

Chapter 7

Major Findings

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Progress has been made in conserving and restoring ecosystems in China, in the context of rapid development and globalization. Nevertheless, sustainable ecosystem management faces serious challenges from the huge demand for socioeconomic development drawing upon finite ecological resources. The mission of the Task Force is to provide advice on how best to manage these challenges. We found:

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7.1 Some Advances Have Been Made in Ecosystem Conservation and Restoration; However the Capacity of China's Ecosystems to Generate Multiple Services Is Too Low

Since 1998 the Chinese government has increased its support for ecological conservation and restoration of forest, grassland, and wetland ecosystems. More than 700 billion yuan (about USD\$103 billion) was invested in key programs, including returning cropland to forest (or grassland), natural forest conservation, returning cropland to lake, and returning grazing land to grassland. Forest ecosystems have been protected or improved with afforestation, and forest cover has increased to 20.4 % of China's land area (SFA 2009). The rate of deterioration of grassland and wetland has also slowed, but related processes are still going on. So far 2,538 nature reserves have been established, covering 15.5 % of China's land area.

Scenario modeling showed that business as usual would have led to lower generation of ecosystem services in China. However, even with the planned restoration and conservation of these ecosystems, there has often been a one-sided focus on certain provisions, like food production, water retention, or prevention of erosion, neglecting other services such as biodiversity or carbon storage. A low level of generation of ecosystem service of forests, grasslands, and wetlands are indicated by:

- (a) Forest stand density per unit area that is well below the world average, there is an ongoing decline of the last few spots of natural and seminatural forests.
- (b) Meat production capacity from grasslands that is only a third of the world average.
- (c) The ongoing decline in wetland ecosystems.

There is an opportunity to reverse this low level of ecosystem service provision and generate more services for China by improving ecosystem management.

7.2 Low Awareness of Ecosystem Services and Poor Ecosystem Management Remain as Great Challenges

Ecosystem services are the benefits people obtain from ecosystems. However, these benefits from ecosystems are not fully recognized and appreciated at present in China. Insufficient understanding of the complex and dynamic characteristics of ecosystems has led to overuse or misuse of ecosystem services, inducing environmental degradation and shortages of some ecosystem services in meeting societal demands. For example, overuse of natural forests for timber production resulted in the loss of forests and serious degradation before 1980s, and the logging ban reduced timber supply from the 2000s. More than 40 % of China's demand for wood products is now met from imports. Although investment in ecosystem restoration has increased, the cost-effectiveness, ecological efficiency, and the sustainability of ecological restoration programs have not yet been proven in a long run.

Moreover, key regional development plans have not fully recognized the value of natural grassland and wetland ecosystems. For instance, both the Poyang Lake and Jiangsu Coast wetlands are threatened by regional development plans approved by the State Council. Conflicts between different laws, regulation, policies, plans, and inadequate enforcement are evidence of a poor understanding of the importance of ecosystem services and ecosystem management in China.

7.3 Less Land Is Left in China for the Expansion of Forests, Grasslands, and Wetlands, so China Now Needs to Enhance the Quality of Ecosystems and Their Capacity to Generate a Range of Services

The total area of forest, grassland, and wetland occupies 55.6 % of China's lands. The remaining 44.4 % is farmland, built-up, and unused land. There is no doubt that the built-up area will increase with rapid urbanization. To ensure food security, China has adopted a strict policy to protect farmland. As for the unused area, almost half is unusable, including alpine desert in the Tibet Plateau, arid Gobi Desert in the west Inner Mongolia Plateau, Taklimakan and other deserts in northwest China, and glaciers. Only 11 % of unused land has potential for conversion to new uses, but only with large investments and often on account of related services such as biodiversity and regulating ones.

Chinese government committed to increasing the forest area by 40 million hectares by 2020, and national sector-based plans for ecological conservation and restoration include targets for increasing the forest coverage rate substantially and maintaining the natural wetland area. Considering land use in China, it is difficult to expand one ecosystem without reducing the areas of other ecosystems. There are extensive and growing threats to grassland and wetlands and ongoing reclamation of high value grasslands for croplands and urban development. Consequently, the management targets of forest, grassland, and wetland ecosystem should be changed from expanding areas to enhancing the capacity to generate multiple ecosystem services per unit area.

7.4 Cross-Sectoral Coordination and Public Participation Mechanisms Are Crucial for Improving Ecosystem Management

Lessons from international experience are that successful ecosystem management depends on:

- (a) Planning and cross-sectoral coordination mechanisms focused on a multi-dimensional enhancement of ecosystem services
- (b) Clearly defined targets, comprehensive and objective monitoring, and reporting systems

- (c) Effective mechanisms for equitable sharing of costs and benefits
- (d) Mechanisms for solving conflicts

Lessons and experiences from Chinese case studies show that improved legislation, institutions, and policy at the national, provincial, and local levels can greatly improve ecosystem management, for example:

- (a) Better cross-sector coordination at landscape (or regional) scale can be best achieved through planning and implementing of ecosystem restoration programs, which are vital in improving real world effectiveness of ecosystem management (Loess Plateau case study).
- (b) Better coordination institutions at the provincial or river basin level are needed for effective ecosystem management. The Mountain-River-Lake Development Committee and Program of Jiangxi Province is a good example (Poyang Lake case study).
- (c) Effective local level ecosystem management systems can be achieved at the county scale with social and economic benefits through better stakeholder involvement (Baoting County case study).

Further, full participation of nongovernmental organizations, enterprises, and communities is important for determining and implementing locally adjusted and effective ecosystem conservation and restoration measures.

7.5 Scientific Support and Capacity Building Needs to Be Strengthened for Better Ecosystem Management

The experience of CERN (Chinese Ecosystem Research Network) and the Loess Plateau case studies show that integrating monitoring, long-term research and demonstration projects provide essential technical support for better ecosystem management. Lack of adequate technical support is a barrier to adequate science-based policy-making and implementation of best practice ecosystem management in other parts of China. In particular there is:

- (a) Insufficient monitoring of the status of major ecosystems in terms of basic, real-time, and reliable data that is openly available to inform public participation, scientific research, and policy-making.
- (b) Lack of effective channels for science to inform policy, decision-making, and practice. Consequently many scientific outputs are in a form that cannot be applied in practice, and many policies and plans for ecological conservation, restoration, and rehabilitation are less effective than they could be.
- (c) A need to focus on emerging global environmental issues – such as excessive reactive nitrogen and phosphorous in the environment (Rockstrom et al. 2009) – that will have impact on China. This uncertainty and risk needs to be managed with the knowledge generated by strategic monitoring and research.

- (d) A need for technical support of long-term ecosystem monitoring, assessment, and demonstration as a basis for better science education, public participation, and policy-making, leading to the achievement of an ecological civilization in China.

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