

POLICY BRIEF

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Sustainable Land Management in Asia: Applying a Land-Use Function Approach

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Highlights

Asia is expected to experience population growth, followed by a declining trend, that will likely result in unpredictable socio-economic change presenting new challenges for land management. Sustainable land and natural resource management will play a crucial role in addressing these issues in the region. In particular, assessing the multifunctionality of land is necessary to consider regional sustainability.

Recommendations:

- Employ a land-use function (LUF) approach to enable policymakers to assess impacts on the performance of multiple functions associated with land-use change, including the economic, environmental, and societal impacts.
- Conduct participatory assessment of LUFs, enabling the involvement of stakeholders at multiple levels, including policymakers, researchers, and landowners, and allowing local contexts to be reflected in the quantitative assessment of land management and practices.
- In regional land-use policy, explore plausible futures considering the three dimensions of LUFs — economic, environmental, and societal.

Sustainable Land Management in Asia

The loss of multiple ecosystem services through land degradation is a critical concern in many parts of the world. Urgent action is needed to avoid further degradation in the face of climate change as well as unprecedented consumption caused by population growth, changes in income and consumer preferences, and other factors (IPBES 2018). In rural areas of Asia, there have been significant transformations in land use to improve food production (ADB 2017). However, these have focused on land-use efficiency to improve productivity, with less consideration of the multiple functions of land and the roles they can play in achieving the Sustainable Development Goals (SDGs).

Sustainable land management enables the multifunctional use of land-based resources, including soils, water, animals, and plants, to produce goods to meet changing human needs, while simultaneously ensuring long-term productive potential with the maintenance of environmental functions. Achieving sustainable land management is a key challenge in addressing the growing issue of land degradation and advancing progress on the SDGs. In particular, regional land-use policy and planning are central to disaster risk reduction and climate change adaptation, which could reduce the number of affected people, economic losses, and social impacts due to extreme climate events and disasters.

This policy brief presents approaches for assessing the multiple functions embedded in land use and management. It provides a set of recommendations for advancing sustainable land management, primarily for policymakers and practitioners in the public and private sectors in Asia, but also of some relevance in other regions. The brief is mainly based on research conducted in Bangladesh, China, and Japan.

Recommendation 1: Employ a Land-Use Function Approach

Consider Multifunctional Land-use

If multifunctional land-use is considered, rather than land-use efficiency from a specific perspective (e.g., focusing only on crop productivity), a greater variety of ecosystem services can be provided to a wider range of beneficiaries. Since the 2000s, payments for ecosystem services (PES) have been implemented to maintain and improve the various functions provided by ecosystems. Under PES schemes the beneficiaries provide direct or indirect payments to the providers. In Japan, for example, a community-based programme provides direct payments for mountain agriculture, aiming to maintain agricultural landscapes and prevent further abandonment of farmland in hilly and mountainous regions. In China, the Sloping Land Conversion Program (SLCP) compensates farmers for converting cropland to forest and grassland.

Policies and practices are also promoting land-use transformation towards the provision of specific ecosystem services to address social and environmental problems. In China, the Rural Land Transfer policy has also been applied to promote more rational and effective utilisation of agricultural land and to prevent abandonment. In Bangladesh, with the rapid expansion of groundwater irrigation, rice varieties with a range of yields were introduced during the dry season to enhance rice crop productivity. The Government of Bangladesh is also implementing an agroforestry programme to diversify production, improve soil health, and maintain the groundwater level in tackling climate change. Evaluation of how each policy affects regional sustainability remains largely issue-specific, and there is a pressing need for policymakers to conduct more integrated assessments.

Identify the Multifunctionality of Land

There is a growing need for analytical methods that evaluate changes in sustainability (Pérez-Soba et al. 2008). One such method is a land-use function (LUF) approach, which considers the private and public goods and services

provided by different land uses that reflect the dominant economic, environmental, and societal aspects of a region.

Previous assessments have tended to focus on specific land-use problems, over regional development. An LUF approach enables policymakers to assess the integrated impacts of policies on the performance of land-use functions associated with land use, including the economic, environmental, and societal impacts.

- LUFs should be identified based on the socio-economic and environmental situation relating to a regional sustainability context, e.g., land-based and non-land-based production, provision of work, food security, and provision of biotic and abiotic resources.
- For each LUF key indicators are used in analysis of how policy changes may impact the performance of that function, e.g., income from primary and/or tourism industries, employment rate, per capita food availability from land, water quality, and soil conservation rate.

Recommendation 2: Conduct Participatory Impact Assessment & Evaluation

Assess the Impacts of Policies & Practices

Payments for ecosystem services (PES) have been widely implemented in the public and private sectors, from the local to global level. This transfer scheme can play a role in aligning land-use decisions by land owners with the societal benefits of natural resources. However, the insufficient performance of these practice-based (i.e., action-oriented) payment schemes has generated increased interest in results-based (i.e., outcome-based) schemes (Lankoski 2016). Quantitative impact assessments of such payments and other land-use policies and practices should be conducted, to help maximise their contribution towards sustainable land management.

Engage Stakeholders in Assessment

Adopting sustainable practices requires broad stakeholder engagement and collaboration, including multiple levels of government, nongovernmental organisations, and scientific institutions (ADB 2017). Participatory assessment is an effective approach that can involve people with varied levels of knowledge and preferences in creating a future society. However, most cases of stakeholder involvement are limited in the qualitative assessment.

To involve stakeholders in quantitative assessment of LUFs, the Framework for Participatory Impact Assessment (FoPIA)

approach can be applied through an assessment phase, i.e., the selection of key LUFs and their indicators, involving impact assessment and implementation (Xue & Zhen 2018). The FoPIA process should be designed to:

- Combine the qualitative knowledge provided by local stakeholders with quantitative data gathered by researchers and governments and to mainstream the LUF concept into policy decisions.
- Encourage experts to work together across disciplines to provide a rational and scientific assessment of the impact of land-use changes on sustainability.
- Consider stakeholder preferences when linking land multifunctionality to regional sustainability.

A policy impact assessment of LUFs with stakeholders should therefore be conducted to enable the incorporation of local context into regional policy and planning in a way that is accessible to non-experts.

Recommendation 3: Explore the Multiple Dimensions of Land-Use Functions

Explore Plausible Futures

Scenario analysis — exploring sets of assumptions and their consequences — is central for exploring plausible futures under social and environmental change (Díaz et al. 2015). As land-use change affects ecosystem functions, influencing the delivery of various ecosystem services that are essential for human wellbeing, land-use scenarios should consider the multifunctionality of land for society in the future.

Scenario impact assessment using LUF indicators can reveal diverse effects along various dimensions. In UNU-IAS analysis of Bangladesh, China, and Japan, a scenario featuring payment schemes and land-use transformation policies had positive impacts on all three dimensions. An intensive land-use scenario saw a negative impact on the environmental dimension, suggesting a need for targeted strategies combining different land-use policies and practices (Fig. 1).

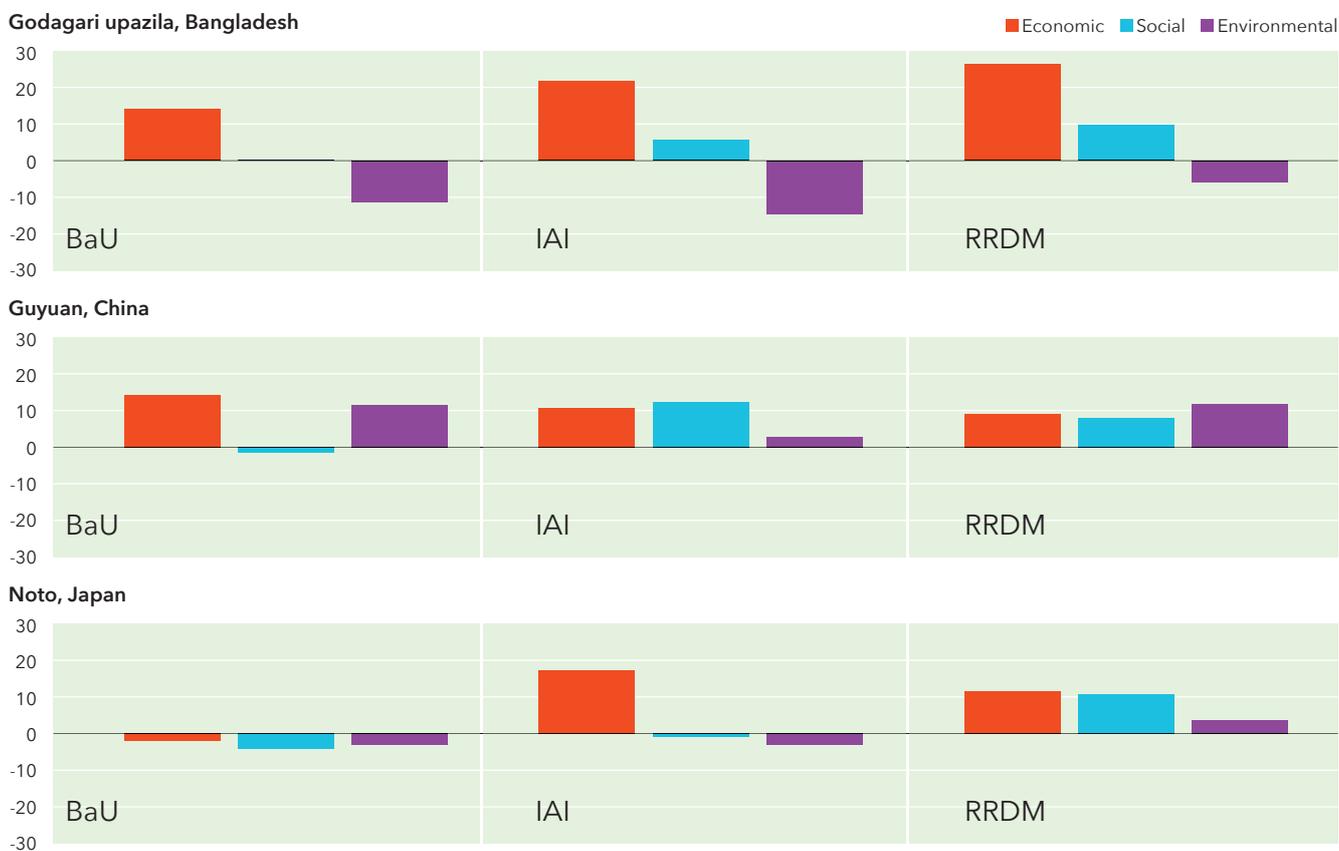


Figure 1 — Impact assessment of LUFs in Bangladesh, China, and Japan (Source; Xue et al. 2019). BaU is the business as usual scenario, IAI is the intensive land-use scenario, and RRDM is the scenario featuring payment schemes and land-use transformation policies. The vertical scale indicates the integrated assessment score for each dimension of LUFs. Positive scores constitute improvements and negative scores are changes for the worse. A larger score indicates a greater change.

Although validation and further quantitative predictions are required in order for the output of scenarios to be incorporated into policy decisions, the combined impact of land-use policies should be considered in future rural planning through the participatory assessment process.

Communicate through Scenarios

Changes in the human population such as population distribution and age structure are significant anthropogenic pressures on the direct drivers of ecosystem change (IPBES 2016). According to projections, Asia is expected to experience population growth until 2050, following by a declining trend. In Japan, the depopulation trend began around 2010, and it is expected to appear around 2030 in China and 2050 in Bangladesh (UN 2017). This will likely result in unpredictable socio-economic change, causing new land management issues such as abandonment and subsequent degradation (Shoyama et al. 2019). Stakeholders tend to have an indifferent attitude toward the social dimension of LUFs, reflecting a decreasing dependency on the land due to diversification of income sources (Bangladesh), rural labour transfer (China) and an ageing society (Japan) in rural communities (Xue et al. 2019). Urgent action is required to address these issues emerging from socio-economic changes, as well as climate change.

In order to build future society by addressing these new issues, scenario approaches such as stories could play an important role by enabling dialogue between people and groups through participatory processes (IPBES 2016). Participatory impact assessment of LUFs with different scenarios should be used to overcome barriers to communication between experts and non-experts, and build the capacity of decision makers.

Note

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