materials extraction, components procurement, etc.) and downstream (both domestic and overseas marketing and distribution) considerations being added subsequently to complete the life cycle. In the case of building construction, a methodology is being evolved, although this is a working draft and not the team's final recommendation.

Possibly because student-centred teams were involved, the work method is based on short cyclical outputs, usually spanning three to six months. This, in addition to being easy on the client's pocket, has forced the teams to prioritize the tasks at hand, after the scope and objectives have been decided upon with the client. Prioritization in itself has been a positive learning experience. It also has the advantage of demonstrating to the client that the survey is not a one-shot effort but something that needs to be continually conducted with vigilance. The starting point is an assessment of resource flows through the process. These are assessed in terms of heat energy conversions of material inputs and outputs. Water volumes used are also assessed, as are the discharge of toxic wastes and gaseous emissions. The resource stock – buildings, machinery and equipment – is usually analysed next, once more in terms of heat calorific value. The knowledge and support of the production manager and experienced line workers are invaluable at this stage. The upstream and downstream analyses which follow are usually based on interviews with the procurement staff and marketing managers. Discussing the possible implications with them leads to changing current practice to a more environmentally favourable outcome.

Focusing on the life cycle inventory (LCI) in the methodology adopted has also made the team aware of the importance of data-building. Data are not something one asks for and gets, but something that one works towards creating. For this, the client's trust is paramount, but just as important is the understanding and cooperation of the workforce involved in the production process. Their experience, together with the fresh inquiring eye of the survey team, working with mutual respect in an environment of trust, make the inventory a success. It is also not always possible to have absolute values for every item. In such instances, upon mutual agreement after discussion between the survey team and the client, a suitable figure is arrived at. The assumptions underlying the calculations must be absolutely transparent, so that at a later date new or more reliable information can be inserted to update the figures if necessary. This

data-building exercise leads to the LCA team having access to confidential information whose release to the general public could cause grave harm to the client. Exercising suitable restraint in handling and disclosing this information is paramount for the long-term relationship between the surveyed (client) and the surveyor (LCA team).

In conducting LCA the greatest challenge is to maintain confidentiality and client trust, while advocating transparency and public disclosure in the search for consumer confidence for the environmentally friendly product, process, or service. Very much like a medical practitioner, lawyer, or accountant, the new generation of environmental assessors practising LCA must evolve a set of professional ethics and codes of conducts that they will abide by. Even from the limited exposure to the clients with whom the Rits LCA Team has been working thus far, it is clear that LCA practitioners can work towards the evolutionary transformation of systems of the raw materials procurement, processing, production, assembly, distribution, consumption, and resource recovery. However, as they do so, it is important that this experience be translated into a set of standards and guidelines for good practice which has broad-based public support and which can be periodically reviewed in the light of fresh evidence from the field. The process of creating an environmentally friendly economic and resource management system can be further strengthened by using these standards as the basis for directing public or institutional finance by granting incentives or subjecting to regulation.

Concluding comments

The experience of the Rits LCA Team has shown the viability of LCA as a diagnostic tool for determining the environmental health of production processes. It has been seen as an effective entry point for bringing enterprises and local producers – even small and medium-sized ones – into the orbit of the ISO 14000 series specifications in a voluntary and committed manner. The neutrality of the organization advocating this practice, namely the university, has also contributed to the credibility of the process. The non-profit nature of the organization has enabled the first, and most cumbersome, level of LCA, namely the life cycle inventory, to be conducted at a cost affordable even to small institutions. The major challenge remaining is to evolve a framework and guidelines for life cycle impact analysis, LCIA. Whilst working at the cutting edge of these aspects, it is also important to broaden the support base for the practice of LCA, both

among the general public and target firms, as well as among professionals who could contribute to strengthening the process further. In order to ''socialize'' the practice of LCA, the pressing need now is to increase the number of trained environmental assessors. Toward this end, training programmes and information exchange systems that are practicable and affordable need to be developed. A university which steps down from the heady heights of academia to wrestle with the grease and grime on the workshop floor has much to offer in this regard.

11

Rainwater in cities: A note on ecology and practice

Klaus W. König

Cities are great consumers, and water is no exception. They require large amounts of water to sustain themselves, owing to the sheer numbers and density of housing. To meet their demands, there has been a variety of ways in which cities have accessed water and managed needs. The most typical pattern to date has been to build a large dam or central water supply and pipe in the water as needed. This type of exercise can be ecologically disruptive, as well as costly. One of the resources that maintains potential for exploitation is rainwater, as a renewable natural resource to which we generally have access. Usually cities have access to rainfall, which opens up possibilities for its improved application and for innovative water management methods.

Generally, the larger a town or city, the more difficult it is to achieve sustainable water resources and to maintain regional water circulation. The following three scenarios illustrate problems which exist worldwide:

- *Scenario 1:* Groundwater is available in adequate quantities and of good quality, but the demand for potable water continues to rise with the growth of the town, while the new formation rate for groundwater is reduced because rainwater can no longer seep into

the subsoil naturally. More roads, paths, paved areas, dwellings, public buildings, and industrial plants work to seal the surface, and the town comes to ''import'' potable water from other regions, which endangers nature through heavy extraction of water and dependency on this region. Another problem concerns the quantity of rainwater flowing off the surface, which rises dramatically when the surface is sealed. This causes flood damage and rising costs for sewers and the cleaning of wastewater.

- *Scenario 2:* Potable water is obtained from surface water, a river or lake. The treatment for making potable water is technically expensive because other communities lead their poorly cleaned wastewater into these open waters. As a result of this exercise, potable water becomes extremely expensive; so expensive that large sections of the population can no longer afford it. As a consequence, social unrest can then be avoided only by subsidies. The town is socially and financially heavily burdened. Another problem is that the spontaneous rainwater flow, mixed with wastewater in a heavy downpour, pollutes the river or lake once again and provides more problems for gaining potable water.
- *Scenario 3:* As a result of climatic and geological conditions there is little potable water available; the resources are quickly exhausted. The possibilities for development by the town are therefore restricted. The cost of a long-distance water supply is prohibitive.

This chapter examines possible applications of rainwater utilization and application in an urban context. In doing so, it examines some of the more available technologies for this purpose, and draws on Germany's experience in dealing with the related issues. As part of this discussion, variants of practice and boundary conditions of decentralization issues are raised.

Questions and demands

Centralized water systems have come up against various problems before. They are expensive, ecologically and socially disruptive, and can drain whole communities of financial and other resources. One of the ways in which water utilization and management is being considered recently is in terms of decentralization of functions. Decentralization of water services is coming to be seen as a preferable alternative to the previous types of centralized system. However, there are questions that need to be examined. Can decentralized measures

be realized in towns too? What measures are especially suitable for towns? How can partnerships and collaborations among cities and transnational networks help to solve these problems?

Installations for the direct utilization of rainwater offer a decentralized alternative to stormwater retention basins, especially in densely built-up areas or in cases of poor soil permeability. They can thus extend the scope of stormwater management with regard to drainage systems and offer a number of solutions or options for the challenges of water management. Combining such a system with an absorption area is significant if it means that the area can be smaller while maintaining the necessary drainage capacity. Furthermore, the sedimentation and filtration characteristics of rainwater utilization facilities can have a water purification effect that can complement the functions of an underground seepage area. Ecological aspects for public welfare and financial savings during operation must work to complement each other. The prerequisite for this is reliable, professional construction of any drainage concept and water recycling system with little maintenance.[1]

Best results by decentralization

Decentralization is supported and fuelled by both technology and the need for governments to improve their services. The technology is such that even ''tailor-made'' concepts can now be realized. The aims of local town hydrology can be supported through the combination of rainwater utilization with planted roofs and draining into open waters. At a glance the special advantages of these measures are as follows:

Planted roof	partial water retention (outflow at peak forming flooding) improvement of the micro-climate through formation of oxygen, evaporation, binding dust
Seepage	full water retention, no sewer connection formation of new groundwater
Open waters	partial water retention evaporation
RW use	partial water retention (outflow at peak forming flooding, quantity according to emptiness of the cistern) relief on the sewer – quantitative by amount of rainwater used, qualitative by decalcifying/washing powder potable water savings

Various combinations

It is possible to save potable water and effectively reduce wastewater and stormwater run-off simultaneously, as well as supporting the formation of new groundwater, using various combinations of approaches. The following section describes a number of combinations that may be applied particularly to an urban setting, depending on the situation of the case. It assesses each of the combinations, drawing out the benefits and challenges that make up each of these approaches.

The combination of planted roof and rainwater utilization for dwelling houses has great potential, but there are some reservations. The retention of water on the roof can reduce the possible quantity collected by more than half. With intensive planting it must also be expected that humic matter and nutritives will be introduced, which can detrimentally alter the water quality. However, if (1) the substrate of the planted roof and the utilization are harmonized in such a manner that the reduced quantity is adequate, and (2) the filter function before the rainwater storage is replaced by a suitable mineral planted roof substrata that allows no humic matter or nutritives through (absorbing matter contained in the rainwater), the result is a pre-filter installation with little maintenance and no extra costs. The Bavarian Department for Wine Cultivation and Garden Construction in Veitshöchheim–Würzburg is experimenting with appropriate variations of planted roofs.

Combining the methods of planted roof and seepage should have the aim of saving the sewer connection of rainwater drainage. Whether this will succeed or not initially depends on the type and size of the seepage. When combining with a planted roof the seepage may have to be less than 50 per cent of the otherwise usual quantity. The lower the coefficient of discharge of the planted roof, the better the hydraulic relief effect for the seepage installation. With good filtering capability the planted roof can replace the filter-active upper soil zone as a ''brake'' for heavy metals, etc. This is especially interesting when combined with seepage pits.

Rainwater utilization with seepage represents the most often used combination variation. It is preferably used where the potable water savings have priority and, at the same time, a central rainwater drainage for the storage overflows is to be avoided. As with the planted roof above, the previous mechanical filtering and sedimentation in the storage cistern take over the pre-cleaning to eliminate

problematical suspended matter from the rainwater before the seepage. The studies carried out in 1993 by Rott and Schlichtig at Stuttgart University are representative of the points:

> In summary it remains to say that the investigation results showed a better quality of stored roof drainage water than was assumed at the beginning of the investigations … Pollution was able to be taken out of the overflow water and carried into the soil through the following sedimentation of these particles in the storage cistern … Instead of running the overflows from the rainwater utilization installations into the sewer, the cleaned overflow could be directly returned to the natural water circulation through decentralized seepage pits or seepage troughs above ground. In addition the sludge pollution of the sewage plant could be reduced through the extraction of pollutants in the storage sediment. (Translation of original text in German.)[2]

Architectural and economic aspects

Components for rainwater utilization are now increasingly being combined with compact building block systems and supplied as units ready for installation, so that less work will be necessary for designers and construction supervisors.

In implementing these systems, responsible authorities should determine the seepage properties of the soil for housing development areas and advise these before construction begins. Roof pitches of buildings can be fixed so that planted roofs are possible. If the positioning of the buildings and their heights are regulated, then the possibility should be taken into account that the rainwater flowing off can be led into the open waters of seepage installations. A pond that is formed between the cistern and the seepage installation will afford special advantages (of course, the development of algae cultures and mosquito-breeding has to be avoided). Such an approach would have the following advantages:

- A cleaning effect, by extra sedimentation of suspended materials being contained in the water;
- A positive effect on the humidity of surroundings through evaporation;
- An area of water as an element of the landscape planning so as to stimulate and enrich the housing development area;
- In front of glass façades of buildings an area of water has the effect of mirroring daylight, so that the quality of the rooms inside is increased and electrical energy for lighting is reduced;
- Part of the rainwater storage can thus be inexpensively achieved

within the cost budget for the exterior landscaping and reduced electricity costs.

Rainwater cisterns

In the development of new building areas, the question is raised as to whether an area with new dwelling units can be connected to the existing sewer system. Almost all older cities have a mixed system of drainage. The capacity for accepting the extra drainage arising from rainfalls from new building areas is in fact inadequate. But what is to be done when seepage and connecting to a body of water is impossible? A typical case is a sloping site, in which seepage water comes to the surface lower down the slope.

In this case, rainwater falling on the roof surfaces of building premises is collected in rainwater cisterns. The volume of the cisterns is divided into a pure storage volume (lower part, holding about three cubic metres) and a retention volume (upper part holding about two cubic metres). The cisterns have a throttle valve on the pipe about half way down. The rainwater can therefore be led into the sewer later. In addition there is an emergency overflow on every storage cistern connected to the sewer.

Regulations or subsidies

Can rainwater retention and potable water savings be achieved overall by collecting rainwater? In new housing areas of cities, the practice so far has involved encouraging cistern construction with subsidies from sponsoring programmes, which brings relief according to the principle of voluntary installation. This cannot be calculated in advance. It will only be binding for everybody when a community owns all of the plots of land in a new housing area, and then sells each plot under the condition of rainwater utilization. It is easier if regulations are imposed on the development plans. In the areas of Baden–Württemberg, Saarland, and Hessen in Germany the governments have empowered their towns and communities to impose such local regulations for making private storage construction compulsory. However, these are not always forthcoming.

A solution without costs to the community, which also shows great effect in existing housing areas, is the division of wastewater rates into soiled wastewater and rainwater fees. The ecologically effective storage measures are rewarded, if necessary, with a bonus on the

rainwater fees. The expense of rearranging the fees and for altering local regulations is nowhere near as high as the increase in the size of sewage installations that may have to be made. About 25 per cent of the communities all over Germany charge according to this causal principle. Experience on this is available, among others, in the following German towns: Augsburg, Freiburg, Münster, Mannheim, and Munich. In Munich, for example, rainwater drainage costs DM 2.54 annually per square metre of sealed surface; in Bonn the cost is DM 3.08 per square metre.

Public savings and municipal subsidies

The expected public savings to be made by moving the necessary storage equipment to private land, financed through private investment, could be paid out through subsidies to the private investors. A municipal subsidy programme is above all meaningful when seen from the ecological point of view, when a ''whole-year effect'' occurs. In other words, the rainwater utilization occurs not only through garden watering in the vegetation period but over the whole year, so that rainwater storage, potable water savings, and reduction in wastewater take effect continuously. Communities that are advised by the author therefore include in their regulations the obligation to connect toilet flushing combined with at least one other utilization.

Contracting and new fields for urban business

How can towns build their own projects for rainwater utilization without having to finance the installations? In Germany there are new financing models through contracting. Towns and communities have the building services for their schools, nursery schools, administration buildings, and so on, renewed free of charge: the investment is borne by a private service company. To finance the necessary equipment, operations, and maintenance, the contractor takes out the old building services and uses the savings in energy achieved by the new installations. The new energy centres remain the property of this company for at least 10 years, according to the contracting agreement. In this period, the town transfers fixed monthly fees on the basis of the proposed use. This principle can also be used for rainwater utilization installations. If a town is obliged to sell water to finance its potable water supply, and water-saving measures are therefore opposed to its business interests, it can compensate for this through

business activities in rainwater utilization. In Frankfurt, the corporate strategy of the City Services Department is geared to evolving from a pure water supplier into a service company for environmental protection. New fields of business have to be developed to make resource protection into a profitable branch of the company. The product is no longer called water, but the intelligent utilization of water. Water recycling and rainwater utilization concepts might be sold, according to the business of freelance engineers.

Loss of public safety?

Critics of decentralized systems fear a loss in public safety when supply and disposal installations are transferred to private responsibility. Does the manufacture, the operation, and the maintenance have to be controlled and supervised in the public interest? With rainwater utilization this concerns principally the safety of the public potable water network, when empty cisterns are topped up; with seepage it is the maintenance of functionality through regular care. Are the operators of such systems capable of accepting this responsibility?

Communal administrations quite rightly defend themselves against having to look after the reliability of private installations in such cases. One possible solution is for decentralized water supply and wastewater installations to be checked at regular intervals by independent specialists working privately, just as chimney sweeps checked fireplaces in the past, and vehicle inspection tests are carried out on motor vehicles. Another strategy is to develop an eco-partnership of citizens to exchange maintenance experience.

The municipal rainwater project in downtown Berlin

More and more associations and institutions are being drawn from the city of Bonn to Berlin, once again the capital of Germany. Many are finding their new offices in historic buildings. This was the case with the German Congress of Municipalities, now residing in the Ernst-Reuter-Haus in central Berlin. During the reconstruction of the building, we had the opportunity to provide water supply from an ecological point of view. The construction of a rainwater storage cistern was imposed by the authorities as a relief on the sewer. Hitherto the toilets had been flushed with potable water and the rainwater had been led from the roofs directly into the combined rainwater and soil sewer. Specialist planning engineers made the alternative suggestion of using rainwater supply for building services. The

module method of construction has proved to be simple and uncomplicated in the design and execution. Large advances have been made in past years in the cistern and filter technology.

The water coming out of the cistern is strictly separated in its own pipework system which carries it throughout the building to the use locations – in this case for toilet flushing and garden watering. When the storage quantity is used up, potable water is automatically fed into the system through an ''open feed'' safety system. For buildings with heavily changing quantities of use such as this one, ''hybrid'' installations are sensible. This is achieved by a pump in the cistern filling up an intermediate cistern in the building with cistern water. The following pressure booster installation consists of several pumps that go into operation separately or together according to the drop in pressure in the supply pipes. By means of an appropriate switch it is ensured that the defect of one pump is compensated by the output reserves of the others.

Conclusions

Decentralized measures help in handling rainwater in ways that are close to nature and to the principles of causation. Potable water can also be saved by combining rainwater utilization. Rainwater storage cisterns, just like planted roofs, provide considerable cleaning of the rainwater to seep away. Where seepage is impossible cisterns with separate storage volumes and delayed outlets should be used in future. But only with overall use will it be possible also to calculate the water resources saved so as to reduce the sections of the sewer networks. Regulations in development plans are one method of achieving this. Costs and responsibility in doing this are inevitably transferred to private hands. The control of the functionality and installation safety is necessary, according to experience made so far; but it may not be imposed on communities. This activity, like that of the chimney sweep, should be transferred to private experts.

Manufacturers have now reached a professional standard in installation techniques for rainwater utilization, resulting in an increasing degree of effectiveness. Solutions possible today enable considerable reductions in extreme water requirements and sewer emissions, especially with the large installations in cities. Creating a network for the exchange of experience will help cities with an impending urban water crisis to achieve independent water supplies and to restore regional water circulation in their respective regions.

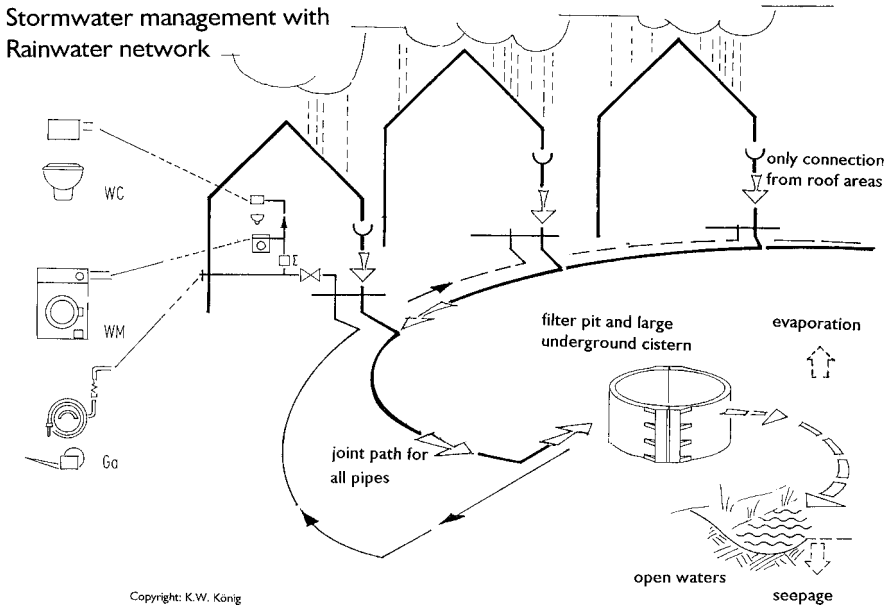


Figure 11.1 **Large cistern with overflow to pond and seepage. Competition entry for the solar residential area in Saarbrücken–Bübingen, 1995. (König, "Rainwater in architecture.")**

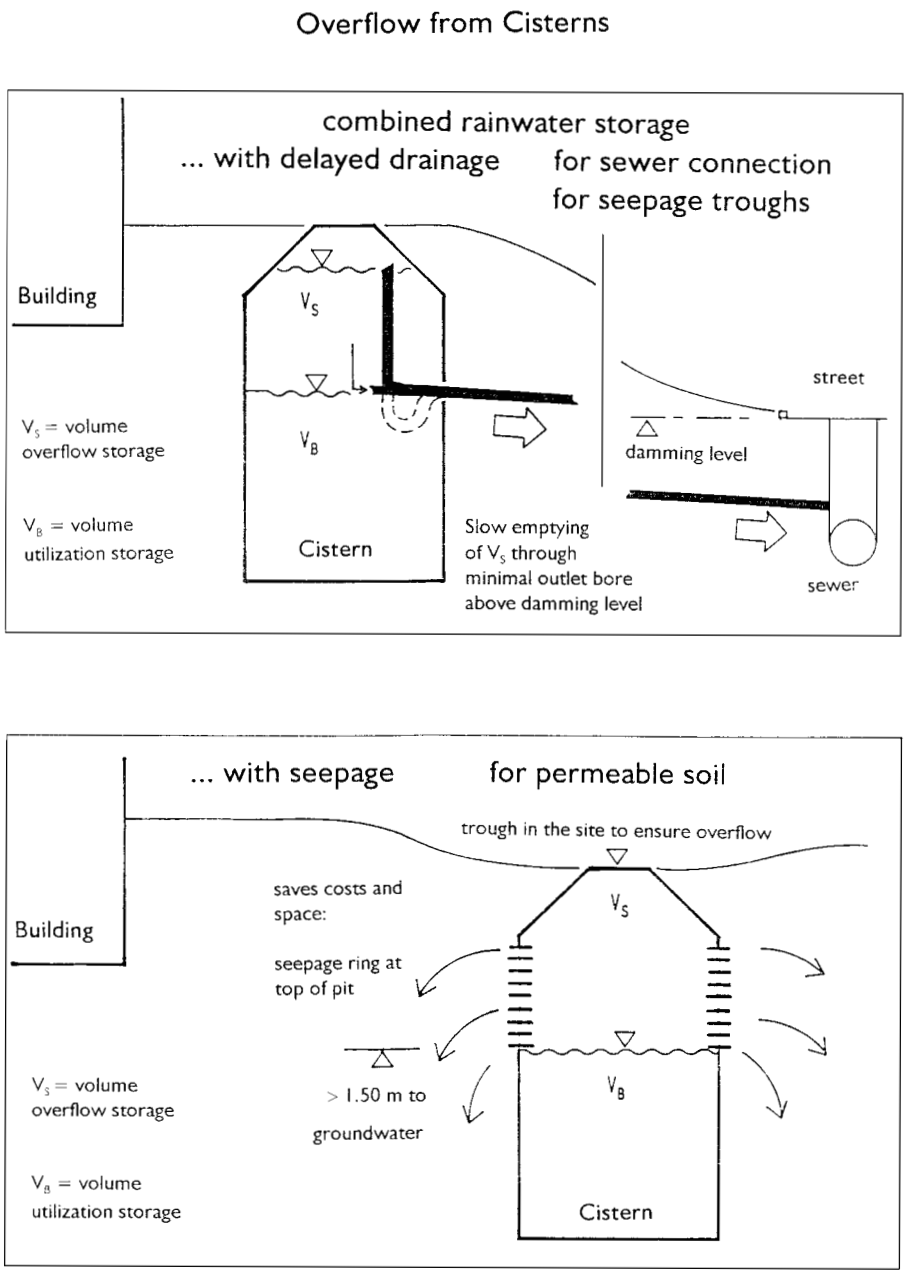
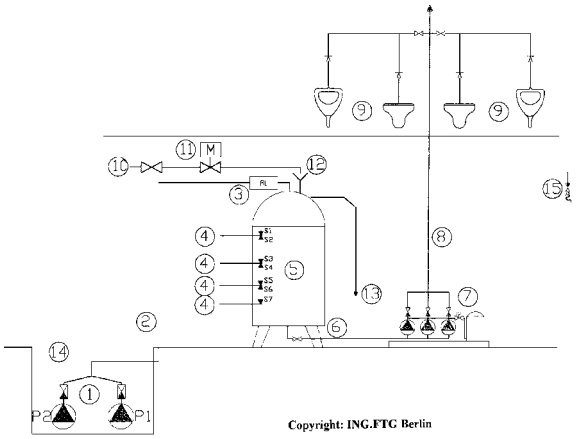


Figure 11.2 **Combined rainwater storage with separate overflow volume for seepage and delayed drainage to the sewer. Both versions are on the market in Germany as precast concrete systems. (König, "Rainwater in architecture.")**



1. Double pumping installation with float switch (WILO 2x TM 30-4).
2. Rainwater pressure pipe.
3. Rainwater fine filter (in front of the intermediate cistern)
4. Float switch for filling the cistern as required.
5. Intermediate cistern (WILO VB 800 l).
6. Connecting pipes – intermediate cistern – pressure boosting system.
7. Three-stage pressure boosting system (WILO CO-3 MHI 805/ ER).
8. Rainwater pressure pipe to the consumers.
9. Consumers (34 toilets, 26 urinals, and garden sprinklers).
10. Water feed with potable water.
11. Water feed valve.
12. Open inlet of the potable water feed according to DIN 1988.
13. DN 100 Cistern overflow with connection to soil sewer.
14. Rainwater storage cistern (70 cu.m.)
15. Garden sprinkler valve with safety key.

Figure 11.3 **Operating water distribution in a building with hybrid pumping technology.**

Notes

1. Fachvereinigung für Betriebs- und Regenwassernutzung [Association for Water Recycling and Rainwater Utilization] (fbr), *Zukunft der Regenwassernutzung* [The future for rainwater utilization], vol. 1 (Frankfurt: Fachvereinigung für Betriebs- und Regenwassernutzung e.V., 1996).
2. U. Rott and B. Schlichtig, ''Regenwassernutzung – Ein Betrag zum Gewässerschutz oder eine Gefährdung für die Sicherheit unserer Wasserversorgung?'' *Wasser und Boden* 11/94 (1994), pp. 14–21.

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12

Communities, markets, and city government: Innovative roles for coastal cities in reducing marine pollution in the Asia–Pacific region

Lyuba Zarsky and Jason Hunter

The need for innovative approaches

Globalization is driving a quiet yet pervasive change in how the world governs. As the quest for economic growth strains national budgets, governments are rapidly decentralizing key areas of governing power to local and municipal levels of administration. While empowering local municipalities with greater political authority and responsibility, a welcome move for many cities, municipalities are now faced with the monumental task of meeting the rapidly growing social, economic, and environmental demands.

Cities are further challenged by a combination of weak fiscal regimes, little experience, and often weak governance capacity, which is crippling the ability of many of the world's cities to maintain basic infrastructure. One area where these policy and economic failures are having the greatest impact on health, economy, and political stability is the challenge of coastal cities to finance, build, and operate their water and sewage infrastructure sustainably. Nowhere is this a greater challenge than in East Asia.

Despite a dramatic shift in national governments' attitudes toward addressing environmental problems, the region's cities are primary – and rapidly increasing – sources of land-based marine pollution.

While there are many reasons why efforts to control municipal pollution are ''stuck in the mud,'' three are especially salient in the Asia–Pacific region.

First is the problem of fiscal constraint. Raising environmental performance in general and in water management in particular will require a large investment in infrastructure. Investment requirements span not only ''plant and equipment,'' that is, wastewater management and water delivery systems, but also the development and maintenance of environmental information systems (especially performance indicators), and technical training. The large investment requirements – awesome at the best of times – are particularly daunting in the context of financial crisis. Public funding for environmental infrastructure is being slashed, not expanded, especially in South-East Asia.

Second is the lack of regulatory and policy capacity. Industrial emissions are a significant source of land-based marine pollution. Part of the problem is poor water pricing: industrial (and other) users rarely pay the full cost of water services. In fact, they are typically subsidized. Effective metering systems, however, require investment, which leads back to the problem of fiscal constraint. Even without water price reform, effective regulation of industry could potentially be a low-budget strategy to improve delta, riverine, and coastal water quality. However, the enforcement of existing regulations – based on a traditional command-and-control model – has proved difficult throughout East Asia (and, indeed, in North America as well). Enforcement problems stem from many sources, including poorly funded environmental bureaucracies, corruption, and – probably most important – poorly designed incentives.

Third is the problem of political will. In the main, the international environmental agenda is dominated by rich countries, whose priorities often differ from those of poorer countries. While government leaders and bureaucrats may sign agreements and develop ''action agendas,'' there is little effective political demand at home – from either élite or community groups – to implement them. Similarly, domestic environmental legislation is often passed, yet rarely enforced. Priorities are more often geared towards rapid economic growth, with little incentive for spending on environmental performance. Moreover, in times of financial difficulty, as has been seen during the current crisis, infrastructure projects are often the first to be cut as an easy means to increase government revenues. The problem of skewed priorities is compounded by the fact that, in many East Asian countries, there are

still few avenues for community and non-governmental groups to press their concerns. In some cases, governments are nervous or even suspicious of citizen action.

Overcoming these constraints requires innovative approaches to infrastructure financing and environmental regulation and enforcement. It also suggests that meeting these challenges must be linked to the key priorities for water management in East Asia, including the need to provide access to clean water and sewage for a large share of the population, as well as clean water for industrial growth. Finally, it points towards greater community responsibility and action. This paper suggests that coastal cities could play a pivotal and creative role in financing water infrastructure and regulating water pollution by industry. On the one hand, as large agglomerations of both people and industry, coastal cities are important sources of the problem – that is, land-based sources of marine pollution. Even if national governments were slow to act, cities could make a substantial dent in the problem of improving coastal management. Moreover, the fact that they must live with the pollution gives cities particular incentives to reduce it.

On the other hand, cities may have advantages over national governments in taking action on coastal marine pollution. They may be more open to civic groups and other NGOs as partners, which could help to reduce the cost of pollution reduction and improve the enforcement of regulation. Cities could also sidestep the geopolitical constraints which hamstring national governments and take collective actions with cities in other nations in protecting shared watersheds, coastal areas, or seas.

This paper has four aims. First, it sketches an outline of a ''new model'' of environmental management based on the collaboration of government with markets and communities. Second, it explores why such a model is especially salient for coastal cities in two dimensions: increasing investment in water infrastructure and raising industrial performance as regards water pollution and conservation. Thirdly, it considers why and how the model might best take root in a city government context. Finally, it examines the challenges to implementing these approaches and potential avenues to overcome these barriers. This paper examines these issues through the lens of East Asian cities; with the world's largest concentration of coastal cities, a mixture of developed and developing nations, and rapid economic growth, East Asian cities provide a good cross-section of the challenges cities face, as well as a good test bed for innovative approaches to urban environmental management.

Multiple agents: A new model of environmental management

The traditional model of environmental management puts government, usually national government, in the role of regulator and enforcer, as well as financier of public goods and operator of public utilities. Whether in the United States or China, the government has traditionally been understood to be in a bilateral relationship of regulator and regulated, provider and consumer with industry and community. In this ''command-and-control'' model, government's role is to wield sticks and offer carrots directly and to be the ''good parent'' in providing public goods.

While it has achieved some success in raising environmental performance in the United States and elsewhere, the traditional model is being re-examined because it is expensive and rigid.[1] On the regulatory front, the command-and-control model requires that substantial resources be devoted to enforcement. Moreover, there is no incentive for business to exceed standards. On the public goods front, government services are subject to problems of corruption, capture by sectoral interests, and political determination of prices.

In East Asia, the command-and-control model has not been very effective. While a spate of environmental legislation bloomed in the early 1990s, enforcement has languished, in part owing to lack of funds (as well as political will). As providers of public goods, national governments have been constrained by ineffective tax systems, priorities for other kinds of spending (especially military), and corruption – and, more recently, by financial crisis. Moreover, some East Asian countries lack strong traditions of law.

Informal regulation

Rather than bilateral governor–governed dyads, the new model of environmental management is based on the concept of multiple agents and multiple incentives.[2] It suggests that there are three key agents who interact in setting social norms for environmental management: government, markets, and communities. While it can act directly to influence the other sectors, government can also achieve social goals by indirect action; it can design policies and build capacities which enable communities to act upon markets, and vice versa, in raising environmental performance. Specifically, this means that communities can play a role in regulating industry; and markets (and communities) can play a role in the provision of public goods.

Most important, the ''triangular model'' means that governments can exert leverage upon the other two sectors in raising environmental performance. Leverage is the key to overcoming the three obstacles identified above, namely, fiscal constraint, lack of regulatory capacity, and lack of political will.

The role of communities in improving the environmental performance of industry has been termed ''informal regulation.'' According to Afsah and colleagues,

> Recent evidence from Asia, Latin America and North America suggests that neighboring communities can have a powerful influence on factories' environmental performance … The agents of informal regulation vary … local religious institutions, social organizations, community leaders, citizens' movements or politicians … Factories negotiate directly with local communities, responding to social norms and/or explicit or implicit threats of social, political or physical sanctions if they fail to reduce the damages caused by their emissions.[3]

Via informal regulation, communities reduce the cost of monitoring and enforcement of regulations. Community groups can also help to identify policy gaps and perverse incentives, provide technical assistance, and gain popular support for government initiatives. In recognizing the role of communities in environmental regulation, governments focus on how to make community intervention and pressure effective. To this end, gathering and disclosing information becomes a key role for government, as well as providing forums in which citizen and industry groups can directly negotiate with each other.

Community groups may also play a role as providers of public goods, including water supply and management. For example, in the slum of Orangi in Karachi, Pakistan, community groups got together to build their own sewers. Contributing both money and labour, the community was able to build underground sewage pipes at a fifth of the cost of government-run projects. Over 12 years, they contributed US$2 million and installed sewers serving over 90,000 homes. The project was launched with a very small grant.[4]

Markets

The other key agents in the new model are markets, as providers or partners in the provision of public goods. In water supply and man-

agement, especially in developing countries, governments have been grossly ineffective. According to an Asian Development Bank (ADB) study, over 40 per cent of Asia's urban population did not have access to adequate sanitation in 1987. Where sewage systems were in place, over 90 per cent of the sewage was discharged untreated. Moreover, the system was highly inequitable. Water and sewage hookups – at state subsidized prices – were typically available only to wealthier customers. Forced to pay private vendors for potable water, the poor paid as much as ten times more than wealthier customers.[5]

In this context, governments have increasingly turned toward privatization of water utilities. However, given highly subsidized water prices, turning a profit in the water supply business is not easy. Probably the single most potent market-oriented policy initiative – both for conservation and as a way to boost infrastructure investment – would be for governments to nudge water prices surely and steadily towards the full cost of provision. Metered water systems with full-cost pricing would provide incentives for water conservation to households and industry alike.

Raising water prices, however, is politically sensitive and subject to reversal, a fact not lost on private investors. In Malaysia, for example, the government has embraced privatization on a scale larger than any other country in East Asia. With 65 per cent of its waste going directly untreated into its waterways, Malaysia privatized its national sewage treatment facilities in 1993 as a way to overcome its financial and technical constraints. Under a concessions agreement, the Indah Water Consortium was asked to upgrade and build new sewerage treatment facilities in a US$2.8 billion contract. Although initial indications show reductions in effluent, progress has been slow owing to consumer protests over fees.

The government has been forced to step in on several occasions to lower prices.[6] The Malaysian case demonstrates that communities can act not only to further but to undermine governmental goals. Government–market initiatives that ignore impacts upon, and the likely responses of, communities will be vulnerable to opposition and paralysis. Lack of participation in the design and planning process is one way to trigger opposition. Under a multiple agent model, governments would at least recognize the importance of garnering community support before undertaking important policy initiatives, such as changing water prices.

Reducing land-based sources of pollution

The reduction of land-based sources of marine pollution from coastal cities will require two broad initiatives: (1) a large increase in investment in water supply and management infrastructure; (2) a significant improvement in the environmental performance of industry (and government). Given the obstacles identified earlier – fiscal constraints, lack of regulatory capacity, and lack of political will – it is likely that adoption of the multiple agent model is the only way to address municipal sources of land-based sources of pollution. Two broad applications of this model are described below.

1 Innovative financing for water infrastructure

The need for investment in water supply and management in Asia is staggering. According to the United Nations Environment Programme (UNEP), as much as 70 per cent of the waste effluent discharged into the Pacific has had no prior treatment.[7] Besides ecologically destructive nutrient loading, untreated waste is a major source of sewage-borne pathogens such as cholera, hepatitis, and salmonella.[8] Bangkok attributes 6 per cent of deaths annually to waterborne diseases. The problem is not confined to the region's poorest countries. As late as 1991, the Republic of Korea reported that only a third of municipal wastewater went to treatment plants. Region-wide, the ADB estimates that only 60 per cent of the population in urban areas and 40 per cent in rural areas have access to safe drinking water, and that over 270 million urban residents lack adequate sanitation.

Estimating the capital requirements for adequate water and sanitation infrastructure is difficult. In addition to technology and design choices, there is great uncertainty over the future costs of providing water supply for urban areas. In part because of past pollution, new water sources will lie further from cities and will cost more to reach. Moreover, there are social choices: even if all agree that the goal is to service 100 per cent of the population, choices must be made as to the rate of meeting demand.

One attempt to estimate water and sanitation investment requirements was undertaken by Paul Weatherley for a 1994 ADB study. Weatherley developed two scenarios: ''business as usual,'' and accelerated progress. The business-as-usual scenario projected trends of the past seven years to the year 2000. Given that the number of people served had declined in the past seven years, this estimate would

mean that a smaller per centage of the population would have access to clean water and sanitation, even at the same levels of investment. Under this scenario, Weatherley estimated that, for the developing market countries of the ADB, US$7.8 billion per year would be needed. Under an accelerated progress scenario, wherein a larger percentage of the population would be served than in 1994, the annual capital requirement would be US$13.1 billion.[9]

The traditional approach to water infrastructure financing – public-sector and multilateral banks – will not be up to the task. Multilateral funds and bilateral aid budgets are shrinking. Moreover, public-sector investment and operation of water supply and sanitation will be both insufficient and non-optimal. ''With a few exceptions,'' concludes a recent study, ''the public sector has been a costly and inefficient provider of infrastructure while its social and environmental dimensions received little attention ... most public utilities are insolvent and heavily subsidized by the state, yet the quality of service remains poor and the coverage partial''.[10]

The only way to meet growing infrastructure needs in general and water management in particular is via increased participation of the private sector. However, infrastructure investment is characterized by political risk, long-term and/or low returns, high overhead costs, and long payback periods. Water and sanitation investment is particularly problematic: the ratio of investment in fixed costs to annual revenues is ten to one.[11] Unlike electricity, which has drawn lively investment in developing countries, water is not very attractive to private investors. ''Water and sewerage,'' says John Briscoe of the World Bank, ''is a low-return, high-risk business.''[12]

In this context, governments have two options. First, they can keep public ownership of assets but contract out management, operation, and/or investment. They can use service contracts, management contracts, lease arrangements, and concessions. Second, they can privatize wholly or partially, temporarily or permanently. Among the innovative instruments and mechanisms which have been utilized or proposed are government guarantees, predetermined revenue streams, concessions, joint ownership, and a variety of build–own–transfer or build–own–operate (BOT/BOO) programmes.

In such partnerships, one of the key roles of government is to manage and reduce market, technological, and/or political risks, on both sides. Besides the specific guarantees it can offer investors, government must promote good governance at home and ensure high environmental and social performance by private investors. Govern-

ments also can act as financial brokers through concessionary tax policies, discretionary funding, and combining a number of public and private investors.

2 Industry regulation and community involvement

While little data is available, it is evident that industrial effluents are a significant source of land-based marine pollution in Asia. A 1993 World Bank study of Indonesia, for example, concluded that industrial pollution constitutes 25–50 per cent of the total pollution load in different rivers in Java.[13] More recently, the ADB estimated that industrial wastewater constitutes an estimated 25 per cent of total discharge in Bangkok and 35 per cent in Manila.[14]

Rapid economic growth, much of it based in coastal cities, coupled with little or non-existent enforcement of environmental regulations, is widespread throughout East Asian cities. Regulating industries in the traditional way has not been very effective. While the need to improve industrial environmental performance is clear, as outlined below, it also seems obvious that the traditional model of regulation can be only minimally effective.

The multiple agent model, however, points toward new approaches which would utilize communities and consumers as ''informal regulators.'' Indonesia, for example, developed a five-tier coloured rating system for the environmental performance of leading companies. Just the threat of receiving a black (i.e. substandard performance) label served to increase many companies' investment in environmental management. The Philippines' Department of Environment and Natural Resources (DENR) has planned to replicate the Indonesian model with a public disclosure programme called EcoWatch. One study of the water pollution levy in China found that, even though the official levy rate was uniform across the country, the effective rate varied significantly across provinces and was highest in urbanized areas, especially eastern coastal regions. The authors concluded that a key factor in determining the effectiveness of the levy was ''community capacity to understand and act on local environmental problems, indexed by measures of information, education and bargaining power.''[15]

If communities can play an important role – especially in Asia – in raising industry performance, then the role of government is to develop the capacities of communities. Central to this task is the gathering and disclosure of information. Environmental performance

indicators, including water use and water emissions, would be especially effective for both industry and community groups. Such data could be part of a larger plant-based Environment Management System. Public disclosure of the information would be crucial. In addition, governments need to help communities understand technical information better, as well to provide arenas for discussions and negotiation between communities and local industry.

Given the crucial role of information, governments need to consider industry incentives to provide it. Businesses need to be rewarded publicly for good environmental behaviour, and shamed for bad. They also need help from governments and community groups in improving their technical and managerial capacities to improve water management. One of the United States Environmental Protection Agency's most effective environmental management tools has been the Toxic Release Inventory (TRI), a 1986 regulation which requires certain industrial sectors to publicly report environmental releases and transfers of chemicals. In 1998 the EPA expanded this programme to involve multiple stakeholders in assisting in the provision of real-time monitoring data to the public, with the Environmental Monitoring for Public Access and Community Tracking (EMPACT) programme.

Coastal cities

So far, this paper has argued that a multiple-agent model of environmental management is crucial to addressing coastal marine pollution (and other improvements in environmental performance). Furthermore, it has suggested two applications of the model: innovative infrastructure financing and community regulation of industry. While we have examined the ''markets'' and ''community'' legs of the triangular model, we have not yet sketched in the ''government.'' This next section will consider the particular benefits of using this approach to tackle the aforementioned problems in the context of cities and municipal governments.

Cities in general are dynamic arenas for both population growth and industry. According to the ADB, urban areas account for 80 per cent of economic activity in the Asia–Pacific region. In East Asia, 57 per cent of the population lives in urban areas today and 67 per cent will be urbanized by 2015.[16] Strikingly, a substantial portion of this population is living on the coast. Of the world's six coastal cities with a population greater than 10 million, five are in Asia. Half the world's

cities with a population of 1–10 million people are in Asia.[17] In China alone, where the urban population is expected to increase by over 125 per cent in the next 25 years, over 400 million live on the coast and account for over 60 per cent of China's output.[18]

In addition to their absolute importance in terms of industry and population, cities are points of entry into the globalized economy. Export industries, financial services, and import companies are overwhelmingly concentrated in cities, and mostly in coastal cities. At the end of the twentieth century, cities have emerged as important international, as well as national, players.

Given their incentives to improve environmental management – people and industry in cities must live with and in the pollution – cities are likely to be quicker to take action than national governments. Moreover, they may be more politically light-footed, with fewer conflicting interests to balance. Cities may be more open to working with civic and community groups, who are often clearly focused on practical goals aimed at improving city life. Even more ideologically-minded NGOs tend to be constructive and proactive when working at a local level.

The concept that cities have particular advantages and opportunities to enhance environmental performance, especially in terms of water and energy management, has gained momentum in the last decade. The US city of Portland, Oregon, may be the farthest ahead in developing municipal programmes to promote energy conservation and efficiency. Portland has a sweeping set of initiatives which include working with market and community actors in a variety of ways, ranging from helping to finance energy-efficiency home improvements in poor neighbourhoods to purchasing electricity from more efficient suppliers, to joint partnerships with utilities. The city describes its relationship with utilities as stemming from the ''City's roles as educator, partner with private enterprise, financier, regulator, purchaser and aggregator.''

One of the advantages for cities in taking action on infrastructure financing is that they can use their own credit rating to borrow on international markets. In many cases, cities may have a higher rating than countries. Barcelona, for example, has taken the initiative to maintain and improve its bond rating as Spain's has been on the decline.[19]

In Asia, the Philippines has led the region in giving greater control to local governments. Under the Philippines Local Government Code of 1991, local governments were given increased autonomy, increased

centrally collected shares of revenue to the municipalities, and greater power to increase local property taxes as well as issue their own taxes. By giving local authorities the ability to control these revenues, the municipalities have gained a sense of control and created greater incentives to mobilize various sources of revenues.

Manila has used this new-found flexibility to meet the costs, estimated at US$5–7 billion, to upgrade its water and sewage system by granting concessions to private-sector concerns. The project will relieve the city of these exorbitant capital costs, the concessionaires have a secure revenue flow guaranteed by the International Finance Corporation, and the consumers have improved water and environmental quality at lower costs.[20]

In the southern Philippines city of Cebu, local government has teamed up with 40 of the countries largest corporations and non-governmental organizations to form the Cebu Investment Promotion Center.[21] The goal of the consortium is to attract and facilitate foreign private-sector involvement in infrastructure projects. Similarly, the city has established the Cebu City Inter-Agency Committee, a government/NGO initiative to address the deleterious impacts of development. Together the two projects have been an integral part of Cebu's development, attracting investment, responding to development challenges, and forming partnerships between the private sector, government, and NGOs.

In addition to embracing better water, marine, and coastal management practices in their own backyards, cities may have a role in promoting cross-boundary marine and coastal management regimes. In North-East Asia, for example, regional cooperation to develop common coastal-zone management protocols has been stymied by geopolitical tensions. Littoral cities in the Sea of Japan could collectively and voluntarily move towards common standards and practices.

One drawback of cities as leaders in environmental management is that local governments can be captured by local development, real estate, or other economic interests. Moreover, the accessibility of local action to local community groups is both a strength and a weakness. The involvement of dozens of groups, potentially with conflicting interests, can lead to policy paralysis. To work effectively with both markets and community groups, cities will need to design institutional mechanisms consciously so as to structure policy and project debate among the three partners (government–markets–community), as well as between businesses and communities. City governments must also take very seriously their role in gathering and

providing environmental, social, and economic information to the public.

Moreover, it is clear that in order to implement any of these strategies cities must also raise their capacity to govern effectively through international cooperation. A number of international programmes to share best practices, know-how, and technology is already under way. These must be replicated and expanded. At the end of the twentieth century, cities have emerged as important international players. The approaches outlined above will hopefully provide them with the tools to excel in their new roles in the twenty-first century.

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Part III
International and future dimensions

13

Cultivating an urban eco-society: The United Nations response

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In recent years, a number of high-level United Nations conferences on sustainability-related issues of global significance have taken place. These conferences have addressed issues as diverse as sustainable development, social development, human settlements, gender equality, and children. They have both shaped the international policy environment and catalysed similar processes of policy development at national, regional, and local levels, affording a critical linkage to sustainable development.

Within the next ten years, more than half of the world's population will live in urban areas. Cities exert enormous environmental impacts far beyond their boundaries, and face challenges in several areas. These include minimizing the negative impacts of city-based production and consumption, as well as implementing urban development and management strategies based on an understanding of the finite nature of global resources and the carrying capacity of ecosystems. The unique nature of each city and its culture, position, and level of development require local resources, knowledge, and skills to achieve sustainable development.

Thus, the challenge is how the government, both local and central, can mobilize human, financial, and technical resources to enable sustainable cities. Successful environmental planning and management

require understanding, agreement, and coordinated action by all stakeholders involved, including public, private, and popular sector groups. Only through cooperation and partnership of all stakeholders can cities cultivate a sustainable, eco-efficient society. Today's urban government must therefore be reinvented in order to create intra-city partnership and solidarity as well as strong cooperation among cities and citizens, sometimes beyond the city boundaries, nationally and globally. Indeed, municipal governments have a key role to play in urban governance, in which partnership is the framework of policy actions.

Within the governance framework, municipal governments can also induce the private sector and residents to refrain from mass production and consumption in order to promote eco-societies in urban areas. A large part of this role is encouraging and supporting efforts of community-based organizations and NGOs in supplying or improving urban services, such as water supply, sanitation, solid waste management, public transport, health care, and education.

The restoration and protection of the environment on a long-term basis will involve the forging of partnerships through an innovative approach with a regional or decentralized focus on specific programmes and projects of priority. A global network of sustainable development information and knowledge could become a tool of both eco-information on sustainable development, and eco-knowledge management. Also, sharing experiences and know-how among cities can be an effective way of expanding capabilities without requiring large resource expenditures.

A major reorientation in urban governance is required in order to reach the goals of the commitments made at the high-level international conferences on sustainability-related issues. Forging partnerships for the development of new methods and approaches to settlement planning, adaptable to each society's conditions and circumstances, is crucial. In this light, the United Nations will continue to provide analytical research and operational assistance to be utilized, as required, by urban centres.

Sustainable development

Agenda 21, a programme of action for sustainable development worldwide, was adopted at the second United Nations Conference on Environment and Development, known as the ''Earth Summit,'' held in Rio de Janeiro in June 1992. Agenda 21 stands as a comprehensive

blueprint for action to be taken globally, from now into the twenty-first century, by governments, United Nations organizations, development agencies, non-governmental organizations, and the business community, in every area of economic and social development and environmental protection.

Sustainable development means meeting the economic, social, and environmental needs of the present generation without compromising on the ability of future generations to meet their needs. Meeting human needs implies recognizing each person's right to a minimum standard of living, health, and well-being, including adequate access to food, clothing, shelter, medical care, and necessary social services, as stated in the Universal Declaration of Human Rights.

Economic and social development and environmental protection are interdependent and mutually reinforcing components of sustainable development. Sustainable development strategies are important mechanisms for enhancing and linking national capabilities to bring together priorities in social, economic, and environmental policies in a harmonious manner.

Sustainable development requires greater integration at all policy-making levels, including the lowest possible administrative levels, with the involvement of non-governmental actors. Through systems of good governance, integrated strategies can enhance prospects for economic growth and employment while at the same time protecting the environment. All sectors of society and all stakeholders should be involved in the development and implementation of those strategies.

Sustainable development and urban governance

A commitment to the sustainable development of cities requires clean production, good jobs, good social conditions, and rigorous environmental standards. It must also take into account the impact of urban production and consumption on the lives of people outside cities. Sustainable urban development must take into account the finite nature of many of the resources needed to sustain the population of cities and of the capacities of ecosystems in the wider national, regional, and international context to absorb wastes produced by the populations of cities. Historically, these have not been major concerns of city authorities.

Chapter 8 of Agenda 21 addresses the issue of good governance at all levels. The overall objective of this chapter is to improve or restructure the decision-making process so that consideration of socio-

economic and environmental issues is fully integrated and a broader range of public participation assured. This objective has evolved with the understanding that countries will develop their own priorities in accordance with their prevailing conditions, needs, national plans, policies, and programmes.

Within the next ten years, more than half the world's population will live in urban areas. An increasing proportion live in large cities, including some of unprecedented size. The main challenge in the next two decades is how to manage the development of a rapidly urbanizing world in such a way as to satisfy the social, economic, and environmental needs of our societies, overcome the limitations of past urban policies, and satisfy the growing demand for democratic governance at all levels.

The task ahead is staggering. The plight of developing countries can be seen from the fact that in 1965 there were only seven cities in developing countries with a population of 5 million or more, of which only one exceeded 10 million. By 1995, there were 27 cities in developing countries with a population of 5 million or more, and 10 cities with a population of 10 million or more. By 2015, it is estimated that 53 cities in developing countries will have a population of 5 million or more, 22 will exceed 10 million, and three cities are likely to have a population in excess of 20 million.

The ''sustainable'' component – ensuring that the present needs are met ''without compromising the ability of future generations to meet their own needs'' – requires action to prevent the depletion or degradation of environmental assets in order that the resource base and ecological base for human activities may be maintained. This implies the need for authorities to consider how their policies and actions affect environmental assets and how, in the long term, depletion and degradation can be avoided.

With modern cities facing challenges related to environmental degradation, poverty, lack of housing, poor drinking water and sanitation, access to education, transportation, and other critical policy issues, the need to develop adequate administrative and financial capacities for effective urban governance is critical. Urban planning and management requires understanding, agreement, and coordinated action by the full range of public and private groups and organizations at neighbourhood, community, city, and national levels, through a process of identifying and involving stakeholders. This must include groups outside the formal planning and management

systems, such as women and marginalized and disadvantaged groups, especially the urban poor, at both city and neighbourhood levels.

The rapid growth of urban populations and the complexities of sustainable development in large cities makes questions of local governance, decentralization, and the relation of local authorities to national governments ever more critical. Local authorities have the greatest understanding of the unique problems of large cities and are best able to ensure the participation of urban groups in addressing those problems, but they generally lack the financial resources necessary to deal with the problems, and many of the problems require action beyond their jurisdiction. A high degree of cooperation and coordination is therefore required between local, regional, and national authorities to achieve sustainable urban development. Regional planning is essential for managing urban water supplies, efficient transportation systems, and environmentally sound waste disposal. In large countries with a number of large cities, the national government may be best able to develop the expertise needed to address complex economic, social, and environmental problems. Environmental standards for vehicle emissions, industrial emissions and effluents, energy efficiency of appliances, and construction codes have their greatest impact on the urban environment, but generally need to be established at the national level, perhaps with local variations.

Policy-making for sustainable urban development is further complicated by the fact that the legal framework for environmental protection is often fragmentary, with a variety of laws enacted at different times, with different goals, and with implementation responsibilities lodged in different agencies. Integration of environmental protection with economic and social development is made difficult by existing laws and institutional structures established at a time when the complex relations between economic, social, and environmental issues were not understood. Substantial training of staff and organizational restructuring is often necessary to address issues of sustainable development that cut across traditional disciplines. Increased research and development and exchange of information between cities is essential for addressing these issues.

Strategies for sustainable cities

The sustainable development challenges of mega-cities are enormous. Meeting those challenges will require economic and social

infrastructures that are reliable, efficient, flexible, and responsive to the ever-changing needs of diverse urban populations. The high concentrations of wealth, pollution, markets, services, and consumption of cities will also affect the areas surrounding them. The degree to which the mega-cities are sustainable will have repercussions for all human settlements of the next century. Thus, how we plan and direct the growth of future cities will be the true test of both the local and the global commitment to sustainable development.

Although the challenge appears daunting, it is not hopeless. Many positive signals have emerged during the initial phase of Agenda 21 implementation. One of the most positive signals is the Local Agenda 21 process generated by local authorities and local communities. This process has already produced useful lessons applicable to the way we chart the course of sustainable mega-cities.

The ''Local Agenda 21'' concept was formulated by the International Council for Local Environmental Initiatives (ICLEI) and launched at the 1992 Earth Summit. It is defined as a ''participatory, multi-sectoral process to achieve the goals of Agenda 21 at the local level through the preparation and implementation of a long-term strategic action plan that addresses priority local sustainable development concerns.'' Agenda 21 recognized this concept along with the critical role of local authorities in sustainable development (chapter 28). It provides a unifying framework for many existing international and national initiatives related to human settlements and sustainability.

The Local Agenda 21 process has galvanized hundreds of cities and communities, and by 1997, over 1,800 cities and towns in 64 countries could be identified as Local Agenda 21 Cities. Thousands of other cities are in the process, supported by international and national programmes such as the Sustainable Cities Programme of the United Nations Centre for Human Settlements (UNCHS), the Capacity 21 programme of the United Nations Development Programme (UNDP), and the Urban Environmental Management Programme of the German development cooperation agency GTZ.

The Local Agenda 21 Cities are characterized by:

- Engagement of all stakeholders in the city;
- Continuous consultations to develop a shared vision for the community;
- Participatory assessment of the social, environmental, and economic needs of the city;

- Participatory target-setting to achieve the vision;
- Clear and transparent monitoring and reporting procedures.

These characteristics have enabled the Local Agenda 21 cities to achieve tangible results that have changed the way they produce, consume, and transport goods and services, care for the natural habitat, and most importantly, care for and empower the community. In most cases, great results have been achieved with little financial resources. The true ''capital'' of these efforts has been the commitment of the community and municipal leaders.

The Local Agenda 21 process provides valuable lessons for the sustainable development of mega-cities. The most important lesson is the need for participation and engagement of the entire community, from the mayor's office to the Scouts club in the elementary school. Participation leads to ownership and ownership ensures long-term success. Participation pools the available knowledge, whether in the form of scientific information from the city's research institutes or common sense from the local youth council. Participation also increases the resources of the local government through contributions from the community ranging from volunteered time to financial contributions from the city's businesses.

The sustainable cities of the future will need to develop policies that promote sustainable resource use including the use of energy, land, water, and human skills. They need to adopt policies that balance not only supply and demand but also these economic elements with the social and environmental needs of the community. They will need to invest in infrastructure to provide basic services and adopt policies that increase local productivity. However, local participation will be the glue that holds these policies together in the long term.

Despite its success, the Local Agenda 21 process continues to face obstacles when viewed in the broader context of a country or region. A 1998 joint study by the UN Department of Economic and Social Affairs (DESA) and ICLEI identified a number of national obstacles that cities of the future will need to overcome. For example, a city's efforts to develop incentives for resource use reduction or pollution prevention may be undermined by lack of similar incentives at the national or regional level, leading to, among other things, the ''free-rider'' syndrome. Subsidies that support unsustainable agriculture reduce the effectiveness of a city's efforts to promote sustainable food production and distribution systems. Transportation policies that favour car use reduce the effectiveness of a city's efforts to promote

public transportation or other alternatives. Nonetheless, the sustainable mega-cities of the future can be powerful advocates for harmonizing regulations, standardizing best practices, reducing perverse subsidies, and demonstrating creative solutions on a large scale.

Education and public awareness

A fundamental prerequisite for sustainable development is education accessible to all, at all levels and available through all possible channels including non-formal and informal modes of teaching and learning. Education is a lifelong process beginning with the family and local communities. Ensuring full and equal access to education, for women and girls in particular, has a crucial impact on sustainable development and on changing the attitudes and behaviour of families and societies towards sustainability. Education also empowers youth and provides them with the essential knowledge and know-how to lead sustainable lifestyles.

Even where there is a strong educational system, a reorientation of that system including its curricula and the mindsets of educators might be needed. Education for sustainable development is inclusive of, but not limited to, environmental education. It means taking an interdisciplinary approach incorporating social, economic, and environmental dimensions, and providing teacher training.

Priority has been given to education, public awareness, and training by the United Nations Commission on Sustainable Development, which has adopted a work programme on this theme – one of four adopted in 1996 – which was further elaborated at its sixth session in 1998. In that work programme, emphasis has been placed on incorporating education concerns and public awareness needs into national and local strategies and action plans for sustainable development. Also emphasized was the need to link education and awareness-raising to promoting sustainable consumption and production patterns.

Public awareness is essential for public participation in decision-making for sustainable development and is closely linked to access to information and to empowering citizens. Information and awareness campaigns not only need to be better targeted, but also must be linked to concrete opportunities and actions to put new information to use. Towards that goal, governments at all levels, NGOs, and the media and advertising sector should work together to facilitate the

communication of the key messages of sustainable development to the public.

Consumption and production patterns

The United Nations General Assembly, at its nineteenth Special Session in June 1997, undertook an overall review and appraisal of the implementation of Agenda 21, including a discussion of changing consumption and production patterns. With respect to cities, the General Assembly decided that action should focus on taking into account the linkages between urbanization and the environmental and developmental effects of consumption and production patterns in cities, thus promoting more sustainable patterns of urbanization.

During the past five years, methods to achieve greater resource and energy efficiency in production processes have been further developed by business and industry. Eco-efficiency and the related objective of industrial ecology, which aims to close the production cycle of polluting substances by using them as inputs in other industrial processes, have become a focus of work on sound environmental management.

In addition to the continuing efforts to increase the energy and resource efficiency of production, sustainable development policy-makers are increasingly examining possibilities for changing consumption patterns, focusing on the demand side as well as the supply side of the economy. This should lead to policy measures in such areas as taxes, consumer information, and education to change the behaviour of consumers, and thereby of producers. In the urban context in particular, provision of infrastructure and public services is critical to changing consumption patterns in such areas as transportation and leisure activities.

Policy development relating to consumption is also benefiting from further work on the environmental impacts of goods and services through all phases of their production, use, and disposal. This integrated life-cycle analysis approach emphasizes that production and consumption constitute a multi-stage process, with each stage associated with certain types of environmental degradation. Policies to increase manufacturers' responsibility for the effects of the use and disposal of products would lead to improved product design, integrating efficiency of use and waste reduction into the production process.

One of the biggest challenges for governments at all levels is finding effective and acceptable ways to influence millions of individual consumers. While economic instruments to ensure that the prices of goods and services fully reflect their environmental costs are fundamental to changing consumption patterns, price is only one variable influencing consumer behaviour, and in many cases may not be the most important.

Informed and empowered consumers can be a major driving force behind more environmentally sustainable patterns of consumption and production. Education for sustainable development implies an interdisciplinary approach at all levels of the educational system, incorporating social, economic, and environmental dimensions. Increased public awareness of sustainable consumption and production issues will promote both more sustainable consumption patterns and greater public participation in decision-making for sustainable development. Information and awareness campaigns need to be better designed and targeted, using knowledge derived from marketing and advertising, and must also be linked to opportunities to put new information to use. Measures to encourage or require businesses to provide consumers with information on the environmental impacts of their goods and services can also contribute to enabling consumers to play a more active role in promoting sustainable consumption and production. These concerns need to be reflected in the policies and strategies of governments at all levels, including local levels.

Priority action for the twenty-first century

All of the policies mentioned above are potentially helpful, but no single one of them can achieve the objectives of sustainable development by itself. In order to achieve sustainable development, governments need to introduce packages of policies that are mutually reinforcing. No two cities require precisely the same measures to make their development sustainable, as they are all starting from different positions and view the same problems in different ways. Willingness and ability to tackle problems are likely to vary from country to country and city to city. It would be inappropriate, therefore, to define a precise package of measures to be applied to all cities regardless of size and state of development. It is more helpful to identify policy directions and leave the choice of individual measures and the way in which they are applied to the discretion of the cities and the countries concerned.

The capacity of city authorities to govern does not depend on a large capacity to invest, as many actions to encourage and support social and economic development do not require public investment. City authorities, for example, can increase the supply and reduce the cost of land for housing by changing land-use regulations, simplifying building regulations, and making better use of publicly owned land. City authorities can often improve the quality of public transport by providing the right framework for private companies. They also have the main role in enforcing legislation on air and water pollution and occupational health and safety, which does not necessarily require large public investments.

The achievement of sustainable development goals within a city requires a wide range of household and community projects, whose individual impacts may be small but whose collective impact is significant. Municipal authorities must encourage and support many such initiatives so that their cumulative impact will be significant for districts, cities, and city-regions.

By means of a government framework of incentives and regulations, municipal governments can have a major role in promoting sustainable development and poverty reduction in urban areas, even with a limited investment capacity. A large part of this role is encouraging and supporting efforts of community-based organizations, NGOs, and private-sector institutions to supply or improve urban services such as water supply, sanitation, solid waste management, public transport, health care, and education. Poverty reduction could be promoted through changes in the regulatory framework for land management, urban agriculture, and housing. Municipal programmes can also make major contributions to employment creation, especially through support to small-scale and informal enterprises.

Good governance requires a representative political system through which the priorities of citizens and businesses can influence government policies and the actions of private actors. It needs to involve a wide range of local groups actively in developing ''city governance'' to ensure that the different priorities of different groups are addressed. This requires the formulation and implementation of policies and programmes planned and carried out by various government agencies.

Partnerships between NGOs, community organizations, business and commercial enterprises, professional organizations or associations, and national and local government are needed to achieve sustainable development across all sectors and geographic scales and promote successful inter-project linkages.

Protecting the urban environment

Energy and transportation

In order to meet energy demands from intensified agriculture, construction, and industrialization, energy and material consumption has escalated rapidly since the nineteenth century. Global energy consumption has evolved from a reliance on traditional energy sources, primarily fuelwood and other biomass, to fossil fuels. Human welfare has become more and more dependent on electricity, with more than a third of fossil primary energy now converted to final use as electricity. World commercial energy consumption increased by about 50 per cent between 1972 and 1996. Industrialized countries still account for over 60 per cent of total commercial energy consumption, although their share is declining as the rest of the world develops.

There have been massive investments in modern energy supply over the past 30 years. Nevertheless, over 2 billion people, mostly in the rural areas of developing countries, still have little access to commercial energy supplies. Poverty and remote locations leave many communities dependent on animal or human motive power and on fuelwood and animal dung for cooking and heating.

The combustion of fossil fuels results in emissions with adverse health effects and detrimental environmental impacts. Urban air quality and long-range, including transboundary, atmospheric pollution, including ''acid rain,'' have been addressed with some success in developed countries. Rising atmospheric concentrations of greenhouse gases, leading to global warming, still remain to be tackled effectively.

The Istanbul Habitat II Conference concluded that the bulk of population growth in developing countries will be concentrated in cities. This urbanization will result in increased energy demand. Energy policies are linked to many aspects of urban development, particularly land use and zoning, transportation systems, and the energy efficiency of buildings. In the transportation sector, technology-based strategies to address the environmental impacts through alternative fuels and engines with high efficiency and low emissions, such as fuel-cell powered electric vehicles, could greatly improve the quality of life in urban areas.

Energy use, economic and social development, and environmental degradation are linked in a complex relationship. There is a need to promote more sustainable patterns of production, distribution, and

use of energy, including at the intergovernmental level. The Commission on Sustainable Development will focus on atmosphere/energy issues in 2001.

A shift in energy systems towards environmentally sound and efficient energy technologies would contribute substantially to sustainable development. The globalized market, popular participation in decision-making, restructuring of energy utilities, and changes in energy finance, among others factors, will have a strong bearing on the transition to a sustainable energy system. Technical innovations and improvements, together with market instruments and other measures, such as fiscal incentives and regulations, will be needed to accelerate development of a sustainable energy system. There are a large number of possible policies for promoting energy strategies supportive of sustainable development, such as promoting access to modern energy, indigenous capacity-building, improvement in energy services, participation of stakeholders in decision-making, systematic introduction of environmentally sound and efficient fossil-fuel technologies, increased use of renewable energy technologies, and improvement in energy efficiency.

The transportation sector is the fastest-growing end user of energy and is expected to be the major cause of growing world oil demand during the next 20 years. World demand for major transportation fuels increased at an annual average rate of about 1.9 per cent during the 25-year period from 1970 to 1994. Private passenger and commercial vehicle use have increased by 3.5 per cent and 4.5 per cent respectively during the same period. Part of the predicted rise in energy demand by this sector is expected to result from increased transport needs associated with urban growth.

The transportation fuels share of crude oil consumption increased to about 60 per cent from about 50 per cent during the 1970–1994 period. Public transportation systems are often the only means of motorized transport available to the poor, and well-designed systems in urban areas can play an important role in minimizing traffic congestion, urban air pollution, and public safety hazards. Recent concerns about urban air quality and global warming have led to the consideration of transportation issues in overall policies aimed at achieving sustainable development.

The transportation sector plays an important role in economic and social development, making a substantial contribution to gross domestic product (GDP). It provides valuable employment opportunities, and has large indirect benefits in facilitating national and

regional development and globalization. However, transportation also imposes considerable costs on society and the environment, notably in terms of accidents, pollution, and the degradation of ecosystems and landscapes.

Transportation systems have been credited with determining the rate and direction of urban expansion. They have provided access to better employment, leisure, and other opportunities essential for economic and social development. However, steady urban population growth in the latter half of this century and the rapid expansion of city boundaries have imposed enormous strains on many urban transportation systems. Solutions to urban transportation problems will require better city planning, improved infrastructure, and increased investment in public transportation systems. Some countries have shown initiative in this area, including Japan with its Intelligent Cities Project, Technopolis, and Media City.

Possible policies for reducing the negative environmental and social impacts of transportation include measures to reduce demand, measures to encourage a change of transportation modes, measures to raise energy efficiency within each transportation mode, and measures to promote the use of alternative fuels in the transportation sector.

Water and sanitation

In many parts of the world, current patterns of water resource development and use are not sustainable. Water use has been growing at more than twice the rate of population increase during this century. Approximately one third of the world population is already living in areas facing moderate to severe water stress in terms of withdrawals relative to availability. Under current patterns of water use, with continued economic and population growth, this proportion could reach two thirds of the world population by 2025.

High pollution loads have already caused widespread harm to a number of ecosystems and resulted in a wide range of health problems. Currently, it is estimated that some 1.2 billion people in developing countries, of whom approximately 300 million are located in urban areas, lack access to safe water supply. With the continuing rapid urbanization, developing countries would need to provide services for an additional 2.4 billion people in order to achieve full coverage by 2025. As the urban population in developing countries will more than double between 1995 and 2025, to achieve this objec-

tive they would need to nearly double the rate of progress achieved during the period 1990–1994.

Given the urban explosion, developing countries will find it increasingly costly to provide continuous and reliable services to those sectors of their urban population currently served and to expand the distribution network to a growing urban sprawl. Already, in many cities both in developed and developing countries, groundwater is being depleted and utilities are forced to develop resources located further away at increasing cost. Often, service is intermittent, available for only a few hours per day or even per week. Water losses in distribution systems in some cases amount to as much as 50 per cent of the total amount supplied to urban areas. The situation concerning sanitation in developing countries is even more alarming. Currently, nearly 3 billion people lack access to suitable sanitation, of whom nearly 600 million are without services in urban areas. In many developing countries, as much as 90 per cent of wastewaters are untreated, with the result that surface and groundwaters are being increasingly contaminated by urban wastes. Additional services would have to be provided at a rate of 90 million people per year in order to achieve full urban coverage by 2025, or approximately five times the rate of progress achieved between 1990 and 1994.

The task of expanding sewerage and wastewater treatment facilities to keep pace with the rate of growth of urbanization in developing countries is daunting. As illustrated by recent major outbreaks of cholera, the environmental and health problems related to contaminated water supplies and other sources of pathogen transmission from inadequate sewer systems in urban areas already constitute a major problem in many developing countries. They will become ever more serious unless urgent action is taken to remedy the situation. Social, economic, and environmental sustainability in any society will remain unattainable unless significant progress is made towards solving the water supply and sanitation problem.

Given the increasing stress on water resources from competing uses, this goal can only be achieved in the context of an integrated water management approach. The solution of the problem will require the formulation of human settlement policies which foster the provision of sanitation services to the poor, the establishment or strengthening of public or private institutions capable of delivering services, and the formulation of pricing policies which, while taking into account the needs of the poor, will provide a tool for demand management and ensure the financial viability of public or private

utilities. The recycling of urban wastewaters for possible use in agriculture provides a means to limit pollution and increase the availability of water resources for agricultural purposes.

Waste management

A growing number of the world's rivers, lakes, and groundwater aquifers is being severely contaminated by human, industrial, and agricultural wastes. In many cases, pollution loads have outstripped the absorptive capacity of rivers. In addition to affecting freshwater resources, their contamination ultimately affects oceans and coastal areas, threatening marine life. The future health of our oceans depends heavily on the prevention and control of freshwater pollution.

Untreated domestic and industrial pollutants from urban areas, particularly in developing countries, constitutes a growing threat to the health of surface and groundwater resources. As much as 90 per cent of urban sewage in developing countries is released untreated into water bodies. In addition, pollution from diffused sources due to the extensive use of agrochemicals is also a growing threat to the health of our water resources.

The prevention and control of pollutants from urban and industrial sources, though costly, is easier to achieve than control of pollutants from diffused sources. The implementation of the ''polluter pays principle,'' the use of economic incentives, sewerage charges, and regulatory measures provide the necessary tools to bring about the use of cleaner and more efficient technologies, in terms both of materials and water use. In this regard, considerable success has been registered in many industrialized countries. The prevention and control of pollution from the use of agrochemicals is more complex, requiring the formulation and implementation of economic and regulatory measures such as the use of integrated pest management measures designed to reduce the use of pesticides and fertilizers. In the final analysis, the sustainable development of water resources is inextricably linked to land management measures, particularly in view of the growing demand for food production to feed the increasing world population in the next 30 years, with less water and land available for this purpose.

The disposal of solid wastes constitutes another growing threat to the health of surface and groundwater resources. Policies designed to enhance waste minimization through increased material efficiency and reuse are important. There is also a need to link the disposal of

solid wastes with suitable land management in order to ensure their safe disposal in such a way as to minimize the impact on water resources.

As we live in a dynamic social state, the generation of waste is inevitable, as is the fact that some degree of pollution will occur. This is particularly the case in developing countries, where trade-offs between development and conservation may be particularly difficult. A fine line needs to be trodden between developmental needs and the protection of aquatic ecosystems, so that irreversible damage is not allowed to occur. This kind of sustainability cannot be achieved without adequate monitoring of the availability, use, and quality of water resources. In the case of developing countries, recent evidence suggests that, far from improving, their capacity, limited as it was in the 1970s and early 1980s, has steadily declined in many cases. The situation is particularly serious in the case of water-quality monitoring, where, in many countries, the capacity is virtually non-existent.

International cooperation and partnerships for cities

Global cooperation for common action

A key issue for the future will be how to reconcile the pursuit of increased well-being within the ecological limits of the biosphere. It is crucial that political processes – within cities, within nations, and internationally – implement existing international agreements and strengthen regulatory and incentive structures, so as to ensure that the world's natural resource endowments and natural systems can sustain the world's population without compromising the ability of future generations to meet their needs. Global environmental cooperation has been and still is a major challenge in pursuing this goal.

International cooperation for sustainable development involves a mix of local, national, and global action. It requires exchange of information on facts and analysis of complex ecological, social, and economic issues. Responsibility for sustainable development rests not only in the hands of national governments and international institutions, but with many other actors. International cooperation for sustainable development requires a participatory political process, mobilizing scientific and professional opinion, defining action at all levels, and open to inputs from the non-governmental community, from civil society, the private sector, local authorities, and others.

During the 1990s, progress has been made in building international cooperation on sustainable development, a progress which shows evidence of defining a new type of open political process. The United Nations Framework Convention on Climate Change and the Convention on Biological Diversity were negotiated and signed and entered into force, together with the Convention on Desertification. International legal agreements such as the Convention on International Trade in Endangered Species (CITES), the Montreal Protocol on the protection of the ozone layer and the Basle Convention on hazardous wastes have undergone important amendments. The Protocol on Biosafety is near completion, together with new agreements on Prior Informed Consent. In December 1997, the Kyoto Protocol to reduce greenhouse gas emissions was completed, including the Clean Development Mechanism, tradeable emission permits, and joint implementation, as well as the application of cleaner and more efficient energy technologies and reductions in energy demand.

Partnerships for sustainable development

Sustainable development strategies are crucial to cities of developing as well as developed countries. All countries, through action at the regional, national, and local levels, will need to address sustainability problems in ways tailored to their economic development, cultures, religions, and political systems. Sustainable development towards this goal can be achieved through active partnerships among governments, the private sector – particularly in relation to technology development and transfer – and community-based organizations.

Sharing experience and know-how among cities can be one of the most effective ways to expand capabilities without large resource expenditures. Systems of ''swapping'' expertise, for instance, can allow a city to gain needed expertise in one area while sharing its expertise with another city. ''Twinning'' arrangements could be used in a much more focused way to assist with this process, especially where cities in developing countries can draw upon technical assistance from ''sister'' cities in developed countries.

Another approach to partnership is a global network of sustainable development information and knowledge. This global network should, on the basis of existing environmental Web sites and networks, provide information on eco-societies and serve as a focal point for anyone seeking urban environmental information. In particular, there is a need for a global network focused on practical experience

with the issues of large cities. This network should aim at providing information on environmental protection practices and promoting collaboration in building an eco-society between urban planners, environmentalists, and international organizations.

The advent of increasingly information-intensive activities and the disparities in the use of information technology between industrial and developing countries are likely to widen the gap between networked countries (or cities) and isolated countries (or cities), in terms of not only good governance and environmental protection but also economic and social development. Therefore, assistance should be provided to assist the cities of developing countries, particularly least-developed countries, and geographically isolated countries and regions, to reduce the gap and integrate them into the global information society. Efforts should be focused on local human resource development, capacity-building, and broad accessibility to the Internet.

The role of the United Nations

The high-level United Nations conferences on sustainability-related issues which have taken place in recent years, have shaped the international policy environment and policy development at the regional and national levels. Additionally, they have provided a new context and rationale for local authority action on sustainable development.

The issues of the United Nations conferences have ranged from sustainable development (UNCED) to poverty, employment, and social integration (the Word Summit on Social Development, Copenhagen 1995); the status of women (Fourth World Conference on Women, Beijing 1995); the regulation of global trade (Uruguay Round of the General Agreement on Trade and Tariffs, 1994); and the overall review and appraisal of the implementation of Agenda 21 (''Rio +5,'' the Nineteenth Special Session of the General Assembly, June 1997). The results of these conferences will contribute to shaping the global policy agenda of the twenty-first century.

Two conferences are of major importance to local authorities: the World Summit on Social Development (the ''Social Summit,'' Copenhagen 1995) and Habitat II (the ''City Summit,'' Istanbul 1996). Both conferences addressed the concerns faced daily by many local authorities, such as homelessness, unemployment, crime, poverty, social exclusion, pollution, waste disposal, and traffic congestion.

While NGOs, after years of struggle, had become regular participants at the UN conferences, Habitat II attracted unprecedented local

authority attention, marking a political coming of age, and offered an opportunity for the first time for many other partners. These included the World Assembly of Cities and Local Authorities (WACLA), which was organized by the International Union of Local Authorities (IULA), and ICLEI. WACLA, held directly prior to the Habitat II Conference, was the largest representative meeting of local authority officials from all over the world. WACLA produced an Assembly Declaration referring to the importance of decentralization and democratization, the need to combat social exclusion, the creativity and innovative capacity of local leadership, the value of developing partnership approaches with all vital local forces, technology's transformational power, and the mutual benefits to be obtained from decentralized cooperation and international exchange of experience.

In 1990, UNCHS (Habitat) launched the Sustainable Cities Programme (SCP). Its principal goal is to provide city authorities and their partners in government, business, and civil society with an improved environmental planning and management capability. The programme has been designed to strengthen their ability to define the most critical environmental issues, to identify available instruments to address these issues, and to involve all those whose cooperation is required in a concerted and practical action. The participating cities differ in the type and severity of environmental problems encountered, but they have several commitments in common: to resolve their environmental problems, to incorporate environmental considerations into continuing development management practices, to rely on broad-based participation, and to use and further develop local expertise.

The United Nations Commission on Sustainable Development was established by the General Assembly in response to the request made at Rio in 1992 by the Earth Summit. It is made up of government representatives and its mandate is to examine the progress made in implementing Agenda 21. The work of the Commission on Sustainable Development focuses on defining the challenges of sustainable development in a number of economic sectors, *inter alia* energy, transport, industry, and agriculture, and identifying solutions to these problems. Its work is intended to support governments in defining the content and direction of national strategies and policies. Implementation of policies will essentially rest with governments, which will have to work in close collaboration with local and regional institutions as well as community-based civic organizations. This part is critical, since governments have limited capacity and the sustain-

ability of measures introduced will require active collaboration with the private sector and citizen groups.

One of the central messages of Agenda 21 is that sustainable development requires action in the area of environmental policy as well as in policy dealing with economic sectors such as agriculture, industry, energy, transport, and tourism. Policies in these areas have to be designed not just from the perspective of resource conservation and environmental management, but also from the perspective of resource development in order to meet developmental needs. The new multiannual work programme of the Commission on Sustainable Development reflects this concern.

In April 1996, the United Nations General Assembly, at its resumed Fiftieth Session, adopted a resolution (A/RES/50/225) on Public Administration and Development. The resolution acknowledged that the role of the United Nations is to assist governments, at their request, and to focus, *inter alia*, on strengthening government capacity for policy development, administrative restructuring, civil service reform, human resource development, and public administration to include wider aspects of governance, including democratic, legal, and judiciary reform, and strengthening of civil society. The resolution also acknowledged the role of United Nations activities and programmes in public administration and development to assist governments, upon request, to improve their responsiveness to meet the basic needs of all, as well as to achieve sustainable development in all countries.

It is the goal of the United Nations, with its specialized programmes and agencies such as UNCHS, UNEP, UNDP, UNESCO, UNIDO, and ILO, to provide analytical, normative, and operational capacities which can be utilized as required by urban centres and civil society. Also, it is imperative that the United Nations assist in providing a framework for linking local actions and innovations to activities at the national, regional, and global levels through which the lessons learned in individual city experiences can be shared, analysed, generalized, and discussed widely. Thus, this link will serve to make global strategies more responsive to local needs and opportunities and, conversely, help to implement global strategies and agreements at the local level. A continuing international dialogue with the aim of refining and expanding pathways for action is needed. The United Nations is determined to work together with all stakeholders including governments, cities, NGOs, and private enterprises in making the earth sustainable for future generations.

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14

An economic assessment of China–Japan cooperation to address acid rain

Jusen Asuka-Zhang

Global environmental challenges represent a series of problems and consequences that are essentially local in nature, but whose effects and impacts go beyond immediate local and national borders. Many of these problems can be traced back to industrial and economic activities. As part of this paradigm, cities have traditionally been places where much of a country's industry has been located, even though this situation is in a state of continual flux. Nevertheless, the power of cities as entities with far-reaching effects can no longer be questioned. From an environmental perspective, they – together with localities – remain important players in both problems and solutions that can have continued impact across nations and over generations.

In an age of telecommunications and new technology, the importance of the nation state is continuing to shift. Cities can often make their own diplomacy, and effectively make up an important part of new models of foreign policy. Sister city agreements, as well as unilateral action on the part of city administrations, represent living examples of how this new global regime is taking shape. While many of these activities are undertaken for the purposes of promoting goodwill, they demonstrate the power of cities to take a lead in networking as well as their potential to support a new development

paradigm. Environmental considerations make up important components of this new paradigm, in particular environmental cooperation and networking for a purpose.

Each city and locality is unique in the types of problem it faces. To solve these issues is ultimately a question for the conditions of the city itself. However, utilizing a broader perspective, this chapter examines some of the more pressing regional/global issues of the East Asian region. In particular, it analyses the cost-effectiveness of environmental cooperation between China and Japan on one of the pressing issues for these countries, acid rain. While the sources of acid rain are diffuse, local and city policies geared toward its mitigation can make a tremendous difference to the quality of our air at the regional and global levels. The issue also highlights the need for cooperation both within and among countries, since national policies come to interact with local policies in a complex mix when intermingled with national foreign policy arrangements. Further, the situation coincides with climate change negotiations at the global level, owing to the fact that greenhouse gases coincide with some of those that contribute to acid rain.

In this chapter, it is assumed that both China and Japan have incentives to stop the acidification of the ecosystem at a minimum cost, yet there is little work on assessing exactly what the relative costs and benefits are. To determine cost-effectiveness, the current situation of transboundary pollution will be quantified, followed by a comparison of the cost-effectiveness of cooperative efforts (the Joint Implementation scheme) to abate the sulphur emission with the scenario of non-cooperative efforts. The result confirms that cooperative efforts are cost-effective, if the abatement cost is small enough in China. Even with a moderate level of abatement costs in China, the betterment of the environment in both countries favours a cooperative approach.

A schematic overview

China's environment and energy problems may eventually become a threat to broader society, and Japan is urged to address these problems because of its geographical conditions. In particular, sulphur that spreads over long distances is causing the acidification of the overall ecosystem in East Asia through transboundary acid rain. To abate these adverse effects, concrete approaches include inter-governmental agreements with quantitative target commitments on sulphur emis-

sion reduction, and the establishment of an emission trading system. To establish such measures, however, it is imperative to grasp a quantitative assessment upon which the discussion can take place.

In their quantitative assessment and policy approach studies on transboundary pollution, Tahvonen and colleagues analysed the economic assessment of the Acid Rain Agreement between Finland and the former USSR (Agreement on the Uniform Reduction of 50 per cent on Sulphur Emissions around the National Border Regions, established in 1987), based on the theoretical model of Maler.[1] In Asia, however, there has not been any concrete policy analysis, owing to the insufficiency of basic information on the deposition, emission, long-distance transfer, and effects upon the ecosystem of sulphur.

Currently, the scheme of Joint Implementation (JI) focus the centre of a framework for a so-called ''environmental security regime.'' JI is a scheme for developed countries to cooperate with the efforts of developing countries for environmental conservation through technology transfer while pursuing economic growth. The expectation is that developed countries will take initiatives on the implementation of JI. In particular, Japan is a country that has already achieved a sulphur removal rate of 80 per cent – through desulphurization – as a result of having internationally acclaimed desulphurization technology. In China, on the other hand, the introduction of desulphurization equipment has been hindered by a lower technological level and by lack of funds, although its consumption of coal is rapidly expanding.[2]

Under these conditions, we must consider the potential for establishing an environmental security regime on ecosystem acidification, using international frameworks such as JI. To achieve this, our task is to analyse quantitatively the policies and measures on technological cooperation between China and Japan which may result in a ''win-win'' situation.

This study offers basic data for the review of a possible agreement between China and Japan on sulphur emission reduction measures with quantified targets. However, it must ultimately consider the role of cities and localities in any such agreement. This chapter quantifies the current situation of acidification, and determines the formula for the effects in China and Japan. It then explains the content of policies that can improve the situation, and the economic rationale of JI. In doing so, it establishes proof of JI's cost-effectiveness and gives a future projection on acidification by assessing each policy option.

Finally, a possible framework for an environmental security regime will be suggested.

Quantifying the situation

The selected target areas of this study are the whole of Japan (721,800 km^2, including coastal seas) and eastern China. It includes nine of the cities and provinces in China with the highest sulphur emissions, such as Shanghai, Beijing, and Shangdong and Jiangsu provinces. The expanse of eastern China concerned here covers 11 per cent of the whole of China, yet its sulphur emission quantity amounts to 43 per cent of total sulphur emission in China, with the highest emission level exceeding 5 tons per square kilometre (actual amount in 1987).[3]

Generally, it is possible to express the degree of acidification in an ecosystem due to acid rain and other indicators by the quantity of sulphur deposition. Three modes of emission sources are considered to be responsible for sulphur deposition in Japan: anthropogenic emission occurring in Japan, volcanic activities in Japan (Mt Sakurajima in Kyushu and others), and anthropogenic sulphur emission in China. Sulphur deposition in China, on the other hand, is caused solely by anthropogenic sulphur emission in that country.

This study is based upon a sulphur deposition amount in Japan of 1.03 Tg/year based on the estimated value for 1990 given by Fujita.[4] The 1986 actual value in Fujita's study for sulphur emissions in Japan is used. As the sulphur emission amount in China, we used the 1987 actual value given in the 1993 report of Japan's Science and Technology Agency. For the deposition amount in Eastern China, the amount is set as 2.60 Tg/year based on the data of the RAINS-ASIA model developed by the IIASA (International Institute for Applied Systems Analysis) and the World Bank. Table 14.1 summarizes the figures used in this study. From the estimation of Fujita, the sources

Table 14.1 **Sulphur emission and depositition Japan and eastern China**

	Anthro. emission (Tg/yr)	Volcanic emission (Tg/yr)	Deposition (Tg/yr)	Deposition ($g/m^2/yr$)
Japan	0.45	0.55	1.03	1.43
Eastern China	4.10	0	2.60	2.52

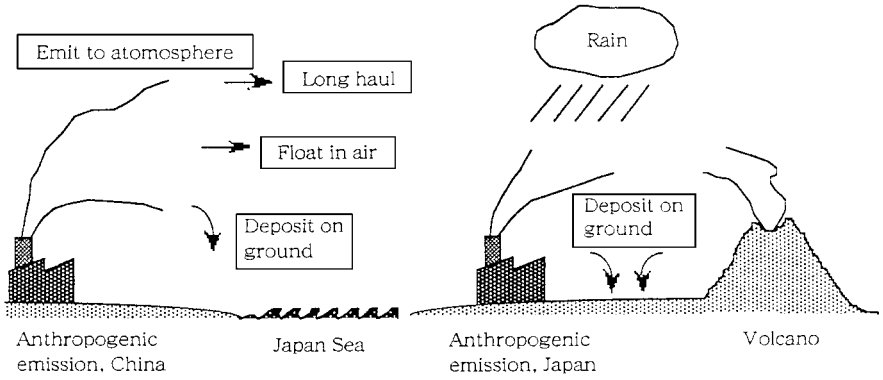

Figure 14.1 **Sulphur emission and deposition between Japan and eastern China.**

of sulphur deposition in Japan were broken down to 30 per cent from the anthropogenic emission of Japan, 35 per cent from volcanic activities in Japan and others, and 35 per cent from eastern Chinese emissions. Using these figures, the quantitative relationship on long-distance transmission of sulphur between Japan and eastern China is illustrated (figure 14.2).

Formulating the relationships

Taking the sulphur deposition amount Q as a vector consisting of the sulphur deposition amount in Japan and Eastern China as QJapan and QChina; the sulphur emission amount E as a vector of emission amount in Japan and eastern China as EJapan and EChina; the transmission coefficient A expressed in the determinant of long-distance transmission of sulphur; and B as the contribution amount of non-anthropogenic sources and anthropogenic emission sources other than Japan and eastern China to the total sulphur deposition amount Q expressed in the vector of BJapan and BChina, then the following relationship can be established between the deposition amount and the emission amount, according to Maler:[5]

$$Q = AE + B \qquad \cdots \quad (1)$$

This equation (1) can be also expressed as follows:

$$\begin{pmatrix} Q\text{Japan} \\ Q\text{China} \end{pmatrix} = \begin{pmatrix} 0.667 & 0.088 \\ 0 & 0.634 \end{pmatrix} \begin{pmatrix} E\text{Japan} \\ E\text{China} \end{pmatrix} + \begin{pmatrix} 0.37 \\ 0 \end{pmatrix}$$

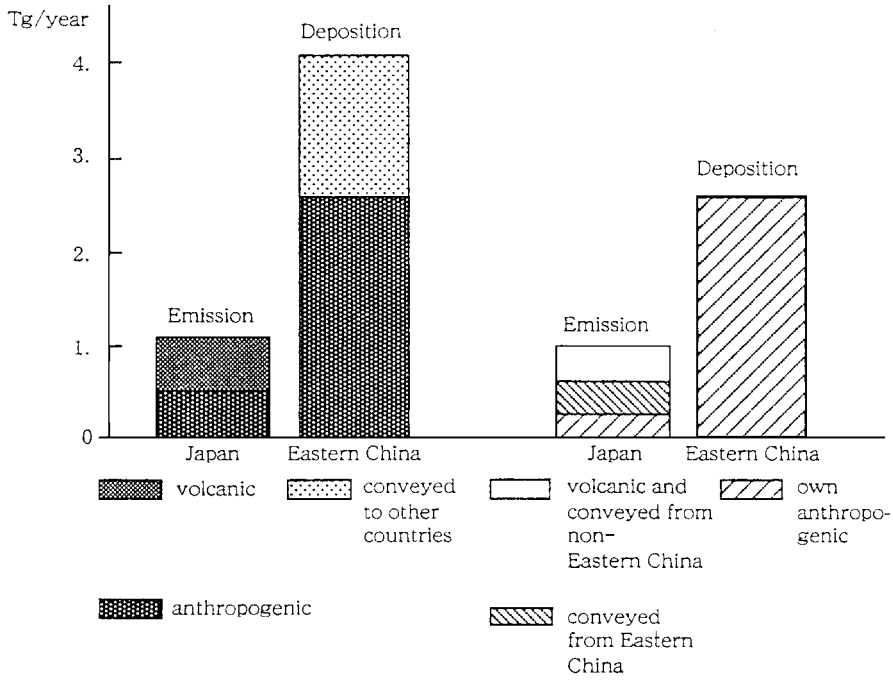

Figure 14.2 **Emission and deposition budget of sulphur in Japan and eastern China.**

From this, we can obtain the following equation:

$$\begin{aligned} Q\text{Japan} &= 0.667\ E\text{Japan} + 0.088\ E\text{China} + 0.37 \\ Q\text{China} &= 0.634\ E\text{China} \end{aligned} \quad \cdots \quad (2)$$

Equation (2) clearly indicates the following two points:

(*a*) Emissions totalling 8.8 per cent of sulphur emission in Eastern China and 4.7 per cent of sulphur emission in the whole of China contribute to the sulphur deposition in Japan. This figure is close to Kitada's estimation of 5 per cent (originating from the Chinese mainland).[6]

(*b*) In equation (2), the ratio between the coefficient on emission amount of Japan (*E*Japan) and eastern China (*E*China), i.e. $0.667 : 0.088 = 7.6$, can be considered as the ratio of effects on sulphur deposition amount in Japan at this point. In other words, to reduce sulphur deposition in Japan will require sulphur emis-

sion reduction efforts by eastern China of 7.6 times those of Japan.

The cost of emission reduction

If the marginal cost of emission reduction (emission reduction cost per unit emission quantity) at this point can be determined, then the prospective relation between emission reduction cost, emission quantity, and deposition quantity when emission reduction measures are adopted can be obtained unifically. In general, the function of emission reduction cost can be formulated by plotting the reduction quantity and cost under the assumption that emission reduction methods are introduced in order of ease of adoption in terms of technology level and cost. The inclination of the graph thus obtained indicates the marginal emission reduction cost.

In the case of Japan, most desulphurization technologies concern the desulphurization of heavy oil and flue gas.[7] Therefore, we use the depreciation and running cost of sulphur emission prevention equipment (heavy oil desulphurization and flue gas desulphurization) per unit of emission in 1992 (140 million yen/10,000 tons sulphur) as the marginal cost of sulphur emission reduction in Japan, in order to make the calculation on the cost-effectiveness discussed in the next section).

In the case of China, on the other hand, the desulphurization technologies that accommodate the conditions in China and that can be provided by Japan will be technologies on coal selection, coal washing, manufacture of coal briquettes with the addition of a desulphurizing agent, a flow-bed boiler that offers the two advantages of energy conservation and desulphurization, dry and semi-dry type simple flue gas desulphurization equipment, and so on. In addition, the desulphurization method that produces ammonium sulphate as a by-product is proposed.[8] The calculation of the cost of introducing these technologies was attempted by Sadakata,[9] but factors such as regional diversities in China, less than fully developed technologies, lack of data, uncertainties in transaction cost, and the fluctuation of price indexes and exchange rates, make it very difficult to establish the full function of emission reduction cost based on mutually reliable and comparable data. However, in consideration of the price index in China and its extremely low rate of sulphur removal, the marginal cost of emission reduction in China is expected to become sufficiently

lower than that of Japan if technology development and dissemination continue and advance in future.

Policy options and Joint Implementation

In this study we have assumed four policy options available for the governments of Japan and China on the prevention of ecosystem acidification through transboundary pollution:

1. ''Wait-and-see'' option: Neither China nor Japan will implement sulphur emission reduction by any new desulphurization measures;
2. ''Without cooperation'' option: China will not implement emission reduction, while Japan will introduce new emission reduction;
3. ''Weak cooperation'' option: Japan and China will implement the uniform emission reduction at a certain determined rate (existing examples include a 30 per cent across-the-board reduction in European countries, 50 per cent unified reduction in the national border regions between Finland and the former USSR);
4. ''Strong cooperation'' option: Japan will not implement any new emission reductions, but China will practice emission reduction provided that Japan supports such efforts technologically and financially.

Joint implementation

Currently, Joint Implementation, by which developing countries and developed countries jointly pursue environmental conservation measures for developing countries, is expected to become a first step toward the building of an ''environmental security regime.'' This situation has come about as a result of the international negotiations on climate change. At COP1 (the First Conference of Parties for the United Nations Framework Convention on Climate Change), held in Berlin in March 1995, Joint Implementation was one of the main items on the agenda. At COP1, agreement was reached on the introduction of a pilot phase, in which projects on emission reductions would be implemented voluntarily without any incorporation of crediting mechanisms.

Joint Implementation was originally proposed as a framework to implement the reduction of greenhouse gas emissions, including carbon dioxide, while pursuing the concept of cost-effectiveness. Recently, however, it has been discussed as a framework for the

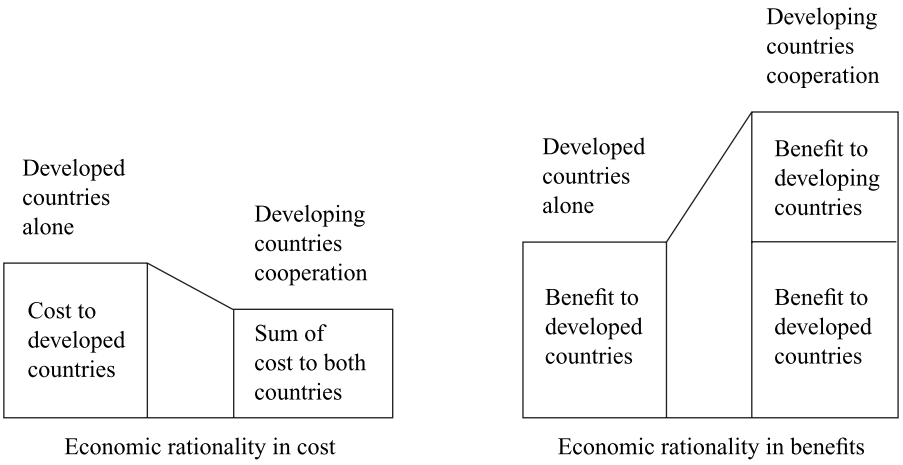

Figure 14.3 **Conceptual diagram illustrating economic rationality of Joint Implementation (in case of transboundary pollutants reduction).**

emission reduction of sulphurs which, when conveyed across borders, may cause acidification in other countries. Figure 14.3 illustrates the cost-effectiveness of sulphur emission reduction expected from the execution of Joint Implementation projects.

Since the marginal cost of emission reductions on air pollutants varies from one country to another, it is clear that implementing greater reductions in the developing countries, which generally present less marginal cost on emission reduction, will be more advantageous and cost-efficient than implementing reductions in developed countries, where the marginal cost is greater. Especially in the case of transboundary pollution – where the ''sender'' of pollutants is a developing country – a reduction in the emission of pollutants in the developing country will lead to cost savings for the pollutant ''recipient,'' a developed country, making it possible to reduce the total policy implementation cost for both countries in comparison to the cost of policy implementations by one country alone. (This is known as the cost-wise economic rationale.) Furthermore, if the transboundary pollutions affect each other, both countries may simultaneously earn the benefits of environmental betterment. (This is the benefit-wise economic rationale.)

In other words, a global approach, in which developed countries cooperate with developing countries in their efforts towards emission reduction through technology transfer, offers a lower overall cost and

greater benefits than individual national approaches. The paradigm therefore shifts to one of cooperation and the ultimate involvement of localities in this paradigm. Among the four policy options mentioned above, the fourth option, ''strong cooperation,'' corresponds to Joint Implementation in terms of air pollutant emissions reduction in China, both a developing country and a sender, rather than Japan, which is a developed country and a recipient.

For the transboundary conveyance of sulphur, however, unlike the situation with greenhouse gases such as carbon dioxide, we need to contemplate the following two points. First, in the case of sulphur, the direct relationship and impacts of long-distant conveyance between the countries have been quantified and identified considerably. To reduce sulphur deposition in Japan to a certain level, it is necessary for China to implement sulphur emission reduction, in terms of volume, 7.6 times that of Japan. This means that, unless the marginal emission reduction cost in China is less than one 7.6th (13.16 per cent) of that in Japan, there will not be any economic rationale in sulphur emission reduction, at least in theory. Second, the quantification of benefits for the environment through desulphurization measures has become possible for individual countries to a certain extent. The damages induced by the increased atmospheric concentration of greenhouse gases such as carbon dioxide include climate irregularity and terrain loss; but there is much uncertainty about their effects in terms of time and space. Therefore the quantification of benefits from global warming mitigation measures will not be easy. In the case of ecosystem acidification due to sulphur emission, however, the localized damage is such that the damage, and therefore the corresponding benefits of its reduction, can be appraised.

In the light of this conclusion, the emission reduction cost of the ''strong cooperation'' option was compared with that of other options, assuming that the marginal emission reduction cost of China is one tenth or one fifteenth of that of Japan. By means of this comparison, it was demonstrated that the cost-effectiveness of greater emission reduction in China (indicated in figure 14.3) lessens the overall cost of new investment on sulphur emission reduction in Japan. We shall examine further the significance of the difference in emission reduction cost between the two countries and the magnitude of benefits in terms of environmental improvement brought about by the emission reduction measures upon the execution of Joint Implementation between China and Japan.

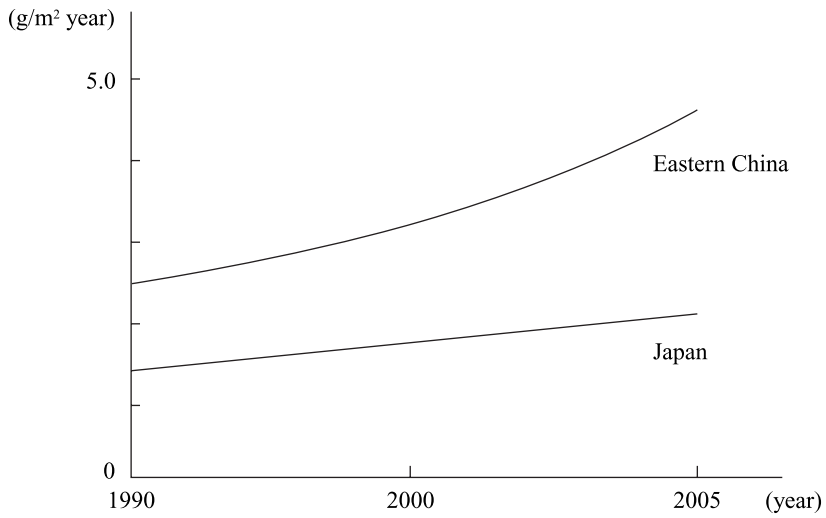

Figure 14.4 **Sulphur deposition in Japan and eastern China, "wait-and-see" option.**

Assessment of the options

"Wait-and-see" option

The "wait-and-see" option, in which neither China nor Japan implements any new desulphurization measures, assumes that:

- Coal consumption in China will increase at the same rate (average 4.3 per cent p.a.[10]) as over the past five years (1989–93). The anthropogenic and volcanic emission quantities will remain unchanged in Japan;
- Sulphur deposition in Japan and eastern China will change as indicated in figure 14.4 from 1990 to 2005, according to equation (2) outlined above.

To indicate the marginal load of sulphur deposition in the ecosystem, there is a critical load. In northern European countries, where the severity of acidification damage is mounting, the critical load is set at 0.50 g/m^2 per year. It cannot simply be compared with that for Japan, because the soil environment is entirely different. It has been reported that acidification damage is not so widespread in Japan because of the greater neutralization power of Japanese soil.[11] However, figure 14.4 indicates that the sulphur deposition of Japan and Eastern China already far exceeds the critical load of northern

European countries and is increasing so that it will reach 2.08 g/m^2 and 4.70 g/m^2 per year in Japan and eastern China respectively by 2005.

''Without cooperation'' option

When the emission reduction is implemented only in Japan for the ''without cooperation'' option, sulphur deposition in Japan cannot be reduced to less than 1.01g/m^2 per year, according to equation (2) above, even if Japan reduces its anthropogenic emission by 100 per cent. In other words, 1.01 g/m^2 per year is the theoretical minimum rate of sulphur deposition which is humanly attainable through the efforts of Japan by itself. However, as mentioned before, Japan's sulphur removal rate was over 80 per cent by 1992; so it is not only technically difficult to reduce emission further, but it is also expected that the marginal cost of emission reduction will rise significantly. Thus, to reach this minimum is next to impossible.

Economic rationale of Joint Implementation

By obtaining the difference between the ''without cooperation'' option, in which only Japan implements emission reduction, and the ''strong cooperation'' option, in which only China implements it, provided that the target sulphur deposition in Japan is the same, one can confirm the cost-effectiveness of Joint Implementation. Table 14.2 represents the result of cost calculation for each of four different sulphur deposition targets in Japan, provided that the marginal

Table 14.2 **Emission reduction costs of "strong cooperation" and "without cooperation" options**

	Target deposition levels in Japan (g/m^2/yr)				
	1.43 (current)	1.30	1.20	1.10	1.00
Cost of ''without cooperation'' (100 MM¥)	0	19.6	34.8	49.9	65.0
Cost of ''strong cooperation'' (100 MM¥)	0	14.9	26.4	37.8	49.3
Cost difference between two options (economic ratonale)	0	4.7	8.4	12.1	15.7

emission reduction cost in China is considerably less than that in Japan (14 million yen/10,000 tons sulphur, one tenth that of Japan). In this table, the emission reduction cost of a ''strong cooperation'' option is relatively lower than that of the ''without cooperation'' option, and clearly and quantitatively indicates the cost-effectiveness of the Joint Implementation. Moreover, the smaller the target deposition in Japan, the greater the cost-effectiveness.

Economic rationale of ''cooperation strength''

To evaluate the relationship between ''cooperation strength'' and economic rationale, we compared the emission reduction cost of ''weak cooperation,'' for which both countries implement emission reduction at a uniform rate, and the ''strong cooperation'' option, in which only China implements emission reduction. Table 14.3 presents the result of the calculation, assuming that China's marginal emission reduction cost is either one tenth or one fifteenth of Japan's. According to this table, sulphur deposition in Japan achieved through a uniform 10 per cent reduction in emission quantity under the ''weak cooperation'' option (1.34 g/m^2 per year) can be achieved without any emission reductions in Japan, that is, if the ''strong cooperation'' option reduces the sulphur emission from eastern China down to 3.35 Tg/year. Further, the emission reduction cost to China through the ''strong cooperation'' option will be less than the sum of the emission reduction costs to China and Japan under the ''weak cooperation'' option. This indicates that the ''strong cooperation'' option to implement significant emission reduction in China only is more cost-effective than the uniform-rate reduction of emission practised in the ''weak cooperation'' option.

In terms of the extent of cost-effectiveness, it is more cost-effective if the marginal emission reduction cost of China is one fifteenth of that of Japan, rather than the case of China's marginal cost of emission reduction being one tenth of that of Japan. In other words, the greater the difference in emission reduction cost between China and Japan, the greater the cost-effectiveness of the ''strong cooperation'' option in comparison to that of the ''weak cooperation'' option. In addition, by implementing emission reduction in China, the the ''strong cooperation'' option provides additional benefits by lowering of sulphur deposition not only in Japan but also in China.

Table 14.3 **Comparison between "weak cooperation" and "strong cooperation" options**

Ratio of marginal cost difference between Japan and China	Japan's target sulphur ($g/m^2/yr$)		"Weak cooperation" option				"Strong cooperation" option			Difference between options (economic rationality)
			Reduction rate	Emission (Tg/yr)	Cost (¥ million)	Total of two countries	Emission (Tg/yr)	Cost (¥ million)	Total of two countries	
1 : 10	1.34	Japan	10%	0.41	6.30	12.0	0.45	0	10.5	1.56
		China		3.69	5.74		3.35	10.5		
	1.25	Japan	20%	0.36	12.6	24.1	0.45	0	21.0	3.07
		China		3.28	11.5		2.60	21.0		
1 : 15	1.34	Japan	10%	0.41	6.30	10.2	0.45	0	7.04	3.13
		China		3.69	3.87		3.35	7.04		
	1.25	Japan	20%	0.36	12.6	20.3	0.45	0	14.0	6.25
		China		3.28	7.70		2.60	14.0		

Summary of results of the analysis

The preceding analysis has enabled us, to some degree, to make a quantitative assessment of transboundary air pollution between China and Japan. Although at a preliminary stage of approximation, the following quantitative observations have been identified:

1. The minimum sulphur deposition obtained through the reduction of anthropogenic sulphur emission in Japan is 1.01 g/m^2 per year. If no additional measures are taken and the situation is left as it is, the sulphur deposition in Japan and eastern China will be 2.08 g/m^2 per year and 4.70 g/m^2 per year respectively by the year 2005. Both these values exceed the level of critical load set in northern Europe (0.50 g/m^2 per year).
2. If the marginal cost of emission reduction in China is sufficiently low (less than 13.16 per cent of the cost to Japan – in this study set as one tenth and one fifteenth of Japan's cost), then Joint Implementation can prove cost-efficient. The other side of the coin is that, if the marginal cost of emission reduction in China is not sufficiently low, there will be no cost-effectiveness in Joint Implementation. The lower the target deposition in Japan, the greater the cost-effectiveness.
3. If the marginal cost of emission reduction in China is sufficiently low, the ''greater emission reduction in China'' presents greater cost-effectiveness against the ''uniform emission reduction between China and Japan.'' Maler and Tahvonen pointed out the economic irrationality of ''uniform reduction'' regarding the transboundary air pollution in Europe.

Contemplation 1: Severity of the situation

Equation (2) obtained above indicates that about 4.7 per cent of emissions in China navigate to Japan as transboundary pollutants. And in terms of sulphur deposition in Japan, many scientists have indicated the contribution of emissions from the Chinese continent. For example, Okita stated that ''30 per cent of the wet deposition along the coastal Japan in the month of January originates from Chinese emission sources, and the estimate by other researchers can be even higher.''[12] Whether this 30 per cent is a liberal or a conservative estimate is open to debate.

In the Kola Peninsula, located near the border between Finland and the former Soviet Union, both emission and deposition of sul-

phur are considerable, making the region the most severely damaged by acidification in the former Soviet Union. About 4.6 per cent of the sulphur emitted in this region has been conveyed long-distance to Finland.[13] On the other hand, 89 per cent of the sulphur deposition in Sweden originates from neighbouring countries. In the case of Norway, the rate exceeds 96 per cent. In Europe, however, no country is single-handedly responsible as a large emission source. In the case of Sweden, for instance, the greatest part of sulphur conveyance is from Germany, but Germany's contribution to sulphur deposition in Sweden is only about 8 per cent.[14] Therefore, at this point, one cannot particularly say that Japan is a ''victim country'' of transboundary pollution in terms of adverse effects caused, in comparison to the case of northern European countries. In addition, the greater contribution (20 per cent) to sulphur deposition of volcanic activity such as that of Mount Sakurajima confronts us with the limit of human efforts in Japan, which is not the case in Europe. Furthermore, the damage from acidification is already apparent in Europe. For example, most of the bio-organisms in 1,800 lakes in Sweden have perished because of acidification.[15] In Japan, on the other hand, the soil ecosystem tends to show strong resistance to acidification. The relationship between the recent dying of cedars and acidification has not been clearly established.

Considering these points, the problem of acidification of the ecosystem in Japan caused by transboundary sulphur may not be particularly damaging at this moment, as it is in European countries, especially northern European countries. The situation in China, however, is extremely severe. For example, the Environmental Science Research Institute of Chongqing, Sichuan, reports that the area with severe acidification has twice the number of cancer deaths than unaffected areas, and 25 per cent less grain production.[16]

We also cannot ignore the impact of the increasing consumption of coal anticipated with the growth of the Chinese economy. China's energy structure of coal dependency (75 per cent of primary energy by coal in 1993) and lower priority given to desulphurization measures is not expected to change in the short to medium term. In the RAINS-ASIA project, the acidification measure project of IIASA and the World Bank mentioned above, there has also been concern about the future of the Asian region. The researchers who participated in this project estimated that sulphur emissions from East Asia will triple from current levels between the years 2010 and 2020, exceeding the total amount of Europe and the United States by 2010.

Damages from acid rain will expand not only in North-East Asia but also to Southern China and South-East Asia.

In other words, even though the current ratio of transboundary sulphur from China is rather small, if the sulphur emission and its growth in China get bigger, it is likely to trigger an increasingly severe situation in the future. Based on the calculation of this study at least, sulphur deposition in Japan will reach 2.08 g/m^2 per year in 2005 if we do not take any measures. It is difficult to determine whether the number 2.08 g/m^2 per year is greater than the critical load for Japan. Nonetheless, history tells us that it will be wiser to take the course of preventive measures before the damage exceeds tolerance levels.

Contemplation 2: Cost of policies and measures and cost-effectiveness

According to equation (2) above, unless the marginal cost of emission reduction in Japan is 7.6 times as much as the marginal cost of emission reduction in China, cost-effectiveness will not be an incentive. Actually, one cannot ignore other elements, such as inter-governmental negotiations and the trade cost of direct investment. The considerable cost difference between China and Japan is a requisite for bringing cost-effectiveness to the Joint Implementation.

In reality, the domestic price of desulphurization technology (equipment) used in Japan compared to the price of relatively simple desulphurization technology (equipment) in China is, at most, 10 to 1.[17] Since desulphurization equipment requires a large initial investment, the absence of investment funds is the bottleneck for promoting technology transfer. Therefore, in terms of pursuing the cost-effectiveness – that is, the overall cost saving in the reduction of sulphur deposition in Japan – the incentive for a Joint Implementation plan involving technology transfer from Japan seems to be not very strong at this point.

However, we need also to consider the following points. The first is the large discrepancies between the sulphur removal rates and technology levels. In Japan, where the sulphur removal rate exceeds 80 per cent today, it is almost certain that the marginal emission reduction cost will increase in future. For China, where the sulphur removal rate is low, the dissemination and improvement of technologies are expected gradually to diminish emission reduction costs – if sufficiently boosted by industrial policies or technology transfer (local

production by Japanese companies). Second is the potential for technological breakthrough. As stated before, the desulphurization technology produces as a by-product ammonium sulphate, which can be used as fertilizer in China. This technology requires less expensive equipment in comparison to other technologies, and because the by-product, ammonium sulphate, can be sold at high prices, it could offset China's emission reduction cost, even providing profits. This technology is under development for practical use. If such technology can be disseminated, it will certainly result in cost-effectiveness. The third consideration is the economic rationale of the benefits shared between two countries through Joint Implementation (see figure 14.3). That is, the economic rationale as regards benefits, if large enough, can supplement a slightly inferior economic rationale as regards cost.

Generally, in environmental issues, the benefits obtained by the introduction of preventive measures significantly outweigh the cost of introduction. Such was certainly the case with Japan's experiences in combating local pollution.[18] Of course, such ''theoretical'' and ''after-the-fact'' arguments may not be sufficiently persuasive to promote the introduction of preventive measures. For, in environmental issues, there is a disparity between the beneficiaries and victims, and there are not many cases in which a price can be set on the future benefits to be earned by the introduction of environmental conservation measures. With the issue of transboundary conveyance of sulphur between China and Japan, however, the disparity between beneficiaries and victims is not large, and the progress of sulphur emission reduction in China is anticipated to be sufficient to bring considerable benefits to both countries. The acidification damage can already be priced, according to the report of the Environmental Science Research Institute of Chongqing in Sichuan province China, mentiond above (see table 14.4). The environmental improvement in the city of Chongqing resulting from the introduction of anti-acidification measures will reduce the damage and bring a range of benefits to the city.

The above three points indicate that the lowering of costs through industrial policies and science and technology policies, as well as the increased economic rationale as regards benefits can overcome a smaller economic rationale as regards cost at this point. Therefore, proceeding with cooperative measures such as Joint Implementation between China and Japan is seen as a desirable approach for dealing with transboundary pollution.

Table 14.4 **Cost of damage due to acidification, Chongqing City, China, 1992**

	Ecosystem	Health	Artifacts
Difference in acidification damages between acidified region and region in general	25% reduction in vegetable and grain production Damaged forest area 5,147 km^2 (dead forest 300 km^2)	Lung cancer deaths twice as high in acidified region Pulmonary disease patients, twice as high in acidified region	Speed of metal corrosion, 8 times as high in acidified region Coating lifetime, 1 year (about half that of normal area)
Damages in prices (annual)	Grains 4.79 million yuan Vegetable 28.73 yuan Forests 4.10 yuan	Per capita medical expense, 4 times Per capita medical expense about 90 yuan With labour loss, total 231.67 million yuan	Metals, 35.1 million yuan With coating fee loss, total 125.81 million yuan

Development of future research

It will be necessary for the quantitative analysis of acidification by transboundary pollutants conducted in this study to be further developed and reviewed, focusing on the following points:

- It is necessary to collect the data with greater reliability from the researches of the natural sciences. For example, there is no sufficiently reliable data available on sulphur deposition in the whole Asian region. Currently, the development of monitoring system networks such as the acid rain network in East Asia is being undertaken on the initiative of Japan. It has hardly reached the stage of determining a common protocol, so it will be several years before reliable and sufficient data can be collected.
- More detailed cost calculation is needed. As mentioned before, there are many desulphurization technologies that can be transferred from Japan and are appropriate to China. Fundamentally, it is necessary to examine the comparative cost calculation for each and to review the order of introduction. Also, one cannot ignore the price of trade, which is certainly a critical factor in determining the policies and influencing the policies of private entities on the investments. Moreover, we need to incorporate other factors as variables, such as time, current emission, current reduction, and the speed of technological development.
- It is necessary to advance the pricing of benefits. The aforementioned survey and research conducted in Chongqing city even addressed health damage. Such studies and researches, however, have not been extended to the whole of China, owing to the difficulties in statistical survey and quantitative analysis. The pursuance of such a survey and research based on continued survey efforts, and the support for it, is awaited.
- Fourth, actual quantitative analysis is necessary for the development of policy studies to build a market of ''emissions trading'' in sulphur dioxides and carbon dioxides in the future. The work of Yamaji and colleagues is one example of the study of policies in the ''emissions trading'' market.[19] However, much of such research is based on energy economy models that are hardly suitable. The actual dimension of the economic rationale for acidification measures which this study reveals can constitute key decision-making data for the examination of emission rights to be given to devel-

oped countries in future in return for their environmental conservation cooperation to developing countries. Clearly there are many pros and cons to each market-oriented economic instrument, and it is still too early to determine whether the programme on sulphur dioxide ''emission rights'' introduced in the United States will be a success or not. However, proceeding with the negotiation between nations on policy-making toward the establishment of an emission rights market will at least heighten awareness of regional environmental security and expand the communication channels between countries, leading to a more thoroughgoing implementation of technology transfer and other cooperative programmes.

Towards the implementation of policies

Generally, international aid is necessary to increase the potential of international coordination in global environmental issues. In the case of China, the incentive to cooperate with Japan in sulphur emissions reduction is limited to the improvement of environmental quality in China and the receipt of aid. If environmental quality improvement is not a high priority in their national policies, it will be necessary for Japan to add some kind of side payment for China's emission reduction efforts, in consideration of the economic rationale in cost and benefits which is confirmed in this study. The actual side payments can be made in the form of fund provision or technology transfer to China. However, Japan's ODA (overseas development aid) needs to be requested by recipient governments, and already its contribution to China stands at 78.4 per cent (accumulated total up to 1993) of its entire ODA including loans with a concessional interest rate (Yen loan) technology cooperation, and grants. That figure represents the greatest amount of ODA to China among the developed countries, and it increasingly involves aid related to environmental conservation. It will not be easy to agree upon further increases in aid. Therefore, we may need to consider the establishment of a separate budget, such as the ''Chinese Environmental Conservation Fund,'' or utilize, as a practical side payment to China, Japanese government support on research and development of technologies that accommodate the needs in China and that can offer low-cost technology.

Of course, through ODA, the Green Aid Plan (the environmental conservation cooperation programme for developing countries initiated by Japan's Ministry of International Trade and Industry), and other programmes, many attempts have been made to transfer

Japan's desulphurization technologies to China. Unless the price is sufficiently low, such technologies are not likely to be widely disseminated in China. As this study has clearly indicated, the merit of Joint Implementation through technology transfer is fairly low in such a case. Since technology transfer is actually carried out by private entities, effective technology transfer cannot be guaranteed unless there are sufficient economic incentives.

Therefore, what is required is to develop low-cost, high-performance technologies through the utilization of the advanced research and development capacity of Japanese companies and public research institutes, and to formulate a system to disseminate such technologies within China. For example, the development of environmental conservation technologies applicable to developing countries can be carried out jointly by a consortium of private and public entities from China and Japan at the Japan–China Environmental Conservation Centre (established in Beijing in 1996). Cities can also play an important role in this process. If a system for technology transfer is established incorporating the promotion of technology dissemination within the developing countries and with cheap production costs, while retaining intellectual property rights to a certain degree, it will elevate the economic rationale in cost for the Joint Implementation. For this, it is essential to raise the support of the Japanese people for industrial and scientific policies that encourage research and development of technologies adaptable to developing countries. In addition, many issues require the formulation of a consensus, such as the relationship between the conventional overseas aid programmes such as ODA and the Green Aid Plan, and new programmes or mechanisms such as Joint Implementation.

Another very critical factor is the timing of the introduction of policies and measures. In consideration of the mounting environmental risk, it may be important to implement some kinds of policies cooperatively on a trial-and-error basis, rather than to adhere to the principles of the exact sciences in the quantitative analysis of the situation. For example, the Acid Rain Agreement between Finland and the former Soviet Union was not fully implemented by the former Soviet Union. Emission quantities did drop in the former Soviet countries, but they did so as a consequence not of the treaty but of economic stagnation. Therefore both governments are investigating the possible modification of this treaty to impose a uniform reduction of sulphur emissions. Their new policy will be to apply the concept of critical load achievement as a committed target, and to build a

multilateral ''environmental security regime'' with the participation of Denmark, Sweden, and Norway, incorporating possible side payments.[21]

Acidification of the ecosystem by sulphur is a real problem facing China now, and poses a more immediate problem than the more distant problem of greenhouse effect gases such as carbon dioxide. It may be worth while for us to review the possibility of sulphur emission reduction by considering a sulphur framework comparable to the frameworks dealing with global warming issues and energy issues. China's negotiators, however, maintain the position that China is the representative of developing countries in international politics, and not many of them have the necessary academic background in environmental issues. Thus, it may be necessary to adopt more strategic measures, such as inducing Chinese government participation by establishing the accomplished facts on the Joint Implementation scheme, by means of joint research by researchers of both countries.

Of course, in reality, there is a risk that environmental cooperation is being used as a negotiation card for adjusting various political and economic interests beside the interests on environmental security. It is true that unless each of the 1.2 billion people living in China develops a sense of independence as regards environmental protection, it is quite unlikely that cooperation will lead to a drastic improvement in the situation. Nonetheless, as a result of the growth of the market economy, insufficient environmental management, population growth, the penetration of urban or Western information into rural areas, increasing consumption, greater disparity between income groups, the strengthening of individualism, and the presence of absolute poverty, environmental destruction and energy source scarcity will progress even more rapidly. Some kind of leverage to address this situation is certainly called for.

Such leverage will be effective only when cooperative efforts between the relevant parties (bureaucrats, politicians, cooperation executives, engineers, academic experts in environmental economy, and NGOs) are implemented, targeting the realization of a technology transfer that can create a ''win-win'' situation from which both sides benefit. This is the path toward the establishment of an environmental security regime in the Asian region, under the anticipated initiative of Japan. It is the author's sincere hope that the result of this analysis will serve as the starting point for building the common awareness required during the process of investigation.

Notes

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15

A new paradigm of North–South relations: Implications of international cooperation by local authorities in Japan

Toshihiro Menju

The post-Cold War era has witnessed a growing diversity of global issues which nation states alone cannot manage effectively.[1] Environmental problems and human rights issues, for example, are vigorously tackled by NGOs and governments cannot ignore their contributions. The scope for non-state actors seems to be rapidly expanding. This relatively new trend demonstrates that global governance is no longer exclusively managed by national governments, but also embraces a variety of new actors.[2]

Among transnational non-state actors, local governments have kept a relatively low profile until recently, compared with civil society actors such as NGOs – which are rightly regarded as indispensable actors, as is illustrated by the prominence of their participation in international conferences. In recent years, however, local governments are becoming very active in the international arena. In September 1995, when the World Congress of the International Union of Local Authorities (IULA) was held on the theme of municipal international cooperation, more than 1,500 participants from over a hundred countries gathered. The report compiled for the World Congress was entitled *Local Challenges to Global Change*, and was the result of a survey on international cooperation conducted by local authorities covering 61 countries.[3]

Japanese local governments are increasingly active in international affairs. The total budget for international activities by all the Japanese local governments amounted to 126 billion yen in fiscal year 1998.[4] The ''diplomacy'' of local government – once deemed as only rhetoric – is becoming more substantive. This paper will illustrate the current status of international activities by local governments, especially in the area of international cooperation, focusing on Japan. It also tries to explore questions with regard to the impact of transnational cooperation at the grassroots level and the formation of a global community.

Expanding international activities by local authorities

Local governments have a long history of international activities. In the United States, ''Sister Cities International'' has served as a clearing-house for the sister city movement since 1956. Today, 1,200 American cities have 2,100 partners in 125 countries.[5] In Europe, IULA was established in 1913 as a world association of local authorities. It aims to foster transnational collaboration among local governments and to promote their position in the international arena. Cooperation among local authorities in Europe has thus been very active for several decades. Moreover, as the World Congress in 1995 demonstrated, local governments are currently expanding their transnational relationship beyond their neighbouring countries and entering into international cooperation between North and South.

In Europe many municipalities have sister-city links with communities in the South today. In particular, local authorities have become active in international cooperation during the last two decades. For example, as many as 413 out of 633 Dutch municipalities are involved in some kind of international cooperation activity.[6] Since the end of the Cold War, international cooperation between municipalities in Western Europe and Central and Eastern European countries has burgeoned through the financial support of the European Union.

In Asia, international activities by local governments have lagged somewhat behind those of European cities. However, Japan and China have taken the lead in expanding international networks for local governments. In China, local governments had 693 sister affiliations in 80 countries in 1996. Among Chinese sister-city partners, Japanese cities were ranked number one, with a total of 176 affiliations. The United States took second place with 111 links, and Russia came third with 41 affiliations.[7]

When local governments in China wish to form an official sister-city

link, the relationship must be acknowledged by the Chinese People's Association for Friendship with Foreign Countries. However, once links are officially formed, local governments can act on their own in implementing exchange activities. In other Asian countries, a new surge of international activities at the grassroots level has been observed in recent years. The Philippines is vigorously attempting to promote sister city movements. In 1994 the Department of the Interior and Local Government of the Philippine government started to collect information about sister cities within the country and to disseminate information to municipalities. It also supported the establishment of the Philippines International Sisterhood and Twinning Association (PHISTA) in 1996, and the government and PHISTA hosted the first Asia Pacific Sister City Forum, with the theme ''Asian Strength Through Sister-City Linkages,'' in October 1998.

In Indonesia, decentralization has not progressed substantially, and local governments are generally not very active internationally. However, Jakarta, perhaps because of its political power, is quite active in international affairs. It has 12 sister-city links around the world. It has also hosted the IULA Asia Pacific Section and provides facilities for its office and training centre. At the training centre, local government officials from Indonesia and other Asian countries study and discuss together in a variety of training courses.

Such activities and networks demonstrate that local governments in Asia are becoming active in international collaboration, although there are differences in the level of activity from country to country.

International activities by Japanese local governments

Japanese local governments have taken a leading role in international networks in Asia, and they are quite active in a variety of fields. Many local authorities have taken innovative approaches by utilizing local resources.

International activities by the Japanese local governments started in the 1950s, after World War II. During the 1950s and 1960s, various restrictions on overseas travel prevented ordinary citizens from participating directly in international exchange activities.[8] Therefore, during that time, sister-city affiliations served as an invaluable opportunity for Japanese local governments to start international activities. The first sister-city affiliation was formed between the cities of Nagasaki and St Paul, Minnesota, in the United States, in 1955, and since then, Japanese local authorities have shown a strong interest in and

commitment to international activities. In the early years, international exchange among sister cities and prefectures was primarily considered a means of establishing goodwill and friendly relationships, and the substance of the exchange was considered by many authorities to be secondary in importance. For Japan – at that time still recovering from wartime devastation – establishing a sister-city affiliation with a foreign partner had a glamorous and honourable image. Therefore, Japanese local governments sought cities in the West, especially in the United States, as their affiliation partners.

By the late 1960s, Japanese local governments had formed 144 sister affiliations and about 86 (60 per cent) of the participating authorities had partners in the United States.[9] Although their relationship was rather superficial, many Japanese local governments had the opportunity to make direct contacts with foreign counterparts for the first time, and they gradually opened their eyes to the world.

The 1970s saw the beginning of mutual visits by citizen-led delegations and the introduction of student exchange programmes as key elements of sister-city and prefecture exchange activities. As overseas tours by ordinary citizens began to grow, Japanese citizens participating in sisterhood exchange activities enjoyed the chance to interact directly with people in overseas partners through homestays and other sister-city programmes. Around this time, homestay activities for visitors from foreign countries were initiated in many parts of Japan by local citizens and some local governments. Through such efforts, local Japanese communities were increasingly hosting foreign visitors coming mainly from Western countries.

During this period, prefectural governments began to be involved in the programmes of receiving foreign trainees funded by the Ministry of Foreign Affairs and Japan International Cooperation Agency (JICA). This was the beginning of the international cooperation activities by the Japanese local governments, and those programmes have expanded considerably in number to this date. In the 1970s, Kazuji Nagasu, the then governor of Kanagawa Prefecture, proposed the concept of ‘‘people-to-people diplomacy,’’ stressing the importance of exchange among citizens and local governments across national borders. His proposal aimed to highlight grassroots international exchange and stressed the need to establish international policy by Japanese local government on their own initiative. Considering the status of international activities by local governments at that time, his ideas appeared somewhat idealistic, but they were valuable

in suggesting the possible role and stance of local government in the international arena in the future.[10]

In the 1980s, economic interdependence began to increase visibly between Japan and other countries, especially those in Asia. Exchanges with Asian regions became active at the local level, manifested by a sharp increase in the number of Japan's new sisterhood or friendship affiliations with cities in China and Korea. The number of sisterhood affiliations with China increased by 87 during the 1980s from a mere 13 in 1979, and the number continues to grow today. The total number of official affiliations with Chinese cities as of October 1997 had reached 237. Likewise, the volume of links with Korea, which totalled only 12 in 1979, increased greatly with the addition of 17 new relationships during the 1980s, and 26 more affiliations were newly established from 1990 to the end of 1995.

Since the late 1980s, local authorities in Japan have also sought new affiliation partners in such nations as Nepal, Thailand, Indonesia, Malaysia, and Mongolia, none of which had ever before participated in sister links with Japan. Japanese cities and prefectures have received trainees from their partners in Asia and thus have become increasingly involved in cooperation activities. Meanwhile, Japanese citizens' groups also launched new international programmes at the grassroots level. The outflow of Indo-chinese refugees in the late 1970s triggered an emergence of NGOs in Japan. While only 20 Japanese NGOs were in existence during the early 1970s, they were joined by 141 more organizations during the 1980s, and this number continues to rise in the 1990s.

Economic ties between communities in Japan and regions of Asia have kept expanding and greatly influenced Japanese local communities in the 1990s. Many small and medium-sized local businesses began to transfer their manufacturing facilities to sites in other Asian nations owing to the high appreciation of the yen. In addition, Japan's local bonds with Asia were further strengthened with the increase of new Asian dwellers attracted by the booming economy of Japan. These foreign residents are now living throughout Japan in spite of the recent economic slump, and they have a direct influence on Japanese local communities.[11] This trend sparked the formation of volunteer groups to provide assistance, ranging from teaching the Japanese language to dealing with human rights issues relevant to new foreign residents.

In the 1990s, local authorities began to host a growing number of

international conferences on specific themes, sometimes working with international organizations. Saitama Prefecture, for example, took the initiative of hosting the Saitama Public Health Summit in cooperation with the World Health Organization (WHO) in 1991. These developments in recent years are regarded as attempts by local authorities to act proactively in the international arena beyond sister links and to try to contribute to the global society.

Local-level international cooperation activities entered a new phase in 1995. The Ministry of Home Affairs (MHA) proclaimed the year 1995 as the ''Starting Year of International Cooperation by Local Authorities.''[12] The Ministry also urged prefectures and the 12 major cities to draw up guidelines for the promotion of international cooperation in order to establish a policy and framework for international cooperation activities in their respective regions. Concurrently, the national government adopted a series of policies to promote the efforts of the local authorities towards international cooperation activities, and these policies and programmes by the Council of Local Authorities for International Relations (CLAIR) created a conducive atmosphere where local governments could carry out international cooperation activities in a larger scale. The Local Authorities Center for International Cooperation (LACIC) was created within CLAIR. It was established as a clearing-house for cooperation activities for Japanese local authorities; its first effort was a training programme inviting local government officials from Asia, who were given on-the-job training with Japanese local governments.

The diversity of the activities in international cooperation

According to the statistics of the Ministry of Home Affairs, the total expenditures allocated to international cooperation activities by Japanese local governments amounted to ¥8,078 million in fiscal year 1997, consisting of the following: assistance to international organizations and others (36.3%), acceptance of trainees from developing countries (25.9%); hosting international conferences (12.5%); staff exchange (4.7%); expert missions (2.3%); assistance provided as supplies or funding (1.4%); and other miscellaneous expenses (16.9%).[13]

Prefectural governments and 12 designated major cities have accepted technical trainees in a programme half of which is funded by the Ministry of Foreign Affairs. Many local authorities have also been engaged in international cooperation programmes for decades, in coordination with JICA. JICA undertook training courses for 573

technical trainees in cooperation with Japanese local governments in the 1996 fiscal year. In the same year, 157 experts from local authorities were sent to developing countries by JICA to provide professional guidance. In addition, 98 local government officials serve in developing countries, participating in the Japan Overseas Cooperation Volunteers (JOCV) programme administered by JICA. Local government employees account for approximately 8–9 per cent of all volunteers in the JOCV programme in recent years.[14]

The relationships between Japanese local governments and developing countries are not restricted to these activities. Many local authorities provide an array of assistance, including the reception of trainees and the provision of professional guidance to sister cities in China and other Asian countries. While some portion of such assistance is implemented within the framework of JICA programmes, many of these activities are initiated by local governments themselves in response to requests for assistance by their partners. Hiroshima Prefecture entered into a friendship affiliation with Sichuan Province in China, in 1984. Hiroshima Prefecture has programmes for trainees from Sichuan Province in such areas as agriculture, industrial technology, dentistry, and athletics teaching. The prefecture also sends engineering and farming experts to its partner region, and has sent a delegation to investigate medical conditions in Sichuan. In addition, in 1993 the Prefecture and City of Hiroshima founded the Hiroshima Sichuan Chongqing Exchange Center for Acid Rain Research, located in the city of Chongqing, which has suffered heavily from polluted air.[15]

In addition to one-way technical cooperation, mutually beneficial cooperative exchanges are also carried out in these sister affiliation activities. The friendship affiliation between Hiroshima Prefecture and Sichuan Province goes beyond technical cooperation, involving exchanges in a broad range of sectors. Expositions of Sichuan products and culture have been held in Hiroshima Prefecture, within which performances of traditional Chinese plays were staged. In turn, Hiroshima Prefecture dispatched delegations of youth soccer teams and groups of children, women, and others to Sichuan Province to further friendship at the citizen level. In addition to the groups composed of specialists in such fields as food-processing equipment, economic exchanges, construction administration, and herbal medicine, missions including youth groups from Sichuan Province also visited Hiroshima. Some affiliations with China even link elementary schools in the two regions to cultivate friendships.

Some local authorities attempt to enhance their local vitality by committing themselves to international cooperation activities. Kitakyushu, which calls itself ''the city that overcame pollution'' with reference to its successes in reducing air and water contamination, is actively providing environmental technology cooperation with its sister city, Dalian, in China. In 1996, Kitakyushu City hosted a Conference on International Environmental Cooperation in which 14 local governments from Japan and China participated. The city also held an Environmental Summit of Major Japanese Cities in January 1997, and the Kitakyushu Conference on Environmental Cooperation among Cities in the Asia Region in autumn 1997, hosting representatives from 12 cities in six East Asian nations. Through active involvement in international cooperation, Kitakyushu aims to transform itself from a conventional steel-manufacturing community into a global leader in the anti-pollution technology. Kitakyushu seeks to position itself as a world leader committed to environmental cooperation.[16] Although Kitakyushu is very active, few local authorities in Japan are ready to use international cooperation as a concrete and substantive strategy, but several large cities have established a facility in cooperation with international organizations such as the United Nations in their region. They are particularly interested in attracting facilities that will be involved in international cooperation. In 1992, the city of Osaka worked with the UNEP to build its International Environmental Technology Centre. Kobe funded the establishment of the WHO Centre for Health Development in 1996.

If the term ''international cooperation'' implies joint international endeavours addressing common issues, it may also refer to partnerships in various regions of the world. One of such examples is the International Association of Mayors of Northern Cities, initiated by the city of Sapporo in 1982. Sapporo invited cities located in northern latitudes to join forces and share their resources to address common problems. In this network these cities worked together to develop antifreeze solutions for roads in winter and held joint merchandise exhibitions featuring their products common in northern regions.

Hyogo Prefecture faced a problem of water pollution in the Inland Sea of Seto. In order to share information with other regions and tackle the problem multilaterally, it organized the International Center for the Environmental Management of Enclosed Coastal Seas (EMECS) in 1994. EMECS, located in Kobe, Hyogo, is an international organization for information-sharing among similar regions

around the world experiencing the environmental problems of enclosed waters.

Some local governments embrace international cooperation to foster ''mutual'' empowerment at the grassroots level. This is illustrated by the following cases, in which international cooperation is recognized as a means of local improvement not only for the developing country, but also for the Japanese community.

The Karaimo Kouryu Foundation, a local NGO in Kagoshima Prefecture, southern Japan, hosts young leaders from agricultural communities in Asia for training, working closely with Kagoshima prefectural government.[17] This exchange has brought about international awareness among young farmers in Kagoshima, and solidarity with Asian farmers was forged through the programmes. Being involved in the programmes, Japanese local farmers have nurtured a global perspective and a market-oriented attitude in their traditional farmer communities. Kagoshima Prefectural Government actively supported the activities of the Karaimo Kouryu Foundation because it recognized that these exchange activities helped to achieve a new international awareness and greater empowerment for local farmers in Kagoshima.

In the city of Tsuruoka, Yamagata Prefecture, a voluntary group called the Shonai International Exchange Association has contributed to promoting greater awareness about developing countries in Japanese local communities. Their activities include student exchange programmes with Thailand and annual international youth festivals involving many local citizens. Again, the local government has favourably assisted in their initiatives.

In another example, the township of Misumi in Shimane Prefecture, a small community with a population of 8,000, takes part in international cooperation by utilizing its indigenous industry, Japanese paper-making, and providing training for trainees from Bhutan. This training programme is administered by the township and a local craftsmen's group, the Association of Craftsmen of Sekishu Japanese Paper. Misumi has become well known in Japan for its unique technical cooperation with Bhutan, and this experience and reputation have enhanced the confidence and pride of the small rural community.

Through its own initiative, the town of Takashima in Nagasaki Prefecture formed a sisterhood affiliation with Hojilto, a town in Mongolia. Instead of providing technical cooperation, the town government aims to revitalize its local economy by constructing a ''Mongolian village'' as a tourist attraction by promoting exchange

with Mongolia. Some local authorities actively work with the various citizens' groups by forming effective networks within the community. One example of such successful cooperation was between a local organization, Caring for Young Refugees, and the City of Kita-ku, Tokyo. Working together, this organization and the local government successfully implemented a training programme for pre-school teachers from Thailand, who were accepted in the local school managed by Kita-ku. Likewise the Peace, Health, and Human Development Foundation in Kobe depends on local authorities when inviting agricultural trainees from South-East Asia.

It is clear that international cooperation has gradually become rooted in the work of local governments in Japan. The rich diversity of their activities suggests that Japanese local governments are increasingly taking their own initiative in these efforts.

The viability of sister affiliation programmes

As of October 1997, as many as 839 out of 3,255 local governments in Japan had formed 1,260 affiliations in 57 countries and regions. Sister affiliations played a vital role by providing Japanese local governments with opportunities for international contacts, especially at a time when international activities were rare at the local level. However, scepticism has arisen in recent years about the role of sister affiliations, as international activities at the grassroots level become increasingly commonplace. This scepticism is based on the perception that conventional sister-city affiliations have usually gone no further than courtesy visits between local government officials. A characteristic pattern of those activities was the mutual exchange of gifts, polite but uneventful parties, and a lack of substantive exchanges of information.

Furthermore, local governments have increasingly come to take various initiatives beyond the framework of sister links, such as hosting international forums to tackle common local issues jointly with local regions in many countries. In such programmes, sister cities have not necessarily become the most appropriate form of international interaction, because they inevitably limit the number of partners. On the other hand, the scope of cooperation efforts among sister cities is actually expanding, gradually making the stereotyped images of sister-city links obsolete. For example, the city of Takasaki in Gumma Prefecture started the Pentalateral Environmental Exchange Program in 1996 with its four sister cities, Battle Creek

(United States), Santo Andre (Brazil), Chengde (China), and Pilsen (Czech Republic). In this programme, every year from 1996 to 2000, each city will host a conference where local government officials and representatives of citizens' groups from all the cities get together to exchange ideas and discuss environmental programmes in common. They agreed to launch educational materials for elementary schools on the common theme of ''Our Forest'' in the context of partnerships between cities.[18] This programme illustrates that many local authorities are now seeking mutual benefits from sister links by establishing a clear focus in the programmes and encouraging citizens' participation.

Local initiatives for cultivating global community

Globalization and global citizenship

The world is changing rapidly owing to the ongoing process of globalization. International interdependence has increased, and the effects of globalization touch even the remotest communities. Global environmental degradation such as ozone depletion and global warming are some of the negative consequences associated with globalization. The marginalization of local economies is also a serious effect of a global economy. On the other hand, another aspect of globalization is the increased participation of citizens and communities in global affairs. Thanks to the expansion of new communication tools such as satellite TV and the Internet, information in the international arena is not monopolized by national governments; it is shared by NGOs and other non-state actors which can easily transmit information across national borders by taking international collaborative action beyond the national interest.

The emergence of opportunities for ordinary citizens to obtain information has nourished new awareness of global interdependency at the grassroots level. Visual information and direct messages from people on the other side of the world have fostered comradeship towards them. The rise of international activities at the grassroots level is one manifestation of this new awareness in many countries. A ''global citizenship'' is forming. This phrase began to be used in Japan among NGOs in the early 1990s, and it now often appears in the mass media and has gained popularity. Local governments have also begun to use this phrase, referring to the spirit of their international activities. Tokyo Metropolitan Government plans to hold a

''Global Citizen Festival'' with local NGOs every other year, having started in 1997, and Kanagawa Prefecture established the ''Global Citizen Kanagawa Plaza'' in 1998 for the focus of its international activities for citizens.

The idea of global citizenship is gradually spreading among informed citizens, reflecting a growing public consciousness of global issues. This phenomenon should be examined carefully and promoted, because it will serve as the spiritual basis of creating a global civil society and a sustainable global community. It is imperative to promote opportunities for international experiences for citizens, by which they can eliminate bias towards foreigners and strengthen solidarity. Personal contact with foreign citizens will enhance the foundation of global peace, if the idea of global citizenship penetrates throughout the world.

Creating grassroots partnership between North and South

Global interdependency is also penetrating throughout Japan. Given this trend, international cooperation activities by Japanese local authorities are expected to continue and develop. When considering international cooperation activities by local authorities from a global perspective, the increasing role being assumed by local authorities and NGOs in the international arena suggests that a new type of global society is emerging, one which is managed by multisectoral actors. Local authorities are creating networks to carry out various international initiatives and making increasingly important contributions to the global community.

It is important to note that international cooperation by Japanese local authorities is aimed at not only one-way assistance to the developing countries but also revitalization of their own regions by infusing new ideas and perspectives from abroad. The two-way exchange and cooperation is a characteristic of community-to-community development cooperation. This approach will help build a foundation of equal partnership between communities in the developed and developing countries by nourishing the sense of solidarity among citizens in both communities. People in Northern countries will benefit greatly from the cooperation by learning about different cultures and traditions from their partners. Development of the sense of global citizenship is a unique feature of the cooperation initiatives of local governments compared with the one-way development assistance that characterizes most ODA programmes. In the case of Japan, local

governments have much to offer developing-country neighbours in various fields. Each prefecture, for instance, has its own agricultural research centre and a wealth of technological and human resources. Developing countries, in many cases struggling to catch up with the rest of the world, may also learn from the past policy mistakes made by Japanese local governments when they went through their own process of industrialization. The bitter lessons of the extensive pollution in the 1960s in Japan, for instance, will be every bit as important to the future of these developing countries as the latest environmental protection technology.

Such concrete knowledge and experiences will be shared through the involvement of local governments in international cooperation. The trainers and trainees in those cooperation programmes will come together to share valuable experiences as colleagues with each other when the local governments develop a long-term relationship based on friendship at the personal level. This alternative approach to traditional development assistance has the potential to change current North–South relationships.

Possible initiatives for Japanese local governments

In Japan, decentralization – redistributing centralized authorities to local governments – is an increasingly popular theme. International cooperation activities by local authorities are considered to be an important example of demonstrating local initiatives; for international cooperation is one of the few areas where local authorities can act freely with no clear legal restrictions, because there are no national laws directly controlling such activities by local governments. This freedom allows them to exert their originality and creativity in designing their own activities.

International cooperation is also important in helping local governments to establish an international reputation, thereby emphasizing their unique regional character and resources in the world. Yet international cooperation activities call for sophisticated international communication skills as well as broader and in-depth international perspectives. This remains the big challenge for Japanese local authorities.

It is clear that local governments have innate restrictions as regards acting in the international sphere. Local authorities are not sovereign entities, and thus lack the means to enforce their power internationally. Nor are they capable of implementing international activities in

complete independence of their national government. On the other hand, the strength of local authorities lies in their local resources and their proximity to local residents. In order to make the most of these characteristics on the international scene, local authorities should enhance their collaboration with citizens' groups, NGOs, and international institutions as well as with the national government. Japanese local authorities must strengthen their links with other domestic entities, such as CLAIR, JICA, and other internationally-oriented organizations. Such networking efforts for international cooperation will help to make a major impact in the world.

When we look back upon the modern history of Japan, local communities in Japan have attained their current level of prosperity thanks to assistance provided from abroad. Japan was clearly behind in the early Meiji era.[19] Many Americans who were invited by the government to work in Hokkaido at that time came from Massachusetts, and they made a significant contribution to the development of Hokkaido. Their activities nurtured a strong respect and friendship in the minds of the residents of Hokkaido, and these ties were reaffirmed when Hokkaido and Massachusetts entered into a sisterhood affiliation in 1990. The relationship between the two regions has developed to encompass exchanges between the medical departments of the universities in the two regions and round-table conferences for trade investment.[20]

When considering the relationship between Japan and developing nations, Japanese communities should follow the example of the role played by the people of Massachusetts in Hokkaido during the Meiji era. As is evident in the case of Hokkaido, a relationship initiated by individuals and the region based on mutual respect can be maintained for over a century. By linking communities together, international cooperation by local authorities will play an important part in constructing a new symbiotic relationship between Japan and the rest of the world in the coming century. The long-term commitment on the part of the Japanese local governments is a prerequisite for creating such a relationship.

Initiatives for promoting grassroots partnership

International cooperation amongst local governments is becoming a global trend. It is therefore important to channel this into an integrated global movement. In spite of recent efforts by local authorities, recognition of community-based international cooperation is still rel-

atively low. One of the reasons is the decentralized nature of activities. In fact, there are tremendous initiatives being taken around the world, yet there is no clear overall understanding of this. The impact is thus limited. In order to make scattered activities an integrated and synthesized movement on the global scale, it is important to create a centripetal mechanism. One of the measures that should be taken is to establish a clearing-house for information, to compile and disseminate information on international cooperation activities by local authorities around the world. This could also assist in establishing standards for such activities and publicizing the best practices. Such an organization should work closely with the United Nations and other stakeholders in international cooperation so that their activities will be promoted not only by local authorities but by major and conventional actors. If Japanese local governments take such an initiative they will be able to improve their activities and take the lead in this global movement.

Another way of adding momentum to this movement is to coin a suitable term to describe international cooperation. The repeated use of such a phrase would result in wider recognition of this movement. For example, the role of women in the process of development became well recognized after the term ''WID'' – Women in Development – was popularized. The United Nations and other national governments now use the word in their official documents and programmes. It is certain that the prevalence of the term WID fostered the global movement to change the situation of women in developing countries.

The name ''Global Citizens' International Cooperation,'' or GCIC, should therefore be employed to describe the international cooperation activities of local authorities. This phrase manifests the spirit of comradeship among people beyond the nation and the role of citizens in international cooperation. The name will provide a clearer focus to an otherwise diverse and divided movement. GCIC should be encouraged not only by the local governments and citizens, but by the United Nations and national governments. With the involvement all of the concerned parties, Global Citizens' International Cooperation will be further promoted and will contribute to the emergence of new global partnerships in the interests of common issues.

Notes

1. This paper is based on the research project ''International Cooperation by Local Authorities'' conducted jointly by the Japan Center for International

Exchange and the Council of Local Authorities in 1996–97. The report *Chiikiga tunagu Aia to Nihon* [Local initiatives to make Japan and Asia cooperate together] was published in March 1998 by CLAIR.

2. The importance of non-state actors in the international arena has been widely acknowledged. Among of the articles which describe this new phenomenon, see Jessica T. Matthews, ''Power Shift,'' *Foreign Affairs*, Jan./Feb. 1997.
3. Gerrit Jan Schep et al., *Local Challenges to Global Change* The (Netherlands: Sdu Publishers, 1995).
4. This figure was obtained at the International Affairs Division, Minister's Secretariat, Ministry of Home Affairs of Japan.
5. 〈http://www.sister-cities.org/membership/his_mis.html〉.
6. Hans van de Veen, *Municipal International Cooperation in the Netherlands*, (Netherlands: LOGO, 1995).
7. *The Yearbook of China's Cities 1996*, English edition (Beijing: Yearbook of China's Cities Publishing House, 1996).
8. For instance, in 1964 overseas travel was liberalized for the general public. The number of Japanese foreign travellers was 163,000 in 1964 and reached 2,466,000 in 1975.
9. Information about the number of sister affiliations in Japan is taken from: Council of Local Authorities for International Relations, *1997 Japanese Local Government International Affiliation Directory* (Tokyo: CLAIR, 1997).
10. For the philosophy of people-to-people diplomacy and the activities of Kanagawa Prefectural government, see Editorial Committee of Ten-Year Chronology of People-to-People Diplomacy, *Minsai gaiko no chosen* [Challenges of people-to-people diplomacy] (Tokyo: Nihonhyoronsha, 1990).
11. The numbers of foreigners arriving in Japan are: 1,295,866 in 1980; 2,259,904 in 1990; 3,504,470 in 1991; 4,244,529 in 1996 (Japan Immigration Association, 1996 Statistics on Immigration Control, Tokyo, 1997).
12. Shigeru Naiki, ''Starting Year of International Cooperation by Local Authorities,'' *Jichitai Kokusaika Forum* 69 (July 1995). The author, the director of International Affairs of the MHA, emphasized the importance of international cooperation activities by Japanese local authorities and stated that the MHA would take several measures to assist local authorities to promote it.
13. Ministry of Home Affairs, personal communication.
14. JICA, personal communication.
15. Hiroshima Prefectural Government, *Shisensho tono Yukokoryu Junennno Ayumi* [Ten years of friendship activities of Sichuan and Hiroshima] (Hiroshima: Hiroshima Prefectural Government, 1995).
16. The case of Kitakyushu is well known in Japan, and many newspaper articles and books describe the programmes undertaken by Kitakyushu.
17. Toshihiro Menju, ''Global Citizenship,'' *Insight Japan*, August 1995.
18. Takasaki has a Web site that explains international programmes both in Japanese and English. See 〈http://www.sphere.ad.jp/takasaki/〉.
19. The Meiji era was from 1868 to 1912.
20. Center for Global Partnership of the Japan Foundation, *The Survey Reports on Regional Internationalization and U.S.-Related Exchange Activities in Japan* (vol. I) (Tokyo, 1994).

16

Urban governance in the new economy

Glen Paoletto

The evolution of development

Throughout history, human society has experienced a number of major socio-economic changes. The so-called Agricultural Revolution and the Industrial Revolution were two such transitionary periods that rocked the very foundations of human development. The way we did things changed, and the tools we had at our disposal empowered humans to take up new challenges. Still maintaining an impact on our lives is the Industrial Revolution. The result of a lengthy historical process, the Industrial Revolution came about for many reasons, but above all was fuelled by both technology and philosophy. Technology was found in the form of steam power; the philosophy was found in capitalism.

The publication of Adam Smith's *Wealth of Nations*[1] in 1776 gave a tremendous drive to what became modern development. While he was not the first to write on political economy, Smith was the first to format the theories and thinking as a science. From the book's publication, it took America some 160 years to develop a real vision for its industrialization. The 1939 World Fair told of networks of highways, television sets for all, and jet planes for mass transportation. By the 1950s, the United States had largely achieved those goals. Based

on Smith's concepts, the modern economy brought about standardization, mass production, and centralization. Social, economic, and political systems and institutions worked more or less exclusively to promote the goals of industrialization and economic growth and wealth. As we now know, the results of these efforts were successful for some countries and peoples.

Technology and technological development have been important components in this success. If we look at history and time in a continuum, we can quite clearly see that the pace of technological change has increased substantially, and is continuing to increase. As Brown Weiss writes, ''we are still new inhabitants of the planet – perhaps only 3 million years old. Our modern age machinery is only about 600 years old, and the rapid modernization of our planet has occurred within the last sixty years. The rate of change in both natural and social conditions continues to accelerate.''[2] As part of this economic process, the dawning of a new age began in the 1960s with the invention of computers and the Internet. Indeed, information technologies are maintaining a large impact on our existence, and in particular our economies. The world information technology market in 1995 was estimated at US$514 billion, with G7 countries accounting for 88 per cent of the market.[3] The software industry alone accounts for an increasing figure of over 1.3 million jobs worldwide.[4] However, we can no longer confine these impacts to the ''economy'' given that many of our other institutions either support or react to our economy, including urban governance systems.

However, despite tremendous changes at the global level since the 1940s, nothing's really changed. Systems of government have basically remained the same; approaches to development also remain in many ways unchanged. Governments find themselves functioning on antiquated structures with mixed to poor results. Government services remain ''mass produced,'' standardized, and centralized. Meanwhile, ''development'' still causes pollution and environmental destruction, while recording poorer performances. Governments still promise real economic growth, and continue to think and act within defined geographical borders when negotiating solutions to global problems.[5]

This chapter explores some of the factors of the new economy impacting on governance and city structures. In doing so, it looks at the impact of information on the economy, and extrapolates possible impacts on governance approaches. Some possible paradigms for governance are raised, as well as a consideration of implications for developing countries.

The term ''urban governance'' is seen to go beyond geographical delimitation of a city. This is especially so in areas traditionally dominated by the market or other parts of the public sector. The public sector's contributions to urban systems, for example, are spread throughout *all* the national government systems. The character of a city is such that the activities of national ministries and agencies form an important part in the process of its governing.[6] Globalization further compounds the blurring of autonomy and distinctiveness, with the result that important decisions impacting on a city – labour, capital markets, welfare – are made more in distant or even unknown locations.[7]

The changing concept of governance

Current concepts of governance and government find their roots in international legal principles: the notion of sovereignty, and the right of a country to make decisions for and by itself, based on its own specific needs without direct regard to others.[8] Current national governance systems are based on old structures that were set up to create wealth through economic development. The problem with all this is that basic ideas and needs are changing while governance is not.[9] Current institutions were created to create wealth. But the notion of wealth, for example, in developed countries has changed from that of 50 years ago. Today, it refers less to monetary value, and more to (*a*) a good lifestyle, (*b*) freedom and access to the things we want, (*c*) low unemployment and crime rates, (*d*) quality education, (*e*) a healthy environment, and (*f*) assets.

So, too, changing is the concept of how society should be governed. ''Governance'' is still defined by most development agencies and banks as meaning the ''manner in which power is exercised in the management of a country's social and economic resources for development.''[10] But is this definition still relevant? While it finds its roots in the international legal approaches mentioned above, sovereign integrity is being challenged by all sectors as being distinct from reality. At the international level, the economy has globalized and thousands if not millions of transactions occur across national borders every day. Already, over US$1 trillion is transferred between countries electronically every day.[11] Cities make what is, in effect, foreign policy.[12] Of the 100 wealthiest entities in the world, 49 are nation states and 51 are corporations.[13] In international law, the current climate change debate is exemplary of another facet of this. National

governments negotiate agreements and agree to frameworks for implementation, but who actually implements? Certainly not governments alone.[14] Also, if we are to achieve the objectives of the Climate Change Convention, are governments really serving the interests of the public and future generations by establishing systems based on sovereign practices when the problem at hand is truly global?

The decision-making actually affecting our lives is, by and large, no longer done by government officials. It is done more in corporate boardrooms, in offices, and in our homes. Systems developed in the 1940s and 1950s worked well when information could be controlled and managed in a centralized way. But now we have so much information and so many interactions and flows that centralized control may no longer be feasible.[15]

The new economy

At the global level, we are in the early stages of a new economy. The ''new economy'' is an economy activated by information technologies and related sectors. Information-related economic sectors can be said to have their coming of age with the dawning of the Internet. The Internet is essentially a low bandwidth, analog network.[16] Its global nature recognizes no gatekeepers or central point of control, and its barriers to access are low.[17] In what key areas are basic changes needed to bring about new patterns of development in the next century? What will be the impacts on cities, where most humans will live? What are some of the most fundamental and important issues to focus on? There are a whole host of issues surrounding the Internet – let alone technology – which need to be addressed.[18]

Meanwhile, the growth of these sectors and of the Internet continues to be nothing less than spectacular. In 1993, there were 3 million Internet users; in January 1998, there were 100 million; and in 2005, there will be an expected one billion Internet users worldwide. In 1993, there were 1.3 million Internet servers (hosts) operating; in 1997, there were 21 million; and in 1998, 30 million. Some 8 per cent of the entire US economy is some way connected to information technologies. Information accounts for one third of the real economic growth in America, employing 7 million people whose average income is two thirds above the national average. Smaller corporations are given an opportunity to compete, while consumers are given more choice. The US economy is experiencing productivity improvements with cost savings in every sector as a result of the application of

information technologies. The United States strongly promotes a non-regulatory, market-led framework to promote the growth of the sector, based on its experience with Silicon Valley. But there is much more at stake than economic growth.[19]

The rate of technological advancement is no less spectacular than that of the growth in information-related sectors. In 1969, man first landed on the moon. The world stopped in its tracks to witness the event, televised live through space. These technological feats were unthinkable and unparalleled. Nowadays, the launching of a shuttle is no more spectacular than the taking off of a 747. We don't think twice about it, and have come to expect it as an ordinary event in daily life. Technology advances quickly, while experience shows that technological advancement and generation, like information flows, cannot be stopped. Cloning technologies are a case in point. UN committees, national governments, and concerned citizens could make all the declarations and protests they liked about the issue, but they did not and will not stop the technology's proliferation if there is a perceived need for it. We can only hope that the technology can be self-regulated in some way to prevent serious future injury. We do not know what the repercussions are and may not know until some time later. Perhaps technology such as this can advance the human cause; perhaps it can hinder it. In either case, technological advancement could not be controlled through centralized governance. Governments and other groups and individuals could only sit and watch their television sets and read their newspapers as the advent of the new technology was announced.[20]

We now have new types of concerns, such as the sustainability of our economies and societies, and the protection of our resources for the use and enjoyment by future generations. Governments are still needed, but how should they govern? The demands on future development are very high: employment and economic growth, increased wealth, education, health, as well as low or zero impact on the environment.[21] But the process is already in motion. It now comes down to how we govern the transition.

New trends

The new economy connects all of us in a web of telecommunication networks, encouraging cooperation and working to decentralize government and other management systems. It does this by forcing flat organizational structures of which cyberspace is an important com-

ponent.[22] With the advent of the IT Age, we are in the midst of witnessing new worldwide social and economic trends. These affect local and national governments, as well as the economy. Some of these are:

- Customization instead of standardization;
- Synchronization over just-in-time production;
- Holistic approaches over specialization;
- Flat organizational charts replacing hierarchy;
- Decentralization replacing centralization;
- A move away from central authority.

There are a number of areas where impacts can be expected in relation to city planning and governance. If local and city governments are very concerned with local development and investment, then the way business and industry operates will come to impact on urban governance. In particular, there are two outstanding trends to which cities may wish to have regard: mass customization and decentralization. Mass customization[23] is still very much a developed-country phenomenon, but it has strong implications for developing countries, particularly as it affects markets where they will sell large quantities of their goods. Mass customization is the epitome of the lean production systems that can have positive implications for the environment. It makes the identification and fulfilment of the wants and needs of *individual* customers paramount without sacrificing efficiency, effectiveness, or costs. In this regard, cities can place themselves in a strong position, as they offer the proximity to the markets that mass customization practices require.

In terms of decentralization, products are now being made of parts manufactured in many different and distant places, as determined by skills, costs, access to markets, and labour.[24] The process of determining what is made where is a complex one. Commodities are produced everywhere, and flow to everywhere. As a result of this type of global industrial structure, business is coming to rely more on efficient information systems to hold all the parts together. In fact, manufacturing processes can no longer be separated from the information systems that support them and make them more efficient. This means that infrastructure, including legal infrastructure, to support the new economy becomes imperative in major cities. Of particular regard to the economy are three resources that further impact on the governance of cities: energy, water, and materials.

As governments move toward distributed and decentralized models of governance, networks, information storage and retrieval, and software applications will become more important. They will play

an ever more central role in how localized, autonomous government units will interact with other local governments, as well as with whatever new forms of government emerge at the national level.[25]

Complexity and governance

Compared to earlier economies, we have more people, more technologies, more wealth, more access to the things we want. A new homepage is made every 10 seconds. A new patent is issued every minute. Satellites, mobile telephones, ''see-you-see-me'' technologies continue to revolutionize communications.[26] National governments find that they can no longer make all the decisions. The government of the People's Republic of China may be able to decide whether a corporation can invest in its territory, but will have difficulties in processing in precise terms what types of technologies it will use and how these impact on its own development. The point is that it becomes impossible for governments to monitor and measure all the changes that are occurring, and all the decisions being made.[27] With these changes comes increasing complexity. As more information is made available and more changes occur, a centralized governance system will eventually collapse from overload.[28]

New schools of thought about governance draw their theories not from political or social science, but from the laws of nature (the biological sciences, new growth economics, and complexity theory).[29] If we look to nature, we can see that similar processes to those being experienced today by the human world have been continuing for many millennia. Every second, thousands if not millions of flows and interactions occur in nature. There is too much information for one central system to control. Yet the system is not overloaded, and flourishes with perfect balance.

How does nature govern? It does not govern with policies. Nor does it govern through some centralized model. Nature governs with a set of simple rules that function, not at the centre, but at the system's periphery. There are basic characteristics that pervade these rules, and some of these characteristics are as follows:

- Stable (they can be relied upon);
- Simple (we understand what they do in terms of function);
- Innovative (they can change if they need to);
- Underlying (they are at the base of the growth process);
- Located at the peripheries (the interaction and flows are occurring superfluous to the rules).

With so many flows and interactions at the global, national, and local levels, our society will have to learn to govern itself with a relatively few simple rules. These need to be simple so that people can understand them and sufficient freedom is given for flows to occur. They need to be stable so that people can come to rely on them. They will continually need to be innovative as needs change – the success of a governance system does not mean that it should not change. Any rules or principles should not be intrusive and at the centre, but rather underlying and located at the peripheries. An important question to be examined is which rules or principles we include and which we do not.

Rethinking governance

Earlier, the definition of governance as used by development agencies was noted as ''the manner in which power is exercised in the management of a country's social and economic resources for development.'' Modifying this definition, and considering the above, a governance for the future will need to be different – more flexible and facilitating. A suggested suitable definition of future governance is ''the manner in which power is exercised to bring about successful social and economic transition for future development.''

But how do we do that? Taken in their entirety, it is not that governments have been doing a bad job in the past to achieve economic growth. Rather, it is that government should now be doing something different to what it has been doing over the last 100 years. Almost all government departments are specialized, providing formatted or standardized services within particular spheres of expertise, knowledge, and central authority. Yet, today, the trend is one towards customization, the exact opposite of what government is currently doing.

As we move into the new economy, we will also need transition in governance. Depending on the level of a country's economy,[30] centralization will find it difficult to function well; instead, principles or simple rules will be needed to foster the new age and economy. Without an approach based on principles, countries will ultimately be putting themselves at risk of detrimental economic and environmental loss. Virtually every public policy area will feel the impacts of information and technology. Security and privacy issues, intellectual property and copyright protection, equity issues, human rights issues, and taxation of flows that transcend national boundaries are all issues that will require solutions. If governments do not prepare an approp-

riate infrastructure that can attract, foster, and maintain IT-type industries, real capital and growth will be lost. Corporations and capital will simply migrate elsewhere where new economies can flourish. As economic hubs and entry points to the global economy, the same can be said for cities and urban governance.

Achieving competitive advantage in a new economy begins with the redefinition of public- and private-sector roles. Where sufficient infrastructure exists, one perspective is that government should let the private sector perform the governance function. The problem with that is that sometimes markets fail.[31] At the macro-level, it has been suggested that there are a number of possible roles for governments in supporting the transition.[32] In summary, the main points are as follows:

- Keep regulation to a minimum (stipulate simple rules and frameworks);
- Provide incentives for innovation (e.g. developing information infrastructure);
- Fund R&D programmes (new energy development, grants for installation of environment-friendly technologies, privacy and security software programmes, online policing services);
- Consider social welfare (consumer protection, provision of services, environmental impact);
- Support industry cooperation.

At the micro-levels, however, it is likely that nothing short of a step-by-step review of government functions will be needed. This is because the impacts of the new economy run deep, and this is especially true for cities.[33] Any such review should be undertaken in terms of *functions, not departments*. In reviewing the functions, three questions will need to be asked and answered for each function:

(*a*) What should government be doing?
(*b*) What does it make sense to keep at the centre?
(*c*) What does it make sense to decentralize and digitize?

In relation to the first question, there is a test that can be applied: ''What is absolutely necessary for government to do and cannot be done by anyone else?'' If a service must be performed by government, then steps should be taken to digitize and decentralize the service to the extent possible. If a function can be performed by someone other than government, the function should be left to those organizations (with financial support), who would be provided with a basic framework for self-regulation. Where a service needs to be provided from the centre, then the systems should be streamlined so as to provide

Table 16.1 **Distribution of government expenditure, selected countries (percentage of total)**

Country	% GDP	Central government	State government	Local government
United States (1994)	41.3	53.4	25.6	21.0
Australia (1995)	46.5	59.0	36.0	5.0
Germany (1995)	57.2	59.2	24.1	16.7
India (1993)	30.8	54.7	45.3	n.a.
Brazil (1993)	56.6	65.7	24.8	9.5
Kenya (1994)	30.0	96.1	no states	3.9
Thailand (1995)	17.3	92.6	no states	7.4

Source: T. Ter-Minassian, ''Decentralizing Government,'' *Finance and Development*, September 1998; IMF, *Government Finance Statistics Yearbook*, Washington DC, 1996; IMF, *International Financial Statistics*, Washington DC, June 1997.

solutions to the problems, rather than apply systems or ''make them fit'' to the problems. Once a review process is complete, simple rules will need to be created to govern each unit

Decentralization

As part of an overall paradigm of governments struggling to govern better, decentralization is a trend that is picking up momentum.[34] However, new governance structures are not simply about transferring responsibilities of national departments to affiliated departments at the local levels without the necessary accompanying resources. Nor is governance about increased efficiency or better technologies. It's about first defining what government should do – area by area – and then building the systems to support those objectives that properly reflect the potential of the new economy.

The transition towards the new economy is bringing about devolution of authority to the subnational or regional level. Socio-economic conditions and needs differ from region to region, while citizens are increasingly coming to demand customization of services. Even today, the actual implementation of policies is generally done at the subnational levels, while information on which decision-making can be based will become much more widely available to the subnational levels. This whole process calls for the re-engineering of government towards creating governance systems that are appropriate, with emphasis at the local level and on satisfying constituencies' needs,

including improved lifestyles, employment, economic growth, low crime rates, health, and delivering better services to citizens.

If one of the main functions of government is to serve the public, then governments need to start thinking how they can better serve their clientele through customization, not specialization or standardization. Serving the public better means putting many services on line; many others can be customized and tailored; problem-solving can be approached through non-specialization and thinking in terms of issues and solutions rather than departments.[35] To reflect the economic realities, and where infrastructure exists, government services will need to be networked, with decision-making focused at the local level. These services will need to be connected to a larger infrastructure that is both national and global, eventually involving both public and private sectors.

As part of this paradigm, the concept of ''networking'' becomes key, and it is in this regard that city and urban governments need to enhance their roles. In many cases, city and local governments are not endowed in terms of revenues and revenue-raising authority. These systems of finance mean that urban governments come to depend more on the finances of the private sector. Local economic performance and income levels become extremely important and equated with the success of a city, which tends to pressure the need for conservative business environments.[36] The result, therefore, is a strong tendency to favour urban development that centres on business and industry and how *they* develop, which further calls for spatial decentralization and allocation of functions for goals to be met.

Business and industry are powerful forces in urban development. They work to impact on what a city looks like, how it operates, and how it develops. Most urban development strategies are dependent on the resources, activities, and attitudes of the private sector. Given that business decisions are directly tied to a host of city services, government officials must necessarily take business and industry into account. How business and industry make decisions comes to rest more on the market, the global economy, and the systems of production and commerce. In this way, the global and local paradigms become linked. In most economies, most of the productive assets of a city are either owned or operated by the private sector, so that the control–command regulatory scenario becomes devoid of reality. The result is that local and urban government officials are generally keen to ensure that competitiveness of business and industry is enhanced

and that business is sufficiently represented in policy negotiation, bargaining, and formulation. In this way, effective networking becomes important if not crucial in both city and local governance.

Business and industry

As highlighted above, the trends in business directly impact on urban governance. Technology plays an important part in this paradigm, while cities often represent hubs of technology. Technical progress is identified as the single most important factor in sustained economic growth in the United States, estimated to account for as much as 50 per cent of long-term economic growth over the past fifty years. Technology relates to the way economies work and the way business is done.

Generally, the pattern has been that (1) high technology research and development, innovation, and product development sites are located mainly in areas of global industrial significance; (2) manufacturing that requires high degrees of skill is located in newly developed industrial parks in central countries (United States, Europe); (3) large-scale electronics production is located in developing countries (South-East Asia); and (4) facilities for customer-related service and production are scattered and located close to markets, mainly near urban centres.[37] Urban centres, therefore, figure prominently in the scheme of things. The economy is already global. Financial houses and brokerages work only with data transferred via linked networks to make transfers, purchases, and sales. Networked technologies become the ''trade routes'' in the new economy. In the industrial age, the economy was based on a physical world where there was an assumption that there was a resource loss every time a transaction was made. If I build a car, I remove and utilize resources that are irreplaceable and build a car. I then sell the car to you, and receive money in return. A net loss has occurred in terms of resource and labour costs. Compare that scenario with new-economy transactions, where the centre of gravity shifts to ideas. If you buy an idea from me, no resource losses or exchanges occur. Rather, the idea is given additional value by virtue of both of us having it.

Ways of doing business are changing dramatically. In 1997, five million people made purchases over the Internet amounting to US$6 billion. By the year 2005, it is estimated that $1 trillion of commerce or sales will flow over the Internet worldwide. Click a mouse and you can invest capital anywhere in the world; you can buy products from

anywhere; and over the Internet you can sell to anyone. The world is now the market-place for small, medium, and large manufacturing, retail, and tourism industries. What that means is that those governments and cities with new economy-friendly legislative and regulatory environments will create for themselves a comparative advantage. Singapore is a case in point, where it is well known that economic gains have been derived from a pre-IT strategy.

In the new economy, the economic competitive advantage of countries will come to depend upon the mix of three factors:

(*a*) Laws, regulations, and infrastructures to support electronic commerce and technological development;
(*b*) Efficient manufacturing innovative enough to exploit the latest technologies;
(*c*) Ensuring that high-tech industry and knowledge workers remain.

Governing corporations

Corporations will be at the heart of implementation and transition to a new economy. They will also be the ones to benefit most from new economic activity and structures. Governments should leave many aspects of the transition to non-government organizations – the corporations, NGOs, and others who can implement better than governments can. But sometimes markets fail. In order to ensure that the markets act in an appropriate way and according to an overall vision, corporations will need to be made responsible for their actions. Perhaps one of the major forces in assisting governments to induce a self-regulating paradigm of corporations is information, and the effective use of information systems that work to invoke a positive reaction.[38]

Energy

Energy security maintains one of the highest priorities among national government agendas today. The problem is that economic and governance systems are tying plans of energy security to irreplaceable resources that may not always be available to all in the future, regardless of what price is paid for them. Fossil fuels used as the basis of economic activity as we know it – mainly oil and coal – are irreplaceable resources. Once they are used, they cannot be replaced. Environmentally, current use has been identified as causing severe detrimental effects to the environment. The fact remains that whole economic structures have been built upon essentially unstable or

unknown factors. In the long term, therefore, energy security in its present state must be in doubt. Building on current and future trends, future energy security in the new economy can be brought about by developing and implementing strategies at the local level focusing on the following:[39]

(*a*) Growing regional autonomy will mean that decisions relating to the local level will need to be made by the local authorities.
(*b*) Energy security will need to incorporate a diversity of energy sources. This will need to be coupled with a decentralized and locally based approach to energy supply and demand.
(*c*) Decentralized energy structures should be based on renewable energy sources. Solar, wind, hydrogen, photovoltaic, and other energies and energy sources need to form the basis of the new economy. The selection of energy sources would depend on the needs of the region in question. Natural gas could also be considered as an important interim or transition option.

Transport systems and building practices and codes also often come under the jurisdiction of authorities at the subnational level. Bringing about eco-efficient transport systems with improved technologies, as well as developing and implementing eco-building codes and eco-architecture should be responsibilities of subnational authorities.[40]

Water

Water is an essential, replenishable resource. Water resources require conservation regardless of whether a country has high or low rainfall. Regional autonomy and varying local conditions also call for local specific plans and approaches to water resource conservation and utilization.

As water becomes an increasingly scarce resource, a future trend must be towards more and better utilization of water, in particular rainwater, in urban systems. Rainwater is a discarded resource, and its mismanagement can result in major environmental problems and disruptions such as urban run-off.[41] But there are simple technologies available that local governments can introduce, which can save rainwater for drinking and other purposes. The big dam age is, by and large, finished, with only a few dams in the world really having lived up to initial expectations. Rather, alternative approaches are needed, such as smaller cascading dam engineering and applications of underground dam technologies.

Material flow reduction

Material flows will require significant reduction in the IT Age. It is estimated that the materials used for economies need to be reduced by half worldwide, and by 90 per cent in post-industrialized countries.[42] In particular, local levels need to reduce or eliminate wastes. The use of materials produces wastes, which cannot continue to be buried, incinerated, or exported without some form of continuing escalation of negative effects. How we govern and manage material flows will make a significant difference as to how much waste is produced, and how much can be eliminated. Strategies to reduce material flows need to be put in place at the sub-national levels as ultimately the people of the locality will be made responsible for their own wastes.

Human resources

In 1991, the World Bank wrote in its *World Development Report*, ''The evidence is that education promotes economic growth and thus puts other goals of development within reach.''[43] In 1998, the World Bank again came to the same conclusions: ''developing countries must institute policies that enable them to narrow the knowledge gaps separating poor countries from rich.''[44] Education will play a prominent role in the transition to any new economy, and the role of cities in this regard cannot be underestimated. The way we think about education needs to change. The reason lies in the type of person we need in the future. A new-economy workforce will need people who are proficient in working with computers and networks, used to collaborating with others, and able to innovate and self-organize. They will need to think differently from the graduates of 20 years ago. They will need to apply holistic approaches when solving problems. Appropriately, most post-industrial governments have placed education reform as one the top priorities on national agendas. The point is that if they don't reform education, they will quickly find themselves with an inappropriate workforce.

How we educate our children is an important and exhausting topic. However, there are three elements that are seen as crucial in terms of high school, graduate, and post-graduate education for the new economy. These elements are awareness, training, and innovation. In the IT Age, we know there will be computers and networks. We know

there will be information flows. We know that the Internet will give the opportunity to collaborate and work with others in almost any part of the world, real-time. We know that for some a specialized knowledge of certain technologies will be needed, but that this knowledge would mostly be gained in a post-graduate study scenario. With that as a background, let's briefly consider the three elements.

Awareness

It will be no longer sufficient to educate children in terms of basic rote learning of maths and science principles. We can no longer think that real education begins after school. From now on, the real education needs to begin in school.

As part of this, an awareness or linkages approach to education is needed. Children will need to leave school being aware of the types of linkage that exist between problems and issues. Examples are environmental problems, how they link with each other and to the challenges societies face; the types of social issue related to those problems; how they were caused; and how they can be solved, if at all. With that premise, studies on basic principles of maths and sciences can be launched in the context of how they relate to those and other issues. In this way, text books need to be rewritten utilizing very different approaches. Linkages, building awareness, and encouraging students to think laterally should be the new objectives.

Training

New information always becomes available, so that education is no longer finished after graduation. Some refer to this process as ''life-long learning.'' While schools would be expected to give a basic founding in the use of computers, information, and the sciences, on-going training programmes will be required to be made more widely available throughout a worker's lifetime. Training extends beyond the classroom into matters of the workplace and home. For a participatory approach to the new economy and ensuring equality of access to the extent possible, governments, including urban governments, will need to consider education from a more holistic and long-term viewpoint. Training programmes will need to be offered to the average citizen, with the objective of assisting computer-illiterate persons to become literate. The training need not be free, and could be performed by others.

As infrastructures are put in place, more information will be available for training, and alternative forms of training will become apparent. Electronic infrastructures can link educational institutions and interested private sectors to deliver training services to citizens when and where they want it – at home, the workplace and school – and can apply the intellectual assets of universities.

Universal access to the Internet and computers will remain a social and moral debate. In the United States, almost half of the households with an annual income greater than US$50,000 have a computer at home. By contrast, only 15 per cent with incomes under $25,000 have a computer. People who work with computers earn 66 per cent more on average than those who do not. Society has much to risk if people remain untrained. However, much of this training could be done on line and at home with appropriate infrastructure and sufficient variety in available courses. The US government is already responding by aiming to have all schools in the United States linked to the Internet in individual classrooms (not in a central facility) by the year 2002.[45]

Innovation

Innovation, lateral thinking, and providing holistic solutions to problems will be the keys to a proficient workforce for the new economy. Ultimately, these are a product of the successful implementation of the other two points above. The children of today will be living in a world where technological applications will advance exponentially. Not all the answers will be available, so knowledge workers will need to come up with ''best guess'' solutions. Basic understanding of the main work-related research areas and studies will be needed, whereas in the industrial age this type of non-specialized approach was frowned upon.[46]

Devolution of power

Mainly for reasons of enhancing effectiveness of education, there is an accompanying move towards devolving responsibility for education to local governments and schools, particularly in industrialized economies. Swedish educational policy represents the latest thinking on decentralization of education. Sweden emphasizes decentralization, management by objectives, and national and local assessment. The current policy is to improve educational quality by rigorous evaluation and to increase effectiveness by introducing individual

choice and encouraging competition. In France as well, decentralization reforms in the 1980s meant that substantial responsibilities were given to local authorities. This approach helped France to tackle the problem of underachievement in urban areas, allowing for more flexibility in education and close links with the community. In Japan, local governments are expected to have a more proactive role in education, including determining class sizes, appointment of teaching staff, and control over school budgets. The report of the Japan Central Council for Education calls for the state's involvement to be kept to a minimum in education.[47] Schools are also defining their own curricula, particular at tertiary education level, and university curricula could become more influenced by comparative advantages and geography in the future.[48] However, as with decentralization processes in other fields, resources need to accompany customization, decentralization, and devolution of power to local levels.

Urban governance in the new economy

How we govern cities in the new economy is not a question of technology. It is more a question of the governance systems employed both to support broader macro-level economic objectives and trends and to respond effectively to the needs of the citizens. There are hundreds of choices available to city governments to support these broader economic objectives, depending on factors such as culture, geography, history, climate, and location. The governance systems that cities employ become crucial in terms of bringing about desired results in the course of day-to-day dealings.

As an important part of the decentralization of government at the local levels, a function-based approach to urban governance could be recommended. This refers to the incorporation of spatial considerations so that, for example, factory sites become the focus of policy rather than industrial sectors.[49] Functionality incorporates the structuring of administrative systems around localities, groups, and systems. Examples of administrative classifications more appropriate to the new economy and innovation may include waste systems, public and open spaces, health systems, transportation systems, wharves and docks, city revitalization, information systems, and rivers. The structure would come to depend on the city itself, in terms of both its current urban geography and any visions it sets for itself. It means a process of targeting groups of citizens such as the young, elderly, or disabled; focusing on localities or pockets of poverty to solve prob-

lems within the broader economy; and working with households, industry, and informal sectors for waste reduction rather than waste incineration alone.

The role of the private sector in this debate can be expected only to grow stronger as many services become privatized. Given that the public interest is not one that usually immediately reflects corporate objectives, the systems need to be structured so that they work to regulate themselves through open information systems. These systems must ultimately extend to both local and national governments themselves to bring about the accountability needed in the process, mainly through a process of information.[50] In these regards, the importance of networked offices and networking as well as information sharing can be highlighted once again.

City and local governments need to review their functions in light of the trends, and to think again about what they should be doing and what they should not be doing. A focus on services could be recommended. In particular, in working to make systems more efficient and effective, city governments will need to consider what others can do better than themselves. Local and city governments – like national governments – do not have the resources they need to achieve everything. In many cases, citizens' groups and NGOs carry out a large number of activities on many of the problems and issues that government alone is unable to solve. Health and comforting services, counselling, community training, basic social welfare services, caring for the homeless, and caring for the elderly and the disabled are examples of the services that these groups already provide and perhaps better than government. Governments find it difficult to address the whole range of society's problems, yet often still insist that only governments can do the job. The roles of centralized structures – even at the local level – are necessarily changing and demand flexibility.

City governments, in particular, need to find relatively speedy solutions to citizens' problems. As a consequence of the above, there is tremendous scope for urban governments to work more with the citizens and NGOs to find these solutions.[51] In terms of waste reduction and treatment, the informal sector (household and civic groups) participates actively in waste reduction programmes, especially if these make socio-economic sense.[52] There are innovative ways in which city and local governments work with citizens to reduce volumes of waste and which can mean more money for the community. Financial support is perhaps the best way city governments can support the groups, the payments for which can be justified on the basis

that the groups can perform the services more efficiently (at a lower cost) and more effectively than government. These types of activity, however, will require their own governance structures to keep abuses low. Rather than regulation, information should be seen as a preferred way to govern the services performed by others, because it is inexpensive to do so and allows for the innovation and flexibility needed.

Developing countries

For developing countries, the scenarios explored in this chapter may seem distant, and need to be taken in context.[53] For example, in countries that are less economically advanced, education may be better undertaken through centralized facilities focusing on general rather than specialized approaches.[54] Further, the impacts of high-tech imports can be severe on developing countries – one networked and programmed computer can displace many people, leading to unemployment. Even technologies that some take for granted – cars, for example – may not be appropriate for some countries, as it means that large investments in infrastructure are required. Roads need to be built, leading to more forest destruction.

Nevertheless, these countries can target appropriate technologies and industries, and cities can provide and act as entry points into the global economy. Countries such as Nepal can and do target ecotourism, and despite occasional disparities, can build local and more sustainable industry. They can import small rather than big tractors, and motorcycles rather than cars. Small tractor importation is seen as one of the major factors providing impetus for the Green Revolution in Punjab, northern India. ''Appropriate technology'' for these purposes means technologies that improve or enhance local resources. However, even in these scenarios, totally ignoring global economic developments could have severe economic and social consequences. Mansell and Wehn point out that ignoring the new economy can mean ''exclusion from the equivalent of the waterways, air transport, rail and road transport systems, that historically have provided the basis for trade in physical goods.''[55] From the beginning, thought is needed to arrive at integrated information strategies, and, in fact, the evidence shows that the less developed a country is, the more importance it should give to such an approach. Otherwise, gaps and inequities, should they already exist, may become even wider. Government leadership, education, and easy-to-understand principles of

governance can still apply, as shown in the case of Bhutan's overall successful efforts at decentralization.[56]

Some new governance applications

The processes of rethinking government outlined above require innovative thought, with the objective of generating simple rules and principles that leave implementation to those who can implement best. However, cities do not govern alone, but decisions made by others often impact upon them. Ultimately, the result is likely to be a centralized-cum-decentralized mix of governance systems and principles that maintain their own balance in an equitable way. Some function-based examples of how government can be transformed to usher in the new economy are set out below. Development and governance, however, are very individual concepts, and how these are applied and rethought very much depends on the country, city, and level of economic development.

Construction

The construction sector is a major sector of any country, and particularly impacts on cities, where most of the buildings are constructed. In light of the above, the government's role would be to promote construction where needed and ensure that it adds to the country's economic security and quality of lifestyle. As a principle of decentralization, governments should not undertake the services that the private sector or others are willing to do. Therefore, governments should avoid building or being directly responsible for construction themselves. Instead, they will need to ensure that any new constructions answer to the needs of the people and to future generations (concrete and steel structures have a life expectancy of some 30 years). Governance in this sector would more likely mean defining more sustainable and enduring structures. Building codes are an obvious way to ensure this, and again the role of urban and local governments can be seen. If there is political will, building codes can be drafted by government to demand energy- and eco-efficient structures and material use. This will mean that material manufacturing industries will need to introduce new technologies to meet these standards. The codes can also change as new technological innovations come about. Rather than reintroducing new codes, they could be structured so as to incorporate the latest technologies as a system

by, for example, applying the top 10 per cent of energy-efficient technologies.

Architecture is another area that governments can manage, so that eco-architecture structures that are also visually pleasing could be required. Rainwater catchment systems can be installed in all new constructions as a matter of regulation to prevent water shortages in cities, and financial support can be given to first-time home buyers. Solar system installation can also be made compulsory and initially supported through grants.

Public works

Public works, such as sewage systems and road maintenance, should be continued as a function of government. These can be best regulated through a centralized/decentralized approach, that is, by having sets of criteria controlled at a central location but having needs and implementation defined and generated at the local level. Where the private sector and others can undertake the activities, then these should be delegated and privatized, with open information made compulsory in the interests of accountability. In terms of the environment and as one of the criteria, new public works in economically advanced countries should aim to have zero impact on the environment, which calls for new technologies. Bidding processes should be made open to international competition.

Education

Education ministries do not educate, and therefore should not educate. Schools educate; teachers educate; parents educate. The role of government in education is not defining who should learn what, but rather what the objectives should be. An example of objectives by the end of high school may be functional literacy, solid understanding of basic sciences, ability for self-thinking and innovation, and awareness of environmental issues. Having regard to the new economy, governments should keep education international, and, in particular, ensure that sufficient infrastructure exists to keep schools wired to the Internet. As centres usually with more advanced infrastructure than rural areas, cities have a real role to play. Government should train and keep trained the teachers who teach, and set up and support networks of responsible teachers and parents at the local levels to report on and monitor problems and new issues. Schools could be

privatized, but the government could provide many more scholarships to those children economically or otherwise disadvantaged.

Development and industry

In economically advanced countries, the government's role will essentially be one of building the trust of the private sector by providing stability, ensuring there is low impact on the environment by developments and industry, and encouraging the development of new industries. Governments should not develop. This should be left to the private sector. All development and industrial activities should aim for zero or low impact on the environment according to set criteria, which the government would generate. New laws and frameworks would be brought about by the government to accommodate the transition to the new economy. Governments would not protect industry. Each industry would need to be competitive based on its own comparative advantages, be they low labour costs, high technologies, or proximity to markets.

Basic government services

Receipt of payments of rates and fines, requests for documents, and information searches are examples of basic services provided by government. Thousands of people are employed to implement these services, yet most basic services could be put on line where infrastructure exists. Polling and other events could be done on line, while voting could be centralized and digitized. Advisory services for the public will be needed; these could be privatized and users charged a fee. The government could provide additional community training and counselling on computers by financially supporting local groups that could do that task. Other initiatives could include a government multi-card that combines a host of services, such as driver's licences, vehicle registration, library cards, debit cards, charge cards, other licences, welfare assistance, and insurance verification. Offices can be networked to enable a sharing of information that can bring about better service to citizens and more effective results.

Transport

Focusing on cities, the government's role would be to support the infrastructure that could reduce traffic flows (including teleworkers),

purchasing and employing only vehicles with low- or zero-emission engines, and privatizing activities as for as possible. Urbanization would need to be monitored through the implementation of careful planning and zoning, after discussion with local people. Low-impact and environmentally friendly transport systems need to be promoted, sponsored, and developed, with investments in railway and other infrastructure for goods transport as preferred options to roads.

Trade

Government should continue to make trade free, set international standards for health, centralize checking of goods but digitize where possible, and remove environmentally harmful subsidies. However, trade in the staple goods such as food and water could be centralized and regulated in the interests of national security.

Crime fighting

The police would necessarily remain centralized and government-controlled, but there would be need for more interface with other related government organizations through networks. There are a multitude of government agencies involved in crime-fighting that do not talk to each other.

International negotiations

The role of the governments in international negotiations is to set the goalposts for the global future directions of the environment, economy, and development. Setting goalposts that would then be implemented at the national and local levels is vital for any country's participation in the international community.

Taxes

Government would need to control taxes, but the taxing systems would need to be appropriate. New forms of tax would need to be considered, while others would need to be made redundant, and devolution to local levels could be considered where there is need for resources to implement devolved responsibilities.

Infrastructure

Emphasis should be placed on putting in place the required infrastructure for the new economy, rather than roads and dams. Networks, computers, training, telecommunication tools, new technologies, necessary laws and frameworks, and so on could be considered with much higher priority.

Technologies

The development of technologies would need to be supported via tax-free or lower-tax environments, rule stability, and appropriate infrastructure. In particular, government research and development should ensure genuine competition among technological options.[57] City governments can also participate and partner with corporations and research organizations to develop technologies that can work to alleviate environmental and other problems, such as high dioxin emissions from incineration.

Internal government documents

Governments are one of the biggest consumers of paper. All internal documents and documentation processes can be put on line to promote efficiency and transparency as well as to save trees.

Development assistance

Development assistance from post-industrial countries to industrial countries should be more flexible in its approaches and function-oriented, rather than involving itself in complicated political negotiations and awaiting ''official requests'' from recipient countries. Assistance should be aimed at putting in place the new-economy infrastructures, especially in developing countries, where the major markets of the developed countries' industries will lie in the future.[58] Developed-country governments can also promote projects in developing countries, maintaining at least the same environmental standards as at home, through public information reporting requirements. A greater role for cities as well as ''soft'' technology transfer (human resource development and human exchange) should be a key part of

that package, including training in computer use, network maintenance, and information processing systems.

The ultimate objective of government will be to access the best knowledge required and provide the best service to its citizens. These things do not usually lie in a centralized office, but rather closest to the ground.

Notes

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ization's tasks and incentives, and gives birth to new orders. The more established an organization, the more difficult it is to change. See M.J. Hatch, *Organization Theory: Modern, Symbolic, and Postmodern Perspectives* (London: Oxford University Press, 1997). For the purposes of this book, however, ''innovation'' refers more to evolutionary change and adaptive responses building on ideas, knowledge, and experience, though not necessarily within established rules and procedures.

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