The United Nations University

PLEC NEWS AND VIEWS

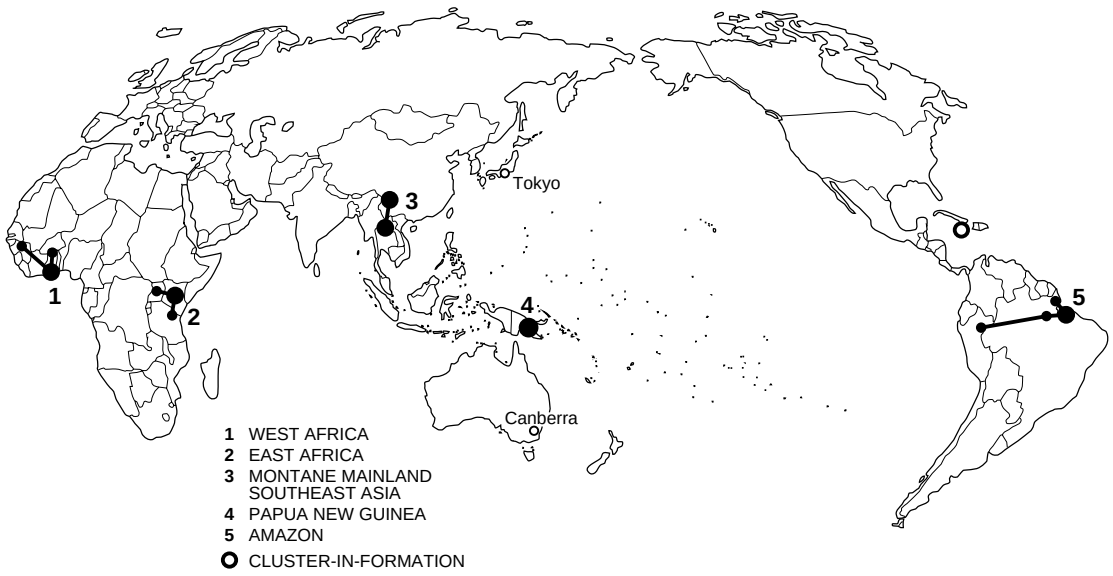
No. 6 – March 1996

A Periodical of the United Nations University Project of Collaborative Research on People, Land Management and Environmental Change (PLEC)

Edited by Harold Brookfield
Scientific Coordinator

Produced in the Department of Anthropology, Division of Society and Environment, Research School of Pacific and Asian Studies, The Australian National University for the United Nations University

ISSN 1020 0843



The clusters of PLEC

P L E C N E W S A N D V I E W S **No. 6, March 1996**

CONTENTS

Page

NEWS OF THE PROJECT AND THE CLUSTERS

News of the Project: a Progress Report 1
by the Editor

WAPLEC Activities in 1995 and early 1996, including a Workshop in Northern Ghana 2
by Edwin Gyasi

The Regional Symposium on Montane Mainland Southeast Asia in Transition, Chiang Mai , November 12-16 1995 3
by Benjavan Rerkasem and Harold Brookfield

The Upper Amazon Várzea (Iquitos, Peru) Team in the Amazonian Cluster 4
by Miguel Pinedo-Vasquez

A Journey to Baoshan and Gaoligong Mountain (Gaoligongshan), Western Yunnan 6
by Harold Brookfield

News of the South-South Programme (The South-South Cooperation Programme on Environmentally Sound Socio-Economic Development in the Humid Tropics) 9
by Miguel Clüsener-Godt (with an Explanatory Note by J.I. Uitto)

PAPERS BY PROJECT MEMBERS

Collaborative Agroecosystems Management Project ('CAMP'): A Proposed Community-Based Initiative in Ghana, by WAPLEC in Collaboration with the Chief and People of Gyamfiase 11
by Edwin Gyasi and Lewis Enu-Kwesi

Agrodiversity and Biodiversity on the Ground and among the People: Methodology from Yunnan 14
by Guo Huijun, Dao Zhiling and Harold Brookfield, with a comment by Daniel Zarin

Indigenous Knowledge: a Long History and an Uncertain Future 23
by Muriel Brookfield

Local Experts and Local Leaders: Lessons from Amazonia 30
by Miguel Pinedo-Vasquez

P L E C N E W S A N D V I E W S

No. 6, MARCH 1996

REPORTS ABOUT GENERAL AND CLUSTER ACTIVITIES

NEWS OF THE PROJECT: A PROGRESS REPORT

by the Editor

PLEC, UNEP and the GEF

The report in the September issue (*PLEC News and Views* 5 (1995), p.1), left the project document being prepared in shorter form for submission to UNEP in October, following receipt in September of new guidelines, and in particular of the GEF Biodiversity Strategy in final draft form. The document, when sent, took the form of the required 10-page Project Brief plus a substantial set of Annexes and Appendices. In November, Juha Uitto and I left the Chiang Mai Symposium (described below) on its last day to travel to Nairobi, and stayed there a week. Juha then returned to Tokyo, and I to Thailand to resume a planned itinerary to Yunnan (also described below). Nairobi was for me a 'side-trip', albeit a rather long one.

On arrival, we were asked to abbreviate the already reduced document much further, getting everything about the project as a whole into the 10-page Project Brief, reducing the size of the Annexes which described Central Activities and each Cluster, and eliminating the Appendices altogether. We did this, also taking all the financial material out of the text and creating a Financial Annex which put it all together. The result was a document consisting of the 10-page Project Brief, then 28 pages of Annexes with 23 financial pages. (Copies were sent to all Cluster leaders in January).

UNEP appeared satisfied, so we then made maximum use of the capabilities of e-mail, sending the revised document as an attachment to the project's 'Canberra crew', (a term provided by our friend Timo Maukonen in UNEP) who expertly edited it and added a cover, and returned the whole lot to Nairobi as e-mail attachment within five days. By this time it was almost December. The next steps were in the hands of UNEP, who first decided that they liked the project enough to handle the formal presentation themselves, then sent the document to an expert external reviewer. A favourable review report was received in February, and UNEP has now initiated action to present PLEC to the GEFOP (Operations Committee) at an early date. While large hurdles remain, we have at last got this far.

This Periodical and the GEC Special Issue

The core management group met in Chiang Mai, and one of the main items of discussion was the future of this periodical, the production cost of which is significant in relation to our available funds. Though it now publishes some very respectable papers, we decided not to move toward refereeing. Events have overtaken some other interim decisions, but costs determine that in one way or another this periodical has to change its nature in 1997. The one item to be noted this time is that for several of the issues, including this one, Muriel Brookfield of the 'Canberra crew' has been de-facto Associate Editor, and this contribution is formally acknowledged.

1995 contracts were extended for some Clusters to March 1996, and only a proportion of Clusters have yet reported on their 1995 work. One such report appears below, together with a selected piece of Amazonia reporting.

Most space this time goes to four articles treating aspects important to PLEC, in a fortuitously but usefully interrelated manner:

- the growing debate about method in studying biodiversity and agrodiversity;
- the rising importance of 'participatory' work in PLEC, and its problems;
- 'Indigenous (or Rural People's) Knowledge', its future, and complexity.

The PLEC special issue of ***Global Environmental Change, Human and Policy Dimensions*** 5 (4), appeared on time in October 1995, again with thanks to the 'Canberra crew'. It contains 12 papers by authors who are, or have been, members of the Project. It has been well received.

WAPLEC ACTIVITIES IN 1995 AND EARLY 1996, including a workshop in Northern Ghana

Edwin A. Gyasi

Highlights

Work by the West Africa cluster of PLEC (WAPLEC) centred on the deepening of research into the human and ecological dynamics of the southern sector of Ghana's forest-savanna ecotone, and the extension of studies into other ecological zones in Ghana and Guinea-Conakry through the four research groups now formed.

The principal activities were:

1. A meeting in February 1995 at Kumasi, to discuss research extension modalities;
2. A technical working session in May 1995 at Legon, to review research progress, fine-tune methodologies and foster linkage between official policy and PLEC work;
3. Documentary research, and a series of field studies;
4. An October 1995 PLEC mission by the WAPLEC Leader to Guinea, Conakry;
5. Exchange of visits and other forms of interaction between PLEC researchers and farmers from PLEC study sites, most especially in southern Ghana, to strengthen PLEC-farmer relationships;
6. A December 1995 mission to Ghana by Janet Momsen, PLEC Scientific Advisor;
7. The start of a research linkage between the Institute of Development Studies, University of Sussex, and the University of Ghana, Legon, through Legon's Department of Geography and Resource Development, with collaboration of PLEC;
8. The workshop described below.

Northern Ghana Workshop

Held at Tamale, between 11 and 13 January 1996, the Workshop objectives were to:

a) discuss, in the context of relevant national and international policies, the findings of the studies on Production Pressures, Changes in the Biophysical Environment and Sustainability of Small-Farmer Agriculture in West Africa;

b) map out strategies for the defence and improvement of agrodiversity, biodiversity and agroecological conditions especially in the context of small-farming situations;

c) discuss the future form and directions of WAPLEC research work.

Among the 30 participants were:

- Government officials including represent-

atives of the Ministries of Environment, Science and Technology, Food and Agriculture, and Lands and Forestry;

- representatives of the Vice-Chancellor, University for Development Studies, and of the Director of the Nyankpala Savannna Agricultural Research Institute;
- Jan Nibbering, special guest from Antenne Sahalienne, Burkina Faso/Holland ;
- Bede N. Okigbo, Director UNU/INRA and a PLEC Scientific Advisor;
- representatives from the four WAPLEC groups, including Ibrahima Boiro and K.A. Barry, respectively Leader and Deputy Leader of the Guinean group.

The 18 papers presented on 11 January in Tamale centred on general PLEC research objectives, policy, and WAPLEC study findings.

On 12 January, the Workshop visited the UNESCO-CIPSEG bio-reserve at Malshiegu while en route by road to the Manga-Bawku PLEC study site through Bolgatanga, where the Workshop passed the night.

The journey to Manga-Bawku provided first-hand experience of the dry 'harmattan' conditions that severely constrain farming, and of the serious environmental degradation in the Upper East Region. At this site were study villages visited on 13 January, before final departures for home from Bolgatanga the following day.

The Workshop was enthusiastically welcomed by the local Chiefs and people, and by officials of Bawku District Assembly and Manga Savanna Agricultural Research Institute.

Conclusions reached by the Workshop

The Workshop reiterated the relevance of PLEC research, and urged strengthening of PLEC work and its impact, through:

- improved funding to motivate the researchers and enhance research capacity;
- enhanced research and policy-environmental improvement synergy;
- greater emphasis upon action-oriented environmental improvement activities;
- greater decentralization together with enhanced coordination of PLEC activities;
- improved intra-cluster and inter-cluster linkage through workshops, which should embody field visits.

Also recommended were greater collaboration between research workers in central Guinea and northern Ghana, who deal with similar environmental problems; integration of Burkina Faso into WAPLEC; and recognition of PLEC as a permanent project.

THE REGIONAL SYMPOSIUM ON MONTANE MAINLAND SOUTHEAST ASIA IN TRANSITION CHIANG MAI , NOVEMBER 12-16 1995

Benjavan Rerkasem and Harold Brookfield

This Symposium, advertized in *PLEC News and Views* 5, was held in the Amari Rincome Hotel in Chiang Mai, where it attracted an even larger attendance than was expected. A total of 155 registered participants came from 18 countries: Thailand, China, Vietnam, Laos, Kampuchea, Bhutan, Singapore, Indonesia, the United States, Sweden, the United Kingdom, Germany, Australia, the Netherlands, Japan, Denmark, Kenya and France. Thirty-seven papers were presented.[1]

[1] The Symposium was organized by the Chiang Mai University Consortium, a collection of research groups within the University, in collaboration with a number of national institutions. These included the Chinese Academy of Sciences/Kunming, Yunnan Academy of Social Science, the Vietnam Upland Management

The Chiang Mai PLEC members were prominent among the meeting's organizers, and particularly prominent as principal organizer was Benjavan Rerkasem. About half the papers given were by regional specialists, the other half by visitors. PLEC members giving papers or making general presentations were (in order) Christine Padoch, Guo Huijun, Dao Zhiling, Michael Stocking, Guo Huijun a second time, Taku Abe with Ryutaro Ohtsuka, and Juha Uitto. Harold Brookfield chaired a session and was a member of a working group on the 'MMSEA Agenda'. All our conference labels described us as 'UNU/PLEC', and Juha Uitto used the opportunity of a question to make a splendid statement about the project, so that by the end of the meeting few can have remained in doubt about who we are and what we are doing. The mailing list for this periodical was augmented significantly.

Since the end of the meeting the Chiang Mai University Consortium has produced a 'research agenda' for wider use, but except where this includes collaborative work with members of other institutions, it does not yet incorporate the agenda of associated bodies in the wider group that attended the Symposium. Such a wider agenda is planned. It is also intended to follow the Chiang Mai Symposium with a second regional meeting, probably two or three years hence, but firm plans are not yet established.

Unedited versions of all papers that are complete have been distributed to registered participants in February 1996. The process of reviewing, editing and modifying papers to form a book will take longer, but has now begun. Arrangements are being made with a publisher. The outcome will be a major step forward in the understanding of a region that is changing so rapidly that the regular academic literature is mostly out of date well before it appears.

Working Group, the Thailand Development Research Institute, and CARE International - Thailand. International organizations which assisted or jointly sponsored the Symposium included Ford Foundation, the East-West Center, the World Resources Institute, the International Institute for Environment and Development, the Centre for International Forestry Research, the International Centre for Research in Agroforestry, DANCED and SAMUTE, the Southeast Asian Universities Agroecosystems Network and, not least, the United Nations University/PLEC. Members of several other Universities and organizations attended. Thus grew what had originally been designed as an 'informal gathering of specialists'.

THE UPPER AMAZON VARZEA (IQUITOS, PERU) TEAM IN THE AMAZONIAN CLUSTER

Miguel Pinedo-Vasquez
Columbia University, New York

Since the arrival of Europeans, forest, fish, game, and soil resources have been intensively exploited in the Upper Amazon várzea region (Iquitos, Peru). Over time, agriculture, fishing and timber extraction have become the most common land and resource uses practised by the residents of the region. These activities have resulted in significant changes in the vegetation and landscapes of the upper várzea region.

To understand how agriculture, fishing and forest management activities have influenced the formation and functioning of **upper várzea ecosystems**, a Peruvian research team has now joined PLEC-Amazonia, and is focusing its work on:

1. **identification, documentation and analysis of historical changes in land and resource use and tenure since colonial times,**
2. **research and long-term experimentation on traditional agricultural, agroforestry, and forest management methods and techniques, and**
3. **inventory, documentation and outreach on fishing activities within communal, inter-communal and national lake reserves.**

Research on historical changes in land and resource use is being conducted by José Barletti Pasqualle, a Peruvian historian specializing in Amazonia history, and with more than 20 years experience as a researcher and teacher in the Iquitos region. Studies on traditional agricultural, agroforestry and forest management techniques are conducted by Mario Pinedo Panduro, an agronomist native to the Iquitos region, with more than 25 years of research experience. Research on fisheries is the responsibility of Victor Hugo Montreuil, a fish biologist with much experience in Peruvian Amazonia. Activities of this upper várzea team are coordinated by Miguel Pinedo Vasquez, who works as a researcher and lecturer at the Center for Environmental Research and Conservation (CERC) at Columbia University.

Research sites of the Upper Amazon várzea team are located in várzea communities downriver from the city of Iquitos. Researchers are working in várzea communities that are well-organized and have actively participated in regulating land and resource use within their territories. Villages in this region are also carrying out conservation activities within their communal or inter-communal lake and forest reserves.

The Peruvian researchers are connected to the Research Institute of the Peruvian Amazonia (Instituto de Investigaciones de la Amazonia Peruana - IIAP). This institute is the largest Peruvian research agency specializing in Amazonian matters and is based in the city of Iquitos. The institute is conducting several research projects in upper Amazonia. One of its main projects is the ecological zonation of Peruvian Amazonia. All researchers of the upper várzea team participate in this project. Members of the research team are also participating in other research and conservation projects implemented by local non-governmental institutions.

The integration of the Upper Amazon várzea research team into the Amazonia cluster will help:

- broaden the comparisons that can be made among várzea sites;
- exchange research information and materials such as seeds and seedlings of species and varieties that are flood resistant;
- conduct training courses in the three várzea regions;
- write integrated management and development plans for the sustainable use of várzea ecosystems; and,
- propose to national and regional governments some development alternatives for the várzea that are ecologically sustainable, economically viable and socially acceptable.

Meetings in Belém and Santarém

The visit to the Universidade Federal do Pará and EMBRAPA in Belém and the Projecto Várzea and its research sites in the communities of Sector Ituqui (19-26 January) by Miguel Pinedo Vasquez, José Barletti Pasqualle and Mario Pinedo Panduro was the first PLEC-sponsored activity for the Peruvian team. The visit helped begin formal exchange of ideas with researchers from all the institutions. The visit to EMBRAPA included a meeting with Dr. Adilson Serrão and Dr. Tereza Ximenes, where the research plan and ideas of the upper várzea research team were presented. General description of the structure, objectives and methodologies of PLEC were presented by Adilson Serrão, David McGrath and Miguel Pinedo. The upper várzea research team also participated in the presentation and discussion of the results of the project Roça Demostrativa (Demonstration Plot). This research and extension agricultural project is implemented by IPAM researchers in communities along the Capim River, near Belém.

The visit to the Projecto Várzea in Santarém allowed the upper várzea research team to exchange ideas with the researchers and the leaders of the fishery unions (Colonia de Pescadores Z-20). The team had an opportunity to visit the communities of sector Ituqui and exchange ideas with local residents. The visit

also helped the Peruvian researchers to understand the patterns of land and resource use and tenure and the impact on the landscape in the lower várzea region.

Information collected from interviews and observations allowed the Peruvian researchers to make some useful comparisons with várzea areas in the Iquitos region. Some of the most interesting observations made by the Peruvians concerned differences between the regions in educational situations as well as different land uses, especially the large water buffalo ranches in the várzeas of Ituqui. An important aspect that makes várzea uses in Ituqui different from the Iquitos region, is the existence of very little areas of forest várzea. The intensive and extensive production of water buffalo seems to have had a great impact on the várzea forest and other plant communities of Ituqui. Ecologically the Ituqui region also presents other very interesting differences; its landscape is in some ways more stable than in the Peruvian region with far fewer signs of lateral river migration than the very dynamic Iquitos zone. Agricultural methods in Ituqui, however, were found to be quite similar to those of Peruvian Amazonia.

A JOURNEY TO BAOSHAN AND GAOLIGONG MOUNTAIN (GAOLIGONGSHAN), WESTERN YUNNAN

Harold Brookfield[2]

After the Chiang Mai symposium, and the 'side-trip' to Nairobi described in the section on 'News of the Project' I paid a long-planned two-week visit to Yunnan. This was not specifically a 'PLEC' visit, since it was funded under a grant from the Australian Research Council, but an opportunity to revisit certain villages in Xishuangbanna (seen in 1993); and then to accompany Guo and his colleagues to Baoshan, and to their newer research area on the flanks of Gaoligong mountain, west of the Nu Jiang (Salween river) in western Yunnan. I concentrate almost solely on this western excursion in the present report.

The journey

The outward journey was fast. After a brief visit to Xishuangbanna, to the principal field site of Kunming Institute of Botany student Guan Yuqing (Guan Yuqing et al. 1994), I got back into Kunming shortly before midnight on 30 November, and was picked up at 7.30 next morning, Friday 1 December, for the long drive to Baoshan, which took 14 hours. Guo Huijun, his colleagues Dao Zhiling and Shen Lixin, and Ms Liu Wenhui, journalist for *Chinese Science News*, were company and interpreters of the passing scene. This included the varied management of flat land, unstable slopes and pockets among degraded land of the Yi people southeast of Dali. Fortunately, I was able to see all this at a little greater leisure on the way back, when we took two full days to cover the same distance, stopping overnight in Dali-Xiaguan.

At Baoshan, the main business was the **first-ever training course for both forestry and village officials on biodiversity conservation**, which got under way on Monday. Presentations and discussions were interpreted for me by Dao Zhiling, and by Guo Xiao Li of the Foreign Affairs Office of Baoshan County. The first afternoon was occupied by opening presentations, the presentation by the Director of the Baoshan Division of the Gaoligong Mountain State Nature Reserve, Zhou Xiaodong, being particularly informative to me by providing a lot of background on the history and nature of the reserve. During the following two days long and important presentations were made by Professor Xu Zaifu and by Guo Huijun, and there was an open discussion among the officials and the Kunming participants on the problems of managing the reserve and its buffer zone. I also made a presentation, which I based on the problems of managing nutrient depletion and its consequences in agricultural land cleared of forest, and on participatory resource-

[2] This note is based on one prepared for the Newsletter of the Gaoligongshan project.

management projects elsewhere in PLEC, especially in Thailand, Ghana and Amazonian Brazil, in each case in socio-political conditions different from one another, and from Yunnan. Guo Huijun and Xu Zaifu, in particular, were very helpful in expanding what I said about ideas and situations that were unfamiliar to the village and forestry officials. It was clear that the meeting as a whole was highly successful.

We had already visited two of the 127 administrative villages surrounding Gaoligongshan on the Sunday, both these villages being in land from which the forest had been cleared years ago. After the meeting we returned to the Nu Jiang valley, being impressed by the enormous contrast between its two sides - the Gaoligongshan side with many permanent streams with opportunity for irrigation, and the Nushan side totally deforested, very dry and exhibiting in places evidence of quite severe degradation. We then went up the long and very beautiful valley to Baihualing and before dark reached the headquarters of the Nature Reserve, close to the forest edge above Baihualing village, where we spent the night. Most of the next day was spent in the Reserve, mainly in its buffer zone below 2,500 m where secondary growth after forestry activity has reached a range of stages. We returned to Baoshan well after dark, after Professor Guo and I had together formally inaugurated the Gaoligongshan Farmers' Biodiversity Conservation Association, at the administrative centre of Baihualing village. To my great pleasure, I was made a member of the Association.

The Gaoligongshan Project

The problems facing the Gaoligongshan project are formidable. Some 300,000 people live around the reserve, in Baoshan and Tencong Counties, and there are more living across the international boundary, below the northern part of the reserve that borders on Myanmar. **Twenty-seven ethnic groups** are represented, dominated by Dai and Lisu, and although some villages can trace 20 generations of history, most of the population has migrated into the area quite recently, much of it within the last 20 years. In Yunnan Province as a whole the rural population is still growing faster than the urban population, with the fastest growth rate now among the minorities. Since the idea of a Nature Reserve was first seriously mooted about 1958 most of the former forest below about 1,800 m has been cleared and converted into agricultural land, although on some parts of the forest edge pressure may have been eased by the concentration of villages into clusters at lower altitude during the period of Production Teams, before 1978.

Within the same period, however, a major addition to the demand on land has come from the development of the Nu Jiang valley below its gorge into one of Yunnan's main sugar-cane growing regions, supplying six small factories. Although most cane is grown on the lower slopes of the Nu Jiang valley between 700 and 1,000 m, its cultivation extends almost right up to the forest edge where the yield is poor. There is conflict between the conservation goal and the demands of the Agriculture Department and Baoshan County, which seek sugar quotas even from high-altitude Baihualing. However, under what is now virtually individual control over cropping decisions there is progressive shift toward tree crops, especially coffee, mango, walnut, chestnut, oranges and most recently cinnamon, and the sugar factories are finding it more difficult to get supplies of cane. In the valley there is also growing intensity of both food and cash-crop production, with complex systems of land and water management.

Baihualing village is the main pilot area of the project, although there are also two others, one on the western side of Gaoligongshan in Tencong County. Baihualing has about 221 ha of land of which 140 ha is under wet rice, some of it high yielding but most of the land is not yet adequately cleared of stones. Here, as elsewhere around the mountain, there was a period of rapid forest-edge clearance for swidden cultivation in the early 1980s, during a time following the introduction of

individual responsibility and land distribution when there was major uncertainty over where new boundaries would lie. Uncertainty still remains, and Baihualing villagers have interpretations of where the reserve boundary lies that differ substantially from those of the Nature Reserve administration. Ingression into this disputed area of the buffer zone, especially for firewood and collection of forest products, continues.

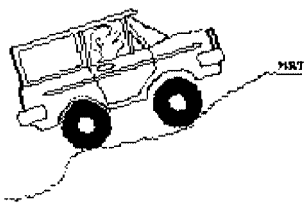
The problem facing the project is to combine integrated land management and development for the villagers with a rational schedule for Nature Reserve development. It is essential to gain the cooperation of the villagers, and this is being done not only through the Association mentioned above, but also by experimental planting of tree cash crops on farmers' land, with their cooperation. To an outside observer it seems clear that economically-marginal sugar cane should be phased out of the upland side-valleys and replaced by more profitable permanent crops, but this involves not only the villagers but also the County and Agriculture Department authorities. Moreover, since the declared buffer zone extends some way into the forest, conservation of biodiversity and its rational use in this zone has to be a matter for persuasion and mutual agreement. Use of disputed land, in particular, has to be agreed. The project therefore has to have a substantial aid function, and with its present limited resources it is not going to be easy to extend this to many more than the present three of the 127 villages surrounding the Reserve, even though there is general awareness that both the present and future agricultural prosperity of the whole region depends on the good water supplies that come from the forest-fed streams.

Gaoligongshan is an area of extraordinary beauty and physical as well as biological diversity. It has tourist potential, initially being developed by the construction of a small guest house at the headquarters above Baihualing. At present, tourism is almost non-existent in this remote area, over two hours from Baoshan town and a whole day's drive from the nearest city at Dali-Xiaguan. There is awareness of the need to improve tourist access and manage it with great care, but clearly tourism is also a potential economic resource of some significance to the minority-group villagers, among whom at least the women retain their traditional dress.

Because Gaoligongshan has such a range of altitudes, and lies along a corridor from the Himalaya to the hills of northern Southeast Asia, its global significance as a biodiversity reserve is very apparent. But it is only now that a new high-altitude botanical garden is being planned to provide the basis for *ex-situ* as well as *in-situ* conservation of rare species. It will be a long time before such a garden can match the established facilities in Xishuangbanna, and in Kunming. The conservation goal has a number of potential assets. There is some very good land management, and use of intensive practices around Gaoligongshan, and there is a significant minority among the villagers who are interested in experimenting with new crops and new ways, even though some have to leave the village and rent community land in order to be free to do this. The present project is admirable, but it is small, and the task is very large.

Reference

Guan Yuqing, Dao Zhiling and Cui Jingyun
1994 Evaluation of the cultivation of *Amomum villosum* under tropical forest in southern Yunnan, China, *PLEC News and Views* 4: 22-28.



NEWS OF THE SOUTH-SOUTH PROGRAMME

(The South-South Cooperation Programme on Environmentally Sound Socio-Economic Development in the Humid Tropics)

Miguel Clüsener-Godt
UNESCO, Paris

Explanatory Introduction by J.I. Uitto: The South-South Cooperation Programme on Environmentally Sound Socio-Economic Development in the Humid Tropics was initiated at the conference with the same title organized by the Association of Amazonian Universities (UNAMAZ), the Programme on Man and the Biosphere (MAB) of UNESCO, UNU and the Third World Academy of Sciences (TWAS), in Manaus, Brazil, directly following the Earth Summit in June 1992. Collaboration was established between the Programme and PLEC, which has continued through the participation of PLEC members in the South-South Cooperation Programme's meetings in Chiang Mai, Thailand, in 1994, and in Madagascar in 1995. In recognition of the complementarity between the stated aims of the two initiatives, it was agreed that space would be offered both in *PLEC News and Views* and in the *South-South Perspectives Newsletter* for brief notes on the progress of the other programme. It is felt that this amicable exchange of information is mutually beneficial.

The Programme on 'South-South Co-operation on Environmentally Sound Socio-Economic Development in the Humid Tropics' aims to put into action the recommendations of Agenda 21 adopted in Rio de Janeiro at UNCED, and particularly the Convention on Biodiversity. The Programme tries to identify best ways of providing sustainable and decent livelihoods for the inhabitants of the Humid Tropics. Most specifically, it seeks to create opportunity for maximum interaction among scientists, resource managers and environment policy makers working in similar ecosystems in different areas of Latin America, Africa and Asia.

First of all it is necessary to assess the variety of ecological and social landscapes in various parts of humid tropical areas of the world: this could improve our knowledge on how we can work in these fragile socio-ecosystems and prepare transition strategies towards sustainable development. We could improve a lot by studying comparatively across the South the successful cases of management of resources and development processes responding to the three criteria of social equity, ecological sustainability and economic efficiency.

A second step is to strengthen the existing response capacities of the developing countries, rather than building new institutions. This is done by increasing the local capacity for carrying out management, research and training in the humid tropics to face the challenges of the world. The industrialized countries could best contribute by establishing endowment funds for research institutions in the South. Southern countries should find ways of mobilizing local resources. It is fundamental that the research and development systems of the developing countries become increasingly self-reliant. The Programme aims to strengthen the local capability of training high-level specialists able to plan and implement sustainable development strategies and manage the natural resources in the best way.

To this end, the Programme has already organized a number of conferences and seminars in the last three years, and plans for further meetings are detailed below, together with information on other publications of the Programme.

The Programme publishes a newsletter entitled *South-South Perspectives*, in English, and also in French and Spanish, describing its activities.

South-South Activities and Publications of the Programme

Forthcoming Meetings

1. International workshop on 'Biovillages', Madras, India, foreseen in August 1996. UNESCO, UNU, TWAS, Swaminathan Foundation;
2. Regional workshop on 'Management of Biosphere Reserves in South-East Asia and Programmes for Sustainable Development', UNESCO Office for Science and Technology, Jakarta, Indonesia, foreseen in 1996;
3. International workshop on 'Management of Coastal Areas with Particular Emphasis to Biosphere Reserves'. Victoria, Seychelles, foreseen in late 1996;
4. Regional workshop on 'Management of Biosphere Reserves in Africa and Programmes for Sustainable Development', Dja Biosphere Reserve, UNESCO and IUCN, foreseen in 1996.

Strengthening of Biosphere Reserves

In the humid tropical regions, special attention must be given to strengthening of Biosphere Reserves and rational use of biodiversity for the benefit of local and indigenous populations. Research, monitoring and collaboration between these reserves will focus on testing hypotheses in the field of sustainable use of biodiversity to identify the relevant technologies and know-how. This is why exchange of experience, training of biosphere reserve managers and participation of local and indigenous people is organised.

The Programme published several **working papers** on some of the Biosphere Reserves concerned, about their work, their problems and the solutions adopted to achieve sustainable development by improving management structures with regard to financial autonomy:

1. The *Mata Atlântica Biosphere Reserve (Brazil): An Overview*. Antonio Carlos Diegues. 36 pp. In English, with French abstract (1995);
2. *The Xishuangbanna Biosphere Reserve (China): A Tropical Land of Natural and Cultural Diversity*. Wu Zhaolu, Ou Xiaokun. 52 pp. In English, with French abstract (1995);
3. *The Mae Sa-Kog Ma Biosphere Reserve (Thailand).* Benjavan Rerkasem, Kanok Rerkasem. 28 pp. In English, with French abstract (1995);
4. *La Réserve de biosphère de Dimonika (Congo).* Jean Diamouangana, 28 pp. In French, with English abstract (1995);
5. *Le Parc National de Taï (Côte d'Ivoire): Un maillon essentiel du programme de conservation de la nature*. Yaya Sangaré. 28 pp. In French, with English abstract (1995);
6. *La Réserve de Biosphère de Mananara Nord (Madagascar) 1987-1994 : bilan et perspectives.* Noëline Raondry, Martha Klein, Victor Solo Rakotonirina. 72 pp. In French, with English abstract (1995);
7. *A Study on the Homegarden Ecosystem in the Mekong River Delta and the Ho Chi Minh City (Viet Nam).* Nguyen Thi Ngoc An. In English, with French abstract (1995, in press);
8. *The Manu Biosphere Reserve (Peru).* Gustavo Suarez de Freitas. In English, with French abstract (1995);
9. *The Beni Biosphere Reserve (Bolivia).* Carmen Miranda L. In English, with French abstract (1995 in press);
10. *La Reserva de Biosfera Sierra del Rosario (Cuba).* Maria Herrera Alvarez, Maritza Garcia Garcia. In Spanish, with English abstract (1995);
11. *The Omo Biosphere Reserve (Nigeria*). Augustine O. Isichei. In English, with French abstract (1995);

Cont. on p. 32

PAPERS BY PROJECT MEMBERS

COLLABORATIVE AGROECOSYSTEMS MANAGEMENT PROJECT ('CAMP'): A PROPOSED COMMUNITY-BASED INITIATIVE IN GHANA, BY WAPLEC IN COLLABORATION WITH THE CHIEF AND THE PEOPLE OF GYAMFIASE

Edwin A. Gyasi and Lewis Enu Kwesi,
University of Ghana, Legon, Ghana

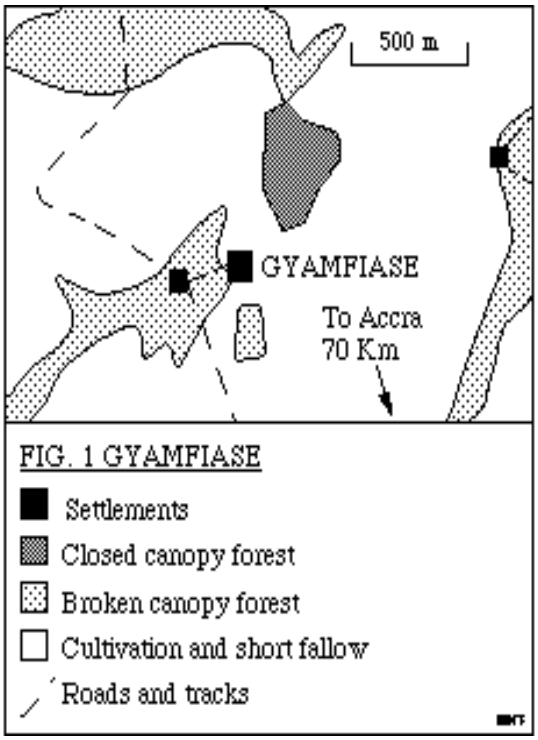
Background

A decentralized, bottom-up approach based on community participation is widely advocated for development (Economic and Social Commission for Asia and the Pacific, 1979; Bamberger, 1988; PNDC, 1989). An opportunity to test this and the developmental strategy based on collaborative research and the biovillage concept (Swaminathan, 1995), is provided by the Collaborative Agroecosystems Management Project (CAMP), proposed to protect the relict forest and indigenous agroforestry at Gyamfiase, and to rehabilitate the degraded surrounding areas in Ghana, in line with the general PLEC research objectives (Brookfield, 1995).

In tropical Africa, the forests and the systems indigenously developed for their sustainable use, along with their underpinning agroecological knowledge and conservation values and taboos are threatened by a constellation of forces including:

- inappropriate technologies;
- the spread of European or Western culture; and
- production pressure which, ultimately, derives from the demands of an expanding, increasingly urbanized population (Gyasi et al. 1995).

As a result of the generally negative environmental impact of these forces, the true or nearly true forests and sustainable indigenous farming practices have largely disappeared, except in isolated localities such as Gyamfiase (Fig. 1).



The Gyamfiase forest grove and indigenous agroforestry system at Gyamfiase, a farming village, is located 70 km north of Accra in Akuapem, a rural area in the southern sector of the forest-savanna ecotone, once characterized by thick semi-deciduous forest and environmentally low-impact economic activities including diversified rotational agroforestry. However, there is a growing domination of savanna species and of less sustainable sedentary farming practices and their local adaptations, except in a few localities such

as Gyamfiase, where there remains a rich forest grove, the abode of the shrine, Obosom Gyamfi. The grove is immediately surrounded by a biodiverse indigenous agroforestry zone, which grades into a zone of severe biophysical degradation associated with overcropping, especially by the migrant settler-tenant farmers who rent the land from the Akuapem owners.

Problem

How the Gyamfiase agroecological 'greenbelt' of forest and agroforestry has managed to survive the pressures of the growing population, and the demands of the neighbouring migrant-tenant and urban markets is somewhat enigmatic. It appears to relate to the fact that the grove traditionally serves as the sanctified abode of a fetish. But, perhaps, a more fundamental factor lies in the sheer tenacity of Nana Oduro Darko II, the conservationist and environmentally conscious Chief of Gyamfiase.

However, the demands of the expanding population and the weight of the forces of modernity cast doubts over the survivability of the rare Gyamfiase natural and cultural heritage. The threat to the forest grove underlies the need to encourage countervailing interventionist measures, after understanding the composition, structure and management systems based upon the pilot PLEC study findings (Gyasi et al. 1995), and further studies.

Objectives

Therefore, the project seeks to carry out detailed survey and analysis of the biophysical conditions of the Gyamfiase forest grove and of the character of the farming practices there, with a view to using the knowledge gained as a basis for their planned protection and enhancement, and, ultimately, for rehabilitation of the degraded surrounding areas. Towards this end, the first and foremost aims are:

a) mobilization of the community to encourage biophysical conservation and agroforestry practices by education;

b) identification of the threatened plants, and their propagation in a buffer zone around the grove through *in situ* and *ex situ* seed multiplication (by orthodox methods and modern tissue culture), using the relict grove as a germplasm bank;

c) more job opportunities, poverty reduction and minimisation of pressure on the remnant forest through the development of fodder banks and other facilities to sustain a livestock industry, promotion of mushroom and snail farming, and development of eco-tourism which we have, through participatory field studies, identified as priority needs or realistic aspirations.

A related objective is to use Gyamfiase as a field laboratory for research into sustainable agroecological management, for possible extension to other areas.

Project management

Implementation of the project will be guided by a modified version of the Swaminathan (1995) biovillage concept. The modified concept seeks to protect bioreserves through an integrated strategy. This will involve plant propagation in a buffer zone, and the promotion of sustainable economic activities in a transition zone around the core forest. The project employs the modern developmental concept, which emphasizes a participatory community-based approach centred on the local people, but involving other interests including the researchers. This is reflected by the composition of the committee constituted to manage the project in collaboration with other GOs and NGOs:

- 5 representatives of the local communities (including the Gyamfiase Chief) who shall hold the key executive

positions;

- 2 representatives of PLEC;
- 1 representative each of the NGOs, GACON, GhRRM and UNU/INRA.

It is proposed to implement the project in four 18 months phases spanning six years, after which period it is expected to be self-sustaining or sufficiently established for management by the local people without external support.

Similar initiatives in agroecosystems management are planned for other WAPLEC study sites, including Manga-Bawku in Ghana's Upper East Region, characterized by a severely degraded savanna environment.

References

Bamberger, M.
1988 *The role of community participation in development planning and project management*. Washington, D.C.: The World Bank.

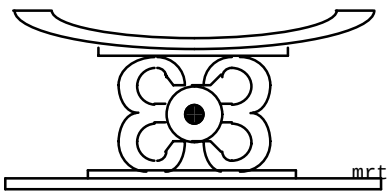
Brookfield, H.
1995 Postscript: The 'population-environment nexus' and PLEC. *Global Environmental Change* 5(4): 381-393.

Economic and Social Commission for Asia and the Pacific
1979 *Guidelines for rural centre planning*. New York: United Nations.

Gyasi, E., G.T.Agyepong, E.Ardayfio-Schandorf, L.Enu-Kwesi, J.S. Nabila and E.Owusu-Bennoah
1995 Production pressure and environmental change in the forest-savanna zone of Southern Ghana. *Global Environmental Change* 5(4):355-366.

PNDC, PNDCL 207:
1988, *Local government law.* Accra: Ghana Publishing Corp./Assembly Press.

Swaminathan, M.S
1995 Agriculture, food security and employment : changing times, uncommon opportunities. *Nature and Resources* 31 (1): 2-15



AGRODIVERSITY AND BIODIVERSITY ON THE GROUND AND AMONG THE PEOPLE: METHODOLOGY FROM YUNNAN

Guo Huijun, Dao Zhiling and Harold Brookfield
Chinese Academy of Sciences/Kunming; Kunming Institute of Botany, CAS; Australian National University

With a comment by Daniel Zarin, University of New Hampshire, U.S.A.

Introduction

The paper on diversity measurement by Zarin (1995) in *PLEC News and Views* No. 4 provides an excellent guide to basic survey and measurement techniques. It stops short of detailing methodology on the ground in focus sites where the participation of men and women farmers becomes not only possible, but necessary. Zarin advocates an essentially random approach to sample selection, based on 'landscape units' determined initially by interpretation of aerial photographs and remote sensing imagery. We do not dissent from this approach as a set of guidelines for diversity measurement where the object is research into -- ultimately -- the pattern diversity of ecosystems and agroecosystems. In work in Montane Mainland Southeast Asia, and especially in Yunnan, however, a more purposive approach is taken for the reason that consultation with the people, and the participatory use of their own deep knowledge of biodiversity within their habitats, is essential.

This is also the case in some other PLEC Clusters. The inclusion of Brookfield as third author of this paper, at the invitation of the first two authors, derives from his contribution in bringing together key elements of three differently constructed short papers into a single paper, and in presenting a wider PLEC perspective. Methodological debate of this kind is of major importance in the development of the project and essential to the 'harmonization' of methodologies that need to be interrelated, but cannot in all cases be uniform. A comment by Dan Zarin, whose system remains basic to PLEC, appears below. [1]

The most important aim of PLEC in Yunnan is to undertake participatory planning and experimental work together with communities, with the purposes of protecting biological diversity and improving agricultural sustainability and water management. Work is already in progress in Yunnan, both directly within PLEC in Xishuangbanna Prefecture (or County) along the Lancang Jiang (Mekong river) in the far south of Yunnan, and in a closely related project funded by the MacArthur Foundation on forest management and biodiversity along both eastern and western slopes of Gaoligong mountain, between the Nu Jiang (Salween river) and the Myanmar border in Baoshan and Tencong Prefectures of western Yunnan. Both areas include major official nature reserves.

This work has led to the development of a purpose-driven methodology called **'Agro-biodiversity Assessment' (ABA)**. Its scale is that of the village or villages within a group of villages which, in China, together make up an **'administrative village'**.[2] The Yunnan group begins ABA at the level of the administrative village, but then focuses on the 'natural' village as a manageable unit.

[1] The substantial help of Muriel Brookfield and Helen Parsons in detailed editing is gratefully acknowledged by the authors. We also appreciate the suggestions of an anonymous reviewer.

[2] An Administrative Village in China commonly includes from two to as many as ten 'natural villages'.

The group is presently working in six such 'natural' villages, three in each of the two areas, all of which contain tracts of forest, and are adjacent to large or small nature reserves.[3] The paper outlines the methodology used, and explains how and why it varies from Zarin's proposals. It also provides an example of the value of involving local people directly in the survey work itself, as well as in subsequent planning. The paper is condensed and rewritten from a set of short unpublished papers edited by the senior author, and entitled **'Agro-biodiversity Assessment (ABA)'**, which were presented to the PLEC-MMSEA methodology and training workshop held in Chiang Mai and Xishuangbanna, in May-June 1995.

The relationship of biodiversity to agrodiversity is close in Yunnan, where 110 patterns of agroforestry systems have been identified, many of them embracing conservation and most of them making extensive use of wild plant species (Guo Huijun et al. 1994: Guo Huijun and Padoch 1995). Among 5,000 species of higher plants, 1,715 have been recorded as having medicinal use, 86 provide food, 29 yield .fibre and 22 provide perfume, dyes, or potable liquids. The numerous Dai minority, among whom homegardens are particularly well developed, cultivate 315 species belonging to 219 genera and 85 families around their houses; these include 69 species domesticated by the Dai themselves (Xu Zaifu and Yu Pinghua 1991).[4]

[3] In Yunnan, 29.5 per cent of the forest is managed by the state, 70.5 per cent by the communities: of the latter 20 per cent is collectively managed, while 80 per cent is managed by individuals, who therefore manage 56 per cent of the whole. This division is not static, the community having the power to change ownership.

[4] In these circumstances it is essential that biodiversity assessment capture and measure the genetic diversity created and innovated by the indigenous people, which can be easily lost with commercialization and monocultural production trends during modern times.

Defining the terms

The Yunnan group first proposes a variation of the definition of 'agrodiversity' provided by Brookfield and Padoch (1994), where it was defined as the many ways in which farmers use the natural diversity of the environment for production, including not only their choice of crops but also their management of land, water and biota as a whole. In order more clearly to separate biodiversity from the total diversity in environmental management, it is here proposed that **'agro-biodiversity'**, within agrodiversity as a whole, has the specific meaning of **management and direct use of biological species, including all crops, semi-domesticates and wild species**. It is therefore the **result of interaction between the diversity of cultural practices and biological diversity**. Some diverse agricultural systems contain within them much greater biodiversity than others. Agro-biodiversity can be viewed in much the same way as all biodiversity, as ecosystem diversity, species diversity and genetic diversity. Ecosystem diversity is the basis of land management diversity.

Land management diversity can be viewed in stratified quasi-hierarchical manner, with higher and lower orders of diversity. Thus in Yunnan, all management systems except the village and roads can be classified into just seven major types: water bodies, forests, agroforests, wet rice fields, upland fields, orchards and homegardens. Within each type, there are many sub-types. For example, within agroforest systems there are four basic types: systems including totally-harvested trees, systems in which trees are only partially used, protection belts, and cash crops under natural forest. Within this, however, the Yunnan group has identified eleven sub-types, 82 forms and 220 associations. No less important is classification by land tenure. Again there are three basic types: state, community and individual. But holdings may be large or small, and biodiversity differs significantly between the larger plots and the smaller,

fragmented plots. Several tenure types may be found within the same management system. In Baihualing village, for example, the Gaoligong mountain survey found six distinct types of forest ownership. Analysis which takes these variables into account will reveal evidence of the function and dynamism of biodiversity which has never been studied, but which is essential as a basis for planning.

Field methods

The place to begin is with the collection of all available secondary data. The 'administrative villages' of Yunnan are in some ways comparable to the 'landscape' level of ecological classification, where the 'landscape' unit is taken to mean an area in which a cluster of interacting stands or ecosystems is repeated in similar form (Forman 1982). The administrative villages contain repeated patterns of land-use elements. The administrative village is the smallest unit for which data on population, broadly classified land use and production are available, in each case on an annual basis. At this level, topographic maps and new land-use survey, begun in 1990 on a scale of 1:25,000, can provide additional basic sources of data for classification of management types. These secondary data sources may contain many inaccuracies, but they must first be studied for all that they can yield.

In ABA, we then turn to the people, first to key informants, then to the communities themselves where both semi-structured interviews and more formal questionnaires need to be implemented in order to establish necessary data on land use and holding, needs and consumption, and the use of natural biodiversity. More detailed information is obtained from a sample. This leads logically, through inquiry and observation, to the beginning of survey on the ground. For detailed baseline data we have to make observations at the farm level; and all resource-management patterns must be mapped and described on a scale not smaller than 1:10,000. [5]

The value of remote sensing is limited at this scale, and aerial photographs are more useful, especially where a sequence through time is available. They then need to be supplemented by transects and territorial mapping. For agro-biodiversity assessment it is necessary first to focus on the dominant species in each land management pattern. It is essential to understand the contribution of each land-management pattern within the whole village territory, where some are of major importance and some are only minor. This can best be done by drawing a village territory map, engaging a participatory group among the villagers, as a first step. The investigators draw the map, but it is then corrected by the informants to get useful information that reveals local perceptions of boundaries, resources available and their distribution. It is often useful to start with a map of the village settlements, streams and highest hill tops as landmarks, and then to draw the boundary of the territory of each 'natural' village. Sometimes, this reveals disputes but less so than between both community and individual land and areas declared natural reserve.[6] Informants are then asked to point out other things on the map that are important landmarks in the village. They should not be interrupted until they have finished pointing. It is up to the investigator to decide how much detail is

[5] In work in a closely-settled part of the central highlands of Papua New Guinea, Brookfield (1973) found it necessary ultimately to map at a scale of 1:3,600 in order to capture the full detail of management diversity and land tenure.

[6] While the team was doing the territorial map of Baihualing village in Gaoligong mountain, they found that 30 per cent of the forest was under dispute between the village and the nature reserve. This was because of historical policy changes, as well as misunderstanding over boundary marks. The team asked the farmers to draw the historical territorial maps of each natural village as additional information. Usually, according to observation and interview, these areas are more often cut than other land, and biodiversity destruction is heavier than elsewhere.

needed on this first village map. Even on the village map, however, the land-holdings of single families, and the different types of land tenure can often be mapped in outline.

The next stage is transect method. Transects are selected so as to cross all the major micro-ecological and production zones, along lines of greatest agrodiversity as determined in the initial stage. They ensure representation of the full topographic, resource and tenurial variation in the community. In large village territories more than one transect is usually required. Transects add a great deal of detail, on slope, drainage, vegetation, water, soils, cropping patterns, trees and other vegetation, and on farm size. It is at this stage that the range of management types is fully determined, together with sample plots for species diversity measurement. Villagers accompany the investigators, one of the major advantages being that people are often more willing to discuss sensitive issues such as land ownership patterns and conflicts when away from the village. The more often villagers accompany the investigators on these walks, the more information is obtained.

Finally comes the work on sample plots. Here the Yunnan ABA method differs most sharply from that advocated by Zarin, since sample determination is based on land management type, as determined during the two previous stages, and not on landscape units. Sample plots are selected purposively, rather than randomly, according to the higher levels of management pattern, broadly-determined species diversity, elevation, and different classes of land tenure. However, the Yunnan team is careful to follow the same basic rules, that sample plots must be chosen so that a minimum of two, and usually three to five, represent each land-management type, that the plots are of standard size and shape, and that they must be well marked for data validation and future re-sampling.[7] Plots within the forest need to be more numerous than in managed land. Land ownership may be an important indicator of diversity in cultural practices, which has significant impacts on biodiversity.

The teams working in sample plots include at least a botanist, an agronomist and a forester, but it is essential they be accompanied by one villager, or more if necessary, for on-site identification of plant use, and any human activities. It is also essential that one or more of the scientists speak the local language. The information recorded includes both scientific and local name of each species, the height and diameter of plants, their use, human activities, and the ownership of both land and plants. The social, economic, and ecological value of each species can thus be archived.

The inclusion of on-site ethnobotanical information is vitally important where the long-term goal is the planning of diversity management. Plants which cannot be identified, or which can be identified only with a local name, are collected for further examination by taxonomists. The knowledge of local people can be employed even by researchers who are not themselves taxonomists, or who lack field experience of plant identification. Local knowledge obtained from field study accompanies the collection of specimens for taxonomic identification. Many ethnic names of plants have been recorded in some regions. A *Name List of Xishuangbanna Flora* records about 1,000 species ethnic names in the Dai, Hani and Jinuo languages (Yunnan Institute of Tropical Botany, 1983). Scientific names can therefore be checked from this handbook.

The greatest value of using local people as participating field workers is that they

[7] In the tropical forest in Xishuangbanna plot size has been 50 x 50 metres, with 1 x 1 metre plots for the lowest storey. In sub-tropical forests a 20 x 20 metre plot has been used, and this is now being adopted as a standard quadrat in all work. For the homegarden management system, sampling is not feasible and the whole area must be surveyed.

have more detailed knowledge of their environment and plants than any outsider. Indigenous knowledge is comprehensive concerning land use, vegetation, the soil, and plants, especially the plants commonly used by them for food, medicine, fibre, ornament, timber and for ritual purposes. A separate note on use of the ethnotaxonomic approach among the Dai people is appended.

Analysis and evaluation of agro-biodiversity

The system described above follows the same general path as that described by Zarin, from the most general, regional view to the particular site. It uses or adapts each of the specific steps proposed by Zarin. The principal differences are first, that it gives less emphasis to remotely-sensed data sources and moves onto the ground at a much earlier stage, and second that it involves the people, their tenure of the land, their information, and most importantly their use and evaluation of plants almost throughout the work. This last is essential where the purpose is participatory design of conservationist systems of land management. What is described here is the preliminary stages of assessment, and even they are not necessarily rapid. To undertake a complete inventory of biodiversity in a large landscape unit could occupy several years of work. For example, a still incomplete biodiversity inventory of Gaoligong Mountain (Li Gui and Xue Jiru, eds 1995), recently published, is based on formal work that began in the early 1980s, and informal work that goes back to 1920.

When we turn to analysis we can again follow, or parallel, the approaches proposed by Zarin, and similarly can either scale up or scale down as required. Following the categories of diversity proposed by Whittaker (1972), and also discussed by Zarin, *Alpha* (species) diversity can be established within each management type, generalized or subdivided. Available indices of species richness and relative abundance can be derived. The *beta* (habitat) diversity between habitats is also applicable to use on land management types, and so also is the *gamma* (landscape) diversity. We can also go further, and analyse the interaction between the diversity of human cultural practices and institutions, and biological diversity. A measure not captured in standard biodiversity studies is the resource value of the elements in biodiversity, in relation to the abundance or scarcity of each element. Resource value, in relation to abundance or scarcity, indicates the likelihood whether people will conserve, or destroy species. In this context, we may hypothesize that economic demand is the most critical determinant of resource value, because while subsistence needs can be satisfied, economic demand cannot. The real key to planning conservation is to match economic demand to what is available, without destruction.

This paper has suggested that the concepts of agrodiversity and biodiversity can be linked through agro-biodiversity, in which biodiversity measurement and evaluation are undertaken within management types and their subdivisions, rather than in subdivisions of the landscape as a whole. Management is not only a matter of agro-technology, but also of tenure, regulation and the culture of the people. The early evidence from Yunnan suggests that understanding the status of agro-biodiversity in the community is central to any planning for biodiversity. The method described above can capture the essentials of agro-biodiversity by a straightforward path of investigation in a comparatively short time, and then permits later elaboration. This path has to lead to gaining the participation of people in managing the resource that biodiversity constitutes, and it takes time to develop that participation. The West African and Amazonian Clusters are proposing participatory planning of sustainable and conservationist use of land and biodiversity over five year or longer periods in selected communities.

PLEC in montane mainland Southeast Asia must similarly view its initial work as only a first step. The assessment method described here makes use of a number of short cuts, but ultimately it leads to experimental work in close participation with the farmers, resolution of difficulties and disagreements, and commitment to a long-term exercise together with the local people in planning their future. The real issue is the interaction between people and their resources, how much of these resources they will use and, if the resources are inadequate or are degrading, what steps are required. Some preliminary experimental work in agroforestry with economic tree-crops on degrading land is already attracting favourable attention among the farmers, as presenting an alternative to further invasion of forest. A Gaoligong Mountain Farmers' Biodiversity Conservation Association has been formed, and was inaugurated in December 1995.

APPENDIX

The ethnotaxonomic approach among the Dai People of Xishuangbanna

Dao Zhiling

Dai are one of largest ethnic groups of Yunnan Province, living mainly in Xishuangbanna and Dehong prefectures. Among the local flora of Xishuangbanna region more than 1000 plant species, and more than 600 species of medicinal herbs, are used by Dai people (Zhao Shiwang and Zhou Zhaokui, 1985, Dao Zhiling, 1991). People not only use different wild plants (*Hong diteng* in Dai), but distinguish these from domesticated plants (*Hong bubian* in Dai). Each plant species has its Dai name, with a nomenclature that can broadly be represented as distinguishing a sort of equivalent of 'genus' and 'species'. Two examples can explain this system. The Dai name for *Alstonia scholars* is *Mai dingbie.* 'Mai' means this plant is a tree, and 'dingbie' means duck's toe. For *Cassia tora*, the Dai name is *Ya haohuai.* 'Ya' means this plant is herb, and 'haohuai' mean its fruit resembles a buffalo horn.

The 'genus' level is based both on life form and use value. Thus *mai* = tree; *ya* = herb, *he* = rattan, *gu* = fern, *man* or *huo* = tuber plant; *ma* = fruit, *pa* = vegetable, *kao* = grain, *tuo* = beans, *ya* = medicinal plant, and *luo* = flower (Xu Zaifu and Yu Pinghua, 1991). The 'species' name indicates the properties, characteristics, uses, origins and habitats, thus helping to identify which function the plant has and where the plant grows. However, different genders may use different 'genus' forms to name plants. For *Bauhinia variegata*, men use the name of *Maixiu*, while women use *Luoxiu* or *Paxiu;* men and women form different working groups, and they have different indigenous knowledge about the natural resources. The traditional Dai doctor (*Mo yadai*) has a much more rich botanical knowledge than all others. Medicinal plants are grown in many homegardens, sometimes in specific medicinal-plant gardens, and many species of known curative value are carefully preserved in the wild.

Indigenous knowledge and biodiversity conservation

Dai have a number of sayings that express keen understanding of the importance of natural resources and their conservation. Such sayings (paraphrased) include: 'without forests, there will be no water; without water there will be no farming land; without farming land there will be no grain; without grain there will be no people.' Another states that 'with shifting cultivation one can be rich for three years, and then be poor for several years while there are no forests on the mountain' (Dao Guodong, 1992). Such folk knowledge of the importance of forest conservation has been handed down through many generations.

Moreover, there is another element in the beliefs of people that is significant for conservation. In common with some animist ethnic groups, the Buddhist Dai retain a profound belief in the existence of spirits. Some unique big trees are thought of as 'ghost trees' and some mountain forests as 'ghost mountains'. Each village and town commonly possess a 'holy hill', which is the home of the supernatural and the rest site of spirits after people are dead. Such trees and hills are strictly protected by the communities. There are about 400 ha of 'holy hills' in Xishuangbanna, each with an area of 1-30 ha. These religious reserves have protected significant areas of tropical dry seasonal rain-forest and semi-green monsoon forest (Pei Shengji 1985, Liu Hongmao and Xu Zaifu 1992, Zhu Hua et al. 1993). Moreover, Dai follow Hinayana Buddhism, and each Dai village has its own temple, where many kinds of plants are cultivated. They include *Ficus religiosa* and *Terminalia bellirica.* 'Five kinds of trees and six kinds of flowers' is the minimum number (Dao Guodong, 1992). More than 100 species of plants connected with the activities of Buddhism are planted in villages, temple yards and homegardens, or protected in the wild.

Ethnotaxonomic work can greatly aid biodiversity inventory. It is, however, important to recognize that ethnotaxomic knowledge is not uniformly shared. Men are best informed about trees, women about wild vegetables, flowers and fibre plants. The doctor's knowledge is most comprehensive about medicinal plants. This differential knowledge needs to be carefully explored. If resource management is to succeed, ethnotaxonomical information is essential. To understand how many plants are used by local people, the function and importance of each plant, and the resource-management types in the local community, is important not only for science, but also for the most practical purposes of conservation.

COMMENT

D.J. Zarin

The Agro-biodiversity Assessment (ABA) methodology described by Guo, Dao and Brookfield is an appropriate and useful means of acquiring information about the diversity of local land management. Their hierarchical definition of management systems into types, sub-types, forms and associations is a particularly useful way of organizing what, at first glance, must be an overwhelming complex of information. It is also an especially effective way of communicating that information to non-specialists. Within the context of the methodology I outlined in a previous PN&V article, the hierarchical definition of management systems described by Guo et al. provides a needed organizational framework for categorizing 'investigator- or population-defined resource management types' (Zarin, 1995).

I also applaud Guo et al.'s emphasis on the participation of local populations within the context of ABA, although I am not convinced that all local people 'have more detailed knowledge of their environment than any outsider' or that indigenous knowledge is always 'comprehensive concerning land use, vegetation the soil and plants...' Since I have no experience in southeast Asia, I cannot dispute the claim for that region. Among non-tribal populations of rural Amazonia, however, indigenous knowledge of the environment is extremely variable, both within and between locales. Some number of local individuals are likely to be natural resource experts par excellence; they are not the only ones entitled to contribute to, and be informed about, research efforts which are intended to influence their communities (see Zarin 1995, footnote 2).

How does ABA differ from the methodology outlined in Zarin (1995)? The difference is more in emphasis than in substance, and I believe the approaches are complementary, rather than mutually

exclusive. Guo et al. measure replicate sample plots within each of their six land management types: forests, agroforests, wet rice fields, upland fields, orchards and homegardens. Precisely how they select plots within each of these categories remains somewhat unclear. Are they randomly selected? Or do they further stratify on the basis of sub-type (n=11), form (n=82), and association (n=220)? Randomization at the level of the major land management type will produce data which will permit comparison between the major types, but is unlikely to permit rigorous comparisons at the lower hierarchical levels (sub-type, form, and association).

Where adequate aerial photo coverage is available, it may be feasible to distinguish among the six major land management types defined by Guo et al. through rigorously ground-truthed aerial photo interpretation (API). If this is feasible, there is then an obvious overlap between what Zarin (1995) refers to as a 'landscape-unit' and this first hierarchical level of Guo et al. Even where the overlap is only partial (i.e. API can distinguish among some, though not all, of the major land management types) the exercise is useful, or 'purposive' to use the language of Guo et al., because the bird's eye view provided by remote sensing adds a dimension unavailable to either the researcher or the local on the ground. Just as the bird can see farther and wider, API can be used to gain insights into areas beyond the sites of intensive study without having to replicate all of the fieldwork. Although such insights are obviously limited by the resolution of the images, even a coarse ability to interpret landscape patterns, analyze their spatial distributions and assess temporal shifts beyond the borders of the study site is extremely valuable. Accomplishing this purpose was one of the major goals of the methodology outlined in Zarin (1995), and without the use of remote sensing data this scale of analysis is not possible.

As a final point, I would like to emphasize that there is no dichotomy between random and 'purposive' sampling, as suggested by Guo, Dao and Brookfield. Randomization always has a purpose, and that is to insure that the sampling results provide an unbiased estimate of reality. As an example, at the lowest hierarchical level, Guo et al. have identified 220 land management associations and a minimum of three land tenure types; they make a further categorical distinction between large and small holdings. Their sampling universe therefore consists of a minimum of 1320 discrete potential categories, although some of these may be hypothetical rather than actual (e.g. association 119 may not be present in a large holding under land tenure type 3). Nonetheless, this is a formidable sampling challenge, especially where the goal is an assessment of 'diversity.' Unless Guo et al. intend to sample all of the discrete categories for which an actual occurrence exists, they will need to include some level of randomization in the selection of which discrete categories to sample in order to produce an unbiased estimate of agrobiodiversity.

References

Brookfield, H.
1973 Full circle in Chimbu: a study of trends and cycles. In H. Brookfield (ed.) *The Pacific in transition: geographical perspectives on adaptation and change* pp. 127-160. London, Edward Arnold.

Brookfield, H. and C. Padoch
1994 Appreciating agrodiversity: a look at the dynamics and diversity of indigenous farming systems. *Environment* 36 (5): 6-11; 36-45.

Dao Guodong
1992 *Some historical culture of Dai*. Beijing, Ethnic Press. [in Chinese]

Dao Zhiling
1991 Medico-ethnobotany of Xishuangbanna Dai People, Unpublished Master's Thesis in Botany, Kunming Institute of Botany, Chinese Academy of Sciences [in Chinese].

Forman, R.T.
1982 Interaction among landscape elements: a core of landscape ecology. In S.P. Tjallingii and A.A. de Veer (eds) *Perspectives in landscape ecology: contributions to research, planning and management of our environment.* Proceedings of the International Congress organized by the Netherlands Society of Landscape Ecology, Veldhoven, the Netherlands, April 6-11 1981, pp. 35-48, Wageningen, Centre for Agricultural Publication and Documentation.

Guo Huijun and C. Padoch
1995 Patterns and management of agroforestry systems in Yunnan; an approach to upland rural development. *Global Environmental Change: Human and Policy Dimensions* 5 (4): 273-279.

Guo Huijun, Dao Zhiling, Shen Lixin and Wang Weibing
1994 *Agroforestry systems in Baoshan, Yunnan, Southwest China.* Kunming, Yunnan University Press.

Li Gui and Xue Jiru, chief editors
1995 *Gaoligong Mountain National Nature Reserve*, Beijing, China Forestry Publishing House [in Chinese].

Liu Hongmao and Xu Zaifu,
1985 Ecological significance of Xishuang-banna Dai Nationality's Holy Hill. *Chinese Journal of Ecology* 11 (2) : 41-43.

Pei Shengji
1988 Some effects of the Dai people's cultural beliefs and practice upon the environment of Xishuangbanna, Yunnan, China. In K.L. Hutterer, A.T. Rambo and G. Lovelace (eds) *Cultural values and human ecology in southeast Asia*. Ann Arbor, University of Michigan [page numbers to find].

Whittaker, R.H.
1972 Evolution and measurement of species diversity. *Taxon* 21(2-3): 213-251.

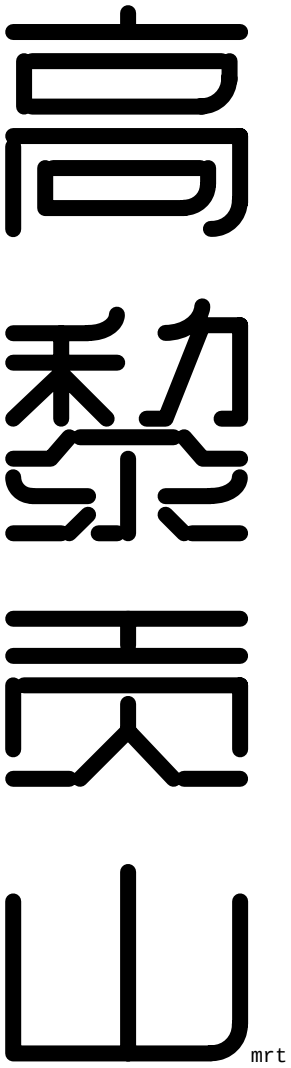
Xu Zaifu and Yu Pinghua
1991 A survey on traditional cultivated plants of Xishuangbanna Dai people. *Acta Botanica Yunnanica* 7 (2): 169-186.

Yunnan Institute of Tropical Botany.
1983 *Name list of Xishuangbanna flora*. Jinghong, Yunnan Institute of Tropical Botany.

Zarin, D.J.
1995 Diversity measurement methods for the PLEC Clusters. *PLEC News and Views* 4: 11-21.

Zhao Shiwang and Zhou Zhaokui
1985 *Records of Dai medicine*, Kunming, Yunnan People's Press [in Chinese].

Zhu Hua, Xu Zaifu, Wang Hong and Liu Hongmao
1993 *A survey of the vegetation on holy hills of Dai nationality in Xishuangbanna*. Kunming, Institute of Botany, Chinese Academy of Sciences.



INDIGENOUS KNOWLEDGE - A LONG HISTORY AND AN UNCERTAIN FUTURE

Muriel Brookfield
Australian National University, Canberra, Australia

Introductory Note: *I had almost finished writing this article when I read Agrawal's provocative discussion paper in the December* ***Indigenous Knowledge and Development Monitor*** *(IKDM) (Agrawal 1995b) which makes several of the points about indigenous and scientific knowledge that I had hoped to raise. I commend his paper to all readers, and offer some additional material and comment.*

'Indigenous knowledge' (IK) and its usefulness came into vogue with anthropologists and development workers in the 1980s, and has become something of a cult in the 1990s, particularly since the Rio conference in 1992. A burgeoning literature, several new institutions, and a network of data collection points have resulted. Yet onlookers could well ask 'Why the excitement? Has not IK been around for a long time?'.

Early history

We could answer 'Yes, for a million years or more'. The early humans were foragers by necessity, and knowledge of the local environment built up over millennia. Eventually *homo sapiens* had sufficient information and skills to develop a form of protoagriculture, though its genesis in particular areas is debated (Reed 1977: Clark and Brandt 1984), and new archaeological work keeps the debate going. During the Neolithic, around 10,000 years ago, the advent of farming stimulated changes in culture and further growth of knowledge. Localized and variable this had to be, but the indigenous knowledge data base took a big leap forward. The accompanying selective use of food sources was followed by both human-engendered and evolutionary change in animals and plants. Though this took place over a very much longer period of time, it caused what Schusky (1989:13) describes as 'a botanical revolution that makes the contemporary Green Revolution pale in significance'. Thousands of years later, when contact was possible on a large scale, empire builders and small-traders were quick to extract the fruits of this, both in information and goods, to the industrializing world.

By the time of the early explorers, it was known that there were many medicinal and plant discoveries to be made - even riches! - by tapping indigenous knowledge. In the eighteenth century, thousands of plant specimens, and drawings of birds, insects and animals were sent back to Europe. A large botanical network was set up (Philip 1995). The hunt was on for pharmaceutical substances, as Holmstedt tells in a short history of the discovery of strychnine. The plant was found in 1805 in Indonesia, and processed some years later in France. He makes the interesting observation that 'we have here for the first time an inter-disciplinary study starting with fieldwork among natives on botany and pharmacology, and up to the isolation of the active principle' (Holmstedt 1995:323).

Is it Science?

In the nineteenth century academics began to cogitate about the form and processes of indigenous knowledge, and asked whether this knowledge system could be regarded as

science -- a question which has been recurring recently. The French philosophers-sociologists and anthropologists were early in the field. Lévy-Bruhl, at the turn of this century, disagreed with English thinkers that 'primitive' thought is concerned mainly with explanation. He emphasized that 'primitives' do not use an infantile version of our own canons of logic: they have a different way of thinking and perceiving their surroundings, much of it due to their mystical orientation and magical beliefs. The people commune with their world and feel part of it. Lévy-Bruhl placed their common sense with science (Horton 1973), but believed that mystical influences took precedence.

Durkheim and Mauss in 1903 presented a different view. They were impressed with 'primitive' classifications and posited that the method had developed from familiarity with divisions and clan systems of known societies. Their conclusion was that 'primitive' classifications of objects were connected 'with no break in continuity, to the first scientific classifications. ...they have all their essential characteristics...systems of hierarchized notions, ...(which) form a single whole. Moreover, these systems, like those of science, have a purely speculative purpose. Their object is not to facilitate action, but to advance understanding, to make intelligible the relations which exist between things' (Needham's translation 1963:81).

Sixty years later Lévi-Strauss, the French intellectual who liked to put other anthropologists' findings into a global framework, argued that 'primitive' classifications were scientific, but arrived at by a different route from that of modern science. He wrote of two distinct modes of scientific thought (Lévi-Strauss, in *The Savage Mind* 1966:15-16) 'one roughly adapted to that of perception and the imagination: the other at a remove from it'. For the former, he used the term 'science of the concrete', which stemmed from myths and rites whose value was 'to preserve until the present time the remains of methods of observation and reflection which were....adapted to discoveries...from the starting point of a speculative organisation and exploitation of the sensible world in sensible terms'. 'Neolithic, or early man, was .. the heir of a long scientific tradition'. In other words, 'primitive' man has been practical in a scientific way. The brilliance of Lévi-Strauss and his quotability ensure that his varying ideas are still discussed. He and the French school were important in confirming the place of indigenous knowledge in history, but a more rigorous interpretation of the definition of science has since been sought.

Agrawal (1995 a,b) seeks to put the long science v. non-science, open v. closed and systematic v. non-systematic, debate to rest. He writes that numerous philosophers of science have not been able to find satisfactory demarcation criteria between science and non-science: and that further tedious investigation of claims that indigenous knowledge fits into one or other category is perhaps unnecessary, and 'would constitute, as it were, a reinvention of the wheel'(1995b:4).

The holistic approach

One point the critics usually agree on is that the indigenous approach is holistic, in contrast to much of western science. The complexity, yet simplicity, of indigenous insight into landscape was not in doubt with many field scientists of an earlier generation. Anthropologist Audrey Richards, gathering data in Africa in the 1930s, wrote (1939:234) that the Bemba of Northern Rhodesia (Zambia) had a completely different way of looking at landscape from Westerners. 'He views the country round him as all one unit, all accessible to him, and all ready to supply his needs'. This indigenous knowledge was not only concerned with animals and plants: it included extensive knowledge of trees and soil. It was normal for Bemba people to be able to name fifty to sixty species of trees, which they valued for materials, and for

medicinal and magical properties.

Over fifty years and many case studies later, researchers are still being astonished by the sophisticated nature of local ecological knowledge. Wilson (1995:292) says of an area further south, in Zimbabwe, that 'the sheer scope of local thinking about erosion in whole catchments - with such concerns as the pattern of paths, soil compaction, local spatial heterogeneity and its drainage implications, and tree-soil dynamics - is awe-inspiring, and indeed alongside or ahead of the cutting edge work by ecologists and soil scientists'.

Ethnoscience and research method

This brings me to the ethno-sciences, one of the twentieth century developments in indigenous studies. Harshburger in 1895 recognized the importance of the cultural component in plant distributions, and coined the term ethnobotany. Since that time, the growth of other 'ethno' disciplines has been remarkable. The field sciences are increasingly taking account of local culture, but at the same time are dividing the academic territory into more and more subdivisions. We now have not only ethnobotany but also ethnobiology, ethnoecology, ethnomycology, ethno-pharmacology, ethnomedicine and ethnoveterinary medicine (Schultes and von Ries 1995), plus paleoethnobotany, ethnopedology and many others[1]. There has been a corresponding increase in new 'ethno' journals. In addition, each subdivision has its gender breakdown, so that titles such as 'Gender-based differences in the ethnoveterinary knowledge of Afghan nomadic pastoralists' (Davis 1995) now add to the literature. Detailed studies are basic, and it is interesting to see scientists recreating the indigenous path to knowledge without having lived the process. The present trend is, first to unravel, then to validate this information. The final outcome -- the search for synthesis, global formulae or regional panacea -- is guaranteed to take the history of IK well into the twentyfirst century. Meantime Agrawal's wry comment on the irony of attempts to valorise IK, by using western scientific criteria, should give us thought.

The method of data collection in the field brings up the old anthropological dilemma -- how does the researcher make contact with local people without affecting them in some way? Since indigenous knowledge has proved over millennia to be dynamic, it would appear obvious that contact of many sorts, if not of any sort, is likely to cause ongoing changes. Is this what is wanted, when IK itself is only very partially understood? It needs to be recognized that IK includes many elements that are imported, along with new crops and methods, through both informal and formal channels.

Researchers do not always ask the most enlightened questions, and are sometimes biased by their particular discipline or cultural perceptions. Nor do they always ask the appropriate people - caution, rank, even misinformation can affect replies, particularly where the nuances of the language are not known, and the whole context is not understood. Some familiarity with the history of the area is essential, and it is fortunate that historians are increasingly interested in past environmental changes, which has led to what has been called ethnohistory, and the initiation of new journals such as *Environment and History.*

The written word

The body of published work on IK was tiny until a few years ago. When the modernization era of development faltered, a need to know about IK began. In the last fifteen years, there has been an exponential growth in the literature. Authors now find no

[1]There would seem to be a danger here of losing the essence of IK by imposing the reductionism of much formal science in the effort to clarify IK.

dearth of places to publish work, but they are scattered widely. In addition to the ethnoscience, ecological, environmental, agricultural, developmental and geographical journals, some coverage of IK appears in journals of the human and social sciences, in conservation and other fields, and in less obvious places such as institutional newsletters and international reports. Increased awareness has led to there being an appropriate forum for almost anything which is currently written. There is also an associated proliferation of data bases.

Bibliographic search for the literature is complicated by the several names by which IK has been known, and a lack of clarity on what indigenous knowledge is or is not. At times it has been referred to as Indigenous Peoples' Knowledge (IPK), Indigenous Technical Knowledge (ITK), then as Rural Peoples' Knowledge (RPK), and sometimes as traditional knowledge or folk knowledge. It can appear under 'agricultural knowledge systems', 'ecological knowledge systems', 'community knowledge systems', 'environmental knowledge', 'local knowledge' - or just 'knowledge'. Or under titles mentioning none of these, see van den Breemer (1989) and Hobart (1993).

Cataloguing

Fears that under modern pressures a great amount of indigenous knowledge will be lost have led to phenomenal growth of archival resource bases. CIKARD (Center for Indigenous Knowledge for Agriculture and Rural Development) was set up in Iowa in 1987, to facilitate participatory and sustainable approaches to domestic and international agricultural and rural development. As part of this objective, CIKARD manages a central literature collection, which includes 'grey' literature, and is using an integrated bibliographic software package PRO-CITE, on the Apple Macintosh system, for cataloguing and indexing. A retrieval and reference service is planned (Warren and McKiernan 1995). Together with CIRAN (Centre for International Research and Advisory Networks) in The Hague, a global network with regional and national centres for gathering indigenous knowledge has been initiated. When the joint publication, the *Indigenous Knowledge and Development Monitor,* was first published in 1993 there were six national centres listed. Two years later, the total had risen to nineteen, reflecting perhaps the present political correctness and fund-raising possibilities in the indigenous knowledge field.

A concern shared by Agrawal (1995a, b) is the inherent danger in isolating and fossilizing fragments of IK in *ex situ* data bases. IK is by nature dynamic and holistic and *in situ*. The present likelihood is that years, maybe decades, will be spent by a large number of people in the busywork of collecting and cataloguing compartmentalized data, without there being a general, let alone full, understanding of their relevance *in situ*.

Ritual and politics

The influence of ritual and politics in present-day indigenous societies is not easy to assess, but cannot be ignored. Two African scientists have recently written of societies in areas that they know well. Amanor (1994:130) describes three interrelated plant-based medical systems in the Krobo district of Ghana. The system most closely associated with priestly cults and ritual has conserved and classified a good deal of sought-after plant genetic material.[2] Anthropologists, who have long studied folk myth and the power of magic, would be aware of their conservation potential: but agricultural scientists who have utilized the plant product often have little idea of its history and development, and agricultural economists even less. Yet if the store of IK is to continue to grow in a natural

[2] See also Dao Zhiling in this issue at p. 19.

way, this ritual knowledge component cannot be overlooked. Nor should it be over-emphasized. Amanor (1995:27-28) warns 'ritual knowledge .. which .. regulates activities in such a way as to preserve the environment' is not the whole story. There is need for detailed understanding of indigenous environmental knowledge as a practical and ever-changing body of information, the use of which is related to daily activities.

Mukamuri (1995) writes that in central and southern Zimbabwe local religious institutions are sometimes used by ruling lineages for political control, and to grant preferential access to particular resources. Individuals share the same environment, but compete for resources and land. It is clear that what people actually do may be at odds with the traditional custom of acting for the common good. Indigenous conservation institutions should be regarded as 'centres of inherent conflict' and 'researchers should be more sceptical when they talk about a ritually-controlled ecosystem' (1995:297-298). Groups and individuals have divergent interests, though both have a great deal of environmental knowledge, and Mukamuri concludes (1995:310) 'development projects should not aim at homogeneity, but at benefitting as wide a range of people as possible.'

Knowledge and power

The use of IK material as a commodity brings many problems for the researcher. These can be ethical or practical. If the motive for research is to make use of local knowledge elsewhere, a degree of fossilization or specialization in a data base may not inhibit this. Large pharmaceutical firms have already made big profits out of IK over the last century, and now the matter of patents for plant genetic material is coming to the fore (Juma 1989: Mooney 1993). The question is being asked in human and social science as well as by field scientists, 'Who owns indigenous knowledge? If it is science, should it be free? Or is it the intellectual property of the local people?'

Political scientists have said that knowledge is power. Should this apply to IK? If the primary motive for highlighting the knowledge of the marginalized poor is to find them a greater voice in development, then Agrawal suggests their empowerment. This would be attained by a very different course of political action from the present: namely that 'attempts be made to reorient and reverse state policies, to permit threatened populations to determine their own future, thus facilitating *in situ* preservation of indigenous knowledge' (Agrawal 1995b:5). Amanor (1994:230-231) had already concluded that there is need to decentralize political systems of administration in the interests of local development. He believes that rural regeneration should also be supported by a new scientific framework which will focus 'on the interactions of people and the environment in specific localities and regions, and ground development policy in historical experience'.

Conclusion

Indigenous knowledge has reached a critical point in its long history. Recognition that it is of value, even of over-riding value, to the rest of the world, is accelerating. Recognition that it could be eroded irretrievably by global interest is slow to follow. Its value *in situ* has yet to be measured against various development proposals. It is possible that its contribution to biodiversity conservation, with western science as an adjunct, may prove to be immeasurable.

The indigenous systems which hold the knowledge face a period of increasing incorporation into a larger regional, national and global polity, with all the conflicting possibilities that are involved. Any system would find it hard to adjust to these multiple impacts, and while indigenous people and their knowledge systems have been

demonstrated to be adaptable in the past, this adaptability will now be very strongly tested. The pace of change will relentlessly challenge customary adaptive processes: and the future outcome for IK has to include uncertainty. Researchers will be stretched to give an accurate history of this time.

Awareness and accountability from scientists and planners could be vital factors in the future of IK. Östberg (1995:115) writes of the responsibilities of those undertaking development projects from outside a local area. 'It is demonstrated that many Burungi experience problems of soil erosion differently from the way visiting conservation specialists do. Mung'ong'o has recently argued that fifty years of conservation efforts in the Kondoa Eroded Area have demonstrated that the Rangi prefer other ways of approaching problems of land degradation to those advocated by the administration. It then falls on outsiders to be informed about the alternative understanding.'

Before we go too far down the data-gathering track, should we not take stock? Should there not be a synthesis of early studies, and a testing of present archival analysis to see if it captures the essence of IK systems, both past and present? Will the holistic reality of IK come through? Or are there gaps to be filled? To be thorough, all future research projects in this field will need to take full account of the IK components. As a start, such projects should include anthropologists, social scientists and speakers of the local languages, with help from historians where possible. To be a keen field or development scientist is not enough. It is not indigenous knowledge that needs to be validated, but the research projects.

PLEC adopts an approach different to the norm, taking full account of what people actually do and why, within the larger framework of what they know and think. There is a clear role for PLEC in explaining farmers' own practices, their selective use of new information, and the function and present nature of rural peoples' knowledge. With real understanding of IK/RPK and its potential, a memorable new chapter in the history of indigenous knowledge could emerge.

My thanks to Helen Parsons for valuable criticism of the draft paper.

References

Agrawal, A.
1995a Dismantling the divide between indigenous and scientific knowledge. *Development and Change* 26 (3): 413-440.

Agrawal, A.
1995b Indigenous and scientific knowledge: some critical comments. *Indigenous Knowledge and Development Monitor* 3 (3): 3-6.

Amanor, K.S.
1994 *The new frontier. Farmers' response to land degradation: a West African study.* London: Zed Books.

Amanor, K.S.
1995 Indigenous knowledge in space and time. *PLEC News and Views* 5: 26-30.

Clark, J.D. and S.A. Brandt
1984 *From hunters to farmers: the causes and consequences of food production in Africa*. Berkeley: The University of California Press.

Davis, D.K.
1995 Gender-based differences in the ethnoveterinary knowledge of Afghan nomadic pastoralists. *Indigenous Knowledge and Development Monitor* 3 (1):3-4.

Durkheim, E. and M. Mauss
1963 *Primitive classification.* Translated from the French *De quelques formes primitives de classification* (1903) by R.Needham (ed.). Chicago: The University of Chicago Press. (N.B. Needham has corrected 69 bibliographic errors found in the original).

Hobart, M. (ed.)
1993 *An anthropological critique of development: the growth of ignorance*. London: Routledge.

Holmstedt, B.R.
1995 Historical perspective and future of ethnopharmacology. In R.E.Schultes

and S. von Reis (eds) *Ethnobotany: evolution of a discipline* pp:320-337. Portland, Oregon: Dioscorides Press.

Horton, R.
1973 Lévy-Bruhl, Durkheim and the scientific revolution. In R.Horton and R. Finnegan (eds) *Modes of thought. Essays on thinking in western and non-western societies,* pp. 249-305. London: Faber and Faber Ltd.

Juma, C.
1989 *The gene hunters: biotechnology and the scramble for seeds*. London: Zed Books Ltd.

Lévi-Strauss, C.
1966 *The savage mind*. Translated from the French *La pensée sauvage* (1962). Chicago: The University of Chicago Press.

Mooney, P.R.
1993 Exploiting local knowledge: international policy implications. In W. de Boef, K. Amanor, K.Wellard with A.Bebbington. *Cultivating knowledge: genetic diversity, farmer experimentation and crop research*. London: Intermediate Technology Publications.

Mukamuri, B.B.
1995 Local environmental conservation strategies: Karanga religion, politics and environmental control. *Environment and History* 1 (3): 297-311.

Östberg, W.
1995 *Land is coming up: the Burungi of central Tanzania and their environment.* Stockholm Studies in Social Anthropology, 34. Stockholm University.

Philip, K.
1995 Imperial science rescues a tree: global botanic networks, local knowledge and the transcontinental transplantation of Cinchona. *Environment and History* 1 (2) 173-200.

Reed, C.A. (ed.)
1977 *Origins of agriculture.* The Hague: Mouton Publishers.

Richards, A.I.
1939 *Land, labour and diet in Northern Rhodesia: an economic study of the Bemba tribe*. London: Oxford University Press.

Schultes, R.E. and S. von Reis (eds)
1995 *Ethnobotany: evolution of a discipline.* Portland, Oregon: Dioscorides Press.

Schusky, E.L.
1989 *Culture and agriculture: an ecological introduction to traditional and modern farming systems*. New York: Bergin and Garvey Publishers.

van den Breemer, H.
1989 Yam cultivation and socio-ecological ideas in Aouan society, Ivory Coast. *Sociologia Ruralis* 29 (2,4):265-279.

Warren, D.M. and G. McKiernan
1995 CIKARD: a global approach to documenting knowledge for development. In D.M.Warren, L.J.Slikkerveer and D.Brokensha (eds) *The cultural dimension of development: indigenous knowledge systems,* pp. 426-434. London: Intermediate Technology Publications Ltd.

Wilson, K.B.
1995 'Water used to be scattered in the landscape': local understandings of soil erosion and land use planning in southern Zimbabwe. *Environment and History* 1 (3): 281-296.

Further sources

Indigenous Knowledge and Development Monitor, The Hague.

Publications from IDS (Sussex), IIED (London), ILIEA (Leusden)

ILIEA Newsletter for low external input and sustainable agriculture.

Leach, M. and R. Mearns (eds) forthcoming
The lie of the land: challenging received wisdom in African environmental change and policy. James Curry and Indiana University Press.

Warren, D.M., L.J. Slikkerveer and D. Brokensha
1995 *The cultural dimension of development: indigenous knowledge systems*. London: Intermediate Technology Publications Ltd.

(The latest collection on IKS, with 47 contributions. Part V, on International Institutions and indigenous knowledge, details future plans of CIKARD, CIRAN, LEAD etc. The Bibliography is regrettably incomplete, e.g. most of Slikkerveer's references in his chapter on LEAD pp. 435-440 are omitted).

LOCAL EXPERTS AND LOCAL LEADERS: LESSONS FROM AMAZONIA

Miguel Pinedo-Vasquez
Center for Environmental Research and Conservation, Columbia University

Introductory Note: Most of the component projects of the Amazonia Cluster work closely with grassroots and rural unions in the design and implementation of their work, which will be described in detail in a later issue. Here we only briefly outline a few factors that have proved important in some of our work.

In Amazonia, development and conservation projects implemented by governmental institutions and NGOs are designed to promote agricultural, agroforestry and natural resource management activities in order to increase the income of peasants and to reduce human pressures on river, lake and forest resources. The expectation is that household income is increased and pressure on resources is reduced when peasant economies depend more on productive activities -- especially agriculture -- than on extraction.

Although most rural Amazonians are engaged in some farming and managing of resources, it is important to recognize that not all farmers are good producers or managers. Ample consideration should be given to the diversity present and to the temporal, spatial, and individual variation before implementing conservation or development projects.

Finding the right people

During the 1970s and early 1980s several governmental institutions and NGOs worked to organize peasants in Amazonia. Most of the current peasant unions of Amazonia result from these efforts. This success has led to more recent efforts to implement development and conservation projects with or through peasant unions. The majority of these experiences have produced controversial results and in some cases deleteriously affected the unions and their leaders.

There are several reasons why development and conservation projects were less successful than earlier projects which organized communities and rural unions. While organizing communities was a socio-political activity, implementing development and conservation projects involves some very specialized technical activities. Here we touch on this and other factors that may be of interest to the PLEC community.

While the prevailing internal and external political conditions in the 1970s and early 1980s are believed to have helped to organize rural Amazonians, other conditions also played an important role in the success of these projects. Most of the team members who worked on organizing peasants spent long periods of time living in their communities, getting the most qualified and charismatic individuals to lead their project activities in the communities, sectors and regions.

In contrast, many team members of governmental agencies and NGOs which have started promoting development and conservation projects have spent little or no time in identifying the most qualified individuals to lead project activities. Direction of development and conservation projects was often delegated to communal or union leaders without prior knowledge of their qualifications to conduct such activities.

Most experts working in development and conservation projects sponsored by governmental institutions and NGOs assumed that peasants who are community and union leaders must also be experts in managing and implementing operational projects. By ignoring the heterogeneity of peasant societies and failing to see that, as in any society, individuals have different talents, most NGO's and governmental agencies have damaged more than helped both rural unions and communities. Good peasant leaders are not usually the best producers or resource managers in the community.

In most Amazonian communities, the individuals or families who are most expert in producing, managing and processing resources do not participate extensively in community organizations. These individuals and families are in many cases opposed to community organization and sometimes they have irreconcilable conflicts with the leaders and other members of the community. Amazonian peasants know that local experts rarely share their knowledge with other members of the community. Because of these factors, the best farmers, agroforesters and resource managers often cannot be contacted through community or union leaders.

Although these community experts are difficult to contact, they are the ones with whom work in implementing production and management activities can be most effective and rewarding. While communal and union leaders have political talent and charisma, the community experts have extensive and deep knowledge and expertise in agricultural, agroforestry and resource management activities. Yet not only have many of these local experts been ignored in the implementation of most projects, the majority of them have had no participation at all in project activities. Without local experts, any technical advice is based on the recommendations of university-trained experts, even though many of them lack relevant field experience.

Many government institutions and NGOs implementing these developmental and conservation projects have made extensive and expensive efforts to train members of communities in improved resource management techniques. Although villagers in several regions of Amazonia have learned new techniques, they rarely use them to produce, or manage their resources. In many cases we found these techniques poorly suited to local situations. Virtually no use had been made of the technical knowledge and understanding of the best local experts. The new techniques were often based on a misdiagnosis of local problems and potentials. By taking the time and acquiring the knowledge to seek out the best farmers, agroforesters and resource managers and then following their advice, many projects might have increased significantly their chances for longer lasting success.

A better way forward

Amazonian rural unions, like other unions, are political entities and their leaders should play a political role motivating community organization, unionizing peasants and defending the rights of their associates. Because of their political expertise, Amazonian peasant leaders have much to say about development and conservation projects. They must be consulted before projects are implemented. Union leaders have helped us select the right communities for our own research and training efforts, and are using some of our research findings and recommendations in proposals they present to government agencies.

Most of us who work in Amazonian PLEC believe that development and conservation problems in Amazonia cannot be resolved without the organized participation of Amazonian peasants. Union and communal leaders have a great task, and should not be distracted from it by being made project managers, or being delegated technical project responsibilities. These leaders are great experts in their own domain. We

believe, however, that there are also many other valuable experts in Amazonian villages who are worth tracking down and incorporating in our research, demonstration and training activities.

Cont. from p. 11

Publications of the South-South Programme

12. *Environnement naturel et socio-économique* de la forêt classée de la Lama (Bénin). Marcel A. Baglo, P. Coubeou, B. Guedegbe, B. Sinsin. In French, with English abstract (1995);
13. *The Calakmul Biosphere Reserve (Mexico),* Eckart Boege. In English, with French abstract (1995).

Other publications of the Programme

1. Clüsener-Godt, M.; I. Sachs and J. I. Uitto (eds), 1992. *Final Report of the Conference on 'Environmentally Sound Socio-Economic Development in the Humid Tropics', Manaus, Brazil, 13 - 19 June 1992*. UNESCO/MAB, UNU, TWAS, UNAMAZ, INPA, 52 pp.;
2. Aragón, L., (ed.), 1993. *Desenvolvimiento Sustentável Nos Trópicos Húmedos,* Série Cooperaçao Amazônica No. 13, Vol. 1 and 2., UNAMAZ, 634 pp.;
3. Uitto, J. I. and M. Clüsener-Godt, (eds) 1993. *'South-South Co-operation on Environmentally Sound Socio-Economic Development in the Humid Tropics: Perspectives from Asia and Africa',* UNU, 180 pp.;
4. Ruiz Murrieta, J. 1993. *Alimentos del Bosque Amazónico*, UNESCO, 225 pp.;
5. Aragón, L. (ed.), 1994. *Proceedings of the International Symposium: 'What Future for the Amazon Region?',* Institute of Latin American Studies, Stockholm University, 204 pp.;
6. Clüsener-Godt, M. and I. Sachs (eds), 1994. *Extractivism in the Brazilian Amazon: Perspectives on regional Development*. MAB Digest 18. UNESCO, Paris, 89 pp.;
7. Salinas, E. Aramayo, X. and M. Soledad Quiroga, 1994*. Manual de Educación Ambiental*. UNESCO/MAB, CIEC and Academia Nacional de Ciencias de Bolivia, 182 pp.;
8. Clüsener-Godt, M. and I. Sachs (eds), 1995. *Brazilian Perspectives on Sustainable Development of the Amazon Region*. MAB Book 15 UNESCO, Paris, 311 pp.

Further Information

Everybody interested can contact :

Dr. Miguel Clüsener-Godt
UNESCO - Division of Ecological Sciences
South-South Co-operation Programme
1, rue Miollis, 75732 PARIS,
Cedex 15 , France
Tel: 33.1.45.68.41.46
Fax : 33.1 40.65.98.97
Telex : 20.44.61 Paris
E-mail : scmcl@unesco.org

Three new books of interest to PLEC

Three books published by the United Nations University Press in Tokyo at the end of 1995 may be of interest to members of PLEC, as they arise out of a UNU project which preceded PLEC, and to some degree flowed into it. All form part of a series entitled 'UNU Studies on Critical Environmental Regions'. They are, in the order in which they were published:

1. Kasperson, J.X., Kasperson, R.E. and Turner, B.L. II, (eds). *Regions at Risk: Comparisons of Threatened Environments.*
2. Brookfield, H., Potter, L. and Byron, Y*. In Place of the Forest: Environmental and Socio-economic Transformation in Borneo and the Eastern Malay Peninsula.*
3. Smith, N.H., Serrão, E.A., Alvim, P.T. and Falesi, I.C. *Amazonia: Resiliency and Dynamism of the Land and People.*

PLEC NEWS AND VIEWS is published for the United Nations University in the Department of Anthropology, Division of Society and Environment, Research School of Pacific and Asian Studies, The Australian National University. Production work has been undertaken by Margaret Forster, PLEC Administrator. Artwork is by Margaret Tyrie and Keith Mitchell.

Copyright: Permission to copy any material in this Periodical will be given, provided that full reference to the author, title, volume title, and place and date of publication are given. Abstracting does not require permission. Enquiries should be addressed to the Editor, Professor Harold Brookfield, Department of Anthropology, Division of Society and Environment, Research School of Pacific and Asian Studies (RSPAS), The Australian National University, Canberra, ACT 0200, Australia. Fax: (+61-6) 2494896. E-mail: hbrook@coombs.anu.edu.au

PLEC NEWS AND VIEWS

- Published about twice yearly
- Editor: Professor Harold Brookfield
- Address: Department of Anthropology, Division of Society and Environment, RSPAS, The Australian National University, Canberra, ACT 0200, Australia
- Phone: +61 (0)6 2494348
- Fax: +61 (0)6 2494896
- e-mail: hbrook@coombs.anu.edu.au