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Law, Policy and Dryland Ecosystems in the People's Republic of China

Du Qun and Ian Hannam
Editors



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Preface

The People's Republic of China (PRC) suffers from some of the world's worst land degradation (LD) problems. The arid, semi-arid, and sub-humid (dryland) zones of Western PRC cover approximately 40 percent of the country, and contain some of the most severely degraded land within the PRC and in the world. The PRC's drylands are continually affected by a number of LD processes including severe wind and water erosion, soil nutrient losses, waterlogging, salinization, river system sedimentation, deforestation, grassland degradation, and biodiversity loss. Erratic rainfall and prolonged periods of drought as a result of climate change increases the vulnerability of the population in these areas. Sustaining land resources is critical to the PRC's economic development: with only about 7 percent of world's farmland and 6 percent of the world's annual water runoff, it will have to sustain about 22 percent of the world's population.

In 2002, the PRC, in collaboration with the Global Environment Facility (GEF), formally established the PRC-GEF Partnership to Combat Land Degradation in Dryland Ecosystems. The PRC-GEF Partnership promotes an integrated ecosystem management (IEM) approach to restore, sustain, and enhance the productive capacity of the dryland ecosystems within the western region of the PRC, involving different government sectoral agencies and multiple donors (including significant support from GEF).

An important aspect of the PRC-GEF Partnership's activities provides for strengthening the legal and policy frameworks for controlling LD. The participatory planning approach for the improvement of LD laws was derived from the model developed by the Commission on Environmental Law (CEL) of the International Union for Conservation of Nature (IUCN). The PRC-GEF Partnership established a legal and policy advisory group to provide national oversight and guidance for the implementation of the proposed activities. The advisory group members were selected based on their extensive policy and legislative knowledge. Multi-sectoral counterpart groups at the provincial level were also established to facilitate the implementation of the specific activities.

From 2004–2009, a series of capacity-building activities were implemented to: (i) increase awareness of the benefits of an IEM approach; (ii) improve the knowledge and skills of provincial legislative and policy officials to enable them to assess effectively the current situation for IEM; (iii) locate the gaps, weaknesses and strengths in the current legislative and policy system; (iv) develop capacity among provincial staff to design improved legal and policy procedures for LD control; and (v) develop skills to effectively monitor, evaluate, and improve the provincial legislative frameworks for change.

This report summarizes the numerous activities implemented and documents prepared by the national and local-level expert groups, and presents the valuable lessons learned. The report will provide an excellent reference for all stakeholders involved in the development of legal and policy frameworks to combat LD, not only in the PRC, but also in other regions with similar LD and demographic problems, like central Asia and Africa.

We would like to congratulate the authors and all the other experts involved with documenting the valuable achievements.

Hu Zhangcui

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Foreword

The International Union for Conservation of Nature (IUCN) Environmental Law Programme (ELP) welcomes this publication. It represents the outcome of successful collaboration between international and regional entities working together, in this case, under the Capacity Building Project of the People's Republic of China–Global Environment Facility Partnership on Land Degradation in Dryland Ecosystems (PRC-GEF Partnership Program) to investigate and develop legal and policy solutions to complex land degradation (LD) issues in dryland ecosystems of Western PRC. Two members of the IUCN Commission on Environmental Law (CEL) Sustainable Use of Soils and Desertification Specialist Group had a significant role in the in-country technical aspects, as well as coordinating the completion of this book in conjunction with ELP, PRC and Asian Development Bank (ADB) officials. Furthermore, it demonstrates in a very tangible way how members of the network of environmental law specialists from different parts of the world can work closely with national entities, in this case, the PRC, to contribute to meeting the challenge of IUCN ELP's Mission:

To advance sustainability through the development of legal and policy concepts and instruments, and through building the capacity of societies to develop and implement environmental law and policy, in furtherance of the IUCN Mission.

This book was produced through the collaboration of the PRC, GEF, ADB, the IUCN Environmental Law Centre (ELC) and CEL – working together to present an integrated environmental law and policy framework for managing LD in Western PRC. In particular, ELC and CEL are proud to be associated with this work, and with good reason. The extensive survey of national, regional and international instruments relating to the prevention and control of LD in Western PRC was based on the environmental law and policy evaluation method originally developed from investigations undertaken by the ELP in implementing the initial Soil Resolutions of the IUCN World Conservation Congresses (2000 and 2004), and introduced in IUCN Environmental Policy and Law Paper (EPLP) Nos. 45 and 52. Further, the Legal and Policy Component of the Capacity Building Project successfully integrated the 12 principles of the Integrated Ecosystem Management (IEM), developed by the IUCN Commission on Ecosystem Management (CEM), into the evaluation methodology.

This new publication complements the previous two EPLPs. It takes the investigation into environmental law and policy frameworks for managing LD in dryland ecosystems one step further by the extensive amount of legal and policy material analyzed at different levels (national, provincial, regional, local) and by applying the IEM-based method to effectively point out inadequacies in legislation and policy. From all accounts, this project has undertaken the most comprehensive national-level evaluation of legal and policy materials relevant to LD in the world to date. Moreover, it sets out the reform agenda the PRC is taking to improve its national, provincial, and regional legislation and policy to prevent and control LD in the Western PRC dryland ecosystems.

Significantly, this book points out how the Legal and Policy Component of the Capacity Building Project contributes to the development of international environmental law and policy strategy for the management of LD in dryland regions including to the objectives of the United Nations Environment Programme (UNEP) Montevideo Programme III; the implementation of the World Soils Agenda; the implementation of the conventions on biological diversity, on climate change and on combating desertification; the Plan of Implementation of the World Summit on Sustainable Development (WSSD) 2002; the UNEP Strategy on Land Use Management; and to various aspects of the IUCN Environmental Law Programme.

It is our hope that the experiences from the Legal and Policy Component of the Capacity Building Project outlined in this book will be utilized by other countries and international organizations to improve the planning and strategy for the prevention and control of LD and desertification, and that it will serve to stimulate concrete steps to promote the sustainable use of soils and natural resources in general.

Alejandro Iza

Head, IUCN Environmental Law Programme

Director, IUCN Environmental Law Centre

Sheila Abed

Chair, IUCN Commission on Environmental Law

Acknowledgements

This report is the outcome of an effective partnership between the PRC, GEF, the Asian Development Bank (ADB), and the IUCN ELP. The assistance of many people from the PRC, ADB and IUCN ELP in the preparation and completion of this report is gratefully acknowledged.

First, thanks go to Frank Radstake of ADB and Madam Hu Zhangcui of the PRC for their motivation and support in bringing this publication to fruition as a significant outcome of the Legal and Policy Component of the Capacity Building Project to Combat Land Degradation under the PRC-GEF Partnership on Land Degradation in Dryland Ecosystems. Special acknowledgement goes to Bruce Carrad, formerly of ADB, for his encouragement to compile this report from an early stage of the project.

Special thanks goes to Dr Sheila Abed, Chair of the IUCN CEL, and Dr Alejandro Iza, Director of IUCN ELC and Head of ELP, for their support and encouragement in the completion of the report and ensuring a continuing, successful ELP project on sustainable use of soils and desertification law, to which this report makes a significant contribution. Special thanks also go to Anni Lukács and Ann DeVoy of the IUCN ELC for advice and assistance on the final manuscript, typesetting, and printing.

We gratefully acknowledge the dedication and substantial knowledge contributed by all members of the Legal and Policy Teams of the six provinces and autonomous regions and the Central Legal and Policy Team of the Capacity Building Project. The diligence of the experts from the Legal and Policy Teams, together with that of experts from the Research Institute of Environmental Law, Wuhan University, Wuhan, PRC, in successfully applying the integrated ecosystem management approach and the legal and policy evaluation method and the recommendations that emanated from their work, produced most of the material used to compile this report.

Special thanks also go to the experts of the Central Legal and Policy Experts Advisory Group, and the provincial and regional Experts Advisory Groups, for their substantial contribution to the role of the Legal and Policy Component of the Capacity Building Project. Their special legislative and policy knowledge and expert guidance to the Legal and Policy Component were significant in its overall achievements. We gratefully acknowledge their constructive critique and encouraging comments throughout the term of the project. Special mention is also made of the PRC officials and experts from the Central Project Management Office (CPMO), especially Ran Dongya, Wang Hong (formerly of CPMO) and Tu Fengxin, officials from the provincial and regional Project Management Offices, and the Project Coordination Office. Wang Shuyi, Li Guangbin, Hu Bin and other colleagues from the Research Institute of Environmental Law, Wuhan University, and Law Schools of other PRC Universities, and legal experts from the Pace University and the Environmental Law Institute in the USA also deserve thanks for their special input to the Legal and Policy Component of the Capacity Building Project at various times and occasions, particularly in the many seminars and workshops.

We gratefully acknowledge the contribution of the individual authors to this report for their application and time dedicated to preparing their respective sections – Zhang Kebin, Professor (Beijing Forestry

University, ADB consultant on PRC-GEF Capacity Building Project); Nicholas Robinson, Professor of Law (Pace University); Cai Shouqiu, Professor of Environmental Law (Wuhan University); Zhou Ke, Professor of Environmental Law (People's University of China); Tan Baiping, Specialist of Environmental Law (Beijing University of Technology); and Wang Canfa, Professor of Environmental Law (China University of Political Science and Law).

Finally, the financial support from the IUCN CEL for printing the report is gratefully acknowledged.

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Summary

Chapter 1 – introduces the background to the Legal and Policy Component of the Capacity Building Project under the PRC-GEF Partnership on Land Degradation Control in Dryland Ecosystems and the concept of integrated ecosystem management (IEM). Chapter 1 also introduces the IEM method and its application in the western drylands of the PRC.

Chapter 2 – discusses the development of IEM in international environmental law and how other countries have used an IEM approach and similar natural resource management concepts in the development of national laws, regulations and strategies to prevent and control LD. Chapter 2 introduces the development of IEM in the law and policy framework of the PRC.

Chapter 3 – summarizes the current status and causes of LD in the dryland region of Western PRC. The causes include both natural ecological factors and human-induced activities, where among the latter are excessive disturbance, intensive land use, overgrazing, indiscriminate removal of grassland and forests, and unsustainable use of water resources. The consequences of LD include decreased productivity of natural resources and ecosystems, reduced agricultural output and lower stock productivity, loss of biodiversity, more frequent natural disasters, worsening poverty and social instability.

Chapter 4 – summarizes the legal and policy framework for prevention and control of LD at the national level and for the six provinces and regions of the western drylands. Laws, regulations and policy from nine law areas were assessed: land resources; desertification; water and soil conservation; grassland; forestry; water; agriculture; wild animals and plants; and environmental protection. It discusses the strengths and weaknesses of the legislation and policy to prevent and control LD.

Chapter 5 – summarizes the evaluation of the capacity of the legal and policy framework for the nine law areas. It is based on the IEM approach and takes into account sustainable development. It specifies areas where legislative and policy improvements can be made.

Chapter 6 – outlines the specific areas where the legislation and policy for prevention and control of LD can be improved, including: integrating key environmental concepts and principles from international environmental conventions into domestic legislation and policy; enacting and improving laws and rules, including new national laws for water and soil conservation, wetland conservation, and soil pollution control; revision of provincial regulations and rules; improving land-use planning administration, ecological compensation and the natural reserve system; closing forests for restoration; improving the EIA procedure and practical water and soil conservation systems; improving policy for LD control, including an increased role of science in policy development; strengthening policy coordination and continuity, policy objectives and market mechanisms.

Chapter 7 – outlines how other countries and regions of the world can learn and benefit from the experiences of the Legal and Policy Component of the PRC Capacity Building Project in preventing and controlling LD. It also points out the contribution that the Legal and Policy Component makes

to the development of international environmental law, policy and strategy, including the value of the outcomes to areas with similar geographical and climatic conditions and problems.

Chapter 8 – presents the conclusions and recommendations from the Legal and Policy Component of the Capacity Building Project and makes points about the continuing use of IEM, effect of LD on society, and the benefits of a sound legal framework. It summarizes the key points to emerge from the Legal and Policy Component, including benefits from IEM, law reform, public participation, and enforcement.

1 Introduction

Qun Du¹ and Ian Hannam²

1.1 Background

The *People's Republic of China (PRC)-Global Environment Facility (GEF) Partnership on Land Degradation in Dryland Ecosystems* (hereafter the PRC-GEF Partnership Program) was established to alleviate poverty, control land degradation (LD), and develop ways to rehabilitate dryland ecosystems in Western PRC. Land degradation is a serious problem in the PRC, affecting mostly the northern and western provinces and autonomous regions. As many vulnerable communities are dependent on arid land resources for their livelihood, LD is closely linked to poverty across these provinces and regions. In total, the drylands occupy 40 percent of the PRC. The PRC-GEF Partnership Program is a commitment by the two partners to develop and implement a prioritized programme to address LD by using integrated ecosystem management (IEM) as an approach to combating LD.³

In July 2004, with the support from GEF and under the guidance of the PRC Ministry of Finance, the PRC-GEF Partnership Program officially commenced as a joint effort between relevant government departments, ADB and the six western provinces and autonomous regions.⁴ Overall, the PRC-GEF Partnership Program planned to invest US\$1.5 billion over 10 years in an effort to control severe LD in Western PRC. This was the first time that the PRC Government and GEF joined forces to introduce an IEM approach to combat LD in the PRC's western region as a long-term planning objective. The main purpose of the PRC-GEF Partnership Programme was to create a sustainable cross-sectoral, inter-regional and cross-cutting framework for integrated natural resources management. At this time, the PRC's existing LD control projects in the western region involved the participation of

1 Professor of Environmental Law, 2005-present, Research Institute of Environmental Law, Wuhan University, Wuhan, and Associate Professor of Natural Resources Management, 2001-2005, Beijing Normal University, Beijing, People's Republic of China; Domestic Environmental Law and Policy Specialist, Asian Development Bank for the PRC-GEF Capacity Building Project.

2 Adjunct Associate Professor, Australian Centre for Agriculture and Law, University of New England, Armidale, Australia; International Environmental Law and Policy Specialist, Asian Development Bank, for the PRC-GEF Capacity Building Project.

3 Global Environment Facility. 2000. "GEF Operational Program No. 12: Integrated Ecosystem Management".

4 Asian Development Bank (ADB). 2004. "Financial Arrangement for a Proposed Global Environment Facility Grant and Asian Development Bank Technical Assistance Grant to the People's Republic of China for the Capacity Building to Combat Land Degradation Project". TAR:PRC 36445. The Project was financed by a GEF grant (US\$7.7 million) and administered by ADB. ADB provided a technical assistance (TA) grant to the amount of US\$1.0 million through its TA Special Fund to complement the GEF Grant and government financing; the total government contribution for the Project amounts to US\$6.3 million.

numerous departments, such as the National People's Congress Legislative Affairs Commission, the State Development and Reform Commission, Ministry of Science and Technology, Ministry of Finance, Ministry of Land and Resources, Ministry of Water Resources, Ministry of Agriculture, State Environment Protection Administration (Ministry of Environmental Protection since 2008), the State Forestry Bureau, the State Council Legislative Affairs Office, and the Chinese Academy of Sciences.

The PRC-GEF Partnership Program is administered by a 10-year Country Programming Framework (CPF) (2003–2012).⁵ The emphasis of the CPF is capacity building to improve infrastructure, enhance capacity with regard to financial and technological support for LD control, and to strengthen cross-sector coordination and transboundary management of natural resources. It also provides an improved policy environment for investment and demonstration projects sustainable in dryland areas. The Capacity Building Project to Combat Land Degradation (hereafter Capacity Building Project) was the first project of the PRC-GEF Partnership Program and is under the CPF. It was launched in July 2004. The Capacity Building Project covers the three provinces of Qinghai, Shaanxi, and Gansu, and the three autonomous regions of Inner Mongolia, Xinjiang Uygur, and Ningxia Hui, in the western region of the PRC (see Figure 1). The total population of this area is around 120 million people, with a very high incidence of poverty and severe LD. The Capacity Building Project was implemented from 2004–2009 by the PRC State Forestry Agency and executed by ADB. It had six components:⁶

1. improving policies, laws and regulations for LD control (hereafter the Legal and Policy Component),
2. strengthening national and provincial coordination,
3. improving operational arrangements at provincial/autonomous region and country levels,
4. capacity development for LD investment projects,
5. monitoring and evaluation system for LD, and
6. implementation arrangements for the CPF.

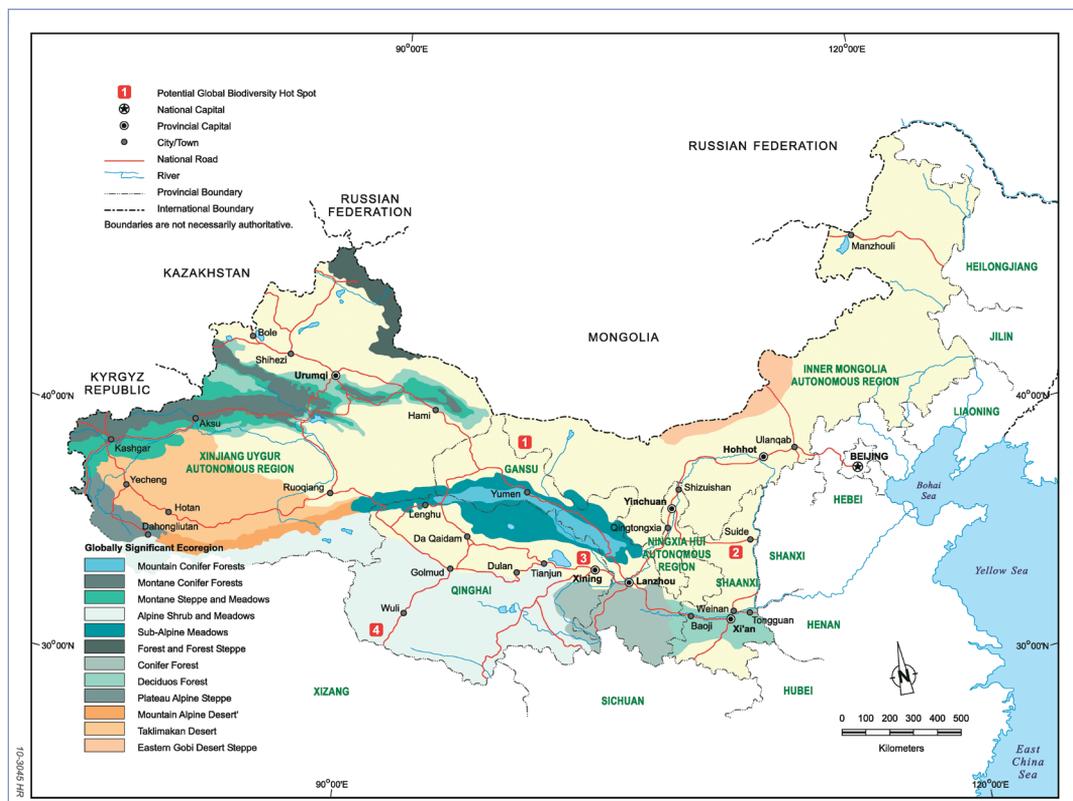
The Legal and Policy Component was designed to improve the laws and policies for LD control by applying the IEM concept and approach in the six provinces and autonomous regions of Western PRC.

In 2008, it was decided it would be useful to prepare a comprehensive publication to document the experiences of the Legal and Policy Component of the Capacity Building Project, including its contribution to environmental law reform for LD control in the PRC, and the world in general.

5 Total investment in the CPF was estimated at US\$1.5 billion; GEF is providing US\$150 million in grant assistance.

6 ADB, *supra* note 4; Hannam, I.D. and Du Qun. 2007. "Environmental Law Reform to Control Land Degradation in the People's Republic of China: A view of the legal framework of the PRC-GEF Partnership Program". In: Chalifour, N.J., Kameri-Mbote, P., Lin Heng Lye and Nolon, J.R. (eds) *Land Use Law for Sustainable Development*. IUCN Academy of Environmental Law Research Studies. Cambridge University Press.

Figure 1. Location of capacity building project to combat land degradation in western dryland PRC



Source: Radstake, Frank, et al. 2010. *Dryland Ecosystems: Introducing an Integrated Management Approach in the People's Republic of China*. Manila: Asian Development Bank

1.2 The Integrated Ecosystem Management Concept

The IEM concept (terminologically identical to “ecosystem approach” or “ecosystem management”) has been applied in international environmental law and progressively developed into normative principles and rules. In international environmental law, IEM is generally inferred in the *Convention on Biological Diversity* (CBD).⁷ The CBD does not specifically define IEM, but the definition of “ecosystem” in Article 2 closely relates to the IEM concept – where “ecosystem” means “a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit”. The 5th Conference of the Parties (COP) of the CBD in May 2000 described 12 Principles for Ecosystem Management.⁸ In 2004, the 7th CBD COP pointed out, “the ecosystem approach is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way The application of the ecosystem approach

⁷ *Convention on Biological Diversity* 1992.

⁸ CBD COP 5, 2000, Nairobi, Kenya; see Decision V/6, “Ecosystem Approach” for a description and the principles of the ecosystem approach; see: <http://www.cbd.int/decision/cop/?id=7148>.

will help to reach a balance of the three objectives of the Convention: conservation; sustainable use; and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources".⁹ The *United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification Particularly in Africa* (UNCCD) has many articles that relate to the IEM concept.¹⁰ Article 2 states that to achieve the objective of the Convention will involve "long-term integrated strategies that focus simultaneously, in affected areas, on improved productivity of land, and rehabilitation, conservation and sustainable management of land and water resources, leading to improved living conditions, in particular at the community level". Annexes of the UNCCD contain articles that refer to, or call for, actions based on integrated and sustainable management of natural resources.¹¹ The *Statement of Principles on Forestry* addresses many IEM principles, including the integrated and sustainable management of forest resources.¹²

1.2.1 IEM and the PRC-GEF partnership

The Capacity Building Project further defines IEM as "a holistic approach to address the linkages between ecosystem functions and services (such as carbon uptake and storage, climatic stabilization and watershed protection, and medicinal products) and human social, economic and production systems".¹³ It explains that IEM recognizes that people and the natural resources on which they depend, directly or indirectly, are inextricably linked. Rather than treat each resource in isolation, it offers the option of treating all elements of ecosystems together in order to obtain multiple ecological and socio-economic benefits.¹⁴ From a legal perspective, as a comprehensive strategy and method to manage natural resources and the natural environment, IEM is a suitable framework in which to consider the national and provincial legislation of dryland PRC. By definition, IEM requires taking all components of an ecosystem into account and a consideration of the social, economic and natural environment. Sustainable forest management (SFM) can be considered as a good example of applying the ecosystem approach. Further, there is potential to use the tools developed under SFM to implement the ecosystem approach. These tools include, *inter alia*, the criteria and indicators for SFM developed under various regional and international processes, national forest programmes, and forest certification schemes. In a conceptual, strategic, methodological or ideological sense it is

9 CBD COP 7, 2004, Decision VII/11, "Ecosystem Approach"; see: <http://www.cbd.int/decision/cop/?id=7748>.

10 UNEP. 1994. *United Nations Convention to Combat Desertification*, Nairobi.

11 E.g., Article 8 of Annex 1 – Africa; Article 4 of Annex II – Asia; Article 3 of Annex III – Latin America and Caribbean.

12 United Nations. 1992. "Report of the UNCED. Annex III. The Non-legally Binding Authoritative Statement of Principles for a Global Consensus on the Management, Conservation and Sustainable Development of all Types of Forests"; see Principles 2(b), 3(c), 6(b).

13 Jiang Zehui. 2006. "To Implement Integrated Ecosystem Management to Accelerate Combating Land Degradation". In: Jiang Zehui (ed.), *Proceedings of International Workshop on Integrated Ecosystem Management*, Beijing 1–2 November 2004, pp. 2–6. Global Environment Facility, Asian Development Bank and People's Republic of China Forestry Publishing House.

14 de Klemm, C., in collaboration with Shine, C. 1993. *Biological Diversity Conservation and the Law*. Gland, Switzerland and Cambridge, UK: IUCN.

considered that IEM is similar to sustainable development. IEM does not exclude other approaches and methods of conservation and protection, e.g., sustainable management, biosphere reserves, protected areas, species conservation plans, but IEM can successfully integrate with these other approaches and methods to tackle complex natural resource management situations.¹⁵

1.2.2 Content of IEM

IEM refers to various principles, operational guidelines and instructions.¹⁶ In May 2000, the CBD COP5 adopted *Five Descriptions* (Box 1) and *Twelve Principles* (Box 2) of the IEM approach,¹⁷ which were later adopted by the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA). This clarified the ecosystem approach as of instructive value to biodiversity conservation and management and furthered the implementation of the CBD.¹⁸ The *Five Descriptions* of the ecosystem approach and the *Twelve Principles* consolidate the content of IEM in a scientific management rationale and together, under the Legal and Policy Component of the Capacity Building Project, they provide a suitable framework to understand and improve the operational aspects of law and policy to control LD in Western PRC.

Box 1. The five descriptions of IEM¹⁹

- (i) The ecosystem approach is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way.
- (ii) An ecosystem approach is based on the application of appropriate scientific methodologies focused on levels of biological organization, which encompass the essential structure, processes, functions and interactions among organisms and their environment. It recognizes that humans, with their cultural diversity, are an integral component of many ecosystems.
- (iii) This focus on structure, processes, functions and interactions is consistent with the definition of “ecosystem“ provided in Article 2 of the Convention on Biological Diversity.
- (iv) The ecosystem approach requires adaptive management to deal with the complex and dynamic nature of ecosystems and the absence of complete knowledge or understanding of their functioning. ▶

15 CBD COP 7, 2004, adopted the decisions on the ecosystem approach, see Decision VII/11; in addition to SFM, many other existing approaches, including ecosystem approaches, ecosystem-based management, as well as integrated river-basin management, integrated marine and coastal area management and others are consistent with the application of the ecosystem approach of the Convention, and support its implementation in various sectors or biomes.

16 As a normative concept, it was first proposed by the Advisory Group in the expert meeting of CBD COP Jakarta 1995.

17 CBD Decision V/6, *supra* note 9.

18 See SBSTTA 9 Recommendation IX/6, “Ecosystem approach: further elaboration, guidelines for implementation and relationship with sustainable forest management”. Subsidiary Body on Scientific, Technical and Technological Advice 9th Meeting, Montreal, 10–14 November 2003.

19 *Ibid.*

(v) The ecosystem approach does not preclude other management and conservation approaches, such as biosphere reserves, protected areas, and single-species conservation programmes, as well as other approaches carried out under existing national policy and legislative frameworks, but could, rather, integrate all these approaches and other methodologies to deal with complex situations.

Box 2. The twelve principles of IEM²⁰

Principle 1 – The objectives of management of land, water and living resources are a matter of societal choice.

Principle 2 – Management should be decentralized to the lowest appropriate level.

Principle 3 – Ecosystem managers should consider the effects (actual or potential) of their activities on adjacent and other ecosystems.

Principle 4 – Recognizing potential gains from management, there is usually a need to understand and manage the ecosystem in an economic context.

Principle 5 – Conservation of ecosystem structure and functioning, in order to maintain ecosystem services, should be a priority target of the ecosystem approach. Its rationale of ecosystem functioning and resilience depends on a dynamic relationship within species, among species and between species and their biotic environment, as well as the physical and chemical interactions within the environment.

Principle 6 – Ecosystems must be managed within the limits of their functioning.

Principle 7 – The ecosystem approach should be undertaken at the appropriate spatial and temporal scales. Its rationale is for the approach to be bounded by spatial and temporal scales that are appropriate to the objectives.

Principle 8 – Recognizing the varying temporal scales and lag-effects that characterize ecosystem processes, objectives for ecosystem management should be set for the long term.

Principle 9 – Management must recognize that change is inevitable (the ecosystem approach must utilize adaptive management in order to anticipate and cater for such changes and events and should be cautious in making any decision that may foreclose options, but, at the same time, consider mitigating actions to cope with long-term changes such as climate change).

Principle 10 – The ecosystem approach should seek the appropriate balance between, and integration of, conservation and use of biological diversity. ►

20 *Ibid.*; see explanation of the ecosystem approach by the IUCN Commission on Ecosystem Management at http://cms.iucn.org/about/union/commissions/cem/cem_work/cem_ea/.

Principle 11 – The ecosystem approach should consider all forms of relevant information, including scientific and indigenous and local knowledge, innovations and practices.

Principle 12 – The ecosystem approach should involve all relevant sectors of society and scientific disciplines.

1.3 The legal and policy component of the capacity building project

Under the Capacity Building Project, the objective of the Legal and Policy Component was “to improve the policy and regulatory framework for LD control as an essential part of strengthening the PRC’s enabling environment and to build capacity to adopt an integrated approach to sustainable land management”. It aimed at improving existing policies, laws, regulations and procedures, including incentives for combating LD, especially at the provincial and regional level. This was achieved using three programmes: (i) improvement of the law and policy framework to enhance institutional capacity to combat LD; (ii) capacity building for implementation of law and policy; and (iii) a supporting study programme on specific subjects to innovate and reform environmental laws and policies for LD control.²¹ The six activities of the Legal and Policy Component are outlined in Box 3.

Box 3. Activities of the legal and policy component

- (i) A comprehensive legislative and ecological information system for legal, policy and institutional arrangements for LD control;
- (ii) Standard provincial procedures based on best practices covering organizations, land management, community participation, financing arrangements, and regulatory and non-regulatory approaches for enforcement;
- (iii) Harmonization of laws, regulations and policies, covering grasslands, desertification, water and soil conservation, water, forestry, agriculture, land administration, environmental protection and environmental impact assessment;
- (iv) Capacity building for law and policy implementation and compliance, including development of an interagency coordination mechanism; procedures for ecosystem function zones to be integrated with other zones used in different sectors; a mechanism to monitor the effectiveness of laws and policies for LD control;
- (v) Procedures under the Environmental Impact Assessment Law for LD control;
- (vi) Legal procedures for private sector involvement, including land tenure; land-use rights; gender rights and market access; compensation measures for grassland closure; and

21 For full explanation see “Component 1 – Improving Policies, Laws and Regulations for Land Degradation Control”, in: ADB, *supra* note 4, at p. 11.

preparation of measures to address sustainable livelihoods in consideration of poverty alleviation, minority groups and gender rights.

The Legal and Policy Component was designed in such a way that each province and region could develop a practical framework to enhance the capability of different groups to implement IEM law and policy, including legal officers, legal draftsmen, judicial officials, policy makers, government officials and private individuals. A number of training workshops throughout the project period established links between policy and law, environmental impact assessment (EIA), and judicial and legislative remedies. Workshops undertaken at the central and provincial levels used the latest international environmental law training techniques.²² The central and provincial legal and policy experts investigated and assessed laws, regulations and policies, a process which produced a substantial amount of legal and policy information for reform at these levels.²³ The methodological approach comprised six steps which were based on a technique originally developed to assess laws and policies for sustainable land and water management.²⁴

1.3.1 Method

The starting point to assess the capacity of the existing legal and policy framework for LD control was the categorization of legislative materials into nine principal law areas:²⁵

1. Grassland
2. Desertification
3. Water and soil conservation
4. Water resources
5. Forestry
6. Agriculture
7. Land administration

22 Cai Shou Qiu. (ed.) 2007. *Legal and Policy Training Manual for GEF-PRC Partnership in OP 12 Land Degradation in the PRC*. Wuhan, PRC: Research Institute of Environmental Law, Wuhan University.

23 E.g., reports on the assessment of the capacity of the legal and policy framework in IEM at central, provincial and regional levels. Chapters 4, 5 and 6 of this publication draw on various aspects of the reports and their recommendations; for more information on Capacity Building Project, see: Radstake, Frank, *et al.* (2010). *Dryland ecosystems: introducing an integrated management approach in the People's Republic of China*. Mandaluyong City, Philippines: Asian Development Bank.

24 Hannam, I. 2003. *Legal and Institutional Framework for the Management of Water and Land in South East Asia and the People's Republic of China: A Method*. Research Report No. 73. Colombo, Sri Lanka: International Water Management Institute.

25 Nine principal law areas decided at the 4th meeting of the Central Legal and Policy Expert Advisory Group, 10 October 2005. See Hannam, I.D. with Boer, B.W. 2002. *Legal and Institutional Frameworks for Sustainable Soils. A Preliminary Report*, Section 4.2 "Soil Legislation Framework Categories". IUCN EPLP No. 45. Gland, Switzerland and Cambridge, UK: IUCN.

8. Environmental protection
9. Environmental impact assessment

Legal and Policy Teams were formed at the central, provincial and regional levels to apply the six-step assessment procedure,²⁶ which was modified to accommodate the principles of IEM in the provincial and regional law and policy reform process.²⁷ The assessment process was facilitated by officials from the People's Congresses and Governmental Legislative Offices of Qinghai, Gansu and Shaanxi provinces and Inner Mongolia, Xinjiang Uygur and Ningxia Hui autonomous regions.

1.3.1.1 Step 1. Prepare criteria (elements) for IEM in LD law and policy

- The definition of IEM is an indicator of the type of legislative materials relevant to implementing IEM. Each individual component of the definition was used as an indicator of the specific type of law or legal system needed to implement IEM, and the type of legal and institutional elements needed to achieve IEM. The legal and institutional elements that enable IEM to be achieved can be a principle or rule or direction of conduct that can be used in its existing form or modified to perform the role of a legal mechanism (such as a direct statutory function or an administrative function), or as a legal principle (a rule of conduct) in legislation.
- The elements are used singly or in combination with other legal mechanisms or principles to invoke a legally based action to achieve IEM. In the PRC, these elements can be distributed among a number of individual national laws.
- A number of core “essential elements” have been developed through an evaluation of legal and ecological principles aimed at achieving a desired standard of performance in IEM.²⁸ These elements are used to: (a) guide the reform of an existing law for IEM, or to develop new legislation based on IEM (for a law to be effective, each legal and institutional element must have the capacity to achieve a prescribed level of ecological management or standard for IEM);²⁹ (b) assess the capacity (see Step 2) of an existing instrument to meet prescribed standards of performance for IEM. Depending on the assessed capacity of the law to achieve these standards, additional elements may be formulated.

26 PRC-GEF Partnership on Land Degradation in Dryland Ecosystems Capacity Building to Combat Land Degradation Project. 2005. *A Method to Determine the Capacity of Laws and Regulations to Implement IEM*, Component 1 – Improving Policies, Laws and Regulations for Land Degradation Control.

27 These steps had been rigorously tested in earlier ADB Technical Assistance Projects, including the National Soil and Water Conservation Strategies 2002 (ADB TA 4404) and Yellow River Law Study 2004 (ADB TA 3708).

28 Hannam, *supra* note 24, pp. 14-18; “Essential elements” are derived through an evaluation of legal and ecological principles that, in combination, aim at achieving a desired level or standard of performance in sustainable land management; for example, at the international level the UN Convention to Combat Desertification contains such “essential elements” as ‘national strategies’, ‘monitoring’ and ‘public participation’ to achieve global goals in combating desertification, while at the national level, the PRC national Law on Prevention and Control of Desertification includes similar provisions to achieve national goals in desertification prevention and control.

29 “Law” in this context means a body of law enacted by a legislature, e.g., an act, decree, regulation, code or other formal legal instrument that is legally enforceable. It can include agreements or covenants that are expressed to be legally binding.

1.3.1.2 Step 2. Assess and review capacity of existing laws and policies to implement IEM (see Chapters 5 and 6)

- The legislation for LD control is in many forms. It includes laws with a capacity to manage or control any aspect of LD. There is no national law for LD control in the PRC but individual laws on the nine principal areas referred to above interact to manage LD.
- A guide was developed to assess and review legislation with a capacity for LD control, specifically addressing LD issues, and to assist the process of integrating legislative elements for LD control within existing environmental laws, or framing a new broad environmental law. The “capacity” was determined by the number and type of essential legal and institutional elements present within the laws, in a format that enables implementation of IEM, and with the legal, administrative and technical capability to take some form of positive action for LD control.³⁰
- Most IEM issues are multi-factorial (i.e., include sociological, legal and technical components), so generally more than one piece of legislation, along with detailed regulations, will be needed to manage each individual LD issue. A variety of legal and institutional elements and mechanisms may also be required, which reinforces the necessity to analyze the existing legislation to ascertain current management regimes and their interactions. The information generated by the analysis was used as a guide as to the type of legislative and institutional elements that could be included within a new legislative regime for each level of LD control.

1.3.1.3 Step 3. Prepare new procedures to implement IEM in the policy and law framework, based on legal and ecological concepts (see Chapter 6)

- New legal procedures are based on the IEM approach to form the linkages between ecosystem functions and services (such as carbon uptake and storage, climatic stabilization and watershed protection, and medicinal products) and the human social, economic and production systems (such as crop production, nomadic and sedentary livestock raising, and provision of infrastructure).
- The procedures recognize that people and the natural resources they depend upon, such as land, water and forests, directly or indirectly are inextricably linked. For the laws to be effective in controlling LD, they must contain specific legal and institutional “elements” that enable stakeholders to cooperate with each other, and key decision-making functions can be coordinated to achieve integrated solutions to LD problems.

1.3.1.4 Step 4. Revise, amend or replace existing laws and policies and recommend new procedures (see Chapter 6)

- Existing laws which form the basis for introducing IEM for LD control in the PRC include: the *Agriculture Law*, *Desertification Law*, *Grassland Law*, *Land Administration Law*, *Environmental Impact Assessment Law*, *Water Law*, *Water and Soil Conservation Law*, *Forestry Law*, *Water Pollution Prevention and Control Law*. Once the capacity of these laws for effective LD control is established, decisions can then be made on which laws, regulations or policies should be revised, amended or replaced.

³⁰ In some cases, “capacity” was direct and obvious. In others, it exists in a format that enables some form of indirect action. “Capacity” is represented in the form of legal rights, the type of legal mechanisms and, importantly, the number and comprehensiveness of the essential elements identified above.

1.3.1.5 Step 5. Identify the support systems for the new legal and policy framework for LD control (see Chapter 6)

- Identify the type and extent of changes to make within particular institutions and how stakeholder institutions will integrate or coordinate their functions.
- Prepare a long-term training and education plan on the role and implementation of the framework.
- Prepare explanatory guidelines to interpret and implement the framework.
- Prepare community information procedures on the implementation of the framework and develop a plan for community participation and feedback.
- Link the framework to an environmental law and policy information system (Step 6).

1.3.1.6 Step 6. Prepare a legal and policy monitoring and evaluation system

- Each province and region will develop a comprehensive provincial system to monitor the implementation of the provincial legal and policy framework.
- This system links with the legal and policy information system prepared under the Law and Policy Component of the Capacity Building Project.³¹
- The system links with the LD GIS prepared under Component 5 of the Capacity Building Project.

1.3.2 Legal elements and guidelines that accommodate IEM

The International Water Management Institute Research Report - *Legal and Institutional Framework for the Management of Water and Land in South East Asia and the People's Republic of China: A Method*, provides 17 legal and institutional elements to evaluate laws and policies for sustainable water and land management.³² These elements are the outcome of a comparative study of laws and policies in a number of Asian countries and other regions of the world. Following a review of these 17 elements by the central, provincial and regional legal and policy teams of the Capacity Building Project, 20 legal elements were re-formulated from these that could accommodate IEM within the structure of the PRC legal and institutional system, and, in particular, the legislative, administrative and policy system of the western region, as follows:

1. *Legal objectives and basis of legislation*: Includes a clearly identifiable statement of the intended purpose of a legal instrument, which has a direct relationship to the general objective for IEM and the basis for IEM rules. It may be expressed either as a single or multi-functional statement, but can also be in the form of a series of independent statements that collectively convey the intent and purpose of the legal instrument in a way to achieve IEM.
2. *Object of legislation and scope of application of law*: Includes statements of object of laws and policies related to IEM, and the scope of application of the laws. It may be expressed in one or

31 Ross, J. 2008. "Provincial Policy and Law Information System". Component 1, Improving Policies, Laws and Regulations for Land Degradation Control. Report to Capacity Building Project, the PRC-GEF Partnership on Land Degradation. Beijing, People's Republic of China: Central Project Management Office.

32 Hannam, *supra* note 24; and Section 1.2.2; Hannam, I.D. and Boer, B.W. 2004. *Guide to Drafting Soil Legislation*. Gland, Switzerland and Cambridge, UK: IUCN, for the 17 standard legal and institutional elements for sustainable use of soil.

- multiple statements, indicate timeline, spatial and social limits, or specify the activities to be applied by the law.
3. *Liability and rights of natural resource sustainable use and management*: Includes statements of liabilities and rights of natural resource sustainable use, and management of all kinds of social subjects, specifically, the status, roles, rights and liabilities of persons, entities, gender, and ethnic groups. It includes text for the preservation and heritage of ethnic, folk, traditional knowledge and techniques in favor of land protection. It includes the right that persons enjoy a healthy natural environment, liability and rights that entities have in sustainable natural resource use, the status and rights of gender, protection of indigenous interests, knowledge and techniques.
 4. *Protection of the country's land quality and interests*: Includes the stipulation of rights and liabilities of the State, collectives, contractors, and beneficiaries of land transition; and the conservation criteria for land quality for IEM. It contains rights and liabilities of country landowners, users, contractors and residents in the course of land transition, contracting or resettlement.
 5. *Definitions and terminology*: Includes the presence of statements or terminologies that define or describe the meaning of key words, phrases or terms in a form that relate to the implementation of IEM. The CBD states the fundamental requirement for conservation of biodiversity is the *in situ* conservation of ecosystems and natural habitats. It highlights the direct relationship of these to the operation of the particular legal instrument. They may also convey intent to engage in a prescribed level of action, or achieve a particular standard for IEM. Definitions are used to interpret the legislation, in either a general sense of understanding, scope and application, or in a direct, technical operational sense relating to the role in the implementation of the law.
 6. *Policy*: Includes statements about an intended course of action, and may include statements of an attitudinal, principled or strategic nature, and/or the existence of any function or activity that enable the development of materials for these purposes and to achieve IEM. It may be national policy, legislative policy and practical measures to implement IEM in the law. There needs to be consistency between the law, policy and practical measures.
 7. *Duty of care*: Includes the presence of terminology, functions, activities, policies and strategic materials that convey a cooperative and participatory commitment to take reasonable and practical steps to achieve IEM. They may include single or multiple stipulations of the sectors, institutions and members to take a common responsibility or liability for IEM.
 8. *Responsibility of governments and administrative institutions*: Includes the terminology and functions that create a responsibility and commitment to achieve IEM through different levels of administration, and with a variety of administrative functions. Through the structure of an organizational or institutional "hierarchy", particular "rights" and "obligations" may be established at respective levels of administration for individuals, or for specific classes of people. It addresses institutional coordination. It specifies governmental competency, responsibility of a principal authority, associate authority, heads of authority or government, and an institutional coordination mechanism.
 9. *Organ of stakeholders*: Includes general statements referring to the active role and responsibilities in IEM of various types of stakeholders, including scientific research organs or technical service organs, country autonomous organizations and non-governmental organizations (NGOs). They

- may be integrated into policy objectives of institutions, incentives, responsibilities, norms, customs, plans and procedures, practical guidelines and conventions, to improve the operation of these mechanisms. It specifies the role of organs for research and technical services, technology promotion, the role of country autonomous organizations and NGOs, the role of farming organs (farmers' associations, economic-aid units) and other citizens' organs.
10. *Administrative regulation*: Includes statements, criteria and evaluation procedures for processes and activities of sustainable use or the conservation of natural resources and their ecological function. It includes restrictive or prohibitive regulations of activities that contaminate natural resources or threaten the sustainable use of natural resources, e.g., on-site checking and permits. It specifies the evaluation of existing or potentially threatening processes or activities to the sustainable use of natural resources, standards of ecological sustainability of natural resources, restrictive or prohibitive activities to natural resources, and other administrative measures.
 11. *Education, research and publicity*: Includes functions, activities, policies or statements relating to educational activities aimed at achieving IEM. These would include technical training courses, skills development programmes, the preparation and dissemination of materials for these activities, and human resources and financial arrangements for educational activities.
 12. *Survey, monitoring, statistics and evaluation*: Includes functions, activities and programs relating to survey, research, monitoring, collection of statistics and evaluation of natural resources and ecosystems, to acquire knowledge and information on the status of ecosystems and management of scientific, technological, social and economic information for the public and decision makers.
 13. *Public participation*: Includes the presence of functions, activities and programmes in a legal instrument that enable interaction with a community of people, or to engage in participatory activities relating to IEM. It includes public interest groups' right to information, an organizational system of public participation, public hearings and other procedures. It includes references to general capacity building, improving awareness, knowledge and skills, problem identification, or some form of technical or practical activity related to IEM. It may also include a mechanism for stakeholders to have formal communication with an organization on problem identification, problem-solving, decision-making, and consultative processes aimed at IEM.
 14. *Programming, zoning and planning of sustainable use of natural resources*: Includes the presence of statements, functions, activities or programmes in a legal instrument that enable IEM to be applied in land programming, zoning and planning activities. It includes references to technical surveys, database development, assembling knowledge on the ecological distribution of natural resources, the ecological condition of natural resources, preparing standards for use of natural resources, natural resource evaluation, classification, environmental assessment, plan development, land zoning, references to plan implementation, monitoring plans and actions, preparation of explanatory materials, and the transparency of implementation of these plans and actions.
 15. *Management of ecology of natural resources and ecosystems*: Includes the presence of statements, functions, activities and programmes in a legal instrument that enable the preparation and direct implementation of IEM in land management programmes. It includes references to EIA, specific types of ecosystem conservation works, projects and design criteria, the construction and

- implementation of the works and projects, and monitoring the outcome of implementation. This element also considers procedures to develop environmental standards, limits of use, including the criteria and matters of concern for development, and specifies the implementation process.
16. *Financial input and market-based incentives*: Includes the presence of statements, functions, activities or programmes in a legal instrument that provide for the financing of projects or activities, market-based instruments or raising money for IEM implementation. It may include reference to budgetary procedures, specific funds, financial compensation or subsidies in special consideration of the interests of disadvantaged small land users, and preferable financial policy for implementation of IEM.
 17. *Compliance, enforcement and inspection*: Includes the presence of statements, functions or mechanisms in a legal instrument that must be obeyed or complied with at a defined standard, or in the form of a direct obligation, or prescribed standard of behaviour. There can be reference to a regulation, or a regulatory role for an administrative authority to invoke enforcement measures including the issue of a preliminary injunction, ordering protective land management measures or orders to restrict illegal conduct that is threatening sustainable use of natural resources. It provides for a legal notice or direction from a regulator or court order. This element is the rule of legal binding or the normative rule, and includes notification, or an administrative decision or order from an authority. It includes the procedure to carry out this role, and to regulate certain activities that are directly beneficial to IEM. It includes self-compliance, regulation of ecological conservation, temporary measures for ecological conservation, administrative appeal, and inspection for ecological conservation.
 18. *Dispute resolution*: Includes the presence of statements, functions, activities or programmes, in a legal instrument that enable settlement of a conflict or disagreement between parties, generally over access, or a perceived right of access, to natural resources or the use of natural resources. Various processes and facilities are available for dispute resolution including conciliation, mediation, arbitration processes, and the courts. These procedures normally include provisions for appeal.
 19. *Legal liability and responsibility by law*: Includes the presence of statements, functions, activities or programmes, in a legal instrument that enable redress and penalty for violation of a law or regulation of IEM and natural resource management. It includes various types of liability and responsibility in civil, administrative and criminal law, procedures for lawsuits, and administrative appeals. It mainly occurs in three forms—civil, administrative and criminal liability.
 20. *Others*: Includes any other one-off form of element in a law or regulation, not provided for above, but relevant to IEM.

1.4 Application of IEM in western dryland PRC

As indicated in Boxes 1 and 2, IEM is a concept, principle and strategy, and a methodological approach for sustainable use of natural resources and, for this reason, it is very applicable to the management of western dryland PRC. It recognizes the connection between humans and nature, and the dependence of humans on natural resources. It demands that ecosystems be managed in an

integrated manner in which every component of an ecosystem, ecological attributes, and all aspects of human society (i.e., social, economic, political and cultural factors of Western PRC) are taken into account in natural resources decision making. In particular, IEM provides for the needs of humans and nature to be considered in an equitable and balanced way. Maintaining sound ecosystem functioning is fundamental for human well-being and livelihood. Perhaps the most important aspect of IEM for the management of LD in the western region is that IEM calls for the integration of disciplines (natural science and social science, e.g., agronomy, ecology, environment, management, sociology, economics, law and knowledge), and the application of knowledge and techniques in all aspects of natural resource use and ecological conservation.³³ It requires cross-sector coordination and cooperation among the principal governmental departments, and, in the case of Western PRC, this includes departments responsible for forestry, agriculture, animal husbandry, hydro-resources, environmental protection, national defence, science and technology, finance, planning, legislation and judiciary.

1.4.1 Implementation and benefits of IEM

To satisfy the aspects of IEM presented below, it is generally considered that IEM is best implemented through an integral framework across government departments, professions and respective jurisdictions. At all levels, IEM must therefore consider ecological and social factors in national planning of ecological conservation and in LD control programmes and governments must adopt a participatory approach in executing natural resource use planning functions. This holistic approach optimizes financial and other resources where, under the objective of the Capacity Building Project, the PRC recognizes that many organizational systems will need to be reformed and administrative mechanisms improved to accommodate IEM in conservation of the environment and control of LD.³⁴ The implementation of IEM through the Capacity Building Project has been influential in promoting awareness of a new approach in natural resource management, legislative development and legal reform in the PRC.³⁵ The application of IEM in the six provinces and autonomous regions provided impetus for the adoption of sustainable use practices in natural resource planning and management. This is enhancing the PRC's implementation of the UNCCD, CBD, and the United Nations Framework Convention on Climate Change (UNFCCC), in particular.

The benefits of applying IEM in the legal and policy processes of the six provinces and autonomous regions of Western PRC under the Capacity Building Project are substantial, and include the following:³⁶

- IEM provides a scientific approach for the PRC to fulfill its commitments to various multilateral conventions concerning environmental protection and sustainable use of natural resources, and IEM establishes a strategic framework to manage land, water and biological resources for sustainable development.

33 Stocking, M.A. 2006. "The Evolution of Integrated Ecosystem Management as an Approach for Managing Natural Resources". In: Jiang Zehui (ed.), *supra* note 13, at pp. 23–39.

34 ADB, *supra* note 4; Hannam and Du Qun, *supra* note 6.

35 Jiang Zehui. 2006. *Supra* note 13.

36 ADB, *supra* note 4.

- The IEM approach is a cross-cutting mechanism that accommodates multiple scientific means and is a good policy tool to coordinate national implementation requirements of international environmental conventions and strategies.³⁷
- It is an effective means to achieve sustainable use of natural resources and combat LD. It is a sound framework for reviewing and solving issues concerning natural resource ownership, use of protected areas, access to resources, and benefit sharing. Stakeholders have been encouraged to participate in and gain benefits from reforms in the management processes.
- The flexible framework of IEM provides multiple options for implementation, including incorporation of IEM principles in national strategies and action plans, regional plans, and applying IEM principles in policy making, land-use and institutional planning. It is a good basis for reform of institutions and organizations to support sustainable use of ecosystems and natural resources.
- IEM reflects a multiplicity of mechanisms including administrative, market-based and societal mechanisms that have been applied in natural resource management. IEM follows the spirit of good governance and is welcomed by civil society and the ecological community. It is an important means to alleviate poverty and enhance sustainable development.³⁸
- IEM is a relevant tool for planning, decision making and evaluating ecosystem activities associated with all aspects of management, policy and law. A better understanding of IEM and its implementation capabilities was a key objective of the Capacity Building Project. Significantly, the outcomes from the Capacity Building Project indicated that the provinces and autonomous regions made significant improvements in law and policy reforms by using this concept.³⁹

The Legal and Policy Component of the Capacity Building Project committed the central government and the governments of three provinces and three autonomous regions to adopt IEM for the improvement of the capacity of the legal framework in dealing with LD. It provides valuable opportunities for the PRC to introduce IEM into its legal and policy framework by taking note of international best experiences and rules of law.

37 Hannam, I. 2007. "Environmental law and policy frameworks to manage land degradation in the dryland ecosystem areas of [the People's Republic of] China". *J. World Assoc. Soil Water Conserv.* J2: 63–74.

38 See WSSD. 2002. "WSSD Plan of Implementation" and "The Johannesburg Declaration on Sustainable Development". United Nations; and WSSD WEHAB (Water, Energy, Health, Atmosphere and Biodiversity) Working Group. 2002. "A Framework for Action on Agriculture".

39 The six provinces and autonomous regions finalized their respective *Report on the Assessment of Regulations, Policies and Institutional Capacity for Land Degradation* in 2007; for reference to these initiatives see Radstake, *et al.* 2010, *supra* note 23, pp. 19-24.

2 Overview of Integrated Ecosystem Management in a legal and regulatory perspective: international and national experiences

Cai Shouqiu,⁴⁰ Du Qun⁴¹ and Nicholas Robinson⁴²

With the development of the science of ecology, the concept of “ecosystem” has been applied in the laws of various countries, and the IEM concept has been used widely in international environmental law. The concept originated in the ecological sciences and has evolved into a series of guidelines and regulations for the management of international environmental resource activities, especially biodiversity. It has now been popularized as a performance tool in international environmental law and national legal regimes.

2.1 The development of IEM in international environmental law

In order to protect ecosystems, international society has introduced various conventions dealing with the international environment and its resources, such as the *Convention on Wetlands of International Importance Especially as Waterfowl Habitat* 1971 (Ramsar Convention), the *Convention Concerning the Protection of the World Cultural and Natural Heritage* 1972 (World Heritage Convention), the *Convention on International Trade in Endangered Species of Wild Fauna and Flora* 1973 (CITES), the *Convention on the Conservation of Migratory Species of Wild Animals* 1979 (CMS), the *Convention on Biological Diversity* 1992 (CBD), the *United Nations Framework Convention on Climate Change* 1992 (UNFCCC) and *United Nations Convention to Combat Desertification* 1994 (UNCCD). It is estimated that one third of international treaties created since the 1970s are concerned with species, habitats and special zones as well as climate, and these are mostly related to ecosystem management.

The early embodiment of the concept of IEM in an international treaty is the *Convention on the Conservation of Antarctic Marine Living Resources* 1980 (CCAMLR). In its Preamble, this Convention “Recognizes(ing) the importance of safeguarding the environment and protecting the integrity of the

40 Distinguished Professor of Environmental Law, Wuhan University, Wuhan, People’s Republic of China; Domestic Environmental Law and Policy Training Specialist, for the PRC-GEF Capacity Building Project.

41 Professor of Environmental Law, 2005-present, Research Institute of Environmental Law, Wuhan University, Wuhan, and Associate Professor of Natural Resources Management, 2001-2005, Beijing Normal University, Beijing, People’s Republic of China; Domestic Environmental Law and Policy Specialist, Asian Development Bank for the PRC-GEF Capacity Building Project.

42 Distinguished Professor of Environmental Law, Pace Law School, Pace University, White Plains, New York USA; International Environmental Law and Policy Training Specialist, for the PRC-GEF Capacity Building Project; former Chair of IUCN Commission on Environmental Law, 1996-2004, and founding Chair of IUCN Academy of Environmental Law.

ecosystem of the seas surrounding Antarctica”, and “Considers(ing) that it is essential to increase knowledge of the Antarctic marine ecosystem and its components so as to be able to base decisions on harvesting on sound scientific information”. Then, the *United Nations Convention on the Law of the Sea* 1982 (UNCLOS) established specific rules to protect the sea environment, marine living resources, and the sea ecosystem, and set measures to prevent and control pollution and damage of the marine environment. The Convention stipulates, “The measures taken in accordance with this Part shall include those necessary to protect and preserve rare and fragile ecosystems as well as the habitat of depleted, threatened or endangered species and other forms of marine life”.⁴³

On 28 October 1982, the UN General Assembly adopted the *World Charter for Nature* which recognized the importance of protecting ecosystems. The Charter prescribes that: “Mankind is a part of nature and life depends on the uninterrupted functioning of natural systems which ensure the supply of energy and nutrients”;⁴⁴ “Ecosystems and organisms, as well as the land, marine and atmospheric resources that are utilized by man, shall be managed to achieve and maintain optimum sustainable productivity, but not in such a way as to endanger the integrity of those other ecosystems or species with which they coexist”.⁴⁵

The *Protocol on Environmental Protection to the Antarctic Treaty* 1991 is another early international environmental law instrument that responded to the IEM concept. The preamble of the Protocol emphasizes that, “Convinced of the need to enhance the protection of the Antarctic environment and dependent and associated ecosystems”; “Convinced that the development of a comprehensive regime for the protection of the Antarctic environment and dependent and associated ecosystems is in the interest of mankind as a whole”; and “The Parties commit themselves to the comprehensive protection of the Antarctic environment and dependent and associated ecosystems”. Further, Article 3.1 of the Protocol (Environmental Principles) prescribes that, “The protection of the Antarctic environment and dependent and associated ecosystems and the intrinsic value of Antarctica, including its wilderness and aesthetic values and its value as an area for the conduct of scientific research, in particular, research essential to understanding the global environment, shall be fundamental considerations in the planning and conduct of all activities in the Antarctic Treaty area”.

The United Nations Conference on Environment and Development in 1992 (UNCED) is viewed as a crucial summit for the recognition and transmission of ecosystem methodology. The UNCED was critical in bringing about several international environmental conventions and policy documents that embody the notion of ecosystem. Among these were the CBD, UNFCCC, UNCCD, and the *Non-legally Binding Authoritative Statement of Principles for a Global Consensus on the Management, Consumption and Sustainable Development of All Types of Forests, Rio De Janeiro, 1992* (Forest Principles). The Forest Principles emphasize that “All aspects of environmental protection and social and economic development as they relate to forests and forest lands should be integrated and comprehensive”. The *World Conservation Strategy* 1991 (WCS) (in preparation for the 1992 UNCED) proposed nine principles of sustainable existence and development and 132 detailed actions for a

43 Article 194.5, United Nations Convention on the Law of the Sea 1982.

44 Preamble, World Charter for Nature 1982.

45 *Ibid.*, General Principle 4.

sustainable development society. These proposals, which describe a set of actions of sustainable development in various economic domains and different ecosystems, serve as guidelines for the implementation of sustainable development strategies at the local, regional, and national levels.

As far as international law is concerned, IEM comes into perfection mainly due to the implementation and development of the CBD. The CBD insists that “the fundamental requirement for the conservation of biological diversity is the *in situ* conservation of ecosystems and natural habitats”.⁴⁶ Furthermore, the CBD highlights the importance and usage of ecosystems while specifying several important terms, including “biological diversity” and “ecosystem”.⁴⁷ The above actions constitute the basic international law of IEM, but it is the performance mechanism of the CBD and its implementation activities that have promoted and popularized IEM. The 12 principles and five descriptions of IEM were proposed at a meeting of experts at the Conference of the Parties to the CBD in 1995 (Malawi). In 2000 at the CBD COP5 (1,500 participants from 156 countries – NGOs, inter-governmental organizations, as well as some aboriginal and local communities were present), expert delegates discussed the definition of IEM and derived the 12 Principles of IEM as the “Decisions of Ecosystem Approach”.⁴⁸ It was this decision that confirmed the IEM approach. At COP8 (Curitiba, Brazil), 2006, IEM was reaffirmed by all Parties to the Convention. A crucial message from the IUCN was that efforts must be made to ensure the Ecosystem Approach is adopted as the ideal framework for the realization of the 2010 target of the CBD. In this context, IEM is viewed as a valuable framework for cooperation among the three Rio Conventions—UNFCCC, CBD, and the UNCCD. Apart from the CBD, other international environmental conventions also take IEM as the tool for the performance and assessment of the particular convention. For example, according to the Parties of the UNCCD, IEM is a strategy for the integrated management of territories, water, and biological resources. It promotes, equally, conservation and sustainable use by using suitable scientific technology. It focuses on the basic progress, function and interaction between biological organizations of different levels with their surrounding environment.

Certain international legal and policy documents concerning sustainable development and pollution control often relate to IEM. The *Programme for the Further Implementation of Agenda 21*⁴⁹ affirms the effect and significance of integrated management of land, water and ecosystems, by indicating that, “Land degradation and soil loss threaten the livelihood of millions of people and future food security, with implications for water resources and the conservation of biodiversity. There is an urgent need to define ways to combat or reverse the worldwide accelerating trend of soil degradation, using an ecosystem approach, taking into account the needs of populations living in mountain ecosystems and

46 Preamble, CBD.

47 Article 2, CBD – “Biological diversity” means the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems”. “Ecosystem” means a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.

48 CBD Decision VII/11, *supra* note 9.

49 Nineteenth special session, Agenda item 8, adopted 11th Plenary Meeting, UN General Assembly, 28 June 1997.

recognizing the multiple functions of agriculture”. In integrating economic, social and environmental objectives, it is important that a broad package of policy instruments, including regulation, economic instruments, internalization of environmental costs in market prices, environmental and social impact analysis, and information dissemination, be worked out in the light of country-specific conditions to ensure that integrated approaches are effective and cost-efficient. To this end, a transparent and participatory process should be promoted. This will require the involvement of national legislative assemblies, as well as all actors of civil society, including youth and indigenous people and their communities, to complement the efforts of Governments for sustainable development.⁵⁰

Several regional environmental conventions make use of the IEM concept. For instance, the preamble of the *Bern Convention on the Conservation of European Wildlife and Natural Habitats* 1979 “Recognizes(ing) that wild flora and fauna constitute a natural heritage of aesthetic, scientific, cultural, recreational, economic and intrinsic value that needs to be preserved and handed on to future generations”. The Convention also specifies the measures to conserve wild flora and fauna and their natural habitats. Certain countries and organizations of the Bern Convention have studied a wide range of environmental issues concerning its implementation.⁵¹ The *Convention on the Protection of the Alps* (Alpine Convention) 1991 adopts an integrated transboundary management approach.⁵² This Convention requires the parties to conserve nature and the countryside, where the objective is to protect, conserve and, where necessary, rehabilitate the natural environment and the countryside, so that ecosystems are able to function, animal and plant species, including their habitats, are preserved, nature’s capacity for regeneration and sustained productivity is maintained, and the variety, uniqueness and beauty of nature and the countryside as a whole are preserved on a permanent basis.⁵³

The IUCN Commission on Ecosystem Management (CEM) provides expert guidance on integrated approaches to the management of natural and modified ecosystems, promoting biodiversity conservation and sustainable development. Its four global themes include promoting the application of the Ecosystem Approach, Ecosystem Restoration, establishing Indicators of Ecosystem Status, and the creation of Ecosystem Management Tools with relative communication. The CEM provides expertise on ecosystem management and improvement through the use of Ecosystem Approaches.

The *Millennium Ecosystem Assessment* (MA)⁵⁴ was sponsored by UNEP, the United Nations

50 Para. 62, “Land and Sustainable Agriculture”, *Programme for the Further Implementation of Agenda 21*.

51 International Workshop on the “Further Development of Ecosystem Approaches”, 9–11 October 2002, Isle of Vilm, Germany; “Biodiversity and the Ecosystem Approach in Agriculture, Forestry and Fisheries” satellite event held by the Food and Agriculture Organization of the United Nations (FAO) in Rome, Italy, 12–13 October 2002.

52 The Alpine Convention is made among seven Alpine countries: Switzerland, France, Italy, Germany, Austria, Liechtenstein, Slovenia, and the European Economic Community.

53 *Ibid.*, Article 2.2(f).

54 The *Millennium Ecosystem Assessment* (MA) assessed the consequences of ecosystem change for human well-being; from 2001 to 2005, the MA involved the work of more than 1,360 experts worldwide; their findings provide a state-of-the-art scientific appraisal of the condition and trends in the world’s ecosystems and the services they provide, as well as the scientific basis for action to conserve and use them

Development Programme (UNDP), the World Bank, and other governmental and non-governmental organizations. Many scientists from different countries took part in the research to decide the main environmental issues by the end of the 20th century. The CBD supports the implementation of the MA “Ecosystem Approach” in the examination of the global ecosystem. Of note, the PRC supported the MA project and one of the first five sub-global regional assessment projects, the integrated assessment of the ecosystem in Western PRC, commenced in June 2001. On 30 March 2005, the UN released the *Millennium Ecosystem Assessment* simultaneously in eight cities worldwide.⁵⁵ The Report stated that, over the last half century, humans had been changing the natural ecosystem in an accelerated and unprecedented manner.⁵⁶ According to experts, in the next 50 years, the degradation of ecosystem services will accelerate, seriously threatening the realization of the UN Millennium Development Goals (MDGs). However, experts also agree that it is possible to slow down ecosystem degradation while increasing demands at the same time through adjusting policies and mechanisms, varying present consumption patterns, improving education, and developing new technologies. The MA is one of the most comprehensive investigations into the eco-environment in the history of humankind, and provides substantial knowledge on the worldwide implementation of the integrated ecosystem approach.

At the WSSD 2002, delegates turned their attention to the significance of the Ecosystem Approach in the management of natural ecosystems.

2.2 National experience in IEM

2.2.1 Integrated approach in environmental law

With the economic and scientific development following the Second World War and accelerated environmental degradation, environmental protection was initiated worldwide and environmental control became institutionalized and numerous environmental professions developed. Various countries established specialized departments and organizations to control environmental pollution, protect and regulate the use of natural resources, manage energy development, and for town and country planning and construction. The legislature realized that it was not sufficient to protect the environment and natural resources by using limited and fragmented laws and as a result, various basic laws were introduced to protect environmental resources at ministerial and industrial levels. Some western countries placed emphasis on integrated legislation, such as the United States with its *National Environmental Policy Act* 1969 and Japan with its *Pollution Countermeasures Act* 1967. Legislation with an emphasis on systematic change was introduced in Latin America, including the *Renewable Natural Resources and Environmental Protection Code* 1974 of Colombia and the *Basic Environmental Law* of Venezuela. The *Renewable Natural Resources and Environmental Protection*

sustainably; <http://www.millenniumassessment.org/en/index.aspx>.

55 Including Beijing; the PRC Ministry of Science and Technology and the PRC State Environment Protection Administration held a conference on 30 March 2005 in Beijing to celebrate its achievements in this area.

56 Among the 24 assessed ecosystems, 15 have been destroyed; some damage is irrevocable; 35 percent of mangrove ecosystems have disappeared; the area of coral reefs has reduced by 27 percent; 10–30 percent of mammals, birds, and amphibians are on the verge of extinction.

Code included laws and regulations concerning aquatic biological resources and marine resources and they built a holistic legal framework for Colombia's environment and natural resources. In the 1980s, a professionalized approach to environmental legislation developed in Asia and Africa, following the worldwide trend. The emergence of a single profession or sector of environmental law, highlighted various shortcomings resulting from the separation of departments, departmental segregation, and made clear deficiencies in institutional cooperation stemming from the fight for power among different sectors of government. These limitations, and the improved understanding of integrity on economic, social and environmental development, led environmental management and legislation toward comprehensive cross-sectoral and cross-departmental approaches.

2.2.2 Impacts of the Agenda 21 sustainable development strategy

With the introduction of Agenda 21 after UNCED 1992, many developing countries, through the integration of social and environmental policies, united various environmental protection and economic development initiatives. Comprehensive environmental and resource enactments became the preferred means to overcome fragmented, uncoordinated, environmental management. By the mid-1990s, many African countries had developed "umbrella" environmental legislation. In the Asia and Pacific region, "umbrella" environmental legislation and environmental policy has become the integrated framework for environmental management. In this regard, there are at least three major categories of comprehensive environmental and resource laws with particular structural characteristics and roles, including:

- Basic law: e.g., *National Environmental Policy Act of the United States* 1969; *Basic Environmental Laws in Japan* 1993; *Republic of Korea Environmental Laws* 1990;
- Integration law: e.g., *the Environmental Protection and Pollution Control Act of Oman* 1985; *Environmental Pollution Control and Protection Laws in Ecuador* 1986; *Environmental Protection and Rational Use of Natural Resources Law in Cuba* 1981; and *Environment and Natural Resource Laws in Peru* 1990;
- Environmental codes: e.g., *Environmental Code of Sweden* 1999; *the State Environmental Protection Code of Burkina Faso* 1994; *Environment Code of Togo* 1988; and *le Code de l'environnement de France* 1998.

2.2.3 Examples of IEM practice

Moreover, since the 1980s, the management of natural resources has shown a trend towards "integrated ecosystem management". Developed countries have already gone beyond the stage of quantity and quality management, moving towards a higher-level ecological management. Experience has shown that the transition from traditional single resource management to systematic management, and from resources exploitation and utilization management to the coordination of resources and environment management, takes time and changes in attitude toward resource conservation and the role of environmental law and policy. Western countries have developed good experience in the management of water, land, vegetation, and oceanic resources. They have also helped further develop the IEM concept, ideas and methods for implementation. For example, inappropriate rural land-use practices and inappropriate policies in the United States, Australia, and Canada caused severe LD and destruction of ecosystems in their respective dryland regions in the 1930–1940s. After

several decades of investigation and trial, these three countries successfully developed integrated approaches to manage natural resources and ecosystems.⁵⁷

2.2.3.1 Sweden

Sweden introduced the *Act Concerning the Management of Natural Resources* in 1987 which is an environmental resources law with an IEM approach. Article 1, Chapter I of this Act specifies: “The land, water and the entire natural physical environment should be utilized and exploited on the basis of sustainable development from the social, economic and ecological point of view”. Further, Article 2 defines that it is necessary to take into account, when implementing this law, the Building and Planning Law, the Law on the Protection of Nature and other relevant laws. In order to avoid duplication and contradiction between various environmental laws, regulations and rules in environmental legislation, the Swedish National Environmental Protection Bureau proposed a draft Environmental Code in 1993, and then in 1999, through the combination, integration and modification of 15 environmental laws, Sweden formally promulgated its comprehensive “Environmental Code”.⁵⁸

2.2.3.2 Australia

In 1992 Australia introduced *The Intergovernmental Agreement on the Environment* (IGAE) to unify its approach to the implementation of ecologically sustainable development (ESD).⁵⁹ The IGAE stresses that the adoption of sound environmental practices and procedures as a basis for ESD will benefit the Australian people and environment, the international community and environment, and the conservation of biological diversity, where ecological integrity is a fundamental consideration. It is supported by two principal national laws. The *Natural Heritage Trust of Australia Act 1997* establishes the Natural Heritage Trust of Australia Reserve to support programmes to conserve, repair and replenish Australia’s natural capital infrastructure. The national government uses a system of Partnership Agreements prepared under this Act to ensure that policies and guidelines for environmental protection and ESD applied at the state level are consistent with national environmental strategies and priorities. In 1999, the Commonwealth of Australia introduced the *Environment Protection and Biodiversity Conservation Act* (EPBCA) which is based on an IEM approach. The EPBCA established a national regime for protection and conservation of biodiversity for Australia to meet its obligations under several international environmental agreements. The EPBCA sets out an environmental impact assessment regime based on six “matters of national environmental significance”.⁶⁰ The rest of the Act outlines the tools and mechanisms to conserve biodiversity and to protect environmentally

57 ADB. 2005. “Integrated Ecosystem Management for Drylands of the People’s Republic of China”. Draft Discussion Paper, People’s Republic of China Mission Beijing – includes comparison between Australia, Canada and USA.

58 Arnemo, R. 2006. *Swedish Legislation on Nature and Natural Resources*. TEMPUS project IB_JEP-19020-2004, “EU Environmental Management Courses”.

59 *The Australian Intergovernmental Agreement on the Environment* 1992 is a non-legally binding document signed by the Australia Federal Government with the various states, local governments and Australian Local Government Confederation; its purpose is to harmonize environmental management on a national scale.

60 *Ibid.*, Part 3, “Requirements for Environmental Approvals”.

significant areas. The *EPBCA* contains many mechanisms that enable the public to formally participate in environmental decision-making activities.⁶¹

2.2.3.3 New Zealand

The *New Zealand Resource Management Act 1991* connects various elements of the environment through an integrated approach to environmental protection and resource development. In this Act, “natural resource” refers to the physical resources of climate, surface and underground waters, soils and minerals, and the biological resources of vegetation, including forests and grasslands, fisheries and marine life, animals and other terrestrial wildlife and fauna. Under Section 2 of the Act, the meaning of environment includes “ecosystems and their constituent parts, including people and communities and all natural and physical resources”.⁶²

2.2.3.4 Japan

The *Japan Basic Environment Law 1993* provided the maximum possible reduction of environmental loads for sustainable development. The 147th Congress meeting became a crucial moment in Japanese environmental history with the introduction and amendment of a number of environmental protection regulations. Seven of these laws came into effect in April 2001 and provide the legal foundation for promoting a recycling economy or recycling society in Japan, especially the *Fundamental Law*, which sets the legal tone for the economic and social development for Japan in the 21st century.⁶³

2.2.3.5 United States of America

The USA realized the importance of “ecosystem” in the integration of environmental protection and natural resource management in the 1970s. In 1969, the USA enacted the *National Environmental Policy Act*. This Act called for better understanding of the ecological systems and the natural resources important to the nation. The USA has been using, in the literature of law, the term of “ecosystem management” on a large scale. This term is carried out in the statutes in federal and state legislation, and intended to be applied in judicial review proceedings.

Regulatory and legal means to control wind erosion in the South Prairie in the USA is regarded as an important example of integrated ecosystem management in the early stage. In the 1930s, dust storms (wind erosion) swept across two-thirds of the USA, sweeping about 300 million tons of topsoil from the northeast coast to the west coast. In 1933, the USA Government passed a law and established the Tennessee Valley Authority (TVA) to conduct comprehensive management in the Tennessee River Valley. However, the effective control of wind erosion took the US Government approximately 50 years from 1940 gradually building comprehensive management and achieving successful results. Comprehensive measures to combat wind erosion included: (1) the “Prairie States

61 Hannam, I.D. 2006. “Legislative Aspects of Integrated Ecosystem Management: the Murray-Darling Basin in Australia”. In: Jiang Zehui (ed.), *supra* note 13, pp. 124–140.

62 Williams, D. 1997. *Environmental and Resource Management Law*. Wellington, New Zealand: Butterworths.

63 Full title is *Fundamental Law of Education Befitting to the New Times 2001*; see http://www.mext.go.jp/b_menu/hakusho/html/hpac200101/hpac200101_2_021.html.

Forestry Project”, initiated by US President Roosevelt where a 30,000-km forest belt was built in eight years, providing protection to more than 1.62 million hectares of farmland and 30,000 farms; (2) the establishment of specialist institutions including the Soil Conservation Board and Soil Conservation Service, and promoting conservation farming techniques; (3) implementation of farmland retirement schemes, where the government pays farmers for land conservation (e.g., planting grass and shrubs in farmland, or turning farmland to pastures or vegetation cover). The USA's experience in controlling wind erosion concluded that to effectively manage major ecological problems it is necessary to take into consideration a variety of factors including ecological, social, economic, legislative and political factors. The rehabilitation of heavily degraded land is a slow process and involves huge costs. This process requires multilateral cooperation from all levels of government, civil organizations, land users, scientists and technical personnel.

A recent successful experience of the application of IEM is in the resolution of the forestry management crisis. On the northwest Pacific coast of the USA, there is a primeval forest of more than 1,000 km² with very valuable ancient trees. In the early 1990s, a serious management crisis occurred in these forests due to the fundamental differences of interests and standpoints between stakeholders in the conservation and use of this forest. In April 1993, President Bill Clinton called a Presidential Forest Meeting in Portland, Oregon to seek a fair solution to the forest management crisis. The public, operators, scientists and various community organizations were each invited to express their concerns regarding the forests, as well as provide suggestions on how to break the deadlock of conflict of interest between different sectors. From this process, a working group, the “Forest Ecosystem Management Assessment Team” (FEMAT), was established. FEMAT comprised more than 100 scientists, managers and members from government. Its duty was to stipulate regulations over the natural forests and other types of forests, and evaluate the forest regulations in terms of ecology, economy, and social impacts. In order to seek an acceptable socio-economic and ecological result, FEMAT took a comprehensive consideration of the regional ecological-economic-social factors along with the possible changes, and revised the initial objective of building a nature reserve for the primitive forests and riparian zone. Instead, the new programme considered the protection of the original forest, and the habitat of owls and seabirds, the critical watersheds for endangered species, and ensured a minimum effect on timber production. The new programme identified new concepts and principles for the management of US natural forests based on the concept of IEM. After several months of public consultation, court debate and amendment, the programme was effectively implemented in the northwest forest areas in early 1994. FEMAT created a precedent in ecological evaluation and influenced the development of other instruments for comprehensive ecosystem management. Since the northwest forest issue, the USA has carried out ecological zone evaluation over six different ecosystems and regions. This process has been appraised and acknowledged by local government and the public.

To facilitate the IEM approach, the USA attaches importance to institutional coordination and comprehensive decision making. In 1995, the US Council on Environmental Quality, the Department of the Army, Department of Energy, Department of Housing and Urban Development, Interior Department, Department of Justice, Department of Labor, State Department, Department of Transportation, Environmental Protection Agency and the Science and Technology Policy Bureau, signed the 1995 *Memorandum of Understanding to Foster an Ecosystem Approach*. Later, the

Federal Interagency Ecosystem Management Task Force was established to enhance understanding of the ecosystem approach in relevant departments of the federal government.

2.3 Development of IEM in the law and policy framework of the PRC

2.3.1 Environmental legislation influenced by IEM in the PRC

The development of the PRC law for IEM has been influenced by the development of ecosystem management law in other countries and the international community. The PRC law introduced in the 1980s was influenced by its participation in international environmental and natural resource activities and international compliance. Before the 1980s, the PRC rarely participated in international scientific and ecological conservation activities so its domestic ecological research was relatively undeveloped. Prior to the introduction of the *Environmental Protection Law (Trial)* in 1979, the PRC's laws and regulations, including the *Constitution*, *Certain Provisions on Protecting and Improving the Environment (Trial Draft)* 1973, and the *Forest Law (Trial)* 1979, lacked ecological principles and there was no reference to "ecosystems" or "ecological protection". Primarily, they were laws for resource use. With the development of ecological scientific research in the PRC, the ecosystem approach began to find its way into the PRC's natural resource policies and laws. In particular, knowledge gained from the PRC participating in the *UNESCO Man and the Biosphere Programme*, which started in 1973, led to a greater appreciation of the role of legislation in ecological protection.⁶⁴ The promulgation of the *Environmental Protection Law (Trial)* in 1979 was a breakthrough in the introduction of the "ecology" concept. The purpose of this Law was to prevent and control pollution of the ecological environment (Article 2), and it emphasized that measures had to be taken to protect the ecological environment when natural resources were being developed or utilized. Article 19 outlined principles to be adopted in planning and land utilization, and included integrated exploration, evaluation, utilization, technology for prevention and control, and scientific investigation.

An early stimulus in the development of ecological law in the PRC was its participation in the processes leading to the creation of UNCLOS, which the PRC ultimately signed. This influenced the PRC to develop the *Marine Environmental Protection Law* in 1982 which was the first occasion in the PRC law where the objective of "maintaining ecological balance" appeared.⁶⁵ In 1982, the PRC also revised its Constitution to give recognition to national protection and improvement of the living environment and the ecological environment, and prevention of pollution and other hazards,

64 "Biosphere", the world's largest ecosystem, refers to a layer of the Earth's surface; the *Man and the Biosphere Programme* is a comprehensive plan for international, inter-governmental cooperation on ecological research, for the purpose of effective protection and rational utilization of the biosphere's resources, the conservation of biological species and genetic diversity, and providing a scientific basis for harmonization and improvement of the human relationship with the environment; http://portal.unesco.org/science/en/ev.php-URL_ID=6393&URL_DO=DO_TOPIC&URL_SECTION=201.html; sixteen Natural Conservation Zones in the PRC were included in the International Network of Biosphere Reserves approved by UNESCO.

65 Amendments to the PRC Marine Environmental Protection Law in 1999 embody the ecosystem concept in an all-round way, with provisions to protect marine ecology, the ecological environment and ecosystems.

through the introduction of the concept of “ecological balance”.⁶⁶ This term equates with the term “ecosystem”, as used in the PRC legislation and policy documents, where protection of the “ecological balance” is equivalent to the protection of an ecological system. The PRC law experts interpret the “eco-environment” as a type of human environment – one which contains various ecosystems and provides for “protection of the ecological balance” and “protection of the ecological environment”. The introduction of these concepts in this manner by the PRC is viewed by them as its initial reaction to the ecosystem approach in its environmental law.

In December 1989, the PRC promulgated the *Environmental Protection Law* to protect and improve the human and ecological environment. Under this Law, People’s Governments at different levels are required to take measures to protect natural ecological systems. Moreover, they have to provide better protection to the agricultural environment by preventing and controlling soil pollution, desertification and alkalization of land, impoverishment of soil, deterioration of land into marshes, subsidence, damage to vegetation, soil erosion, drying up of water sources, extinction of species and the occurrence of any other ecological imbalance. The subsequent Articles to implement these actions reflect the ecosystem approach. The existence of the *Environmental Protection Law* became a stimulus to develop a national environmental legal and regulatory framework and for the provinces, autonomous regions and municipalities to develop and improve their local rules and regulations for environmental protection with an ecosystem orientation.⁶⁷

2.3.2 The PRC policies in light of IEM

On 7 November 1992, the PRC National People’s Congress agreed to sign the CBD. In fulfilling its obligations to the CBD, the PRC soon formulated the *People’s Republic of China Biodiversity Conservation Action Plan* in 1994 which outlined measures to prevent damage to ecosystems and to reduce and restore damage. Substantial progress was made in the conservation of biodiversity when State Council issued the *National Ecological Environment Construction Program* on 7 November 1998. This Plan requires ecological environmental construction and protection in the PRC to follow integrated planning, to apply biological measures, to use science and technology to protect ecosystems, and to adopt the principle of “prevention” when applying ecological protection measures.⁶⁸

66 *Constitution of the People’s Republic of China* adopted 4 December 1982; including the balance within, and harmony between, different aspects of the environment and ecosystems; includes the structure and function of ecosystems in a certain period of time.

67 E.g., *Ordinance on Environmental Protection of Hainan Province* 1990, Section 6 provides that “comprehensive planning and rational layout must be considered for environmental protection, focusing on prevention first, the integration of prevention and comprehensive control”; *Ordinance on Environmental Protection of Inner Mongolia Autonomous Region* 1991, Article 19 provides that “the prevention of pollution and other hazards must give priority to prevention, control integration, centralized control, and comprehensive regulation”; *Ordinance on Environmental Protection of Sichuan Province* 1991, Article 5 provides that “the plan for environmental protection formulated by governments at all levels must be incorporated into the national economy and social development scheme, ensuring the coordination between environmental protection and economic construction and social development. The principles of prevention, control integration and comprehensive management should be adopted. Attention must be paid both to exploitation and environmental protection, while achieving economic and environmental benefits at the same time”.

68 E.g., “Environmental Friendliness Provides the Strategic Protection for the Harmonious Society” – an

The *National Ecological and Environmental Protection Outline* issued by the State Council on 26 November 2000 defines matters relating to the IEM including the cycle of natural ecosystems, safeguarding national eco-environmental stability, establishment of ecological function protection zones, unified planning, integrated decision making, and rational resource use. It also specifies that economic development must abide by the laws of nature, maintain a balance between the local and global situation, protect the environment from exploitation, carry out ecological restoration, and establish an auditing system for ecological and environmental protection.⁶⁹

2.3.3 Ecological function zones

The PRC State Environmental Protection Administration specifies that the purpose of the *National Ecological and Environmental Protection Outline* is to harmonize the relationship between resources, the environment and people. The *Outline* includes international standards of IEM and stresses that the rehabilitation of ecosystem functions to protect the ecological environment under a sustainable development goal is a priority. The ecological function zoning scheme is a relatively new system in the PRC and the development of policy using concepts and principles of IEM is still at the early stage. The ecological function zoning scheme divides regions into different ecological function zones according to regional ecological criteria, ecological environmental sensitivity, and the differences in ecological functions. The zones are used to regulate activities such as regional ecological environmental protection, development planning, resource utilization, industrial and agricultural production, and regional ecological environment conservation. In this regard, the ecological environmental protection and construction activities ought to be an effective way to promote the PRC's ecosystem legislative reforms.⁷⁰

2.3.4 The introduction of IEM into law

A sustainable development strategy has been a significant factor in the development of the PRC's legislation for ecosystem protection. Following the UNCED 1992, the PRC began the transformation from unsustainable production and consumption patterns to a sustainable development strategy.⁷¹

interview with Xie Zhenhua, Director of the State Environmental Protection Administration, in *Selections of Environmental Protection Information*, Issue 12, 2005, p.2; Huang Jijun and Huang Yukan, "The Construction of Ecological Province has a Crucial Bearing on Gross Domestic Product in China", *China Environment News*, 14th October, 2004; in September 2002, the Western Development Office and State Environmental Protection Administration jointly issued the *Ecological Function Zoning Provisional Order*.

69 The increase of adoption of ecological conservation and construction was evidenced in 2005 by the establishment of nine ecological provinces (Hainan, Jilin, Heilongjiang, Fujian, Shandong, Zhejiang, Anhui, Jiangsu and Liaoning), 528 ecological demonstration zones, 79 national beautiful environment townships, 50 National Environmental Protection Model Cities or Urban Areas, 17 types of eco-industrial demonstration zones, 32 national environmentally friendly enterprises, 488 national "Green Schools" and 2,300 provincial and municipal "Green Communities"; Radstake, et al. 2010, *supra* note 23.

70 Du Qun. 2008. "Protecting Ecological Functions: Ecological Function Zoning and Conservation Zones in the People's Republic of China", in Jeffrey, M, K. Bubna-Litic and J. Firestone (eds), *Conservation, Law + Livelihoods: Bridging the North-South Divide*. IUCN Academy of Environmental Law Research Studies. Cambridge University Press, UK. pp. 441-455.

71 Following *Our Common Future*, the report on sustainable development issued by the World Commission on Environment and Development 1987.

Agenda 21 of China 1994 outlines issues relating to the IEM, including the Conservation of Biodiversity (Chapter 15), Desertification Control (Chapter 16), and Organizations and Public Participation in Sustainable Development.⁷² Propelled by the implementation of a sustainable development strategy, the PRC promulgated a number of laws embodying sustainable development ideas and the IEM principles including the *Land Administration Law* (2004 revision), *Law on the Administration of Sea Areas* (adopted 2001), *Law on Desertification Prevention and Restoration* (adopted 2001), *Agriculture Law* (amended 2002), *Marine Environment Protection Law* (amended 1999), *Law on the Prevention and Control of Atmospheric Pollution* (amended 2000), *Law on the Prevention and Control of Environmental Pollution by Solid Wastes* (amended 2004), *Law on Promoting Clean Production* (adopted 2002), and the *Environmental Impact Assessment Law* (adopted 2002). Various provisions in these laws refer to the objective of sustainable development or to adopting sustainable development and sustainable land-use activities. Many local laws and regulations now provide articles in light of the IEM in accordance with the sustainable development concept.⁷³

From the late 1990s, the PRC had recognized the benefits of a sustainable development approach in the reform of its natural resource and environmental laws, commencing in 1998 with the reform of the *Forestry Law and Land Administrative Law*. In 2002, three major natural resource laws, the *Water Law*, the *Grassland Law* and the *Agricultural Law* were improved and other key environmental laws introduced, e.g., *Environmental Impact Assessment Law*. These changes vastly improved the legal and institutional framework for LD management in the PRC, but despite these actions it was recognized that considerable effort was needed to overcome conventional problems that remained in the course of environmental law reform, such as the substantial overlap in role, function and activities, inadequate coordination, lack of a bottom-up mechanism, and conflicting interests between various laws, policies and institutions.

The concept of IEM was formally introduced into the PRC in early 2000 when it began to explore a framework of integrated natural resources management. In 2003, the State Environmental Protection Administration stated that the PRC would adhere to the “*Ecosystem Approaches*” – by following the concept of integrated management and ecological protection which had been in the international community for some time and by using the goal of ecological protection to maintain ecosystem structure, ecosystem functioning and the integrity of ecological processes. It was specified that single-focus management would give way to integrated management, and regional administrative management would be replaced by systematic drainage area management. The unified management of life-support systems and non-life systems was also mentioned, along with ecological monitoring and research-based scientific management. A systematic approach would be applied towards the

72 *Agenda 21 of [People’s Republic of] China* released by the State Council in March 1994; e.g., see Carew-Reid, J. *et al.* 1994. *Strategies for National Sustainable Development: A Handbook for their Planning and Implementation*. IIED, IUCN and Earthscan Publications.

73 E.g., under the Ordinance on Environmental Protection of Liaoning Province 1993, environmental protection focuses on the principle of prevention first and, through the combination of prevention and management, people must protect resources and control damage; see also Ordinance on Environmental Protection of Hubei Province 1994.

management of the ecological environment and more emphasis would be given to the unity and integrity of the ecological environment management system.⁷⁴

Under the objectives of the Capacity Building Project, the Legal and Policy Component committed the central government and governments of the three provinces and three autonomous regions of the PRC-GEF Partnership Project to adopt the concept of IEM to improve the capacity of the legal framework to deal with LD. In this way, the Legal and Policy Component of the Capacity Building Project provided valuable opportunities for the PRC to introduce IEM into a legal and policy framework by introducing the best experiences in international rules of law for the environment. The Legal and Policy Component formally commenced in October 2004.

74 See Wang Ya. 2003. "Establishing a Scientific Concept of Ecological Protection". *China Environment News*, 25 March.

3 Land degradation and desertification in Western PRC

Zhang Kebin⁷⁵

3.1 Background

A good understanding of land degradation (LD) in the western dryland region of the PRC is an essential prerequisite to the effective assessment of the ability of law and policy to control LD.⁷⁶ It also provides the basis for the framing of new laws and policies. Moreover, to determine the most effective legal means for managing LD and desertification processes it is necessary to have a clear understanding of the meaning of key terminologies and the relationship between terms. Scientists consider desertification to be a form of LD that occurs within specified geomorphic environments.⁷⁷ The UNCCD focuses on the physical and geographic aspects of “desertification”. The extensive climatic region of Western PRC is affected by very severe LD and falls within the scope of desertification as depicted by the UNCCD.⁷⁸ Further, the meaning of LD and desertification was central to the activities of the Legal and Policy Component of the Capacity Building Project, in particular, the development of the assessment method and the practical recommendations to improve the legal and policy frameworks at the central, provincial and autonomous region levels.⁷⁹

75 Professor, Beijing Forestry University, ADB consultant on PRC-GEF Capacity Building Project, Beijing, People’s Republic of China.

76 Section 3 “Land Degradation”, in: PRC-GEF Partnership on Land Degradation in Dryland Ecosystems. 2008. *Strategy and Action Plan for Combating Land Degradation in Northwest China*, Project Coordination Office and Project Management Office; PRC-GEF Partnership on Land Degradation in Dryland Ecosystems. 2008. *Best Practices for Land Degradation Control in Dryland Areas of China*, People’s Republic of China Forestry Publishing House; ADB. 2000. *Technical Assistance to the People’s Republic of China for Preparing National Strategy for Soil and Water Conservation*. Manila; ADB, *supra* note 23.

77 More specifically, “desertification is land degradation in dryland areas”; see “Appraising sustainability of the current uses of soil and land”, p. 14. In: Hurni, H. and Meyer, K. (eds.) 2002, *A World Soils Agenda; Discussing International Actions for the Sustainable Use of Soils*, prepared with the support of an international group of specialists of the IASUS Working Group of the International Union of Soil Sciences (IUSS), Centre for Development and Environment, Berne.

78 UNCCD, Article 1, definition of “desertification”.

79 *Report on the Assessment of Regulations, Policies and Institutional Capacity for Land Degradation – for Gansu, Shaanxi and Qinghai Provinces, and the Autonomous Regions of Xinjiang Uygur, Inner Mongolia and Ningxia Hui*.

3.2 Definition of land degradation and desertification

3.2.1 Land degradation

Under the PRC-GEF Capacity Building Project, “land degradation” is a broad term that includes degradation of water and vegetation, as well as the processes of soil erosion and desertification. It is summarized as the “overall reduction in the capability of land to produce benefits from a particular land use under a specific form of land management”.⁸⁰

The UNCCD defines “land degradation” as:⁸¹

“. . . the reduction or loss, in arid, semi-arid and dry sub-humid areas, of the biological or economic productivity and complexity of rain-fed cropland, irrigated cropland, or range, pasture, forest and woodlands resulting from land uses or from a process or combination of processes, including processes arising from human activities and habitation patterns, such as: (i) soil erosion caused by wind and/or water; (ii) deterioration of the physical, chemical and biological or economic properties of soil; and (iii) long-term loss of natural vegetation”.

Land degradation thus refers to an overall reduction in the capacity of the land to produce benefits from a particular land use under a specific form of land management. In Western PRC, land is characterized by the degradation or failure of ecological or economic productivity and natural values of the soil. The different forms of degradation include soil degradation, vegetation degradation, and degradation or failure of biological diversity as well as degradation or failure of the land’s value.

3.2.2 Desertification

For many years, the term “desertification” was a vague and often confusing concept because of the many meanings and applications of the term ‘desert’. A variety of definitions and meanings have been argued extensively in the physical sciences,⁸² but the issue was settled to an extent by the introduction of the UNCCD where “desertification” means:

“Land degradation in arid, semi-arid and dry sub-humid areas resulting from various factors, including climatic variations and human activities”.⁸³

The term “arid, semi-arid and dry sub-humid areas” means areas (other than polar and sub-polar regions) in which the ratio of annual precipitation to potential evapo-transpiration falls within the range 0.05–0.65. Thus, for the western dryland region of the PRC, the processes of LD have been divided into three categories:

1. *Physical processes* – including weathering, wind and water erosion, freeze-thaw, gravity action, artificial destruction.
2. *Chemical processes* – including loss of soil fertility, soil salinization, soil contamination.

80 ADB, *supra* note 4; Hannam with Boer, *supra* note 25, discuss the definition of “land degradation” at p. 14.

81 UNCCD, Article 1(f).

82 E.g., Arnalds, O. 2002. “Desertification: an appeal for a broader perspective”. In: Arnalds, O. and Archer, S. (eds.) *Rangeland Desertification*, p. 5. Dordrecht, Netherlands: Kluwer Academic Publishers.

83 UNCCD, Article 1(g).

3. *Biological processes* – including degradation of vegetation productivity, loss of biological diversity.

3.3 Specific LD processes

Overall, there are many individual types of LD processes in western dryland PRC where it is not uncommon for two or more LD processes to occur simultaneously on one land area:

- *Weathering*: soil components are removed from the ground surface by wind action as well as abrasion of the ground surface caused by soil grains contained in the air flow.
- *Hydrate corrosion*: the soil, soil body or other ground components are destroyed, moved and deposited from the impact of precipitation, surface run-off and sub-surface water movement.
- *Action of gravity*: the down-slope movement of weathered rock or soil material by gravity, in the form of land slips, the collapse of small hills, landslides or debris slides.
- *Freeze-thaw*: is the phenomenon of creep, slide, collapse, solifluction of surface soil and loose components of soil as a result of alternating freezing and thawing in extremely cold regions and locations.
- *Artificial destruction*: soil degradation resulting from human usage of natural resources and economic development, including loss of mud and sand, as a result of abandoned soil, waste sand and slag generated from mining, quarrying, road construction, house building and engineering construction.
- *Soil fertility decline*: loss of soil fertility which affects nutrient availability for vegetative growth.
- *Soil salinization*: degradation and loss of land productivity due to accumulation of harmful salts in the soil profile caused by changes in flow regimes of ground water and surface water.
- *Soil contamination*: where soil quality is not just degraded but also harmful to human health, caused by deposits and accumulation of pollutants in the soil profile, usually the result of human activity, where the amount of residual pollutant exceeds the natural self-purifying capability of the soil.
- *Vegetation degradation*: variation in composition, structure and function of vegetation from the degradation of biological productivity of vegetation, reduced biological diversity and loss of ecological functioning of vegetation due to changes in weather conditions, soil properties, hydrological conditions and human activity.
- *Reduction of biological diversity*: reduction of genetic diversity, species diversity and ecosystem diversity as a result of changes in natural conditions or the impact of humans.
- *Devalued land use*: transformation of land use from a high biological productivity to a lower biological productivity.

3.4 State of LD in dryland ecosystems of the western region of the PRC

The PRC has one of the largest areas and severest levels of LD and desertification in the world.⁸⁴ According to details released by the UNCCD, the area of drought, semi-drought and sub-wet drought regions in the PRC has been estimated at 3.317 million km², being approximately 34.6 percent of the area of the PRC, within which the areas of drought, semi-drought and sub-wet drought regions are 1.427 million km², 1.139 million km², and 0.751 million km², respectively (see Table 1).⁸⁵

Table 1. Area of drought, semi-drought and sub-wet drought regions in the PRC (unit: 10,000 km²)

Weather type	Drought region	Semi-drought region	Sub-wet drought region	Total
Area	142.7	113.9	75.1	331.7
% of region	43.1	34.4	22.5	100
% of the PRC	14.9	11.9	7.8	34.6

The PRC Desertification Monitoring System uses four categories of “desertification”: weather desertification, hydrate corrosion desertification, freeze-thaw desertification; and salinization desertification. The areas subject to desertification are mainly found in four provinces (Gansu, Qinghai, Shaanxi and Hebei) and four autonomous regions (Xinjiang Uygur, Inner Mongolia, Ningxia Hui and Tibet), accounting for 98.45 percent of the total area of desertification in the PRC. The area of desertification in the six provinces and autonomous regions of the Capacity Building Project (which excludes Hebei and Tibet) comprises more than 95 percent of the total area of desertification in the PRC.

3.4.1 Trends

In the past 50 years, desertification in the PRC, especially sandy desertification, has expanded rapidly and caused significant ecological problems and political concern. The 3rd National Desertification Monitoring released in 2005 indicated the total area of desertification in the PRC was 263.62 million km² by 2004, representing 27.4 percent of the total area. Compared with the 2nd PRC Desertification Monitoring in 1994, although the area of desertification measured by the 3rd PRC Desertification monitoring in 2004 had decreased by 37,942 km² (an average annual reduction of 7,585 km²), the total area is declining but the severity of LD in particular affected areas is increasing.

84 Eswaran, H., Lal, R. and Reich, P.F. 2001. “Land degradation: An Overview”. In: Bridges, M.E. *et al.* (eds.) *Response to Land Degradation*. Enfield (NH), USA: Science Publishers, Inc.

85 Extreme drought zones with a wet index of less than 0.65 and area of 0.253 km² as well as wet zones with a wet index of more than 0.65 and area of 41,000 km² occur in some regions of Gansu Province, Inner Mongolia and Xinjiang Uygur Autonomous Regions, and these zones, which make up 0.294 million km² (approximately 3 percent of the PRC), are not included in the 3.317 million km² area.

3.5 Causes of LD and desertification

The LD and desertification in Western PRC result from the interaction between natural factors and human activities. The former includes physical factors (landform type, loess plateau), soil factors (soil erosion risk, weathering and hydrate corrosion), vegetation factors (vegetation type and location), and weather factors (drought, wind and global weather changes). The dominant factor is weathering desertification, mainly induced by drought and wind erosion of sandy substances.

3.5.1 Predisposing conditions

3.5.1.1 Levels of precipitation

Areas with severe desertification in the PRC occur mainly in the three northern regions where rainfall is low, generally less than 500mm per year, and declines from east to west. The combination of low rainfall, high evaporation and frequent drought means that ecosystems in these areas are naturally very fragile.

3.5.1.2 Wind

The northern region of the PRC is influenced by the high Inner Mongolia-Siberian air pressure and the southward air current weather phenomena. It is common for wind speed in spring and winter to reach critical levels causing sand movement.⁸⁶ Winds that cause movement of the sandy soils occur mainly in winter and spring when vegetation cover and rainfall are at a minimum, leaving the land exposed to weathering and with a high potential for desertification to expand.

3.5.1.3 Sandy substances

Geologically, the ground surface in deserted and desertification areas in the PRC is generally covered by thick, loose sandy substances.⁸⁷ These substances provide the basic material for formation and development of desert and desertification areas. The capacity of soil formed on the sandy substances to resist weathering is comparatively low: a combination of the fragile ecological condition, frequency of drought and gales, low ratio of vegetation cover, slow soil formation and natural weathering processes.

3.5.2 Human causes of LD

Many human activities in western dryland PRC lead to LD, including over-exploitation, irrational land use, overgrazing, excessive mining and denudation, and exploitation of water resources. The Legal and Policy Component of the Capacity Building Project regarded the following activities as the main activities to be considered in the evaluation process and in making recommendations for the environmental law and policy framework for LD control.

86 Number of days of sand blown by wind is generally 20-100 in northwest PRC; it is very high in sandy regions, e.g., the number of days of sand blown by wind in the southern part of Taklimacam Desert in Xinjiang Uygur Autonomous Region accounts for one-third of the year, and the maximum number of days in Qirmo and Minqing in Gansu Province are 145 and 148 respectively.

87 Including Horqin Desert in western Liao River Plateau; Ordos Plateau and eastern Wushen River and Lake; Ulan Buh Desert; Tarim Basin, Junggar Basin and Qaidam Basin.

3.5.2.1 Land exploitation and improper land use

The PRC's general policy of economic development was concentrated on rice production during the long period from the founding of the new PRC to the end of the 1970s, and little regard was given to natural land capacity conservation, forest management and good livestock husbandry. Thus, LD had become severe and widespread, vegetation recovery was impaired, land abandoned and unsuitable land had been reclaimed for agricultural production.⁸⁸ Remote sensing survey data collected by the PRC Agricultural Farm Zone Administration indicates that nearly one half of the farmland reclaimed in the northwest had become degraded within 10 years of its conversion. Further, comparison of remote sensing data for 53 county units in the Inner Mongolia and Xinjiang Uygur Autonomous Regions, and in Gansu Province from 1986 to 1996 found that destruction of grassland and woodland was serious and nearly half of the land reclaimed was degraded in these four northern provinces during the 10-year period.⁸⁹ The area affected by desertification had mainly been used for dryland farming but the irrigable land accounted for 36.4 percent of the total farming area.⁹⁰ The area of land with moderate and low productivity is vast and land use in these areas was characterized by extensive cultivation. Due to the low farming incomes and poor land administration and governance, such extensive farmland cultivation is of short-term use and low economic benefit.

3.5.2.2 Degradation of grassland

Degradation of grassland from over-grazing is a significant cause of desertification in dryland PRC. Grass production decreases as does the capacity of the pastoral husbandry. Since the founding of the new PRC, the numbers of livestock in the natural grassland area had increased more than fourfold, and grassland had degraded due to land reclamation and desertification processes.⁹¹ Expansion of desertification is a result of unsustainable grazing of fragile grassland ecosystems. Since the 1980s, livestock breeding and grassland cultivation have taken place under a contractual arrangement with each farmer but land management has been poor and development uncoordinated. Illegal occupancy of grassland occurs due to unclear grassland boundaries and there is conflict over access to common water and land. The system of collective grazing is still practised in most grassland areas and grassland usage is unsustainable due to high livestock numbers. There is a lack of enforcement of grazing limits.⁹²

88 E.g., the area of cultivated land in Xinjiang Uygur Autonomous Region doubled during the period.

89 Survey indicated that land reclaimed during 1986–1996 was 29.12 million mu (1 Chinese mu = 0.067 ha), and the area of arable land that survived was only 14.794 million mu, 50.8 percent of total area reclaimed.

90 The irrigable land in the desert area of Inner Mongolia is 18.9 percent, and the north region of Shaanxi Province and north region of Shanxi Province is 12.4 percent and 6.2 percent respectively.

91 E.g., the assessed stocking capacity of Inner Mongolia Autonomous Region is 44.298 million sheep livestock units (SU) with crop straw for breeding of 54.751 million SU. By the end of 1985, the numbers of livestock in Inner Mongolia Autonomous Region had reached 55.767 million SU which was not ecologically sustainable. By 1997 the number of livestock had exceeded 70 million – almost double the estimated safe level of ecological capacity.

92 During 1980–1990 the degree of overgrazing of grassland in the PRC was 50–120 percent, up to 300 percent in some areas. The degraded grassland in drought areas and semi-drought areas accounted for 56.6 percent of the total area of grassland. Degraded grassland expanded sharply with an annual rate of 1.33 million ha; e.g. grassland in Inner Mongolia Autonomous Region degraded at an average annual rate of 2 percent.

3.5.2.3 Vegetation degradation

The western dryland area is generally devoid of vegetation suitable for natural fuel so woody biomass harvesting is prevalent as the main form of fuel. Firewood used for charcoal production accounts for 14 percent of total firewood consumption, and demand is far greater than the supply. To deal with the problem of firewood shortage, farmers resort to felling woodland and mowing the grassland. The annual demand for wood fuel is around 3.5–7.0 million tons from the desert vegetation, an activity that is fragmenting and slowly destroying the ecosystems.⁹³ In addition to wood, livestock manure and straw are burnt for fuel which could otherwise have been used as organic matter to replenish soil nutrients.

3.5.2.4 Inefficient use of water resources

Inefficient use of water caused by a lack of consistent and effective management and allocation of water resources in the dryland area has had serious consequences. Excessive irrigation in upper stream areas has caused secondary soil salinization and reduced flow in lower river reaches; and large areas of desert vegetation have degraded from the decline of ground water. Traditional flood irrigation practice in agriculture is a wasteful use of water resources and raises the level of ground water in irrigation areas. It is also a direct cause of soil salinization.⁹⁴ Excessive water interception and water storage in rivers upstream of desert land has substantially reduced the volume of water needed in the lower reaches to maintain viability of aquatic ecosystems and for crop production. This has degraded natural ecosystems and cultivation land.⁹⁵ Forest and grasslands have been destroyed by engineering, mining and transportation construction, which are major causes of LD.

3.6 Climate change

Climate change is significantly affecting the stability of ecosystems of western dryland PRC and is responsible for an increase in severity of LD. It is predicted that the area of the PRC affected by drought will expand, the temperature will rise, the effects of drought will worsen and the frequency of drought will increase.⁹⁶ Air temperature data collected in the PRC, for the period 1951–1991 (from 160 observatories and weather stations), indicates that the average air temperature is steadily

93 In Jilantai town of Inner Mongolia Autonomous Region, 66 percent of the area of *Ammodendron* forest to the northwest of Yanhu Lake was lost within 20 years through clearance by locals, and all *Ammodendron* forest within 40 km of the town had been cut down.

94 The amount of water for irrigation per ha is 13,500 m³; in some areas this figure reaches 1,500–2,000 m³; the area of secondary soil salinization in Gansu and Qinghai Provinces and Ninjxia Hui and Xinjiang Uygur Autonomous Regions is around 16 million ha.

95 E.g., in the Tarim River Valley of Xinjiang Uygur Autonomous Region, excessive water use in the upstream area has reduced flows in the lower stream area and vast areas of poplar forest have degraded and withered, causing soil erosion and desertification; a substantial reduction of water flow in the Hei River has degraded the Ejina Oasis ecosystem through reduction in groundwater level.

96 Intergovernmental Panel on Climate Change (IPCC). 2007. *Climate Change 2007: Impacts, Adaptation and Vulnerability*. Cambridge, UK and New York, USA: Cambridge University Press.

increasing in the dryland areas, where a 0.6°C rise in temperature has increased drought frequency.⁹⁷ In some localities, rainfall has increased along with the accelerated increase of air temperature. In comparison with the average annual rainfall in the period 1961–1986, rainfall in the period 1987–2000 has increased by 22 percent, 33 percent, 12 percent, and 10–20 percent, respectively, in northern Xinjiang, southern Xinjiang, Tianshan Mountains, and the area among the Qilianshan Mountains, the Yellow River and the Qinghai Plateau. However, in contrast, the eastern part of northwest PRC has experienced warm and dry weather, with rainfall in the same period decreasing by 5–15 percent.

The increasing trend of warmer and even dryer weather in dryland PRC has induced the breakdown of dryland ecosystems and is worsening the desertification level. The most serious desertification in the PRC is in the central latitudes, which contain the drought, semi-drought and semi-wet and drought areas. The trend of drought in northern PRC is characterized by:⁹⁸ (i) an increase in the occurrence of drought; (ii) reduction in rainfall (shrinkage of water area and drying of lakes); (iii) decreased river flow; (iv) degradation and thinning of glaciers and retreat of the snow line;⁹⁹ (v) significant expansion of desert and area of LD; and (vi) degradation and withering of vegetation systems.

3.7 Impact of LD and desertification on the sustainable development strategy

The main effects of the severe level of LD in the six project provinces and autonomous regions in Western PRC are lowered land productivity, degraded natural ecosystems, increase in wind-blown sand and increased number of sandstorms, increased poverty and deterioration of livelihoods, reduced agricultural production, damage to transportation routes, degraded water resources, and impacts on infrastructure construction of large and medium-sized cities.

3.7.1 Lowered land productivity

Severe soil erosion and loss of organic matter and nutrients have reduced soil fertility, and the resultant degradation of the soil's physical and chemical properties has reduced land productivity. Soil erosion from over-grazing has reduced the productivity of grasslands, and, in recent decades, grassland productivity has declined by 30–50 percent.¹⁰⁰ Woodland degradation and a sharp decline in the vegetation cover ratio have reduced biomass accumulation and firewood resources. Cutting of desert shrub by farmers for firewood has further destroyed biomass and worsened the LD.

97 The rate of increase of air temperature in local places is higher, e.g., a 1.8°C increase in northern Xinjiang Uygur Autonomous Region as against a 1.0°C increase in south Xinjiang Uygur; see Su Hongchao 2003.

98 People's Republic of China Commission of Sciences. 1990.

99 Shi Yafeng; the average air temperature on the Tibetan Plateau and in northwest PRC increased by more than 20 percent in the 1980s compared to the 1960s, and it is predicted that the increase in warming in the Tibetan Plateau and northwest PRC will reach 3°C by 2050. An increase in air temperature has accelerated glacier thawing and the volume of glaciers in the PRC is predicted to decrease by 30–67 percent during the 21st century.

100 The estimated annual total loss of grass from grassland degradation over past 50 years is 3.33 kg per ha.

The extent of LD threatens national food security as land productivity has declined and conflicts have arisen over land use. The degradation of cultivation land, grassland and woodland has sharply reduced bio-diversity, and habitat destruction has lowered the capacity for species survival, lowered resistance against plant diseases and pests, with many species becoming endangered, and some extinct.

3.7.2 Lowered resistance against natural disasters

Many towns in dryland Western PRC are vulnerable to wind-blown sand. Houses have been covered by sand and there are cases where residents have abandoned their homes due to sandstorms, effectively becoming “ecological refugees”.¹⁰¹ The increasing incidence of sandstorms is a sensitive public and political topic.

3.7.3 Acceleration of poverty and effects on social stability

Many minority ethnic groups in Western PRC occupy areas affected by severe LD. The increase in desertification has accelerated their poverty and has widened the socio-economic gap between the western and eastern regions of the PRC.¹⁰²

3.8 Lessons learned from other countries

Successful experiences of other countries in LD control have provided information that has helped improve the management of LD and desertification in Western PRC.¹⁰³ In summary, the following foreign experiences have been found relevant to western dryland PRC:¹⁰⁴

1. Using public education programmes to improve awareness of environmental protection, and prevention and control of desertification.
2. Ensuring all levels of the community are involved and strong leadership is provided at the national level on environmental issues.
3. Improving the capacity of environmental law and policy to protect ecological resources.
4. Improving the decision-making process for planning rural land use and ecological resources.
5. Introducing incentives for farmers to adopt conservation techniques.
6. Using a national strategy for LD control to prioritize funding programmes for the prevention and control of desertification.¹⁰⁵

101 E.g., a severe sandstorm on 5 May 1993 swept through northwest PRC over an area of 1.1 million km², causing 85 deaths, injuring 264 people, destroying 4,412 houses, killing 120,000 livestock, damaging 370,000 hectares of crops, and causing economic losses estimated at CNY 550 million.

102 World Bank. 2001. *[People's Republic of] China, Overcoming Rural Poverty, A World Bank Country Study*. Washington, DC, USA: The World Bank; see Chapter 2, “Trends in Rural Poverty in the 1990s”.

103 E.g., ADB, *supra* note 57, compares techniques used in Australia, Canada, and the USA to control LD using IEM approaches.

104 SMEC. 2002. *Preparing National Strategies for Soil and Water Conservation*. TA 3548 PRC. People's Republic of China: Ministry of Water Resources; see Chapter 6, “Strategy Action Plan”.

105 ADB, *supra* note 76.

7. Maintaining a comprehensive scientific research programme on prevention and control of desertification.
8. Introducing technologically advanced agricultural systems to improve production and increase farmers' incomes.

4 Legislation and policy for land degradation control

Zhou Ke¹⁰⁶ and Tan Baiping¹⁰⁷

4.1 Background

The law-making institutions of the PRC have the power to formulate, revise and abolish the laws for respective jurisdictions.¹⁰⁸ The legislative system in the PRC is organized by a hierarchy of legislative power. It is a single system, but not an absolute unified one as it provides for a local legislature with a defined legislative power within local jurisdictions. The PRC's legislative system has improved along with its political, economic and cultural development. The founding period of the legislative system is from the establishment of the PRC in 1949 to the formation of the *Constitution* in 1954. In 1978, a new *Constitution* was reconstituted and it provided a solid base to construct the new legislative framework for the PRC to enter the "Reform and Opening" period. The *1982 Constitution* together with the *Legislation Law of 2000* has greatly improved the PRC's legislative system and given it more stability.

4.1.1 Present legislative system

The legislative framework for environmental protection and natural resource conservation, as the principal mechanism to achieve sustainable development, has been under constant construction and revision since the 1980s. This legislative framework comprises national and local laws, regulations and structures in a five-level hierarchy, namely: (a) constitutional law provisions and international conventions and agreements to which the PRC has become a party; (b) national laws promulgated by the National People's Congress and its Standing Committee; (c) national administrative regulations, orders, decisions, and other normative documents with the binding force of law, promulgated by the State Council (SC); (d) local laws, regulations, decisions and orders promulgated by the People's Congress of provinces, autonomous regions/cities/counties, and SC-directed municipalities, authorized cities and other local organs with local legislative power, and (e) by-laws issued by ministries or authorities as directed by SC but in accordance with national law and administrative regulations, or by-laws issued by People's Governments at provincial and autonomous region level.

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107 Specialist of Environmental Law, Beijing University of Technology, Beijing, People's Republic of China.

108 People's Republic of China Encyclopedia. 1984. Law. People's Republic of China Encyclopedia Press; Zhou, W. 1994. *Legislative Law*, pp. 63–76. Beijing, PRC: Beijing University Press.

4.2 Legislative and regulatory framework for LD control

4.2.1 Central level

As pointed out in Chapter 3, LD affects all types of land in the western dryland region, including farmland, grassland and forest land. Hence, individual laws, regulations and administrative rules governing land use at the different levels form a comprehensive legal and regulatory framework to control LD.

Guided by the assessment method outlined in Chapter 1 for the Legal and Policy Component of the Capacity Building Project, all central-level laws and regulations relevant to LD control were categorized into nine law areas including: land resources, desertification prevention and control, water and soil conservation, grassland, forest, water, agriculture, protection of wild animals and plants and environmental protection.

The legislation for each area at the central level is listed in Table 2.

Table 2. Legislation for LD control at central level

Area	Level of legislation	Name of document	Status
All areas	National Laws	Constitution of the People's Republic of China	Adopted in 1982, and amended in 1988, 1999 and 2004
Land Resources	National Laws	Land Administration Law	Enacted and validated in 1986, 1st amended in 1988, 1st revised in 1998 and validated in 1999, 2nd amended in 2004.
		Mineral Resources Law	Enacted and validated in 1986, amended in 1996
	National Administrative Regulations	Implementation Regulations for the Land Administration Law	Enacted in 1998, validated in 1999
		Regulations for Land Survey	Issued and validated in 2008
		Regulations for Land Reclamation	Issued and validated in 1988
		Regulations for Prevention and Control of Geological Disasters	Issued in 2003, validated in 2004
		Administrative Regulations for Village and Town Planning and Construction	Issued and validated in 1993

Area	Level of legislation	Name of document	Status
Land Resources	Ministerial By-laws	Administrative Measures for Pre-approval of Land for Construction Projects	Issued in 2001, revised in 2004, amended in 2008 and validated in 2009
		Provisions for Public Hearings for Land Resources	Issued and validated in 2004
		Administrative Measures for Annual Planning of Land Use	Issued in 1999, revised in 2004 and 2006
		Regulations for Disposal of Idle Land	Issued in 1999
Desertification Prevention and Control	National Laws	Law on the Prevention and Control of Desertification	Enacted in 2001, validated in 2002
	Ministerial By-laws	Administrative Measures for Profitable Projects on Prevention and Control of Desertification	Issued and validated in 2004
		Administrative Measures for Collection of Licorice Roots and Chinese Ephedra	Issued and validated in 2001
Water and Soil Conservation	National Laws	Water and Soil Conservation Law	Enacted and validated in 29 June 1991
	National Administrative Regulations	Implementation Regulations for the Water and Soil Conservation Law	Issued and validated in 1993
		The Regulations for Water and Soil Conservation in the Process of Exploitation and Construction of the Bordering Area amongst Shanxi, Shaanxi and Inner Mongolia	Issued and validated in 1988
	Ministerial By-laws	The Administrative Measures for Examination and Acceptance of Water and Soil Conservation Facilities Required in Development Projects	Issued in 2002, validated in 2002, revised in 2005
		Administrative Measures for Utilization and Exploitation of "Four Types of Idle Land in the Countryside"	Issued and validated in 1998

Area	Level of legislation	Name of document	Status
Grassland	National Laws	Grassland Law	Enacted in 1985, revised in 2002 and validated in 2003
	National Administrative Regulations	Regulations on Prevention of Grassland Fires	Issued in 1993, revised in 2008 and validated in 2009
	Ministerial By-laws	Administrative Measures for Balance of Grass and Livestock	Issued and validated in 2005
Forestry	National Laws	Forestry law	Enacted in 1984, amended in 1998
	National Administrative Regulations	Implementation Regulations on the Forestry Law	Issued in 2000
		Regulations on Prevention and Control of Forest Fires	Issued in 1988, revised in 2008 and validated in 2009
		Regulations on the Conversion of Arable Land to Forestland	Issued in 2002 and validated in 2003
		Administrative Measures for Forests and Wild Animal-type Nature Reserves	Issued in 1985
	Ministerial By-laws	Administrative Measures for Registry of Ownership and Use Rights of Forests and Forestland	Issued and validated in 2000
		Administrative Measures for Management of Natural Forest Protection Projects	Issued and validated in 2001
Water	National Laws	Water Law	Enacted in 1988, revised and validated in 2002
		Law on Prevention and Control of Floods	Enacted in 1997 and validated in 1998
	National Administrative Regulations	Regulation on Hydrology	Enacted and validated in 2007
		Regulation on Transfer of Water Resources from Yellow River	Issued and validated in 2006
		Regulations for Compensation for Land Appropriation and Resettlement as a Result of Large and Medium-sized Irrigation and Power Works	Issued and validated in 2006

Area	Level of legislation	Name of document	Status
Water	National Administrative Regulations	Administrative Regulations for Water Drawing Permission and Charging of Water Resources Fees	Issued and validated in 2006
		Regulations on Watercourse of Rivers	Issued in 1988
		Regulations on the Prevention and Control of Seasonal Floods	Issued in 1991, revised and validated in 2005
		Regulations for Resettlement for the Three Gorges Project in the Yangtze River	Issued and validated in 2001
		Regulations on Safety Management of Reservoirs and Dams	Issued and validated in 1991
	Ministerial By-laws	Administrative Provisions for Urban Groundwater Development, Utilization and Protection	Issued in 1993, validated in 1994
		Administrative Measures for Evaluation of Water Resources Used by Construction Projects	Issued and validated in 2002
		Administrative Provisions for Prevention and Control of Pollution in Protected Drinking Water Source Areas	Issued and validated in 1989
		Measures for Compensation for Occupying Water Sources for Agricultural Irrigation and Irrigation Works Facilities	Issued and validated in 1995
		Administrative Provisions for Irrigation Diverted from Yellow River Water in the Lower Reaches of the Yellow River	Issued and validated in 1994
Agriculture	National Laws	Agriculture Law	Enacted in 1993, revised in 2002 and validated in 2003
		Seed Law	Enacted and validated in 2000, amended in 2004
		Rural Land Contracting Law	Enacted in 1993, revised in 2002 and validated in 2003

Area	Level of legislation	Name of document	Status
Agriculture	National Administrative Regulations	Regulations for the Protection of Basic Farmland	Issued in 1998 and validated in 1999
		Administrative Regulations on Agricultural Chemicals	Issued and validated in 1997, revised in 2001
	Ministerial By-laws	Administrative Measures for Transfer of Contracted Rural Land	Issued and validated in 2005
Wild Animals and Plants	National Laws	Law for the Protection of Wild Animals	Enacted in 1988, validated in 1989 and amended in 2004
	National Administrative Regulations	Implementation Regulations for the Protection of Wild Land Animals	Issued and validated in 1992
		Regulations for the Protection of Wild Plants	Issued in 1996 and validated in 1997
	Ministerial By-laws	Measures for the Protection of Wild Agricultural Plants	Issued and validated in 2002, revised in 2004
Environmental Protection	National Laws	Environmental Protection Law	Enacted and validated in 1989
		Water Pollution Prevention and Control Law	Enacted in 1984, amended in 1996, revised and validated in 2008
		Law for Prevention and Control of Environmental Pollution Caused by Solid Wastes	Enacted in 1995, revised in 2004 and validated in 2005
		Environmental Impact Assessment Law	Enacted in 2002 and validated in 2003
		Marine Environmental Protection Law	Enacted in 1982 and revised in 1999
	National Administrative Regulations	Administrative Regulations for Environmental Protection of Construction Projects	Issued and validated in 1998
		Regulations on Nature Reserves	Issued and validated in 1994
	Ministerial By-laws	Tentative Measures for Public Hearing of Administrative Permission in Environmental Protection	Issued and validated in 2004

4.2.2 Provincial and autonomous region level

The three provinces and three autonomous regions in the Capacity Building Project have developed a local law and regulatory framework relevant to LD control, ecosystem management and environmental protection.

The principal local legislation for each province and autonomous region in the Capacity Building Project is listed in Table 3.

Table 3. Legislation for LD control at provincial and regional level

Province/region	Area of local law	Name of document
XinJiang Uygur Autonomous Region	Land Resources	Implementation Measures for the Land Administration Law
		Regulations on Land Supervision
		Measures for the Protection of Basic Farmland Implementation Measures for the Regulations on Land Reclamation
	Desertification	Provisions for Desertification Prevention and Control
	Water and Soil	Measures for the Water and Soil Conservation Law
	Grassland	Implementation Rules for the Grassland Law
		Implementation Measures for the Prevention of Grassland Fires
		Administrative Measures for Grassland Scenic Spots Administrative Measures for Grassland Tenure Contracting
	Forestry	Implementation Measures for Forestry Law
Measures for the Prevention of Forest Fires		
Implementation Measures for Rules on the Control of Forest Diseases and Insect Pests Rules on People's Obligatory Forestation		
Water	Implementation Measures for the Water Law	
	Administrative Regulations for Watercourses of Rivers	
	Administrative Regulations for Groundwater Resources Administrative Regulations for Water Resources in the Tarim River Basin	
Agriculture	Implementation Measures for Rural Land Contracting Law	
	Implementation Measures for the Law for the Promotion of Agricultural Technology	
Wild Animals and Plants	Measures for the Law on the Protection of Wild Animals	
Environmental Protection	Regulations for Environmental Protection	
	Regulations on Nature Reserve Zones	
	Regulations on the Protection of the Geological Environment Measures for Management of National Nature Reserve of Arjin Mountain	
Inner Mongolia Autonomous Region	Land Resources	Implementation Measures for the Land Administration Law
		Rules for Protection of Basic Grassland
		Implementation Rules for the Protection of Basic Farmland
		Measures for Land Supervision
		Implementation Measures for the Regulations on Land Reclamation
		Proposals for Registry of Collective Land Ownership and Use Rights

Province/region	Area of local law	Name of document
Inner Mongolia Autonomous Region	Desertification	Implementation Measures for the Law for the Prevention and Control of Desertification
	Water and Soil	Implementation Measures for the Water and Soil Conservation Law Implementation Measures for the Exploitation and Development of Four Types of Idle Land in the Countryside
	Grassland	Implementation Rules for the Administrative Regulations for Grassland Management Tentative Measures for the Balance of Grass and Livestock Administrative Measures for the Transfer of Contracted Grassland Implementation Measures for the Transfer of Contracted Grassland Tenure
	Forestry	Implementation Measures for the Forestry Law Rules on Forest Seedlings
	Water	Implementation Measures for the Water Law Rules on Agricultural Water-saving Irrigation Implementation Measures for the Flood Prevention Law Measures for the Management and Protection of Water Works Administrative Regulations for Levy on Water Resources
	Agriculture	Regulations for the Contracting in Agriculture and Husbandry Rules on the Zoning of Agricultural Resources Rules on the Protection of Farmland
	Wild Animals and Plants	Implementation Measures for the Law on the Protection of Wild Animals
	Environmental Protection	Regulations on Environmental Protection Regulations for the Protection of Agricultural Environment Regulations on the Protection of Geological Environment Administrative Regulations for National Nature Reserve of Silingol Prairie Implementation Measures for Water Pollution Control in the Yellow River Basin within the Inner Mongolia Autonomous Region Implementation Measures for Water Pollution Control in West Liao River Basin within the Inner Mongolia Autonomous Region Implementation Measures for Nature Reserves
Qinghai Province	Land Resources	Administrative Regulations for Mineral Resources
	Desertification	Regulations on Plant Protection in Desert Areas of the Hai-xi Mongolian and Tibetan Autonomous Prefecture of Qinghai Province
	Water and Soil	Implementation Measures for the Water and Soil Conservation Law
	Grassland	Measures for Grassland Tenure Contracting Administrative Measures for the Transfer of Grassland Use Rights

Province/region	Area of local law	Name of document
Qinghai Province	Forestry	Implementation Measures for the Forest Law Regulations on Greening of Qinghai Province Regulations on Forestation of the North and South Mountains of Xining City Regulations on Greening in Minghe Hui and Tu Autonomous Counties Administrative Regulations on Forestry in Datong Hui and Tu Autonomous Counties
	Water	Implementation Measures for the Water Law
	Agriculture	Measures for Rural Land Contracting Law Administrative Regulations for the Protection of Basic Farmlands Regulations on the Promotion of Agricultural Technology
	Wild Animals and Plants	Implementation Measures for the Law on the Protection of Wild Animals
	Environmental Protection	Implementation Measures for the Environmental Protection Law Regulations for Water Pollution Control of the Huangshui River Basin Regulations for Ecological Environment Protection of the Qinghai Lake Basin Measures on Agricultural Environment Protection Measures on Prevention and Control of Environmental Pollution in the Residential Environment of Xining City
Ningxia Hui Autonomous Region	Land Resources	Administrative Regulations for Land Administration
	Grassland	Administrative Regulations for Grassland Management
	Forestry	Administrative Measures for Forestland
	Water	Administrative Measures for Levy on Water Resources
	Environmental Protection	Regulations on the Protection of the Agricultural Environment Administrative Measures for the National Nature Reserves of Liupan Mountain, Helan Mountain and Luo Mountain Administrative Regulations for the Timely Treatment of Environmental Pollution Administrative Measures for Environmental Protection of Construction Projects Measures on Environmental Protection Administrative Measures for a Levy on Pollutant Discharges
Gansu Province	Land Resources	Implementation Measures for the Land Administration Law Measures for the Supervision of Land Rules on the Protection of Basic Farmland Measures for Land Taken for Infrastructure Construction Rules on the Registry of Land Regulations on the Control of Land Degradation

Province/region	Area of local law	Name of document
Gansu Province	Land Resources	Administration Measures for Mineral Resources of the Northern Mongolia Autonomous County Administrative Measures for Land of the Southern Gansu Tibetan Autonomous Prefecture Administrative Measures for Mineral Resources of the Southern Gansu Tibetan Autonomous Prefecture of Gansu Province Administrative Regulations for Mineral Resources of the Tianzhu Tibetan Autonomous Prefecture of Gansu Province Administrative Regulations for Mineral Resources of the Southern Gansu Yugu Autonomous County Administrative Measures for Mineral Resources of the Akesai Kazakhs Autonomous County
	Desertification	Implementation Measures for Desertification Prevention and Control
	Water and Soil	Implementation Measures for the Water and Soil Conservation Law
	Grassland	Regulations on Grassland Administrative Regulations for Grassland Reclamation Regulations on the Prevention of Grassland Fires in the Southern Gansu Tibetan Autonomous Prefecture Administrative Regulations for Tourism in the Southern Gansu Tibetan Autonomous Prefecture Administrative Regulations on Grassland in the Southern Gansu Tibetan Autonomous Prefecture of Gansu Province Administrative Regulations for Mineral Resources in the Southern Gansu Yugu Autonomous Prefecture Administrative Regulations for Grassland in the Akesai Kazakhs Autonomous County Measures for Grassland in the Northern Gansu Mongolia Autonomous County
	Forestry	Implementation Measures for the Forestry Law Rules on the Control and Inspection of Forest Diseases and Insect Pests Rules on Wetland Protection Administrative Regulations for Forest Seedlings Administrative Regulations for the Baishui River National Nature Reserve Administrative Regulations for the Long Mountain National Nature Reserve Rules on People's Obligatory Forestation Administrative Regulations for the National Nature Reserve of Qilian Mountain Administrative Regulations for the National Nature Reserve of Lianhua Mountain

Province/region	Area of local law	Name of document
Gansu Province	Forestry	Regulations on Forestation along Roads and its Maintenance Rules on the Prevention of Forest Fires Administrative Regulations for Forest Parks Rules on People's Obligatory Forestation in Lanzhou City Measures for Urban Tree Planting in Lanzhou City Administrative Measures for Forestation and Construction on both North and South Mountains in Lanzhou City Provisions for the Protection of Key Urban Public Forestation in Lanzhou City Administrative Measures for the Prevention of Forest Fires in the Southern Gansu Yugu Autonomous County
	Water	Implementation Measures for the Water Law Measures for the Protection of Hydraulic Works Management Administrative Regulations for River Courses Detailed Regulations for Flood Prevention Administrative Regulations for Small-scale Hydraulic Works Measures for Implementing Regulations on River Courses Administrative Measures for Saving Water in Lanzhou City
	Agriculture	Administrative Regulations for Energy Construction in Rural Areas Administrative Regulations for Agricultural Contracting Tentative Provisions for the Conservation and Maintenance of Farmland Administrative Measures for Agricultural Chemicals Administrative Measures for Vegetable Production Bases in Lanzhou City Administrative Measures for Pesticide
	Wild Animals and Plants	Provisions on the Protection of Wild Plants in Southern Gansu Tibetan Autonomous Prefecture
	Environmental Protection	Regulations for Environmental Protection Administrative Regulations for Nature Reserves Rules for the Protection of the Geological Environment Regulations on the Protection of the Eco-environment in Petroleum Prospecting and Development Measures for the Protection of Drinking Water Sources for Urban Life and Pollution Control in Lanzhou City Prevention and Control of Air Pollution in Lanzhou City
Shaanxi Province	Land Resources	Implementation Measures for the Land Administration Law Administrative Regulations for Exploitation and Development of Five Types of Collective Idle Land Detailed Rules on the Protection of Basic Farmland
	Desertification	Implementation Measures for Desertification Prevention and Control Law

Province/region	Area of local law	Name of document
Shaanxi Province	Water and Soil	Implementation Measures for the Water and Soil Conservation Law
	Grassland	Implementation Measures for the Grassland Law
	Forestry	Administrative Regulations for Forests Detailed Implementation Regulations for Obligatory Forestation for All Society in Shaanxi Province
	Water	Implementation Measures for the Water Law Implementation Measures for Water Pollution and Control in the Weihe River Basin Regulations on Environmental Protection in Protected Urban Drinking Water Source Areas
	Agriculture	Administrative Regulations for Rural Collective Economic Contracts Administrative Regulations for Rural Collective Property
	Wild Animals and Plants	Implementation Measures for the Wild Animal Protection Law
	Environmental Protection	Implementation Measures for the Environmental Impact Assessment Law Implementation Measures for the Environmental Protection Law Environmental Protection in the Development of Coal, Petroleum and Natural Gas Rules on Wetland Protection Administrative Regulations for the Timely Treatment of Environmental Pollution Implementation Measures for Water Pollution and Control in the Han River and the Dan River Basins

4.3 Policy on LD control

4.3.1 Policy instruments for LD control at central level

State Council and its ministries and authorities have developed different types of policy instruments that relate to LD control and ecological protection. They are classified in Table 4.

Table 4. Policy Instruments for LD control at central level

Area	Name of document	Issuing authority	Year
Land Resources	Decision on Deepening Reforms and Rigorously Enforcing Land Administration	State Council	2004
	Notice on the Issues Relevant to Land Adjustment and Control	State Council	2006
	Notice on Conducting the 2nd National Land Survey	State Council	2006
	Notice on Promoting Economical and Intensive Land Use	State Council	2008

Area	Name of document	Issuing authority	Year
Land Resources	Notice on the Surveillance Ministry's Opinions on Special Check-up Conducted on the Management and Use of the Compensation Fund for Requisition of Collective Farming Land	General Office of the State Council	2004
	Notice on Strengthening the Conservation Management of Wetland	General Office of the State Council	2004
	Notice on the Land Resource Ministry's Opinion for Accomplishing Pilot Tasks for the Formulation and Revision of Overall Land-use Plans	General Office of the State Council	2005
	Notice on the Issues Relevant to the Establishment of the National Land Supervision System	General Office of the State Council	2006
	Notice on Regulating the Administration of Collection and Disbursal of the Fee from the Transfer of Use Rights of State-owned Land	General Office of the State Council	2006
	Notice on Earnestly Protecting Legitimate Rights and Interests of Land-requisitioned Farmers	Ministry of Land Resources	2002
Desertification	National Plan of the Projects for Prevention and Control of Desertification (2005–2010)	State Council	2005
	State Council Decision on Further Strengthening Desertification Control Performance	State Council	2005
	State Forestry Agency's Notice on Further Strengthening the Protection of Forests and Grassland Vegetation in Northern Desert Areas, and Stopping Land Clearance, Forest and Grassland Destruction, Excessive Grazing and Cultivation, and Picking Vegetation	State Forestry Agency	2002
	State Forestry Agency Notice on Earnestly Handling Emergency Responses to the Disasters Caused by Sand Storms at the Present	State Forestry Administration	2007
	State Forestry Agency Notice on Effectively Curbing the Destruction of Vegetation and Improving the Protection of Forest and Grass Vegetation in Desert Areas	State Forestry Agency	2007
Water and Soil Conservation	State Council Notice on Strengthening Water and Soil Conservation	State Council	1993
	State Council Proposals for Promoting the Establishment of a New Socialist Countryside	Central Committee of Communist Party of China and State Council	2006
	State Council Notice on the Treatment and Development of "Four Types of Rural Idle Lands" (non-reclaimed mountains, gullies, hills and shoals) and Further Strengthening Water and Soil Conservation	General Office of the State Council	1996

Area	Name of document	Issuing authority	Year
Water and Soil Conservation	Notice on Conducting Pilot Projects for Water and Soil Conservation and Ecological Rehabilitation throughout the Country	Ministry of Water Resources	2002
	Guidelines for the Administration of Constructing Silt Dykes in the Loess Plateau Areas	Ministry of Water Resources	2004
	Notice on Further Strengthening Water and Soil Conservation in Development Activities Concerning Land and Minerals	Ministry of Water Resources, Ministry of Land Resources	2004
	National Guidelines for Prevention and Supervision over Water and Soil Conservation (2004–2015)	Ministry of Water Resources	2004
	Proposals for Regulating Technical Assessment of the Performance of Water and Soil Conservation Projects	Ministry of Water Resources	2005
	Notice on Monitoring Water and Soil Conservation	Ministry of Water Resources	2007
	Notice on Launching Investigations into the Reforms of Water and Soil Conservation Mechanisms	Ministry of Water Resources	2007
	Notice on the Administration in Integrated Agricultural Development Projects	Ministry of Agriculture, National Office for Integrated Agricultural Development	2007
Grassland	Opinions to Enhance the Conversion of Farmland to Forestland and Grassland	State Council	2000
	State Council's Opinions for Enhancement of the Protection and Establishment of Grassland	State Council	2002
	State Council's Notice on Improving the Policy for the Conversion of Farmland to Forestland	State Council	2004
	Promoting Sustained and Healthy Husbandry Development	State Council	2007
	State Council's Notice on the Policy for the Conversion of Farmland to Forestland	State Council	2007
	State Council's Notice on Grain Subsidy Measures in the Conversion of Farmland to Forestland	General Office of the State Council	2004
	State Council's Notice on Effectively Fulfilling "Five Points of Coordination" and Further Strengthening the Achievements of Converting Farmland to Forestland	General Office of the State Council	2005
	Notice on Launching the Pilot and Demonstration Projects of Conversion of Farmland to Forestland and Grassland in the Upper Reaches of the Yangtze River, and the Upper and Middle Reaches of the Yellow River in 2000	State Forestry Agency, State Planning Commission, Ministry of Finance	2000

Area	Name of document	Issuing authority	Year
Grassland	Notice on the Agricultural Tax Policy of Conversion of Farmland to Forestland and Grassland in Pilot Area	Ministry of Finance, State Administration of Taxation	2000
	Administrative Measures for Cash Subsidies in the Project of Conversion of Farmland to Forestland	Finance Ministry	2002
	Notice on Effectively Converting Farmland to Forestland and Closing off Hills for Forests Cultivation	State Forestry Agency	2005
	Notice on Further Implementation of the Current Conversion of Farmland to Forestland	State Forestry Administration	2007
Forestry	State Council's Decision on Accelerating the Development of Forestry	Central Committee of Communist Party of China, State Council	2003
	State Council's Notice on Further Strengthening the Prevention and Control of Forest Fires	General Office of the State Council	2004
	State Forestry Agency's Notice on Regulating the Registry for Forest Rights	State Forestry Agency	2007
Water	State Council's Notice for Improving the Policies on Supporting Work in the Late Phase for Resettled Indigenous Groups due to the Construction of Large and-Medium-sized Reservoirs	State Council	2006
	State Council's Notice on the Proposals for Establishing New Mechanisms for Agricultural Irrigation and Water Conservancy Construction	General Office of the State Council	2005
	State Council's Notice of the Comprehensive Opinions of the Ministry of Water Resources on Modification and Formulation of Comprehensive River Basin Plans	General Office of the State Council	2007
Agriculture	Several Policies and Measures for Enhancing the Western Region Development Strategy of the State Council	State Council	2001
	State Council's Proposals for Further Promoting the Western Region Development Strategy	State Council	2004
	State Council's Proposals for the Implementation of Policies and Measures for the Western Region Development Strategy, and the Proposals for Speeding up Specialized Agriculture in Western Regions	Central Committee of Communist Party of China, State Council	2006
	The 11th Five-Year Plan for the Development of National Agriculture and Rural Economy (2006–2010)	State Council	2006
	State Council's Notice on Agriculture Ministry's Opinions for Accelerating the Development of Husbandry	General Office of the State Council	2001
	Agriculture Ministry's 11th Five-Year Plan for Agricultural Reclamation Economy and Social Development (2006–2010)	Agriculture Ministry	2007

Area	Name of document	Issuing authority	Year
Agriculture	Agriculture Ministry's Plan for the Development of Agricultural Science and Technology	Agriculture Ministry	2007
Protection of Wild Animals and Plants	Notice on the Outline for National Eco-environmental Protection	State Council	2000
	SEPA's Notice on Strengthening the Management of Nature Reserves	General Office of the State Council	1998
	Notice on the Establishment of 29 National Nature Reserves	General Office of the State Council	2003
	Notice on Strengthening the Establishment and Management of Nature Reserves	State Environmental Protection Administration	2002
Environmental Protection	State Council's Decision on Several Issues on Environment Protection	State Council	1996
	State Council's Notice on Speeding up a Recycling Economy	State Council	2005
	The 10th Five-Year Plan for National Eco-environmental Protection	State Council	2005
	Outline for Planning Ecological Function Zones (trial implementation)	State Environmental Protection Administration	2001
	The 10th Five-Year Plan for National Eco-environment Protection	State Environmental Protection Administration	2002
	Guidelines for Promoting a Recycling Economy	State Environmental Protection Administration	2005
	SEPA Notice on Further Strengthening Ecological Protection	State Environmental Protection Administration	2007
	Notice on Strengthening Environmental Protection in Rural Areas	State Environmental Protection Administration	2007
	Guidelines for Launching Pilot Projects for Ecological Compensation	State Environmental Protection Administration	2007
	National Ecological Function Zoning	Ministry of Environmental Protection	2008

4.3.2 Policy on LD Control at provincial and regional level

The provinces and autonomous regions have issued many policies relevant to LD control, ecosystem management and biodiversity protection to implement the national policies and manage

specific environmental issues which apply in the provinces and regions. Provincial and regional policies are often associated with the 11th Five-Year Plan process relating to economic development, and include policies for LD control, ecosystem management and biodiversity conservation. Tables 5–9 below indicate the main policy documents of Xinjiang Uygur Autonomous Region, Ningxia Hui Autonomous Region, Qinghai Province, Gansu Province, and Shaanxi Province in relation to the IEM and combating LD.

Table 5. Policy Instruments for LD control in Xinjiang Uygur Autonomous Region

Area	Name of document ¹⁰⁹
Land Resources	<p>Notice on Promoting the Protection of Basic Farmland</p> <p>Notice on Implementing the Notice on Further Strengthening the Management of Land and Effectively Protecting Farmlands by the Communist Party of China Central Committee and the State Council</p> <p>Notice on the State of Plastic Film Pollution in Farmlands and the Opinions for Strengthening Pollution Control Measures</p>
Water	<p>Notice on the Establishment of the Tarim River Basin Management Commission</p> <p>Resolution on Speeding up the Construction of Water Conservation by the Autonomous Party Committee and Government</p> <p>Administrative Measures for the Integrated Diversion of Waters in the Tarim River Basin</p>
Grassland	<p>Notice on Opinions for the Prohibition of Collecting and Selling Flagella Algae and Stopping Digging Licorice and Ephedrine</p> <p>Resolution on Speeding up the Development of Modern Animal Husbandry</p>
Forestry	<p>Notice of the Committee of Communist Party of [the People's Republic of] China of Xinjiang Uygur Autonomous Region on Speeding up the Reform and Development of Forestry</p> <p>Notice on Implementing the Circular of the State Council on Protecting Forest Resources and Stopping Deforestation and Illegal Occupation of Cultivated Land</p> <p>Notice of the Committee of Communist Party of [the People's Republic of] China of Xinjiang Uygur Autonomous Region on Accelerating the Development of Forestry</p> <p>Notice of the Committee of Communist Party of [the People's Republic of] China of Xinjiang Uygur Autonomous Region on Speeding up the Development of Specialized Forestry and Fruit Cultivation</p>
Environmental Protection	<p>Resolution on Further Strengthening Environmental Protection of the People's Government of Xinjiang Uygur Autonomous Region</p> <p>Notice on the Implementation of the Outlines for National Ecological Protection</p> <p>Notice on the Notice of State Council on the Protection of the Tourist Eco-environment</p> <p>Administrative Measures for the Wetland Nature Reserve of Ebinur Lake</p>

109 Policy documents in this Table, e.g., “Notice” were issued by the People's Government of Xinjiang Uygur Autonomous Region, unless otherwise indicated.

Table 6. Policy Instruments for LD control in Qinghai Province

Area	Name of document ¹¹⁰
Comprehensive Administration	Notice on the Measures for the Western Development Strategy in Qinghai
Desertification	Notice for Implementing the Decision of the State Council on Strengthening the Prevention and Control of Desertification
Water and Soil Conservation	Notice on Strengthening Water and Soil Conservation
Grassland	Notice on Implementing the Opinions of the State Council for Protecting and Constructing Grassland Doctrines on Prohibiting Animal Husbandry and Protecting the Environment
Forestry	Decisions of the Qinghai Provincial Committee of Communist Party of [the People's Republic of] China on Implementation of 'the Decision on Speeding up the Development of Forestry by the Communist Party of [the People's Republic of] China Central Committee and the State Council'
Environmental Protection	Proposals for Implementing the Decision of the State Council on Strengthening Environmental Protection Based on the Scientific Development Concept

Table 7. Policy Instruments for LD control in Ningxia Hui Autonomous Region

Area	Name of document ¹¹¹
Comprehensive Administration	Resolution on Improvement of the Environment for Economic Development The Outlines of the National Economic and Social Development in the 10th Five-Year Plan of Ningxia Hui Autonomous Region The 10th Five-Year Plan for Environmental Protection of Ningxia Hui Autonomous Region Notice on the 10 th Five-Year Plan of the National Economic and Social Development of the State Council
Agriculture	Notice on Effective Implementation of the Tasks Concerning Agriculture and Rural Areas Notice on Deepening Pilot Reforms of Taxes and Levies in Rural Areas Proposals of the Autonomous Regional Committee of Communist Party of [the People's Republic of] China and the People's Government of Ningxia Hui Autonomous Region for Promoting the Establishment of a New Socialist Countryside and Implementation of the Tasks Concerning Agriculture and Rural Areas Proposals of the Autonomous Regional Committee of Communist Party of [the People's Republic of] China and the People's Government of Ningxia Hui Autonomous Region for Implementing the Proposals for Strengthening and Enhancing Information Services for Agricultural Products

110 Policy documents in this Table, e.g., "Notice" and "Doctrines", were issued by the People's Government of Qinghai Province, unless otherwise indicated.

111 Policy documents in this Table, e.g., "Notice" and "Resolution" were issued by the People's Government of Ningxia Hui Autonomous Region, unless otherwise indicated.

Area	Name of document
Food	Proposals for Conducting Reforms of Grain Subsidies (trial)
	Proposals for Building Modern Water-saving Irrigation Areas to Guarantee Grain Security and Sustainable Economic Development
	Proposals for the Implementation of the Decision of the State Council to Deepen the Reform of Grain Market Systems
	Implementation Measure for Grain Purchase Licence Systems (trial)
	Implementation Measure for Grain Market Supervision (trial)
Poverty Alleviation	Rules for Statistics of Grain Circulation
	Outlines for Rural Poverty-alleviation Projects in Ningxia (2001–2010)
	Proposals for the Implementation of Poverty-alleviation Projects in 1,000 Villages in Ningxia
Grassland	Resolution on Accomplishment of the Responsibility Warrants on Targeted Control of Population and Family Planning
	Notice on Conducting Better Management of Grassland and Restricting Animal Husbandry Activities
Forestry	Notice on Effectively Conducting Restriction of Animal Husbandry Activities
	Proposals for Speeding up the Development of Forestry in Ningxia Hui Autonomous Region
	Overall Outlines for Protecting the Yellow River Wetland in Ningxia
Economy	Notice on Strengthening the Protective Management of Wetlands
	Proposals for Supporting Economic Development in Non-public Sectors

Table 8. Policy Instruments for LD Control in Gansu Province

Area	Name of document ¹¹²
Comprehensive Administration	Outlines for the 9th Five-Year Plan for National Economic and Social Development
	Outlines for the 10th Five-Year Plan for National Economic and Social Development
	Outlines for the 11th Five-Year Plan for National Economic and Social Development (2005–2010)
Forestry	Proposals for Implementing Hill-land Closure and Restriction of Herding in Key Areas
	Resolution on Accelerating the Development of Forestry

112 Policy documents in this Table, e.g., “Outlines” and “Proposals”, were issued by the People’s Government of Gansu Province, unless otherwise indicated.

Area	Name of document
Agriculture	<p>Proposals for the Implementation of Promoting the Construction of a New Socialist Countryside</p> <p>Proposals for Promoting the Improvement of Farmers' Incomes</p> <p>Proposals for Strengthening Rural Development to Enhance Comprehensive Productivity</p> <p>Proposals for Actively Advancing Agricultural Industrialization</p> <p>Proposals for Speeding up the Standardization of Agriculture and Enhancing the Quality of Agricultural Production</p> <p>Proposals for Greatly Advancing Specialized Economic Farmers Cooperatives</p> <p>Proposals for Strengthening the Promotion and Expansion of Agricultural Technologies and Training</p> <p>Proposals for Enhancing the Establishment of the Rule of Law in Agriculture</p> <p>Proposals for Further Promoting the Optimization of Animal Husbandry Production Patterns</p>
Food	<p>Notice on the Several Opinions Concerning Directly Subsidizing Grain Farmers in 2005 throughout the Province</p> <p>Notice on Implementing the Guidelines on the Reform of State-owned Enterprises in Grain-purchasing and Selling</p> <p>Tentative Measures for Review of Qualifications in Conducting Grain Purchase</p> <p>Notice on the Implementation Plan for Using Part of Risk Funds of Grain to Directly Subsidize Farmers</p>
Poverty Alleviation	<p>Administrative Measures for Resettlement Pilot Projects for Poverty Alleviation (trial)</p> <p>Notice on the Measures for the Examination and Acceptance of Resettlement Pilot Projects for Poverty Alleviation (trial)</p> <p>Notice on the Proposals for the Implementation of Resettlement Pilot Projects for Poverty Alleviation (trial)</p>
Economy	<p>Regulation for Promoting Individual, Private and other Non-public Economic Enterprise</p> <p>Proposals for the Implementation of the State Council's Proposals for Encouraging, Supporting and Directing the Development of Non-public Economy (e.g., Individual's and Private Business)</p> <p>Notice on the Guidelines for the 2006 Economic System Reform</p>

Table 9. Policy Instruments for LD control in Shaanxi Province

Area	Name of document
Comprehensive Administration	The Outlines for the 11th Five-Year Plan for the National Economic and Social Development of Shaanxi Province Outlines for the 11th Five-Year Plan for Environmental Protection
Forestry	Proposals for Implementing Hill-land Closure and Restriction of Herding in Key Areas in province Resolution on Accelerating the Development of Forestry Notice on Preventing Forest Destruction and Illegally Occupying Forest Lands to Ensure the Protection of Forest Resources Doctrines on Hill-land Closure and Restriction of Herding in Key Areas Implementation Rules on Carrying out Obligatory Forestation Implementation Proposals for Carrying out the Resolution on Accelerating the Development of Forestry Resolution on Developing Large-scale Forestation and Grass Planting to Alleviate Backward Agriculture in Arid Areas of Shaanxi Province Resolution on Speeding up Vegetation Planting to Comprehensively Restore Desertified Lands in the Yulin Prefecture Notice on Strengthening Wetland Protection
Agriculture	Resolution on Accelerating the Industrialization of Fruit Cultivation (Apples in Particular) Resolution on Speeding up the Industrialization of Animal Husbandry The Agricultural Development Plan of the 11th Five-Year Plan for the National Economic and Social Development of Shaanxi Province Outlines for Promoting the Establishment of a New Socialist Countryside
Food	Notice on Implementing Cities and Counties Governors' Responsibility Systems of Grain Security in Shaanxi Province Implementation Proposals for Further Deepening the Reform of Grain Marketing Systems Notice on the Outlines for Promoting the Establishment of a New Socialist Countryside Plan for Grain Production
Poverty Alleviation	Outlines for Rural Poverty-alleviation Development in Shaanxi Province 2001–2010 Proposals for Strengthening Poverty Alleviation in Northern "Drought Belt" Areas Notice on Strengthening Poverty Alleviation Targeted at Resettlement Immigrants
Economy	Proposals for Further Speeding up the Economic Development of the Non-public Sector Resolution on Advancing and Strengthening the County-level Economy ▶

Area	Name of document
Environmental Protection	Ecological Function Zoning
	Provisions for Speeding up the Development of Environmental Protection Industry
Water	Overall Plans for Water Resources
	Outline for Saving Water
	Water Function Zoning
	Outlines for Water Resource Protection

The policy documents in Tables 5–9 can be classified into 9 policy areas.

4.3.2.1 Land resources

Land resource policies at the central, provincial and autonomous regional levels have been targeted to protect basic farmlands; improve land management and pollution control; balance the use of land and protect arable land resources; land-save in public and residential buildings; restrict the conversion of farmlands for construction use; control use of rural land for mining and industrial use; and improve rural land-use planning.

4.3.2.2 Water resources

Water resource policies in the provinces and autonomous regions of the Capacity Building Project have been developed to improve water resource management in the following ways: to establish river basin management institutions and apply integrated administration of water resources; develop water-saving agriculture and animal husbandry, water-saving irrigation techniques, and reform water pricing; improve water rights and operational mechanisms for water conservation; control the exploitation of ground water; coordinate the development of urban water utilities, conserve and protect water; and build water-saving cities. Some provincial governments have developed water resource plans, water function zoning and water resource protection schemes.

4.3.2.3 Grassland protection

Policies have been issued to close off hill-lands and grasslands to protect them from herding and grazing; to balance grazing and animal husbandry; to prohibit the collection and sale of herbs and plants; and to convert some farmlands back to grassland. Compensation has been provided for those farmers who are taking conservation measures in their household contracted land.

4.3.2.4 Forest resources

Policies have been issued to accelerate forestry reform, protect forest resources and stop deforestation and illegal use of cultivated land for non-agricultural uses. Policies have been issued to accelerate the development of various types of orchards and the production of local fruits suited to local conditions. Policies have also been issued to reform property rights in forestry, to support the development of non-public forestry, and to comply with the citizen’s obligatory forestation. There are also policies to implement key projects for ecological construction of forestry, which are mainly financed by central government, to enhance forestation and forestry conservation, enable public participation in management of forest resources and for the sustainable development of forestry.

4.3.2.5 Environmental protection

Many policies have been introduced by provincial and regional governments to strengthen environmental protection and implement national ecological protection; protect tourism; conserve key national ecological function areas and to enhance rehabilitation of ecological functions; facilitate the establishment of ecological compensation mechanisms; conserve water and soil from erosion and loss; protect forest and grassland from fires and control pests and invasive species; enhance the protection and management of wetlands and other protected areas such as geological sites, nature reserves, forest and geological parks; and conserve wildlife and biodiversity. Provincial governments have approved the zoning of ecological functions and classified respective areas into eco-function zones. Outlines have been prepared for the 11th Five-Year Plan for Environmental Protection.

4.3.2.6 Mineral resources

Policies for prospecting, exploitation and protection of mineral resources have addressed the management of mineral resource exploitation through improvement of planning procedures, and by accelerating the reclamation and rehabilitation of the eco-environment after mining.

4.3.2.7 Agriculture

Policies adopted by the provinces and regions concerning agriculture cover the following areas: the structural adjustment and optimization of agriculture investment and infrastructure construction, providing public services to farming and herding (e.g., information on agricultural products), and the establishment of farming and animal husbandry support systems. With the removal of agricultural taxes and fees from farmers, to alleviate the burden on farmers, the State has introduced policies to support the extension of new agricultural technologies, construction of rural infrastructure, and to increase inputs to farming and animal husbandry. Other important agricultural policies concerning LD have covered: market-based investment in agriculture, scientific research into crop production and conservation farming systems, poverty alleviation, off-farm employment, grain security, water saving and conservation in irrigation and groundwater extraction, agricultural industrialization, establishment of farmers cooperatives, training, and legal responsibility systems associated with farmland contracts, and processing agricultural products in relation to farmers' income and property.

4.3.2.8 Poverty alleviation

The main policy measures undertaken in the provinces and autonomous regions include: providing information and employment services to farmers for off-farm working opportunities, to improve mechanisms concerning human resources, materials and financial resources, assessment and monitoring to improve implementation of poverty-alleviation projects, to secure food and housing for the poorest people, and to continuously support and increase subsidies to low-income farmers. Population control and family planning in the countryside are important instruments to combat challenges from the effects of drought and LD.

4.3.2.9 Private sector policies

Attention has been given to promote and support private sector participation in environmental management. Many individuals, private and other non-public economic entities have been involved in LD control activities such as planting trees on leased barren hills and slopes, and in operating commercial agro-ecological orchards or farms. These private enterprises have been given incentives

or preferential measures regarding tax, land contracting, and market access for business, all of which are beneficial to LD control.

4.4 The role of policy and legislation in LD control

Through the introduction of a large number of laws, regulations and policies in the areas of land resources, water resources, water and soil conservation, forest resources, grassland resources, agricultural development and environmental protection, the PRC has established a well-structured and multidisciplinary approach to its legal and regulatory framework. This legal and regulatory framework plays an important role in combating LD and in protecting ecosystems.

4.4.1 Strengthening land-use control and protecting farmland

Land is viewed as a resource for humans to live and survive by, and it provides food and materials for basic needs and well-being. This is recognized by many policies, laws and regulations adopted in the PRC. The *Land Administration Law* was introduced in 1986 as the basic law to protect and manage land resources.¹¹³ It was amended in 1998 and 2004, and a series of closely related national regulations and policies were introduced at this time. In all, land-use control has served as a fundamental instrument to implement the law and regulations. With regard to land use, farmland protection is significant for national food security and for providing a sound ecological environment. With the abuse of farmland for non-farming purposes being rigorously reviewed by the State in 2003, all basic farmland has been placed under strict protection,¹¹⁴ by controlling the conversion of agricultural land to other uses. Farmers' rights, when land has been appropriated, have been addressed by laws and policies to provide them with standard compensation and resettlement benefits.¹¹⁵

4.4.2 Combating desertification to improve the ecological environment

Combating desertification has been identified as a priority by the government to improve the eco-environment and living conditions in the western region, and to coordinate sustainable development. The *Law on Prevention and Control of Desertification 2002* and the *State Council Resolution on Strengthening the Prevention and Control of Desertification* stipulate special principles, legal responsibilities and supporting policies for various departments and local governments to carry out the national objectives of desertification control. The *National Program for Combating Desertification 2005–2010* specifies priority areas, national desertification investment

113 Approved 25 June 1986 by the 16th Session of the 6th Standing Committee of National People's Conference.

114 Article 3 of the *Land Administration Law 1986* stipulates "to value land highly, use land rationally, and protect cultivated land effectively is a basic policy of the PRC. People's governments at all levels shall take measures, draw up overall plans, tighten control, protect and develop land resources, and prevent unlawful occupation and use of land".

115 E.g., *Law on the Management of Urban Real Estate 1995*, *Land Administration Law 1986*, *Notice on Earnestly Protecting Legitimate Rights and Interests of Land-requisitioned Farmers*, *State Council Resolution on Deepening Reforms and Strictly Managing Land*, provide provisions to enforce and implement land laws, strengthen the management of land-use planning, safeguard the rights and interests of farmers, and promote intensive use of land resources.

projects and relevant rehabilitation measures. The western provinces and autonomous regions have implemented national laws and policies, and undertaken vegetation protection, forestland and grassland conversion measures, water resource saving and the restoration of degraded land. Provincial and autonomous region-level policies and laws have implemented the 1991 *Water and Soil Conservation Law* to strengthen the governance of small river basins. Central and local governments have invested in a range of desertification control activities, integrated with water saving, and improvement of irrigation, and all citizens have been widely encouraged to participate.

4.4.3 Preventing and controlling soil erosion

Following the promulgation of the *Water and Soil Conservation Law* in 1991, other legal and policy instruments then followed to implement this basic law to solve specific water and soil conservation problems. The *State Council Notice on Strengthening Water and Soil Conservation* aims to improve agricultural conditions, enhance economic development, reduce poverty and protect land. The *Outline for Protecting and Monitoring National Water and Soil Conservation (2004–2015)* sets out the guiding principles, goals, strategies and countermeasures for national water and soil conservation activities. The PRC regards water and soil conservation as one of its most significant activities to protect the ecological environment. Effective ecological compensation mechanisms have been established in the area of water and soil conservation. The *Notice on Promoting the Establishment of a New Socialist Countryside* by the Central Committee of the Communist Party of [the People's Republic of] China and the State Council, and the *Notice on Launching Investigations into the Reforms of Water and Soil Conservation Mechanisms* has improved the eco-compensation mechanisms.¹¹⁶

4.4.4 Improving the ecological condition of grassland

The regulatory framework for grassland is constituted by the national *Grassland Law 2002* and various other statutes, regulations, provisions and national policies concerning grassland utilization, conservation and management. The *Grassland Law* provides for institutional arrangements, a grassland management system, and specific measures and liabilities. In 2002, the State Council introduced the *Notice on Protecting and Establishing Grassland* to enhance the protection of grassland ecosystems and to coordinate socio-economic development and ecological environmental protection. Substantial efforts have also been made in improving animal husbandry, which in turn, protects grassland. Since the 1980s, traditional nomadic animal husbandry has been replaced by closer settlement and a grassland contracting system. These changes in herd management and land use have reduced overuse of grassland and sustainable grassland measures have been introduced.¹¹⁷ Moreover, the grassland closure policy to protect against overgrazing and conserve

116 E.g., from 2003, the PRC allocated funds to construct silt retainers in the Loess Plateau—using related laws and policies, the government launched demonstration projects and demonstration zones, including: 300 water and soil conservation projects; 190 demonstration counties; 1,398 demonstration small river basins; 62 demonstration districts occupying 300 km² and more than 50 technological parks for water and soil conservation; 188 counties conducted pilot ecological reclamation projects; in the “Source Region of the Three Rivers” (Yellow River, the Yangtze River and Lancang River), water and soil conservation projects were launched; and mountains were closed off for forestation and vegetation recovery.

117 Includes supply of water, electricity, roads; housing, sheds, grass and wood; establishment of schools, stores, cultural centres, clinics and veterinary stations.

grassland vegetation is applied in many of the provinces. Preventive measures have been introduced to control grassland fires, pasture pests and rats, and to prevent illegal harvesting and damage of grassland vegetation. The central government has invested in ecological rehabilitation projects in key national function areas which have improved the quality of vulnerable grassland environments.¹¹⁸

4.4.5 Forestry development

The *Guidelines for Forestry Development* were introduced to support the implementation of the *Forestry Law* 1998 and to improve ecological management of large-scale forestation activities. The *Forestry Law* created the legal mechanism for the forestry ecological benefit compensation system. Since 1998, national key forestry projects to protect natural forest resources have been launched, where the major policy instrument is a logging ban and a standard compensation scheme. The introduction of national forestation projects then followed to protect key riverbanks, dust storm areas, desertified and soil eroded areas. These projects are funded by central government. Further, governments at various levels have carried out forestation plans, organized planting activities, and established a forest service network.¹¹⁹ Forest management is improving in the western region as a result of these activities.¹²⁰ In 2003, the Central Committee of the Communist Party of [the People's Republic of] China and State Council introduced the *Resolution on Speeding up the Development of Forestry*, to focus on the ecological management of forests. This policy has created an important legal reform concerning collectively owned forestlands. Collective members individually enjoy the use of collectively owned forestland as a result of the reform. With the forestland contracting instrument being applied to these forestlands, farmers can individually decide how best to manage forestland by complying with the forest regulations. The forestland reform initiative is a helpful stimulus to encourage forestation and protect forests.

4.4.6 Managing water resources

The PRC uses a combination of policy and legal tools to protect water resources. The *Water Law* 2002 has procedures for planning the utilization and development of water resources, protection of hydraulic works, allocation of water resources, dispute resolution, and enforcement and supervision. The *Law on the Prevention and Control of Floods* 1997 provides for planning, control and maintenance, management of flood-control facilities, combating floods, and implementing flood safety measures. These laws provide the legal basis for managing water resources, controlling water disasters, and implementing plans to manage different uses of water, including for food production, domestic consumption and environmental amenities. The Central Committee of the Communist Party of China and the State Council have issued policies and instruments to promote water saving through the use of irrigation quotas in large-scale irrigation districts, as a foundation to expand grain

118 E.g., government invested CNY 9 billion from 2000–2005 on grassland ecology projects, recovery of natural vegetation, grassland enclosure, establishing forage seeds, converting herding land to grassland; funds also applied to engineering technologies and biological measures, to treat grassland degradation, and prohibit and rotate husbandry.

119 E.g., “Three Norths Projects” – a forestation network in northeast, north, and northwest PRC.

120 Projects include protection of wild animals and plants, establishment of nature reserves, planting fast-growing timber in key areas; improving forest survey plans; establishing a quota limit for logging; controlling forest fires, diseases and insect pests, and controlling forest-damaging activities.

production and agricultural development; and to construct irrigation works and water conservancy, build reservoirs and improve the eco-environment. Under the laws and regulations, local governments have launched several specific water-related activities, e.g., the compulsory integrated water allocation management in the Yellow River Basin to control water use from Yellow River. Through these approaches, the eco-environment of river basins is generally being improved.

4.4.7 Rural management

Central and local governments have promulgated a series of laws and regulations for agricultural development, economic structural adjustment in rural areas and to increase the income of farmers and herdsmen. The *Agriculture Law 2002* provides for institutional management of agriculture, agricultural production, distribution of agricultural products, grain security, investment in agriculture, agricultural technologies and education, agricultural resources and agricultural environmental protection, protection of farmer's rights and interests, and economic development in rural areas. The *Rural Land Contract Law 2003* stipulates the rights and duties of householders over contracted collective land, the principles and procedures of the contracting process, contract limits and agreements, the protection of rights and the transfer of contracted land. The *Proposals for Promoting the Establishment of a New Socialist Countryside*, passed by the Central Committee of the Communist Party of [the People's Republic of] China and the State Council is an important policy for agricultural development and the rural economy. The Western Region Development Strategy is the policy that balances the developmental gap between the western and eastern regions in the PRC, and provides various opportunities for environmental protection in Western PRC.¹²¹ The prevention of agricultural pollution and farmland degradation and improvement of the environment in rural areas is one of the key aspects of the Strategy which provides many opportunities for LD control. Important activities in rural environmental management include: the survey of rural land contamination and treatment; safety management of agricultural chemicals and fertilizers; promoting more effective, less toxic and low residual agricultural chemicals; preventing pollution from the misuse of chemicals, fertilizers, agricultural plastic film and sewage irrigation; promoting integrated utilization and treatment technologies for livestock and poultry manure; and encouraging integrated agricultural activities such as fish farming and plantation establishment.¹²²

121 The *Western Development Strategy* covers six provinces (Gansu, Guizhou, Qinghai, Shaanxi, Sichuan, and Yunnan), five autonomous regions (Guangxi Zhuang, Inner Mongolia, Ningxia Hui, Tibet, and Xinjiang Uygur) and one municipality (Chongqing). This region occupies 71.4 percent of the PRC and had 28.8 percent of its population by end of 2002, and 16.8 percent of its total economic output by 2003. The main components of the Strategy include the development of infrastructure (transport, hydropower plants, energy, and telecommunications), foreign investment, ecological protection (e.g., reforestation), promotion of education, stemming the drain of talent to richer provinces. By 2006, CNY 1 trillion had been spent building infrastructure in Western PRC.

122 E.g., the government has developed water-saving farming in arid areas; by 2005, CNY 0.7 billion had been invested in establishing pilot bases for agriculture in arid and semi-arid areas; improving use of agricultural technologies, organic and dry farming; enhancing water-use efficiency and water conservation; promoting protective cultivation and conservation farming projects.

4.4.8 Protecting wild animals and plants

The *Law on the Protection of Wild Animals* 2004 plays an important role in animal species conservation by managing rare and endangered animals and their habitats. The *Regulations on Protecting Wild Plants* 1996, the first administrative statute in this area, and the *Measures for the Protection of Agricultural Wild Plants* 2002 play a significant role in plant species management and biodiversity protection. The *Action Plan for National Biodiversity Protection* 1994¹²³ and the *Outline for National Ecological Protection* instituted by the State Council in 2000 provide general provisions to protect wild animals and plants, ecosystems, biodiversity and biological security, and set out the objective of establishing a network of nature reserves and ecological function conservation zones by the end of 2005. Ecological function conservation zones have become an innovative instrument to protect different ecological attributes—e.g., river basin and water source conservation areas, flood storage areas, sand fixation areas, and other significant places for ecological functions. The *Plan for Protecting and Utilizing Biological Species Resources* provides for preventive activities to eliminate invasive alien species. Other initiatives significant to ecological protection include the *Action Plan for National Wetland Protection*, *Plans for National Wetland Protection Projects* (2002–2030), and the *Plans for Implementing National Wetland Protection Projects* (2005–2010). To date, the ecological functions of some important wetlands have been restored.

4.4.9 Controlling land contamination

Along with the *Environmental Protection Law* 1989, the foundation law for environmental law and policy in the PRC, the *Water Pollution Prevention and Control Law* 1984 (revised 2008) and its implementation regulations, the *Environmental Impact Assessment Law* 2002, and the *Law on the Prevention and Control of Environmental Pollution Caused by Solid Waste* 1995 provide the major legislative mechanisms for land contamination control. The State Council has also developed a series of policy documents that further facilitate land contamination control, including: the *Resolution on Solving Problems in Environmental Protection* 1996, the *Outline for National Eco-environment Protection*, the *Program for National Eco-environment Protection*, the *Resolution on Strengthening Environment Protection Based on the Scientific Development Concept by the State Council*, the *Circular on Speeding up the Recycling Economy by the State Council*, the *Notice on Enhancing Environment Protection in Rural Areas*, and the *Notice on Strengthening Ecological Protection*. Pollution control has been partially successful as the rate of pollutant discharge into some river basins appears to be slowing down, and the environmental awareness of the public has been increasing.

123 *Developing and Implementing National Biodiversity Strategy and Action Plan: Lessons from China* – <http://www.chinagate.cn/english/planning/1858.htm> the origin of the NBSAP was before the CBD, as part of the GEF 1991 PRC Biodiversity Project and the project itself was initiated in 1992; the project sets out objectives, priority actions and research projects, and lists priority species and ecosystems for protection.

4.5 Lessons learned from the PRC's LD control policy and legislation

4.5.1 Reliance on policy and legislation

The investigations under the Legal and Policy Component of the Capacity Building Project effectively show that the PRC has used a combination of legal and policy tools in the economic, scientific, technological, educational and administrative aspects of LD control. The PRC views legislative tools as long-term tools, whereas policy tools are more practical and flexible and can be used to greater effect in the short term. Policy, in general, is not allowed to interfere with the operation of legislation, or act as a replacement for legal tools. The role of policy is to support the law. The Legal and Policy Component of the Capacity Building Project shows that it is necessary to apply both policy and law in a harmonious way in the control of LD, while ensuring that policy does not contradict the law.

4.5.2 Responsibility systems for eco-environmental protection

The success of the *Western Region Development Strategy* in LD control depends upon the effective and harmonious implementation of law and policy. In this regard, a mechanism that is crucial to the success of the *Strategy* is the system of ecological environmental protection responsibility that each level of local government is obliged to apply. From the practical viewpoint, the obligations of the officials of the government departments with responsibilities for eco-environment quality need to be enshrined within the accountabilities of the respective institutions and departments. Environmental monitoring and surveillance systems should be established to ensure that environmental targets and objectives are accomplished, and ecological and socio-economic benefits are effectively coordinated. Institutional coordination needs to be intensified and governments at all levels should actively coordinate and supervise their departments to achieve integrated and sustainable natural resource management. In this regard, environmental protection departments should play a more important role in integrating, coordinating and supervising the various actions of the departments. Local governments at all levels need to determine the priorities for LD control, ecological restoration and regulation, plan their activities, projects and programmes with clear objectives, which are then executed with consistency to achieve sustainable management of land, water and natural resources.

4.5.3 Integrated approach

The Five-Year Plan process of National Socio-economic Development is the most integrated policy instrument in the PRC. Moreover, the 11th Five-Year Plan for National Socio-economic Development differs from previous plans by establishing quantitative targets for significant social and developmental matters for which environmental protection has to be specifically applied. By 2010, while maintaining a steady and relatively fast national economic growth, the PRC expects the worsening trend of environmental degradation to be under control.¹²⁴ To meet this goal, governments at all levels have to integrate various environmental targets into their medium and long-term plans for socio-economic development. In this regard, ecological function zones have been prepared by

¹²⁴ Goals include energy consumption of GDP/per unit reduced by 20 percent; total discharge of major pollutants reduced by 10 percent; and forest cover rate increasing from 18 percent to 20 percent.

governments as a basis to develop natural resource plans and promote coordinated eco-environment development¹²⁵—but this activity needs to be intensified in land-use planning and natural resource activities. Also, the implementation of EIA, as a key legal instrument, needs to be enhanced. For example, forestation and grass planting activities, and some strategies and policies should be subjected to the EIA process. The implementation of EIA should be addressed not only to evaluate adverse environmental impacts, but also to take substantive and appropriate measures to mitigate impacts. In this regard, the scientific and technical sectors need to be actively involved in the EIA process.

4.5.4 Market mechanisms and financial investment

The PRC has invested in many LD control-related activities. Investment by central government in environmental protection had its biggest increase during the 10th Five-Year Plan period, exceeding CNY 111.9 billion, of which CNY 108.3 billion was allocated to the Beijing-Tianjin sandstorm control project; natural forest protection projects; returning farmland to forest (grassland) projects; pollution control projects in the “Three Gorges Reservoirs” and its upper reaches; pollution control projects in the “Three Rivers and Three Lakes” (the Huai, Liao and Hai Rivers and Tai, Chao and Dianchi Lakes); sewage recycling projects; and industrial waste-water treatment. Practice has shown that major investments by government in ecological environmental construction and protection in LD control-related areas have been significant. However, with limited financial resources, conventional command-and-control approaches are less effective. To solve this problem, the PRC has developed additional incentives, policies and market mechanisms to guide organizations and individuals to participate in LD control activities, including levies and tax instruments for ecological environment conservation.¹²⁶ These practices were examined by the Capacity Building Project and found to encourage the rational use of land resources and protect farmland against abandonment or conversion to other uses.¹²⁷

4.5.5 Science and technology

The capacity of science and technology relating to use of land, water and agricultural resources has been improved under the policy of promoting scientific knowledge and technologies for environmental protection. In the 10th Five-Year Plan period, the government implemented specialized scientific and technological projects.¹²⁸ The projects focused on strategic and technological research including recycling technology, chemical controls, and rehabilitation of contaminated areas. Projects have been launched to evaluate the ecosystems of the western region, and study eco-function zoning, restoration and management of fragile eco-environments and expansion of demonstration projects.

125 See Du Qun, *supra* note 70 for more information on the programme for zoning of ecological functions and eco-system zones in the PRC.

126 E.g., implement a tax policy on land occupation; encourage rational use of land resources; strengthen land management; protect agricultural land; raise tax thresholds for exploiting coal, crude oil, natural gas and other mineral resources; and promote sustainable development of resources.

127 PRC-GEF Partnership on Land Degradation in Dryland Ecosystems, *Strategy and Action Plan*, *supra* note 76.

128 E.g., research on counter-measures for serious environmental issues and key supporting technologies were initiated under national scientific and technological research programmes.

Importantly, the *Action Plan on Environment and Health (2007–2015)*¹²⁹ requires research to be conducted into global environmental change, as a way of providing the PRC with a scientific basis for its climate change policies and to provide information for its negotiations under various international conventions.¹³⁰ Moreover, the Capacity Building Project provides opportunities for governments to continue scientific and technological programmes relating to LD. These programmes include the science and technology development plan, technological innovation, eco-environmental protection technology for biodiversity conservation, ecological restoration, and water and soil conservation. The priority action in this area is research and development of LD control technologies, in particular, self-innovative technologies, and the application and extension of the technologies through marketing. The early warning system to forecast LD in dryland ecosystems is an important part of the science programme.¹³¹

4.5.6 Education, knowledge dissemination and encouraging public participation

The PRC introduced the *Action Plan for National Environmental Education and Dissemination (1996–2010)* and the *2001–2005 Program for National Environmental Education and Dissemination* to improve education on the environment and to disseminate information on environmental protection. Notably, the 4th Five-Year Plan of Legal Education 2001 has greatly assisted the integration of environmental law into educational programmes. Government departments have conducted significant work in education and the dissemination of technical information about resource use. Demonstration projects of good practice and the application of advanced techniques play an effective role in disseminating information on the sustainable use of land and natural resources in LD-affected areas. However, experience indicates that government must continue to improve education and information dissemination services on LD control, and the financial support for education, training and technical consultants needs to be increased.

The promotion of education, dissemination of knowledge, and support for public participation were important tasks of the Capacity Building Project. Areas highlighted by the Project included the improvement of the quality of policy related to LD control, policy and legal training on natural resource management and environmental matters, integrated decision-making capacity for eco-environmental protection and socio-economic development, improving the level of professional knowledge and education in the public and training in land-use techniques for households. Moreover, the PRC has improved its procedures for public participation. It is now a requirement that public consultations be carried out when planning construction projects which, under the EIA process, may have a potentially adverse impact on the environment. NGOs and volunteers have played a significant role in LD control

129 The Plan is the first of its kind in this field and it is expected to guide environmental and health work in a scientific way; positive public health is mandatory for sustainable social and economic development and important for LD control; <http://www.china.org.cn/english/environment/238275.htm>.

130 Lin Erda, Xu Yinlong, Wu Shaohong, Ju Hui and Ma Shiming. 2007. "China's National Assessment Report on Climate Change (II): Climate change impacts and adaptation". *Advances in Climate Change Research* (3) 6–11; see PRC's *National Assessment Report on Climate Change 2007*.

131 PRC-GEF Partnership on Land Degradation in Dryland Ecosystems, *Strategy and Action Plan*, *supra* note 76.

activities; however, their legal status still needs to be formally recognized by the law and associated regulations. In addition, the obligation to disclose information to the public and communities and the procedures concerning environmental and natural resource matters have not been clarified by the law and regulations, and there is a need to make improvements in this regard.

4.5.7 Foreign experience and international cooperation

The PRC regards international cooperation as a key instrument in its ability to cope with environmental matters. International cooperation programmes and partnerships with various UN agencies, the GEF and other international organizations, have been undertaken in the western region of the PRC to improve the management of dryland ecosystems, and central and local governments have paid significant attention to these international projects. The PRC is party to more than 50 international treaties (multilateral and regional) concerning environmental management and it has developed many programmes to implement its obligations under the various treaties.¹³² The *Report on National Sustainable Development of the People's Republic of China* 1996 and the *Action Plan for [the People's Republic of] China's Sustainable Development in the 21st Century* 1994 define priorities and actions for sustainable development. Bilateral agreements on environmental matters have assisted the PRC to develop technologies to combat LD and in ecological protection.¹³³ However, there is still room for the PRC to improve its efforts and fulfill its obligations to various multilateral environmental agreements, including the CBD, the Ramsar Convention, UNCCD, CITES, the World Heritage Convention, and others. In addition, there needs to be consistency between the PRC's international obligations and its national policies, and the PRC should continue to introduce advanced technologies and management experiences on LD control from developed countries and further facilitate ecological protection to meet the objectives of sustainable development.¹³⁴

132 E.g., *PRC National Program for Phasing-out Ozone Depleting Substances*; more than 100 policies and measures have been promulgated to protect the ozone layer and establish a base for developing and manufacturing products to replace ozone-depleting substances and other related products, and complete staged reduction targets as prescribed by the *Montreal Protocol on Substances that Deplete the Ozone Layer 1987*; see Institutional Strengthening for the Phase-out of Ozone Depleting Substances: <http://www.undp.org.cn/projects/57794.pdf>.

133 Jiang Zehui, 2006, *supra* note 13.

134 PRC-GEF Partnership on Land Degradation in Dryland Ecosystems, *Strategy and Action Plan*, *supra* note 76.

5 Capacity of legislation and policy to control LD

Zhou Ke¹³⁵ and Tan Baiping¹³⁶

5.1 Introduction

The legal and regulatory framework to accommodate IEM for LD control in the PRC is identified in nine areas of law and policy as follows: land administration, desertification, water and soil conservation, grassland, forestry, water, agriculture, environmental protection, and EIA. The Legal and Policy Teams from the central level and six provinces and autonomous regions subjected the laws and policies selected from the nine areas to the Method introduced in Chapter 1, as follows:

1. Classify the provisions of each law and regulation and policy, under the 20 essential elements outlined in Chapter 1;
2. Analyze the “*presentation, expression and application*” (see Box 4)¹³⁷ of IEM principles through the evaluation of each essential element at individual law and regulation level, and at area level of laws and regulations;
3. Determine the capacity of each law and regulation and policy in IEM for LD control.

From the application of this three-dimensional procedure, the analysis of each individual law and regulation against the 20 elements presented a reliable estimate of the “capacity” of each law and regulation to address LD and IEM (even though the provisions of the legislation from the six western jurisdictions differ slightly due to the variation in socio-economic issues and natural resource conditions in these jurisdictions).¹³⁸ However, the fundamental techniques that make up the capacity assessment procedure, including the classification of nine areas of laws and regulatory regimes, application of the 20 essential elements and 12 IEM principles to each law and regulation, ensure a consistent approach in the evaluation procedure applied to each law and policy. This approach introduced a new and innovative development in environmental law analysis in the PRC.¹³⁹

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136 Specialist of Environmental Law, Beijing University of Technology, Beijing, People’s Republic of China.

137 Information in Box 4 was developed by legal experts of the Legal and Policy Component of the Capacity Building Project.

138 E.g., Inner Mongolia Autonomous Region and Qinghai Province place more emphasis on legislative and policy approaches for grassland management, whereas Gansu Province and Ningxia Hui Autonomous Region put more emphasis on legislative and policy approaches for water and soil conservation.

139 Zhou Ke, Cao Xia and Tan Baiping. 2008. “Toward an Improved Legislative Framework for China’s Land Degradation Control”. *Natural Resources Forum* 31(1): 11–24.

Box 4. Evaluation of laws according to “presentation, expression and application”

Presentation examines whether the 20 elements have been expressly stipulated in the instrument in question:

- A: The law has a specific provision for the elements.
- B: The specific provision for the elements is guided by other laws and regulations.
- C: The element is supported by other laws and regulations.
- D: The content of the elements is not reflected in laws and regulations but in other regulatory instruments.
- E: The content of the elements is not reflected in regulatory instruments at all.

Expression measures whether, and to what extent, the content expressed in the law or regulation in question is compatible with IEM principles and element indicators:

- A: Fuller coverage, and the content reflected is compatible with IEM principles and element indicators.
- B: Fuller coverage, but there is a slight difference between the content reflected and IEM principles and element indicators.
- C: Some reference, and the content reflected is fairly compatible with IEM principles and element indicators.
- D: Some reference, but there is a slight difference between the content reflected and IEM principles and element indicators.
- E: No expressions at all.

Application measures how effective the law or regulation is when implemented in practice:

- A: Frequently applicable with good results.
- B: Generally applicable with good results.
- C: Frequently applicable with moderate results.
- D: Generally applicable with moderate results.
- E: Basically inapplicable.

5.2 Overall capacity of the law and regulation framework for LD control at central level

The Central Legal and Policy Team assessed 55 items of law, regulation and policy, comprising 15 primary national laws, 18 administrative statutes of the State Council, and 22 ministerial and commission provisions.¹⁴⁰

¹⁴⁰ PRC-GEF Partnership Project, Component 1, 2007, *Evaluation Report on the Capacity for Legal Frameworks at the Central Level* provides full details of laws selected and their evaluation.

5.2.1 Analysis of legal expression of IEM principles

Among the 55 central-level legal instruments evaluated, some recently introduced laws have a higher degree of compliance with the IEM principles and ideology and play a more pro-active role in LD control than the laws introduced earlier, which generally lack consideration of LD issues and ecological management and have little identification with IEM principles and ideology. Some laws were formulated to govern a very specific environmental issue and when evaluated against the 20 legislative elements exhibit a very narrow scope. The following section summarizes the deficiencies, strengths and weaknesses of the 55 laws and regulations based on their evaluation against the 20 elements (NB – for discussion purposes, some elements have been grouped; see Chapter 1, Section 1.3.2).

5.2.1.1 Purpose of legislation and basis, scope of application, definition of terms and policy

Based on the level of presentation, expression and application, in general, these provisions are clearly expressed in the legislation, with some references to IEM principles and ideology.¹⁴¹ Technically, the provisions specified in all nine areas of law conform to the PRC legislative tradition, where administrative control is an important part of societal management, and is supported by the policy and functions of government agencies. Laws and regulations at the national and provincial level clearly stipulate the purpose and basis of the legislation.¹⁴² However, the assessment indicated that future legislative reform should consider improvement of the operability of these clauses in the individual laws.

5.2.1.2 Rights and obligations in sustainable natural resource development, utilization and management

The rights and obligations of persons in sustainable development, utilization and management is one of the principal concerns of LD control and can create limitations on natural resource usage. Many instruments in the nine areas of law express an obligation to prevent LD and the right to use land and resources, which is reflective of IEM Principles 3 (activities which consider ecosystems) and 5 (protect ecosystems first). Three chapters of the *Grassland Law 2002* define this principle clearly. The *Forest Law 1998*, *Land Management Law 1998* and the *Environmental Protection Law 1989* stipulate rights and obligations. This element also contains other components, such as the status of women and ethnic groups and their rights and interests, receiving equal protection in specific laws and regulations.¹⁴³

141 Most laws reflect the requirements of IEM Principles 1, 5 and 8.

142 Usually Article 1 of a law or regulation stipulates its purpose, e.g., Article 1 of *Grassland Law*, Article 1 of *Management Regulation on Water Resources in Shiyanghe River Basin*, Gansu Province and Article 1 of *Forestry Law and Land Management Law*.

143 E.g., *Law on the Protection of Rights and Interests of Women*, *Law on Autonomy in Ethnic Regions*, *Several Provisions of State Council on the Implementation of the Law on Autonomy in Ethnic Regions*, *Rules of Ethnic Affairs in Hubei*, *Ethnic Affairs Regulations of Shaanxi Province* and the *Notice on Speeding up Socio-economic Development in Ethnic Areas in Gansu Province*.

5.2.1.3 Protection of rural land tenure and quality

This element is inadequately addressed in the nine law areas. The *Law on Rural Land Contracting* provides general provisions for the protection of rural land tenure. The recent collective forestland reform is also very important to the legal aspects of protection of rural land tenure and farmers' rights on land. In the area of desertification prevention and control, the *Administrative Measures for Utilizing and Developing Four Rural Idle Lands* 1998 closely conforms to this element. It contains procedures to transfer use rights to the "four idle resources", but they are limited in scope. There is a need to improve this legislative function and increase awareness of land tenure, principles of sustainable land use and ecological protection. There has to be a move away from the focus on short-term benefit towards long-term gain for future generations, in keeping with the IEM ideology.

5.2.1.4 Policy

As pointed out in Chapter 4, policy and legislation are closely related in the PRC, where macro policy initiatives generally provide a guide to changes in the content and form of laws and regulations, e.g., combining the procedures for eco-environmental improvement with poverty-alleviation procedures in the *Prevention and Control of Desertification Law* 2001 and related regulations. The assessment indicates a good representation of the policy element in the legal framework.

5.2.1.5 Functions of governments and administrative agencies

This element is effectively presented in most of the nine law areas, deriving from the command-and-control objective of the PRC's environmental protection policy. Most legal instruments outline the responsibilities of government, authorities and institutions in administrative coordination. These provisions closely represent IEM Principles 2, 3 and 9. Some laws set targets for government in relation to environmental assessment, reward and penalty systems, and coordination with other agencies.

5.2.1.6 Establishing specific interest institutions or organizations and their role

Some laws in the nine law areas have numerous procedures associated with this element. For example, the *Environmental Impact Assessment Law* 2002 establishes the agency which technically serves the EIA procedure for construction projects. The *Administrative Regulations on Environmental Protection of Construction Projects* 1998 stipulates that EIAs should be undertaken by units appropriately qualified to undertake assessment responsibilities. The procedures for agencies responsible for examining and approving EIAs, including inspections, are set out in the *Administrative Procedures for Examination and Acceptance of Environmental Protection of Completed Construction Projects* 1990 and in the *Tentative Procedures for Public Hearing of Administrative Permission in Environmental Protection* 1990. These agencies decide the role of research institutions and technical agencies which conforms to the requirements of IEM Principles 1, 2 and 12.

5.2.1.7 Administrative control

There are numerous provisions for administrative control within the instruments of the nine law areas. Some have comprehensive administrative procedures, including an examination and approval system, licensing responsibilities, vegetation management and maintenance, and a regional-based management system. The evaluation indicates that it is one of the more prevalent and stronger elements of the 20 elements.

5.2.1.8 Education, research and publicity

Few specific instruments, except for general provisions in many laws, provide for information dissemination, publicity, education and training to reflect the ideology of IEM Principles 11 and 12. This is mainly because of the traditional way in which the PRC makes its legislation. Specific instruments for these functions are in the form of policy tools and programmes rather than laws and regulations. However, this situation is also reflective of the fact that research into, and publicity about, ecological resources in general have not been seen as a concern of natural resource legislation related to LD. Successful management of ecosystem services will require scientific information, local citizen knowledge, innovation and conventional practice.

5.2.1.9 Investigation, monitoring, statistics and evaluation

The majority of the nine law areas include some procedures to monitor the condition of resources and ecosystems, which conforms with the IEM Principles 3, 6 and 11.¹⁴⁴ However, in the expressed content of the essential legal elements, there are still some gaps within the requirements of IEM principles. This deficiency was identified during the capacity assessment process as requiring improvement in future legislation reform.

5.2.1.10 Public participation

Some instruments in the nine law areas include public participation procedures, in conformity with IEM Principles 1, 2, 11 and 12. One of the important prerequisites for public participation lies in the public's right to knowledge, which requires governments not only to strengthen education and publicity, but also to create information-sharing procedures. To achieve effective public participation requires a system that raises public awareness, conducts environmental education, and guarantees the public's right to knowledge. Legislation in the PRC has been paying increasing attention to this subject. A good example is in the EIA procedure and the public hearing procedure for administrative permission of environmental protection. Future legislation needs to further address and improve the element of public participation.

5.2.1.11 Zoning and planning for sustainable resource utilization and ecological protection

Many instruments in the nine law areas have procedures that satisfy this element. Ecosystem management is a long-term objective and new planning procedures are required, to specify the content of plans, coordination mechanisms, and their relationship to national economic and social development plans. Plans that are compatible with social and economic development and ecological protection are necessary to achieve sustainable development.

5.2.1.12 Financial inputs and market incentive mechanisms

Some new instruments in the nine law areas include provisions for financial support, subsidies, compensation, as well as financial incentive mechanisms. However, it is also necessary that the PRC should adopt more specialized financial instruments in its legislation and in practice, for example credit certification and trading systems, together with preferential policy specifically aimed at environmental protection.

144 E.g., *Environmental Protection Law 1989*, *Law on Prevention and Control of Environmental Pollution Caused by Solid Waste 1995* and *Law on Water Pollution Prevention and Control 2008*.

5.2.1.13 Compliance, implementation and supervision

This element is well represented in most of the nine law areas, reflecting the ideology of IEM Principles 10, 11 and 12. The general requirements of this element are represented in the laws and regulations with procedures for implementation. For example, in the area of desertification prevention and control, this element is expressed in the main law and regulations except the *Administrative Measures for Economic-type Projects of Prevention and Control of Desertification*, where the implementation and supervision of compliance is supported by other associated instruments which have provisions for this element.¹⁴⁵

5.2.1.14 Dispute resolution

Many instruments in the nine law areas have procedures for dispute resolution, including coordination, mediation and administrative and judicial review procedures for dispute resolution, which conforms with IEM Principles 1, 9 and 10.¹⁴⁶ Some laws which do not have elements for dispute resolution are supported by other laws and regulations which have such provisions. It is necessary to integrate IEM ideology and strengthen this element in the legislation to improve the procedures to resolve conflict situations more efficiently. Because the interests of natural resource utilization, development and control involve a large range of stakeholders, and disputes relating to environmental and natural resource matters occur regularly, dispute resolution is fundamental to effective LD control.

5.2.1.15 Legal liability

Compared with other elements, legal liability is comprehensively represented in the legislation. Quite a few instruments provide for criminal liability, civil liability and administrative liability actions, which is compatible with the IEM Principles 1, 3 and 5.

5.2.2 Analysis of experience, lessons learnt and countermeasures to law and regulations for LD control

Application of the assessment method to determine the capacity of the PRC's LD-related laws and regulations indicated substantial variation between laws and regulations in their "*presentation, expression and application*" to achieve the IEM. The following section summarizes the key outcomes from the analysis. The six separate provincial and regional reports, and the central-level report, contain full and comprehensive information on the analytical and evaluation process – *Provincial and Autonomous Region Reports on the Assessment of Local Regulations, Policies and Institutional Capacity for Land Degradation Control and the Central-Level Report on the Assessment of National Laws, Regulations, Policies and Institutional Capacity for Land Degradation Control*. The key findings of the six separate provincial and regional legal and policy reports were included in the respective

145 Xiaoying, Ma and Ortolano, L. 2000. *Environmental Regulation in [the People's Republic of] China: Institutions, Enforcement, and Compliance*. Lanham (MD), USA and Oxford, UK: Rowman and Littlefield.

146 E.g., Article 15 of *Regulations on Land Reclamation* 1988 provides for land damage compensation fees to be agreed between enterprises or individuals who have caused damage and the units who have suffered the loss; where an agreement fails, it can be settled by the local land administrative department and relevant industrial administrative departments; any party that refuses to accept settlement can file a suit to the People's Court within 15 days from the date when settlement is received.

*Provincial and Autonomous Region Integrated Ecosystem Management and Strategy and Action Plans for Land Degradation Control.*¹⁴⁷

5.2.2.1 Experience

The capacity assessment of laws and regulations found that all elements are present within the nine law areas related to LD control, in particular the elements of: objectives and basis of the legislation; administrative management system; administrative regulation; public participation; dispute resolution; and legal liability. The existing laws and regulations for LD control have the following advantages in terms of implementing IEM and sustainable management of natural resources.

5.2.2.1.1 Good expression of IEM principles in individual laws

Laws assessed as having a high level of effectiveness for LD control generally included most of the 20 elements. Individual laws which contain substantive and procedural rights to exploitation, and instruments for utilization, protection and management of natural resources, also provide duties and responsibilities of respective administrations as well as for legal rights and procedures of other entities. Laws for LD control with these elements expressed can accommodate IEM and will generally help achieve sustainable socio-economic and environmental development.

5.2.2.1.2 Standard expression of IEM principles in each area of law and regulation

Different laws, regulations, rules and local regulations feature different administrative characteristics. There are instances where a regulation firmly expresses an intention but the operational legislative elements, with appropriate IEM ideology, are absent from the law. However, where an instrument of this type is administratively linked to another regulation or rule which has appropriate operational elements this can be of direct benefit to the administration and management of a particular natural resource situation. For example, the *Hearing Rule of National Land Resources* (a ministerial rule), provides specific rules on hearings for land resource administrations, whereas others of the 20 assessment elements appear in other separate regulations that form part of this regulatory system, so that collectively, these instruments have the appropriate administrative functions.¹⁴⁸ The assessment method proved very effective in identifying this type of situation in land resource management. The legislation in the nine law areas was generally assessed as being fair and efficient in its reflection of the 20 elements which indicates the structural completeness of the legislative system for an effective implementation of the IEM.

147 *Reports on the Assessment of Regulations, Policies and Institutional Capacity for Land Degradation for Gansu, Shaanxi, Xinjiang Uygur Autonomous Region, Inner Mongolia Autonomous Region, Qinghai and Ningxia Hui Autonomous Region*; and PRC-GEF Partnership on Land Degradation in Dryland Ecosystems, *Strategy and Action Plan*, supra note 76.

148 Van Rooij, B. 2006. *Regulating Land and Pollution in [the People's Republic of] China*. Amsterdam, Netherlands: Amsterdam University Press; *Implementation Regulations on the Land Administration Law, Regulations of the Land Survey; Regulations on Land Reclamation; Regulations on Geological Disaster Prevention; Management Measures on Rural and Urban Planning and Construction; Administrative Measures for the Pre-approval of Land for Construction Projects; Management Measures on the Annual Plan of Land Use; Hearing Rule on National Land Resources; Disposition Measures on Vacant Land*.

5.2.2.2 Lessons learnt and countermeasures to improve legislation

A significant outcome of the assessment of the individual laws against the 20 legal elements was the identification of a number of specific legislative instruments and areas of legislation where improvements could be made for LD control, including:

5.2.2.2.1 Introducing additional laws and improving relevant existing laws and regulations

There is a lack of special legislation for LD control in the land resources area, an area assessed as requiring urgent attention.

The Forest Law 1998 and Water and Soil Conservation Law 1991 were assessed as being no longer adequate in their current form to effectively manage the main problems of LD (identified in Chapter 3). They should be improved according to the principles of sustainable development and the IEM and, in doing so, the western provinces and regions should be closely guided by the current condition of the environment in the reform of these legislative areas. Local government can improve their regional regulations and rules to be consistent with the provisions of the Legislation Law 2000 and with the specific provisions of the principal nine laws. They should make corresponding rules using legal procedures which guarantee the effective implementation of laws and administrative regulations.

Regarding the protection of wetlands, some provisions exist in the *Forestry Law 1998, Grassland Law 2002 and Land Administration Law 1998* to enable wetland conservation, but the assessment indicated that these laws lacked sufficient procedures to enable all ecological aspects of wetlands to be adequately protected. Currently, Gansu and Shaanxi provinces, and Inner Mongolia and Ningxia Hui Autonomous Regions, have enacted local regulations for wetland protection. The introduction of a comprehensive national wetland protection law, based on wetland ecology and in accordance with the objectives of the Ramsar Convention, is essential (see Chapter 6).

The process of legislative reform needs to reflect the 12 principles of the IEM and the 20 legal assessment elements. Local government should promote the coordination of laws, regulations and rules in their respective jurisdictions.

5.2.2.2.2 Formulating relevant legislation and legal mechanisms

Aspects of the legal system on LD control assessed as requiring urgent reform include the law for nature reserves, ecological compensation in LD control, forest protection, grassland protection, EIAs, and water and soil conservation (see Chapter 6).

5.2.2.2.3 Further strengthening the implementation of laws and regulations

Specific measures should be introduced to perfect the implementation of laws, to further develop the ideology of legal execution, to strengthen the liability provisions, especially increasing penalties, to reduce the overlap in administrative functions, and to strengthen legal education and environmental publicity (see Chapter 6).

5.3 Evaluation of the capacity of policy for LD control

To evaluate the capacity of policy for LD control, the provincial and regional Legal and Policy Teams used a similar method to that used for the assessment of laws and regulations. The Teams analyzed policy materials using the 12 IEM Principles to determine the adequacy of policies for LD control in the western dryland region.

5.3.1 Impact of policy at the national and provincial levels on LD control in the western region

While it was assessed that policies on LD control generally reflect an IEM ideology and the principles of IEM, which is positive for LD control in the western arid region, various inadequacies are evident.

5.3.1.1 Impact at national level

5.3.1.1.1 LD control and socio-economic development

Chapter 3 points out that LD is caused by unscientific and unsustainable development methods such as excessive land reclamation, over-grazing, land clearance and unsustainable use of water, and it has been further pointed out that adoption of sustainable development practices will gradually decrease the occurrence and severity of LD. Moreover, the objectives of many national, provincial and regional policies promote sustainable development. For example, the objectives of the *Guidelines for National Eco-environmental Protection 2007* are to protect eco-environmental attributes and safeguard against exploitation beyond the ecological limits of natural resources. The *Guidelines* also clarify the principles for eco-environmental protection which are to follow a sustainable development strategy, coordinate and harmonize development between long-term and short-term plans, balance the utilization of natural resources, protect the ecological environment, and promote a whole-society approach to a sustainable environment. They establish basic rules for exploitation, utilization and protection of land, water, forest, grassland and mineral resources. Implementation of the *Guidelines* creates a positive impact for LD control by establishing a sustainable socio-economic development mode. Firstly, they point out that the reason for ecological degeneration is unreasonable exploitation and the objective for LD control is to replace the economic development mode with a sustainable development strategy. Secondly, attention is paid to environmental protection when utilizing natural resources. Some rules for the exploitation, utilization and protection of natural resources defined in the *Guidelines* stipulate a process for coordinating LD control and socio-economic development. In addition, many other national policies promote coordination of LD control and socio-economic development, with a positive impact.¹⁴⁹

5.3.1.1.2 Poverty alleviation and LD control management in the western arid region

The environmental consequences of LD reduce the productive basis of industrial and agricultural development and increase the potential for poverty which in turn fosters a cycle of resource

149 E.g., *State Council Decision on Practising the Implementation of the Concept of Scientific Development and Strengthening Environmental Protection*; *State Council Proposal on Furthering Promotion of the Development of the Western Region*; *State Council Proposal on Promoting the Sustainable and Healthy Development of Pasturing*; *Decision on Speeding up Forestry Development*; *State Council Proposal on Furthering Farmland Protection Work*; *Proposals on Promoting the Establishment of a New Socialist Countryside*.

exploitation. Guided by local conditions, combining LD control programmes with poverty-alleviation programmes in the western arid region is a fundamental principle and approach for land resource management. The *State Council Proposals on Further Promoting the Development of the Western Region*¹⁵⁰ and the *Development Plan of Poverty-alleviation Program for Rural Areas (2001–2010)*¹⁵¹ both include policy elements to eradicate poverty. Combining a poverty-alleviation programme with a LD control strategy will have positive results for human and environmental management.

5.3.1.2 Positive impact at the provincial and autonomous regional levels

In general, policies on LD control in the six western provinces and regions are rational, fair and efficient, such as returning farmland to forest and grassland, eco-environmental construction, improving the management of sandstorm source areas, and designing effective water and soil conservation systems. For example, the western development and ecological construction programme, implemented by the Inner Mongolia Autonomous Region since 2000, has produced significant achievements for LD management.¹⁵² During the 10th Five-Year Plan period, policies were implemented to return livestock pasture to forest and grassland, forbidding or restricting herding, conserving water and soil, and undertaking grassland rehabilitation to control desertification. Since the mid-1990s, CNY 0.56 billion has been invested in water and soil conservation and ecological restoration projects in Inner Mongolia to control soil erosion over an area of 3,919.4 km², and improve conservation of the water and soil ecological environment. By the end of 2004, 815,500 ha of degraded land had been controlled, slowing the pace of desertification, improving land husbandry and environmental conditions for humans, and advancing economic development and national unity.¹⁵³

5.3.1.3 Limitations of LD control policy

Various limitations of LD control policy were identified as follows:

5.3.1.3.1 Contradictions between LD control policies

Various policies on ecological environment protection complement each other and have similar objectives and guiding principles. Due to the lack of an overall national plan for LD policy formulation, and the lack of coordination between the separate policy management areas, the opportunity for synergies in LD policies is lost. For example, the administrative departments for land, forestry, grassland, and water and soil conservation each have authority under law to levy a fee for construction projects which cause damage to land. This situation has led to cross-sectoral management, duplicated fees and inconsistencies in enforcement. Environmental conservation generally has a lower priority than economic development in governmental plans, although the development of rural

150 The Proposal provides for ecological construction and environmental protection in order to improve ecosystems and farm income.

151 The fundamental living and production conditions shall be further improved, especially public infrastructure for farmland, environmental improvement and public services.

152 Currently, non-State funded forests cover 3.3 million ha and contribute to ecological construction; for contracting and management of grassland, local government has signed 419,000 grassland contracts and pasture land contracts with farmers; 342,000 certificates for grassland management were issued by regional government.

153 Reducing desert area of 316,000 ha at an average rate of 25,000 ha per year.

areas requires sound sustainable land-use policies in order to prevent LD. Local authorities, when promoting policies on agriculture, land husbandry, forestry and rural development, lack adequate understanding of the possible consequences of poor policy execution on the sustainability of resources and ecosystem functions.

5.3.1.3.2 Timeliness of formulation and modification of policy for provinces and regions

There is a higher degree of flexibility within policy formation compared with procedures for making laws and regulations. However, changes to specific policies on LD control in individual provinces and regions generally lags behind the condition of the ecological environment, a situation which results in an inconsistency between the state of the environment and the corresponding policy to recognize this condition. This is a barrier to effective policy implementation.

5.3.1.3.3 Policy for market mechanisms is insufficient

The importance of a market mechanism for LD control has not been fully recognized by policy makers who place more emphasis on administrative management thus weakening the effectiveness of policy implementation. This situation discourages public participation in LD control.

6 Improving policy and legislation to prevent and control LD

Wang Canfa¹⁵⁴

6.1 Impact of international environmental law

Although there have been substantial achievements within the PRC's legal and policy system to prevent and control LD in the country, the PRC has a long-term goal to continue improving the law and policy for sustainable development and IEM and its governance. Since commencing its reform and opening up of policy, the PRC has been an active participant in international environmental affairs and is making a significant contribution to the development of international environmental law generally, but in particular to the environmental law and policy for LD (see Chapter 7). Moreover, the PRC has introduced many concepts, ideas and standards from international environmental law, including the IEM concept, to improve its law and policy for LD management.

6.1.1 Impact of IEM

According to the provisions of various international environmental conventions, such as CBD and UNCCD, the IEM emphasizes the interrelationship between different aspects of the environment, the interdependency between the natural and the human environment and economic production, and has become a significant guide for the improvement of law and policy for the prevention and control of LD in the PRC. Two international environmental events, in particular, influenced the PRC's response to IEM:

- The 7th Meeting of the CBD Conference of the Parties in 2004,¹⁵⁵ which recognized that *“the ecosystem approach is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. The application of the approach will help to reach a balance of the three objectives of the Convention: conservation; sustainable use; and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources”*.
- The PRC-GEF Partnership Project which specifies that *“IEM is a method of integrated management focusing upon interrelation between various environmental functions and services (such as absorption and storage of carbon, stable climate and watershed protection, beneficial products) as well as interdependency between environment and human society, economic and production system”*.

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155 CBD Decision VII/11, *supra* note 9.

In this regard, the IEM recognizes the direct and indirect interdependency between humans and nature, including the relationship between land, water and forest – which is its great strength. By definition, the IEM integrates many aspects of the environment to produce multiple benefits which is an ideal principle to manage the complex, multivariate and multidisciplinary aspects of LD.

6.1.2 Improving law and policy for the prevention and control of LD in the PRC

Various aspects of international environmental conventions can be applied in the PRC national law and policy for the effective control of LD. The rationale behind the success in applying international environmental law to the domestic legislation regime is as follows:

- The IEM concept is an important guideline for improving prevention and control of LD and should be introduced to environmental laws and policies in the PRC;
- The IEM, as advocated under various international environmental conventions, represents the collective experience of many individual countries and can be applied in the PRC;
- The international environmental conventions ratified by the PRC are binding to the PRC. Therefore, the use of the IEM to improve law and policy to prevent and control LD in the PRC is a practical imperative, helping to improve its performance in relation to particular international conventions.

As a major result of the Capacity Building Project of the PRC-GEF Partnership, the IEM is now used by the PRC as a standard procedure and strategy to improve its law and policy to prevent and control LD.

6.1.2.1 Purpose of legislation

With regard to legislation for LD control, the PRC takes into consideration the demands and value of society and economy to achieve sustainable development. Unsustainable, economically driven development is worsening the global environment, impairing sustainable economic development and threatening the existence and health of humans. Consequently, sustainable development is promoted where economic growth can still be achieved without exceeding environmental capacity. As a central aspect of this process, law is a social adjustment instrument with public credibility and universality. Under the circumstances, the standards of performance prescribed in law will be binding and, by progressively improving law making and law enforcement procedures, this will lead to more effective prevention and control of LD, by:

- making environmental protection and economic development equal, and reversing environmental deterioration;
- improving governance with an emphasis on administration, including combining administrative and civil affairs so the public can participate in prevention and control of LD; and
- removing fragmentation, ensuring systematic and coordinated management, and establishing an integrated management system for LD control.

6.1.2.2 Legal system

Chapter 4 indicated that the PRC has established a legal system with sufficient elements to be effective in the prevention and control of LD. However, some aspects of the legal system remain in

conflict with the IEM and new, innovative legislative solutions are required, as well as the improvement of many individual laws, to remove this conflict.

6.1.2.3 Adjustment mechanisms

Pressure for legislative improvement generally comes from administrative, market and societal activities. In addition to strengthening governmental administration to prevent and control LD, improvements to LD control technology and socio-economic development will generally come from public initiatives and increased public participation as well as from increased financial investment.

6.1.2.4 Administrative systems

Coordination between principal administrative bodies shall be reinforced to integrate the management of economy, society and environment.

6.2 Enacting and improving laws and rules

With the introduction of the concept of sustainable development into CPC policy and the PRC national policy, the urgent task is to embody this concept within the legislative system to improve its role in the prevention and control of LD. In this regard, new laws and rules will be needed in specific fields, and various current laws and rules will be revised and improved.

6.2.1 Principles for enacting and improving relevant laws and rules

6.2.1.1 Expanding the scope of laws and rules to cover all aspects of LD control

The prevention and control of LD involve many activities so any area of inadequacy will undermine the efficiency of the whole prevention and control programme. With regard to national laws, the assessment process revealed that many laws and administrative rules associated with water, soil, forest, grassland, vegetation propagation, water and soil conservation, agriculture, prevention and control of sandstorms, and environmental protection, have inadequacies that need to be rectified. For example, the existing national law for land resource protection focuses too much on development and utilization of land, whereas the law concerning soil pollution control is inadequate for state-owned land and to protect the environment. Further, the national legislative framework for wetland protection relies on the administrative framework for natural reserves and wildlife conservation and few legal prescriptions for integrated protection of wetlands exist. Under the circumstances, regulation can be improved by enacting and reforming laws and rules to expand their scope in all aspects of prevention and control of LD and environmental management.

6.2.1.2 Reconciliation of national, provincial and regional legislation

During the enactment and improvement of relevant laws and rules, the relationship between national legislation and provincial and regional legislation will be properly reconciled:

- The provinces and regions in Western PRC will continue to enact and improve the laws directed at local environmental conditions. In circumstances where essential measures are not included in existing laws and administrative rules, local legislatures shall prescribe local rules and regulations that should not contradict national laws.

- The national legislature will adopt laws, mechanisms and measures which have already been tested and improved by local legislatures to ensure national consistency, supervision and management of specific LD issues.
- Local legislatures will establish measures to enforce existing laws and administrative rules to further improve their ability to manage LD locally.

6.2.1.3 Content of laws to comply with IEM

The concept of the IEM, its principles and the 20 specific elements of the evaluation process (described in Chapters 1 and 5) have been accepted as a standard procedure to revise and improve relevant laws and rules for LD control in the PRC. In this way, laws and rules will be enacted in consideration of proven international experience and best domestic practice that can be efficiently monitored and enforced.

6.2.2 Laws and rules to be enacted and improved at national level

6.2.2.1 Revision of the *Water and Soil Conservation Law*

As specified in Chapter 3, the PRC has one of the highest rates in the world of water and soil degradation and associated environmental damage.¹⁵⁶ Compared to investment in economic development, investment in control of water and soil loss in the PRC has been disproportionate. This funding disparity has impaired progress in arresting soil and water loss, and the large-scale and technical difficulties associated with water and soil degradation remain a major political challenge.¹⁵⁷ The extensive loss of water and soil is a threat to the integrity of the national environment and becomes a major obstacle in achieving sustainable development. A comprehensive report on these issues was prepared in the 2002 by the PRC Ministry of Water Resources – *National Strategies for Soil and Water Conservation*.¹⁵⁸ One of the main recommendations of this report was the reform of the Water and Soil Conservation Law 1991 and various optional frameworks were presented in the study for consideration. This recommendation was subsequently fully investigated under a detailed study of soil and water conservation law for the PRC carried out under an Asian Development Bank Technical Assistance Project in 2006–2007.¹⁵⁹ International and domestic legal specialists prepared comprehensive recommendations for the revision of the *Water and Soil Conservation Law* consistent

156 According to the 2nd Nationwide Remote Sensing Survey on Loss of Water and Soil, the PRC has lost water and soil over an area of 3.56 million km², accounting for 37.1 percent of the total territorial area, of which the contaminated water area and weathering area comprise 1.65 million km² and 1.91 million km² respectively. This equals an annual soil loss of 4.5 billion tons, loss of farmland of 66,670 ha and reservoir sillage of 1.624 billion m³.

157 The term “soil and water loss” as used in the PRC equates with “soil and water degradation”; six specific processes contribute to soil degradation—water erosion, wind erosion, waterlogging and excess salts, chemical degradation, physical degradation and biological degradation; water is degraded by sediment and chemical deposits, where the quality of water declines and may become unfit for human and animal consumption.

158 SMEC, *supra* note 104.

159 ADB. 2004. *Technical Assistance to the People’s Republic of China for the Implementation of the National Strategy for Soil and Water Conservation*. TAR: PRC 36443. Manila.

with modern concepts from international and national law-making procedures for soil and water conservation.¹⁶⁰

Since the enactment of the *Water and Soil Conservation Law* on 29 June 1991 there has been significant accomplishment in water and soil conservation and use of water and soil resources, including improvements in agricultural production, rural environmental management, reduction in natural disasters, reduced effects from sillage and sandstorms, and the promotion of the sustainable development of economy and society. The rapid development of economy and society with its increased environmental demands has exposed many gaps in the existing law including: (i) its limited scope to address the large variety of production and construction activities that cause soil and water loss; (ii) duties and responsibilities for water and soil conservation at the local government level are not adequately defined which limits the potential use of water and soil conservation techniques; (iii) there are inconsistencies between administrative functions stated in the 1991 Law and the actual functions of administrations; (iv) various procedures in the existing law are inconsistent with the current level of scientific knowledge, including environmental awareness and sustainable development soil and water management practices; and (v) inadequacies exist within the duty and procedures to punish violators which result in inefficiencies in law enforcement. The justification to revise the 1991 Law is based on the level of domestic experience and international standards in water and soil conservation law. Improvement of the law should be consistent with improvements to the national policy for water and soil conservation and with the best scientific and sustainable development practices.¹⁶¹

6.2.2.1.1 *Matters to consider in the revision of the Water and Soil Conservation Law*

- Revise the purpose. To ensure the fundamental responsibility of water and soil conservation is to “protect environmental security, promote harmonious co-existence between humans and nature, and ensure sustainable development of economy and society”.¹⁶² This objective should be added to the Law as the principle of “prevention and control of loss of water and soil, protection and proper utilization of water and soil resources, lessening harm by flood, drought and sandstorm”.
- Revise the guideline and policy for water and soil conservation, including: (i) changing the existing guideline of “focusing on prevention” to the new guideline of “focusing on prevention, giving priority to protection”; (ii) amending the concept of “focusing on prevention” to “focusing on prevention, giving priority to protection for water and soil conservation, and proper reconciliation of economic development and water and soil conservation to strictly control water and soil loss within prescribed thresholds”; and (iii) changing from “general planning, integrated control” to “scientific planning, integrated control”, to emphasize scientific planning and integration of measures concerning control of water and soil loss, and to represent the essential demand of scientific development in water and soil conservation practice. It is proposed that an article be

160 Hannam, I.D. and Song Ying. 2007. *Report and Recommendations on Revising the 1991 Water and Soil Conservation Law of the People’s Republic of China*, Technical Assistance to the People’s Republic of China for the Implementation of the National Strategy for Soil and Water Conservation TAR: PRC 36443. Manila

161 SMEC, *supra* note 104.

162 *Water and Soil Conservation Law* 1991, Article 1.

introduced into the *Water and Soil Conservation Law* referring to the “national policy of protection of water and soil resources, prevention and control of loss of water and soil” (stated in Notice No. [1993]5 of the State Council). This will strengthen conservation of water and soil consistent with international standards, and with the terms of the requirements for the “construction of environmental civilization” of the 17th Congress of the Communist Party of [the People’s Republic of] China.

- Strengthen the system of responsibility for practical water and soil conservation. In order to reverse the position of “focusing more on economic development than environmental protection and deployment than implementation”, and to promote the practice of setting targets for water and soil conservation, the duties and responsibilities of government at all levels for conservation of water and soil should be strengthened; all levels of local government would report to the same level of the People’s Congress Standing Committee regarding conservation of water and soil, and in relation to performance evaluation and accountability for conservation of water and soil during the leadership term.
- Improve the planning system for water and soil conservation. To date, water and soil conservation planning has been part of the general land planning process. Historically, drafting and enforcement of water and soil conservation plans have not received adequate attention and, in this regard, an additional chapter on “Planning” should be considered in the revision of the *Law on Water and Soil Conservation* with an emphasis on: the planning responsibilities of the drafting organ; the process for plan approval; requirements for drafting plans; plan enforcement; special inclusions in plans; drafting sections and chapters on water and soil conservation; techniques to improve the legal standing of water and soil conservation plans.
- Improve and strengthen measures to prevent and protect against water and soil loss. The existing *Water and Soil Conservation Law* includes many articles to prevent and protect against water and soil loss, with various levels of efficiency.¹⁶³ These should be maintained in the revised law, but new practices should be introduced to improve local conditions in soil and water conservation.¹⁶⁴ This will enrich and improve various legal prescriptions to prevent and protect water and soil resources. In detail, the following legal elements would be added:
 - (i) Prohibit or limit activities that cause water and soil loss or harm the environment; strengthen the administration of prevention and protection zones.
 - (ii) Expand the detail of the water and soil conservation compensation system; specify the activities that damage water and soil conservation facilities, natural vegetation, soil, terrain and landscape that lead to soil and water degradation, and specify the compensation payment for water and soil conservation. Civil compensation liability would be specified for damage caused to water and soil conservation facilities, and the payment of compensation would not waive the compensation responsibility for maintenance of water and soil conservation facilities.

163 Hannam and Song Ying, *supra* note 160, see Chapter 6, “Final Recommendations for the PRC Soil and Water Conservation Law Reform”.

164 E.g., PRC-GEF Partnership on Land Degradation in Dryland Ecosystems, *Best Practices*, *supra* note 76.

- (iii) Improve the administrative system and water and soil conservation measures applicable to construction projects, including the system of supervising and investigating water and soil conservation activities.
- Develop a sound investment guarantee mechanism for water and soil conservation: standardize the controls for water and soil loss; establish a co-financing system for water and soil conservation for central and local governments; guide and encourage public and social investment in water and soil conservation; establish an environmental compensation mechanism for water and soil conservation; establish a security system for implementation of water and soil conservation practices in conjunction with mineral resource development projects.
- Improve monitoring, supervision and investigation of water and soil conservation practices; budget for the establishment of a monitoring network, its operation, management and maintenance; specify supervision duties, administration and enforcement procedures for governmental bodies; specify the procedure to assess harm concerning water and soil conservation, and the approval of qualified supervising and monitoring agents to assess water and soil conservation.
- Improve and strengthen the legal responsibility for water and soil conservation – overcome the inadequacies in the current law in relation to its functions, basic rules, and inadequate punitive measures. The revision of the law would consider stronger punishment and enforcement procedures for various activities that violate water and soil conservation requirements. Various classes of legal responsibility would be added to improve law enforcement.

6.2.2.2 Special legislation for wetland conservation

The justification for special legislation for wetland conservation is based on the high level of international and domestic interest in conserving the PRC's substantial area of ecologically significant wetlands and the inadequacy of existing legislation to protect wetland resources.¹⁶⁵ As a result, more attention is being given to investigating and enacting specialized wetland conservation law. The PRC has extensive wetland resources with significant environmental, economic and social values, including in Western PRC. The development, utilization and conservation of these wetland resources must be managed by natural resource law principles that are commensurate with wetland conservation. This necessitates the enactment of a special law to conserve wetland resources whilst controlling development activities and with effective enforcement procedures. Wetland resources in Western PRC, as elsewhere, have been seriously damaged through reclaiming farmland from natural lakes, draining ponds for fishing, disposing of waste water and solid wastes in wetland areas, and reducing the capacity of wetlands for floodwater storage and flood control. These activities have degraded the quality of wetland ecosystems, lowered their biological productivity, and reduced their biodiversity. The existing limited legislation used for wetland management is structurally and administratively inadequate.¹⁶⁶

165 Article 1 of the *Convention on Wetlands of International Significance Especially as Waterfowl Habitat* 1971, defines wetlands as “areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres”.

166 Zhu Jianguo and Wang Xi *et al.* 2004. *Study on [People's Republic of] China's Wetland Conservation Law*, pp.18–22. People's Republic of China Legal Publishing House.

6.2.2.2.1 *International and national issues*

Wetlands, along with forests and oceans, are among the most globally important ecosystems. The international legislative attention given to wetland conservation is limited and the principles and administrative systems to conserve wetlands are not well defined by law. At the PRC national level, the provisions applied to wetland conservation are scattered throughout various environmental laws, rules and by-laws, some of which include provisions for wetland conservation and utilization, but most only deal with one individual aspect of a wetland system, such as the land component, or the water component, and do not consider all essential components of a wetland system from an ecosystem or administrative perspective. Within the PRC legal system, there are many concepts, rules and by-laws concerning wetland conservation that are not based on the IEM and sustainable development, and are therefore not adequate to protect wetland resources. The existing laws are characterized by an emphasis on resource development and utilization and not resource maintenance and recovery. Though the concept of sustainable development has increased in popularity in the PRC in recent years (see Chapter 2), and more consideration has been given to revising individual natural resource laws by introducing legal provisions to protect natural resources, “the problems of incompatible speed and intensity of development and utilization as well as demand and reality of environmental protection” are still unsolved.¹⁶⁷ The approach to wetland conservation indicated in the Ramsar Convention¹⁶⁸ has not been adequately introduced into the PRC law including a system to monitor the environmental aspects of wetlands and to survey national wetland resources. In general, an effective system for natural resource protection has not been established by law in the PRC. Moreover, the *Land Administration Law*, *Water Law*, *Grassland Law*, *Fisheries Law*, *Law on Protection of Wildlife* and *Mineral Resources Law* all prescribe a system to compensate owners for loss of natural resources where, in the absence of a special wetland conservation law, a legal procedure is not available to compensate for loss incurred by wetland resource development and utilization. In 1998, when disastrous floods occurred in the Yangtze River and the Nen River, the PRC established the policy of “returning lakes and wetlands from farmland” as one measure to compensate for the loss of benefits that wetlands provide. However, because it was a flexible policy measure, enforcement was variable and characterized by “distorted countermeasures to the policy”, which attracted a lot of public attention and social focus.¹⁶⁹ This situation reinforced the justification for a special law on wetland conservation. It is considered that special legislation on wetland conservation is necessary for the PRC to meet its obligations under the Ramsar Convention. The PRC ratified the Convention in 1992 and, from that point, was bound to undertake the conservation of wetlands and protect their biological diversity. So far, 36 wetlands in the PRC have been listed as internationally important in accordance with the Convention but this development needs to go further and include

167 Kang Yin. “Study on Problems Regarding China Wetland Conservation Law”. Paper for Master’s Degree of Environmental and Resources Protection Law, Northeast Forestry University.

168 Articles 2–5; in particular, Article 3 provides for the formulation and implementation of plans to promote the conservation and wise use of wetlands.

169 Zhu Jianguo et al., *supra* note 166.

the fundamental principles of the Convention in domestic law to fully meet international obligations for wetland conservation.¹⁷⁰

6.2.2.2.2 *Establishing a special law on wetland conservation*

For the PRC, the challenge is to establish a wetland law based on the principle of integration so it can properly consider the economic and biodiversity values of wetlands. By comparison with the existing system where legal provisions for wetlands are scattered among various laws, rules and by-laws for environmental protection and resource utilization, a new IEM-based wetland law would include the full range of legal and institutional elements that enable all development, utilization and wetland conservation aspects to be considered in a consistent, uniform manner by following standard legal procedures and uniform legal principles. This legislative approach gives equal consideration to wetland conservation, utilization and development, where the prescribed ecological limits and standards would lead to more effective coordination and decision making on wetland resources. This form of legislation will ensure that all legal principles necessary for wetland conservation will be in the principal law together with clear definitions and consistent principles of conservation, utilization and development of wetland resources.

6.2.2.2.3 *Key elements of a special law on wetland conservation*

- Principles of wetland conservation – including principles for environmental protection, observing environmental law and preserving an ecological balance, scientific planning and sound utilization.
- Administrative system for wetland conservation – the forestry administration will coordinate the cooperation of all sectors, including water conservation, agriculture, territory resources, environmental protection, marine protection, development and reform and construction, within the respective ecological standards.
- Legal system for wetland conservation – the special law on wetland conservation should include the following procedures:
 - Wetland conservation planning: the responsibilities of the relevant wetland agency for plan preparation; approval process for wetland conservation planning; principles for preparing wetland conservation plans; content of plans; links with other environmental plans; enforcement of wetland conservation plans;
 - Wetland reserves: criteria to establish natural wetland reserves; relationship between natural wetland reserves and jurisdiction; process to establish natural wetland reserves; supervision and control of natural wetland reserves; legal status of administrative agency for natural wetland reserves; financing arrangements;

170 See Preamble to Ramsar Convention, including consideration of fundamental ecological functions of wetlands as regulators of water regimes and as habitat supporting a characteristic flora and fauna, especially waterfowl; wetlands constitute a resource of great economic, cultural, scientific and recreational value, the loss of which would be irreparable; stemming the progressive encroachment on and loss of wetlands.

- Wetland use control: specifying wetland use; conditions and approval process to change wetland use; conditions and process for temporary wetland occupation; administrative rules for wetland development and use; measures for supervision and control of a wetland buffer zone adjacent to a natural reserve;
- Wetland evaluation: wetland classification; evaluation method; implementation procedure; implementation of EIA to wetland;
- Wetland resource surveying and monitoring: method and procedures for surveying and monitoring; surveying and monitoring agency; wetland parameters to be monitored; technical instruments and data sharing;
- Mediation and legal responsibility: mediation agency; mediation responsibilities; mediation procedures; administrative, legal and civil responsibilities.

By the conclusion of the Capacity Building Project, some of the provinces and regions in Western PRC had introduced local regulations for wetland conservation (i.e., prior to the introduction of a national law), including Gansu and Shaanxi provinces, and Ningxia Hui and Inner Mongolia autonomous regions. In this regard, a new national law for wetland conservation could be substantially driven by the local law-making process. In other words, the provincial and autonomous region regulations would be the impetus for making national wetland law.

6.2.2.3 A national law for the prevention and control of soil pollution

With the continual expansion of the PRC economy, soil pollution is an increasingly serious problem. Existing laws and regulations include various provisions to prevent and control soil pollution but they are not systematic and too incomplete to be effective. A national law to prevent and control soil pollution therefore is needed and should focus on:

6.2.2.3.1 Principles for the prevention and control of soil pollution

The law to prevent and control soil pollution shall be based on principles that protect soil ecology, enable public participation, integrate source control and process control, and ensure “polluters pay”.

- *Protect soil ecology:* Soil pollution causes extensive harm through the deposition of toxic elements and heavy metals in soil, which can be absorbed by humans and harm their health; surface and ground water become polluted; soil becomes contaminated; and the quality of public drinking water is endangered. Soil pollution may also damage or cause the death of vegetation and forest plantations, causing significant economic loss from pollution of crops and forests. Most instances of pollution result from unsound economic development and land-use practices which bring prevention and control of soil pollution into direct conflict with economic development motives. Prevention of soil pollution should be a priority to ensure sustainable and socio-economic development and protect human health and property. Stringent measures should be applied to prevent soil pollution.
- *Public participation:* Prevention and control of soil pollution concerns public life, health and property and the public is entitled to participate in legal decision-making procedures that prevent pollution. Effective public participation relies on full access to soil environmental information,

enabling the public to participate in practical prevention and control programmes. It is important the public gains access to information on the soil environment, development proposals, utilization and protection of land resources as well as information on relevant laws, rules, by-laws and policies. The public is entitled to participate in decision making, public hearings, formal discussions or other legal fora to resolve soil pollution issues. Legal procedures should ensure that people are allowed to express their opinions and that their views are fully considered by decision makers. Further, the public shall be allowed to claim their due rights and interests by reconsideration, lawsuit where they are deprived of access to information, legitimate participation or where entity rights and interests are violated.

- *Integrate source control and process control:* *Source control* includes taking action to reduce the formation of pollutants by using appropriate technology, alternative materials, and management and education processes. *Process control* includes a whole management plan process and implementation of control activities where potential to harm the environment exists. End control has been the primary strategy of environmental protection in various countries since the middle of the 20th century. This approach prescribes permissible standards for emission of pollutants or wastes but has had limited results in lessening or reducing pollution. This approach does not educate polluters to reduce pollutants, whereas source control is a more effective approach.
- *Polluter pays:* This principle applies to those institutions and individuals who pollute and damage the soil environment during construction and other activities, making them liable to control the pollution incurred and to rehabilitate the soil.¹⁷¹ The fundamental of this principle is “control by the polluter, protection by the developer”, to strengthen the public’s sense of responsibility for environmental protection and it considers the matter of finance in the prevention and control of soil pollution. Establishing this principle within a soil pollution law will motivate potential polluters to use cleaner production measures, prevent leakage into soil, increase funding to prevent and control soil pollution, reduce consumption, and enhance responsibility in the use of natural resources.

6.2.2.3.2 *Defining the objectives for the prevention and control of soil pollution*

The objectives in existing law to prevent and control soil pollution are restricted to arable farmland only. Industrial areas and urban land, with dense industrial and mining activity where the emission of industrial waste water, waste gas and waste residue, and pollution by heavy metals have caused serious soil pollution, have been excluded. Therefore, enactment of a law to prevent and control soil pollution should specify that development, utilization and protection of all land (farmland, industrial land, urban land and unused land) should comply with the law.

6.2.2.3.3 *Establishing an administrative system to prevent and control soil pollution*

The administrative system to control soil pollution should consist of one specialized authority to ensure soil pollution problems are managed in a consistent, fair and integrated approach. Under this system all sectors would have an obligation to apply the same standards to individual problems

171 Lv Zhongmei, Gao Lihong and Yu Yaojun. 2001. *Law of the Environment and Resources*. People’s Republic of China Legal Publishing House.

and participate in a cooperative system designed to ensure all aspects of soil pollution are managed uniformly.

6.2.2.3.4 Establishing a legal system to prevent and control soil pollution

An effective legislative system to control soil pollution will require specific legal elements that enable: planning for prevention and control of soil pollution; zoning land as an ecological function area; EIA for all projects, developments and uses of land resources; limiting and licensing emissions of pollutants; applying controls within a specified period; a pollution early warning and emergency system; mediation and dispute resolution; and establishing legal responsibility for soil pollution.

6.2.3 Regulations and rules to enact new laws and improve existing laws at provincial and regional level

6.2.3.1 Local legislative achievements from the application of the IEM principle and concept

Under the Capacity Building Project, the Legal and Policy Expert Groups from the six provinces and autonomous regions in Western PRC completed the assessment of provincial and regional laws, policies and institutional aspects and made various recommendations to improve future law making. As a result, many new and revised laws and rules had been made by 1 December 2007 and Table 10 lists them.

Table 10. Key legislative achievements following the IEM principles in the project provinces and autonomous regions in Western PRC

Province or autonomous region	Local laws enacted
Shaanxi Province	Regulations on Wetland Protection Regulations on Closing Hillsides and Prohibiting Herding Regulations on the Protection of the Qingling Mountainous Environment
Gansu Province	Regulations on Integrated Utilization of Resource; Regulations on Administration of Water Resources in the Shiyang River Basin Regulations on the Conservation of the Agricultural Environment
Qinghai Province	Measures for Implementation of the Grassland Law of the People’s Republic of China Regulations on Environmental Monitoring Measures for Implementation of Grassland Law Measures for Administration of Water Use Licensing and Levies for Water Resources
Inner Mongolia Autonomous Region	Regulations on the Preventive Defense of Meteorological Disasters Regulations on Wetland Protection
Ningxia Hui Autonomous Region	Measures for Administration of Water Use Licensing and Levies for Water Resources Regulations on Grassland Administration
Xinjiang Uygur Autonomous Region	Measures for Implementation of Law of the People’s Republic of China on the Prevention and Control of Desertification Regulations on Wildlife Protection Regulations on the Protection of the Kaner Wells

Table 10 indicates where the IEM has been integrated into the law-making process of the six western provinces and autonomous regions of the PRC, creating a solid basis for the establishment and improvement of an integrated law and policy framework for the prevention and control of LD.

6.2.3.2 Regulations and rules to improve laws at provincial and regional level

In addition to changes made to existing laws and rules, the six provinces and autonomous regions propose future legislative areas where the concept and principles of the IEM will be integrated to further strengthen law making to prevent and control LD. Table 11 outlines their legislative agenda for further reform.

Table 11. Legislative plans of the six provinces and autonomous regions in Western PRC

Province or region	Legislative plan
Shaanxi Province (2008–2009)	Measures on the Protection of the Wei River Environment
Gansu Province (2008–2012)	Administrative Regulations for the Protection of the National-level Natural Reserves in Severe Drought Ecosystem in Anxi District; Measures on the Prevention and Control of Water Pollution in the Yellow River Water Course; Measures on Implementation of The Law of the People's Republic of China on the Promotion of Cleaner Production; Regulations on the Protection of the Natural Environment; Regulations on the Protection of Natural Forest; Measures on the Implementation of the Animal Husbandry Law of the People's Republic of China; Regulations on the Administration of Water Resources in the Sule River Basin; Regulations on Wildlife Protection; Regulations on the Promotion of Sand-related Industry in Hexi Corridor; Regulations on Administration of the Maqu Natural Reserve; Regulations on the Administration of the Bailong River Basin; Regulations on the Administration of Water Resources in Taolai River Basin; Regulations on Environmental Protection (Revised); Implementation Measures on the Law of the People's Republic of China on Water and Soil Conservation (Revised); Measures on the Administration of Tree Planting on Two Mountains in the South and North in Lanzhou City (Revised); Measures on the Protection of Municipal Drinking Water Sources and Prevention & Control of Water Pollution in Lanzhou City (Revised); Regulations on Environmental Protection in the Southern Gansu Tibetan Autonomous County; Regulations on the Administration and Maintenance of Woods in Dongxiang Autonomous County; Measures on the Administration of Water and Soil Conservation in Dongxiang Autonomous County; Regulations on the Administration of Grassland in Tianzhu Tibetan Autonomous County (Revised); Measures on the Administration of State-owned Land in Akesaihasake Autonomous County, etc. ▶

Province or region	Legislative plan
Qinghai Province (2008–2009)	Regulations on Contracting Country Land (Revised); Regulations on the Integrated Administration and Utilization of Resources; Implementation Measures on the Law of the People’s Republic of China on the Prevention and Control of Atmospheric Pollution (Revised); Regulations on the Sanjiangyuan Natural Reserve; Measures on Implementation of the Law of the People’s Republic of China on Water and Soil Conservation (Revised); Measures on the Administration of Licensing for Discharging Pollutants; Countermeasures to Weather Changes
Inner Mongolia Autonomous Region (2008-2010)	Regulation on National Nature Reserve Management in Dalai Lake; Implementation Measures on the Law of the PRC on Land Contracting; The Regulation on Whole People’s Obligatory Tree Planting
Ningxia Hui Autonomous Region (2008–2009)	Regulations on Wetland Protection; Measures on Implementation of the Water Law of the People’s Republic of China (Revised); Measures on the Protection of Drinking Water Sources
Xinjiang Uygur Autonomous Region (2008–2009)	Regulations on the Protection of Natural Woods; Detailed Rules on Implementation of the Regulations on Administration of Water Resources in the Tarim River Valley; Detailed Rules on Implementation of the Grassland Law of the People’s Republic of China; Measures on Administration of the Oil Surveying and Development Environment

6.3 Improving key legal elements to prevent and control LD

Chapter 4 pointed out that the existing legislation to control LD in the PRC is relatively sound and complete. The assessment method also indicated that various legal instruments, including pollution control, restrictions on development and use of natural resources, and natural reserves, public participation, punishment, and administrative responsibilities were not adequate for effective LD control. Moreover, the assessment drew the conclusion that the following aspects needed to be addressed more effectively by legislation:

1. Land-use planning administration
2. Natural reserve management
3. Ecological compensation
4. Forestland closure for planting trees
5. Environmental impact assessment
6. Water and soil conservation

6.3.1 Improving land-use planning

The system of land-use control has established general planning procedures for land use, whereby areas for different uses are prescribed and land-use limits are defined for landowners and users in accordance with national land law. Use of specific types of land is determined according to approved general planning procedures. Any variation to land use would be subject to approval and more stringent controls would be enforced for construction land than farmland.

6.3.1.1 Strengthening the law on land-use planning and improving the land-use control system

The system of land-use control is based on the general planning provisions for land use. However, the *Land Administration Law* is not an integrated whole for all forms of town and country planning and is more closely related to national economic development than environmental protection, and is therefore insufficient for modern land-use requirements. The revision of various aspects of the *Land Administration Law* is required to improve the legal procedures and rules for land-use control and administration of land-use planning.

6.3.1.2 Further defining legal relations with relevant planning

General planning for land use approved under the *Land Administration Law* would remain as the main guideline for urban and rural construction, land administration and for the system of land-use control. Any land use approved under the general planning procedures should not be illegally altered. Local planning for municipal construction, villages and towns, water conservation, energy sources, tourism, and ecological construction prepared by a region, sector or industry, should be compatible with the general planning procedures for approved land use. These uses must also comply with farmland protection and environmental protection and be consistent with the scale of land use prescribed by the general planning procedure. Where a proposal is in conflict with the general planning procedure and approved land use, in terms of scale and the use proposed, the general planning procedures will prevail.

6.3.1.3 Improving the system for preparing land-use plans

A system of public consultation prior to approval and decision making will establish and promote a democratic process for land use planning and for water and soil governance. Village (Town) planning must be undertaken by consultation with the public at large, and the activities concerning basic farmland, farmers' requirements, and town and village construction and development need to have public approval. Procedures for public hearings and expert assessment will be established to prevent unlawful revision or reversal of a planning decision. Qualifications for those engaged in preparing general land-use plans will be specified, and professional land planners will be separate from administrative personnel.

6.3.2 Improving the nature reserve system

Establishing nature reserves and protecting biodiversity and natural resources is regarded as one of the most important means for the prevention and control of LD in dryland Western PRC. The PRC has a high number of national and regional nature reserves which are significant for biodiversity conservation.¹⁷² The system of nature reserves could substantially contribute to LD management in the following ways:

6.3.2.1 Conditions under which to establish, alter and abolish a nature reserve

Article 18 of the *Regulations on Natural Reserves* 1994 provides for demarcation of nature reserves into three zones: the core zone, buffer zone, and experimental zone. However, in practice many

172 Zheng Chaogui and Zhu Cheng. 2004. "Present conditions and prospects of the research on nature reserves in [the People's Republic of] China". *Journal of Geographical Sciences* 14(1): 79–86.

nature reserves were established and approved by law without such zoning and demarcation – in such circumstances, the ecological functions of nature reserves are substantially reduced and administrative procedures inadequate. Article 15 of the *Regulations* enables a government authority to alter, cancel and change the function zoning of a nature reserve, but provides no procedures for the entity to request such changes. This situation substantially weakens the effectiveness for conservation of the nature reserve system. In practice, the scope and boundary of many nature reserves and functional zoning are frequently altered or cancelled, where the reason generally given by the people's government (who originally approved the nature reserve) is to benefit economic construction. Under the *Regulations*, this action is detrimental to the environment but does not constitute a violation of the law and is not subject to penalty. Moreover, it is a major inadequacy of the system of nature reserve management. Under these circumstances, it is necessary to ensure that conditions of establishment, and use and zoning of a nature reserve should be part of a comprehensive approval procedure. Provisions should be made for the core zone and buffer zone of a nature reserve to be used for ecological purposes and not conflict with tourism or forest use. As to altering or abolishing a nature reserve, the law should indicate the responsible entity and the procedures to be followed. It should further state that alteration or abolition would be approved for environmental protection purposes only. The law should also stipulate public participation in nature reserve decision making and that public opinion be taken into account through a formal decision-making procedure.¹⁷³

6.3.2.2 Ownership and use of nature reserves and land contracted to farmers

The *Regulations* provide no provisions on use rights of lands within nature reserves that are contracted to farmers. The provisions for this are found in the *Measures for Land Administration of Natural Reserves* 1995, which were enacted jointly by the National Land and Resources Administration and former National Environmental Protection Administration. Clause 7 of the *Measures* states that "... the land ownership and use by law shall not be subject to alteration by nature reserve zoning....." This causes the administrative power of nature reserves to be in contradiction with land ownership and use rights and leads to problems for nature reserve administrative agents. It is necessary to revise the *Measures* to remove this contradiction. The provision to take collective-owned land or farmer's contracted land by a local people's government to establish a nature reserve should either be revoked or a compensation provision provided. Alternatively, the local people's government should contract with the collective economic organization on the development and use of such areas, where farmers are permitted to run an on-site non-farming business (e.g., tourism), and where economic compensation is provided by the local people's government.¹⁷⁴

6.3.2.3 Financing nature reserves

Clause 23 of the *Regulations* states that "expenses for natural reserves shall be funded by local people's governments higher than county level, and central government shall endow a given subsidy for administration of national natural reserves". Although it specifies that the local financial sector

173 Wenjun Li and Nianyong Han. 2001. "Ecotourism Management in [People's Republic of] China's Nature Reserves". *Ambio: A Journal of the Human Environment* 30(1):62–63.

174 *Ibid.*

provides finance for local nature reserves, this instrument does not specify a budget process to meet the costs. Most regions with nature reserves have insufficient financial resources for a nature reserve programme, which provides uncertainty for the nature reserve system, and impairs effective development of the ecological benefits of the nature reserve system. The procedure for funding should be specified in the law to improve the management of the reserve system. Key sources for funding could derive from taxes and charges for environmental resources, and finance from central and local governments.

6.3.2.4 Improving the administration of nature reserves

The *Regulations* poorly define “nature” and the “functions of nature reserves”. According to Clause 22, an administrative agent of a nature reserve has responsibility to protect the reserve and to manage tourism. Joint responsibility for both protection and tourism activities creates conflict between financial and environmental interests especially in circumstances where tourism is a priority to protection of the reserves and high numbers of tourists will damage the ecology of nature reserves. The administrative body of each nature reserve should comply with the provisional use of zones of nature reserves and balance the economic gain and ecological benefits.

6.3.2.5 Strengthening legal responsibility

The related provisions of legal responsibility for nature reserves are insufficient and considered an obstacle to effective environmental protection and enforcement of nature reserves. Ecological functions require the full legislative protection to ensure they are properly protected. The system of nature reserve zoning is a key aspect of the nature reserve administrative system and the *Regulations* require substantial revision to improve their role in this area.

6.3.3 Compensation system for ecological construction for the control of LD

Chapter 4 pointed out that in the course of LD prevention and control activities, the relationship between ecological protection and economic development under the concept of the IEM should receive higher recognition for its role in reducing LD. The compensation system for ecological construction in LD management is an important aspect to consider under the IEM concept.

6.3.3.1 Principles of the ecological compensation system for the control of LD

6.3.3.1.1 Principle of “compensation payment by beneficiary”

The principle of equality of legal rights and obligations in the prevention and control of LD is expressed by the “*compensation by the polluter, compensation by the beneficiary*” principle. Under the PRC environmental protection law, a polluter has a responsibility to compensate where environmental pollution is caused. A biological beneficiary is liable to pay compensation for the biological function protection area which a person benefits from. Regional compensation is an example of this principle. LD control in the PRC is usually approached from a water catchment management perspective and river control projects include water and soil conservation works. This means that regional compensation is necessary to either protect the upper or lower reaches of a stream. Under the principle of “*compensation by the beneficiary, impartial share of rights and obligations*”, effective measures to prevent and control LD that employ sustainable land-use practices would be applied.

6.3.3.1.2 *Principle of diversified ecological compensation*

Diversified biological compensation should be employed as an effective form of compensation and used to manage biological function zones to optimize compensation benefits. Fund compensation, material compensation, policy compensation and technical compensation are relevant forms of biological compensation in the PRC, of which fund compensation and material compensation are the most common. Policy compensation includes compensation for loss of rights and opportunity cost from central government to provincial government and from provincial government to municipal government. Persons who are compensated may be entitled to priorities and preferences as specified in the policy. It is appropriate to have innovative policies, and promote development and financial policy as preferential policy for tax immunity. Technical compensation considers the nation, and the region which benefits environmentally. It provides technical support for the control of biological function areas and the natural environment, and includes technical servicing, and free technical consultation and instruction. Under a proper compensation system, individuals whose land use rights within a nature reserve are restricted they will be compensated. Under this mechanism, biological function zones or biologically protected areas will receive good protection and the nation will benefit economically and environmentally,

6.3.3.1.3 *Principle of public participation*

The law establishes rules for behavior in relation to activities that may be permissible or unacceptable, which is the core of law enforcement. However, lawful human behavior depends to some extent on the amount and kind of information people receive regarding their rights. Effective implementation of the biological compensation system to prevent and control LD is characteristic of socialist economic interests and the public is informed of the legal obligations they are expected to uphold. In this regard, public supervision of biological compensation is expected. In many cases where a public information process was absent, the implementation of a biological compensation system often failed. The principle of public participation should be a prerequisite for a biological compensation system to prevent and control LD. The principle of public participation relies on prior notification of compensation details, a compensation process and publication of compensation outcomes. The degree and criteria for compensation should be explained and promoted through normal media processes in order to ensure effective public participation.

6.3.3.2 Implementation of the compensation system

6.3.3.2.1 *Financial transfer payment*

The financial transfer payment scheme is an important ecological compensation system of national government,¹⁷⁵ and this method of financial payment is used by central government to achieve equality in compensation for local development. A significant amount of funding in this scheme goes to ecological compensation, including compensation to prevent and control LD.¹⁷⁶

175 Lu Hongyou. 1997. *Study on Governmental Function and Financial System*. People's Republic of China Financial and Economic Publishing House.

176 Ma Lizhen. 2007. "Study on Problems Concerning Ecological Compensation Law". Paper for Master's degree of Quantity Economics, Huaqiao University, see <http://www.cnki.net>; an ecological tax (also known as an environmental tax) is a form of tax collected by government from social institutions and individuals

6.3.3.2.2 *Ecological compensation tax*

An ecological compensation tax for the prevention and control of LD should include two components. One is collection of tax from units or individuals who cause environmental contamination (which embodies the polluter pays principle), and the other is collection of tax from individuals who benefit from an ecological area (which embodies the principle of equality of legal rights and legal obligations as well as promoting an environmental protection consciousness within the whole society).

6.3.3.2.3 *Ecological compensation fund*

The financial transfer for ecological compensation provides significant benefit to ecological function areas and improves prevention and control of LD. In future, ecological function areas could also develop into an independent ecological compensation fund. The central, provincial and regional governments could establish a special ecological compensation fund within their budget. Surplus financial transfer payments should also be investigated as a source for the ecological compensation fund.

6.3.4 **Forest closure system**

To prevent the PRC's western forest ecosystems from further ecological deterioration, the forest law system should consider sustainable use of forests, establishment of a forest ecosystem management system, and specify the methods to rehabilitate forest ecosystems and carry out forest closure for tree planting. The aim is to prevent soil erosion, desertification, protect the biological diversity of forest ecosystems, control forest diseases and pests, and carry out rehabilitative planting. Various measures are specified under Article 8 of the *Forest Law* 1998 to protect forest resources, including quotas on felling, tree planting and closing forestland, to improve the ecological values.¹⁷⁷ Currently, the provisions of Article 8 do not provide for a system of closing forests for rehabilitation planting. A new, more complete system of closing forests for rehabilitative planting, based on sustainable development, would include: financial support for closing forests; a method for closing forests for planting trees and legal enforcement; pronouncement of closing forests for tree planting; specifying tree planting measures; addressing the relationship between farmers concerning rights of land use and access; addressing the conflict between closing forests for forest cultivation and the loss of household economic gain; public production and the ability to support livelihoods; ecological compensation; and legal responsibilities.

6.3.4.1 **Applicability of the forest closure system**

Clause 28 of the *Forest Law* defines the procedure for closing forests for tree planting, a procedure that can have a major impact on the control of various LD problems identified in Chapter 3. However, the procedure only specifies that forests can be closed for the planting of new woods and does not

who use environmental resources as a measure to raise money for environmental protection and to develop an environmentally friendly attitude towards resource utilization; see de Sadeleer, N. 2002. *Environmental Principles, From Political Slogans to Legal Rules*. Oxford, UK: Oxford University Press.

¹⁷⁷ Article 28 of *Forest Law* 1998 states that young woodland should be closed for forestation, implemented by local people's government under Article 31 of the Regulations for *Implementation of the Forest Law*; it also provides for a forest felling license which can be revoked if felling takes place in shelter forest or in special purpose forest which is beyond cultivation or recovery; or if felling takes place within the period of forest closure or within the area that has been closed off.

state any ecological objectives for this activity. The original intention of the system of closing forests was to ensure a balance between the frequency and degree of forest use and the ecological capacity of the forest ecosystem to recover.¹⁷⁸ The scope of forest closure areas for tree planting should not only include sparse forests, undergrowth or bush forests but also include cultivation of forests, bushes and grassland in the areas such as high mountains, steep slopes, exposed rock, desert and sandy soils where forestation is difficult to implement but natural seeding is still available.¹⁷⁹ In all cases, measures should be taken to protect the newly cultivated woodland.

6.3.4.2 Financial support mechanism

Closing forests for rehabilitative planting will reduce farmers' income, although it produces other valuable benefits in turn. These activities require financial support, but most areas in which forest rehabilitation projects are applied are economically undeveloped, and adequate funding is not locally available so that a proper financial support mechanism is needed. The existing public-welfare forest conservation funding mechanism is a part of the effective financial support system that central and local governments have established. However, the scope of public-welfare forests is still very limited and compensation standards are not sufficient. Thus more specific obligation of central and local governments with regard to financial support to forest closure should be provided including detailed financial arrangements. To prevent the implementation of closing forests from becoming an excessive financial burden to a local authority, particularly in poverty-stricken areas, central and higher-level governments should introduce a financial payment scheme to transfer compensation funds among various jurisdictions.

6.3.4.3 Types of forest closure and legal validity

The function of different forest ecosystems varies according to the ecological capability of individual ecosystems and their condition at the time of planting. This information will determine the ecological standards for their future management. In areas where the natural environment is vulnerable but the ecological function and status of the forest is important, the ecological standards applied for closing forests should be comprehensive. In areas where the forest ecology is healthy and ecological functioning is vigorous, the standard conditions for forest management can be less rigorous. In this regard, the procedure in law to close forests for rehabilitation should be considered with the following management approaches:

6.3.4.3.1 Full forest closure

This is recommended for remote mountainous areas, upstream areas, water storage reservoir areas, surface-water source protected areas, and areas with important ecological functions and ecological status. It should also be applied to fragile ecosystems, including areas where severe soil erosion, severe sand storms and areas where natural vegetation recovery is ecologically difficult. Human activity in these areas should be prohibited beyond those measures required for forest cultivation. Activities that should be prohibited in the woodland area include: grazing or dispersed browsing of

178 Editing Committee of China Agriculture Encyclopedia. 1989. *China Agriculture Encyclopedia* (Volume on Forestry). People's Republic of China Agriculture Press; Fei Shimin *et al.* 2004. "Progress of Research on Closing of Forest for Planting in [the People's Republic of] China". *World Forestry Study*, Issue 5.

179 Fei Shimin *et al.*, *ibid.*

livestock; unapproved fires during a forest fire control period; firewood chopping; mowing; digging up trees and other vegetation; forest destruction for land reclamation, quarrying, sand mining, soil excavation; illegal wildlife hunting; willful removal or destruction of bulletin boards and boundary markers of tree planting areas, and any other human-induced activities that destroy tree planting areas.

6.3.4.3.2 *Partial forest closure*

This applies to tree planting for special purposes, where there is good forest growth and a large area of coverage. The forest area subject to partial forest closure should be closed completely within the growing period, with firewood chopping and mowing permissible under the same conditions that apply in other seasons. Any development activities, utilization and destruction of the forest ecosystem beyond these levels would be strictly prohibited.

6.3.4.3.3 *Alternate forest closure*

This includes areas which have been designated for mass production, domestic use or the provision of fuel. Under these circumstances, it is desirable to divide the forest area into separate sections for either full or partial closure.

6.3.4.4 Relationship between forest closure and local land ownership

In regions where forest closure is adopted, the land is likely to be leased by farmers which can present a conflict between forest closure and rural land use. This conflict must be resolved to implement effective forest closure. In these situations, it is impractical and unreasonable to force farmers to transfer their land use. Local government officials will need to use persuasion and education to get farmers to change from their traditional methods of production to methods of forest utilization with environmental protection as the primary objective. The main goal of farming is to generate income to improve living standards, but the current system of farming only damages forest resources. Combining farming with sustainable forest use can be economically as well as ecologically acceptable. Farmers should be encouraged to develop planting vegetation and breeding fowl. These uses are ecologically compatible with forest closure and have an environmental objective. Farmers' income can be increased and poverty alleviated. In regions with a better ecological basis, tourism can be regulated properly by law, thus resolving the conflict between forest closure and other forms of land use. To achieve the environmental, social, and economic goals of forest closure, a contract should be made between local governments and farmers to define each party's rights and obligations. The contract specifies the farmer's use of the woodland within the forest closure area as binding, and outlines maintenance obligations. Changes are not allowed without approval. A user of woodland would be entitled to special production and business operations within the area, and specific activities such as planting vegetation, rearing animals, tourism development and sightseeing would be defined by law in a manner that protects forest biodiversity. The contract would outline legal responsibilities in respect of any obligation violated. The contract system is an incentive to adhere to the conditions of the contract and strengthens farmers' awareness of environmental protection.

6.3.4.5 The function of government

To implement the system of forest closure in a timely, legally and administratively effective way, the public and local government should be informed of the measures for closure. Information should be

displayed around the forest area, indicating the name of the forest, the area, yearly limit, conservation measures, and responsible persons. A farmers' committee or local professional association within the forest area would operate under a forest protection agreement. Local government should guide farmers to reform traditional and inappropriate land uses. Collaborating with farmers avoids conflict, by explaining the purpose of forest closure is for plant growth, and encouraging farmers to adopt sustainable development land-use practices that are compatible with forest ecosystem protection. Governments at county or village level should establish an organization for forest protection and to administer forest management responsibilities. The forestry authority will provide technical instruction on forest closure, information on tree species, seeding techniques, and cultivation, according to local conditions. Governments will introduce preferential policy and support measures for forest closure, including: modifying agricultural practices, labour issues, income potential, livestock management, pasture and crop information, energy alternatives, planting firewood, and procedures for disaster management.

6.3.4.6 Violations against forest closure

To ensure effective implementation of the forest closure mechanism, the legal responsibilities of different parties should be clearly specified in the legislation. Central responsibility will ensure that any person who damages or destroys a forest area shall be legally accountable for these actions.¹⁸⁰ The objective is to rectify any damage to the forest resource by practical action instead of relying on compensation payment only. The main objective under the legislation is to maintain, restore, or improve forest ecological values, including ecosystem functioning, habitat, soil and water conservation functions, and microclimate control. Damage to forest resources through species loss, fragmentation and decline in ecological function represents a significant loss. Compensation is payable for loss of national values, and full reparative compensation for social public interest may not be possible. The aim is to provide a legal responsibility to remedy damage caused to the forest ecological resource, ensure regeneration and recovery of ecological function, (through replanting trees, recovering vegetation, and recovering land use), thus public interest is restored and protected. Costs should be borne by the persons who caused the damage. In circumstances where a person who caused damage does not comply, restoration would be undertaken by an authorized representative to achieve the equivalent objective. Persons who cause the damage must be responsible for the cost to remedy the damage.¹⁸¹ In the case where an activity violates administrative measures by destroying vegetation within the closure area, that person will be required to rehabilitate the area within a specified time limit, and the action shall be compensated under law. Where a violator refuses to replant trees, or replanting does not meet prescribed standards, the forestry authority of the People's government higher than county level shall be responsible for the replanting, and any expenses incurred shall be the violator's responsibility.

180 Lv Zhongmei, Gao Lihong, Yu Yaojun et al. 2001. *Law of Environment and Resources*. People's Republic of China Legal Publishing House.

181 Fang Shirong. (Ed.) 2007. *Administrative Law and Administrative Lawsuit Law*. People's Republic of China: University of Political Science and Law Press.

6.3.5 Improving the system of EIA

Although the PRC system of EIA is not specifically structured to prevent and control LD, it does have sufficient procedures covering most forms of environmental protection and should be applied to ensure the principle of the IEM is taken into account in development proposals. Moreover, the *Environmental Impact Assessment Law* 2002 can be improved to more effectively manage LD problems.

6.3.5.1 Expanding the scope of the EIA system

According to the *Environmental Impact Assessment Law*, EIA procedures shall be applied when land use is being considered and before a construction project commences. However, there is no policy prescription for using the EIA process in relation to LD control. For the specific field of LD prevention and control, local government policy circulars and documents and administrative organs have an important role. In this regard, an effective EIA process is very important for establishing and implementing local policy.

6.3.5.2 Strengthening legal responsibilities of EIA

Legal responsibilities outlined in the *Environmental Impact Assessment Law* are considered too impartial, lenient and inadequate for effective administration of environmental protection responsibilities and standards. This inadequacy is best illustrated by the current low level of the maximum penalty (CNY 200,000) for a violation. This is disproportionate to the value of large construction projects and is not a deterrent to violation. Legal procedures for EIA administration could be improved under a “penalty per day” policy, whereby any construction project violating the law and commencing construction without having first carried out an EIA, shall be ordered to stop. Penalties will accumulate according to the number of days of illegal construction, where each construction day shall be deemed as a separate illegal activity. In addition, the rule of “double punishment” shall apply where the principal of the project, project owner, and key persons involved with the project shall each be liable to a penalty.

6.3.5.3 Application of the precautionary principle

In circumstances where a construction project commences without having first undertaken an EIA, a revised EIA law will include articles that require construction work to cease and then the full EIA process would follow. Where a project fails to carry out an EIA, the penalty range of CNY 50,000–CNY 200,000 would apply.¹⁸² However, this approach conflicts with the *precautionary principle* where the current EIA Law already has this expectation of proponents. The main objective is to assess potential environmental impact and develop protective measures to prevent environmental harm from a development activity. The existing EIA law states that if a construction project commences without prior EIA, EIA shall be permitted later. Such a provision substantially undermines the intent of EIA which is to prevent environmental harm. Moreover, to apply the *precautionary principle*, it is necessary for the most appropriate legal procedures for EIA to be well established within the Law. In this regard, any construction project that commences prior to EIA would be ordered to stop work and be subject to a sizeable penalty. The illegal project would then be subject to full re-examination for EIA as a new construction project.

¹⁸² See also *Environmental Impact Assessment Law*, Article 31.

6.3.6 Establishing a water and soil conservation system

Water and soil conservation should be carried out according to the guideline of “prevention first, protection foremost” by using a water and soil conservation approach which specifies the most appropriate measures. An administrative body would use this instrument to prepare a water and soil conservation plan, and it would provide a lawful way for public participation in water and soil conservation activity. This approach requires the specification of water and soil conservation measures prior to construction. The establishment and improvement of a water and soil conservation scheme are characterized by the following:

6.3.6.1 Objectives of a water and soil conservation scheme

A water and soil conservation scheme is aimed at construction projects with the potential to cause water and soil loss. The scheme is aimed at controlling natural resource exploitation, especially mining and construction projects in fragile ecological areas. The main activities to be controlled include excavation, backfilling and earthworks with a potential for water and soil loss. A project owner, unit or individual, engaging in a construction project has responsibility to prepare a water and soil conservation scheme and submit it to the appropriate authority for examination and approval.

6.3.6.2 Classification of a water and soil conservation scheme

Production and construction projects and activities involving development and utilization of natural resources which have the potential to harm the environment shall be subject to water and soil conservation measures. Large-scale projects with a potentially high degree of harm shall be subjected to rigid water and soil conservation standards, while small-scale projects with lower potential for harm will be subject to lesser standards. In this regard, water and soil conservation schemes would be categorized according to size and scale and potential for water and soil loss. Where construction projects are large in scale, with a higher potential for serious harm and therefore a need for more sophisticated controls, the project owner, unit or individual will be required to prepare a detailed environmental report that includes a comprehensive water and soil conservation plan. For small-scale projects, the project owner, unit or individual would still prepare a report that included all planning and design aspects of the project including the water and soil conservation measures.

6.3.6.3 Inclusions in a water and soil conservation scheme

A water and soil conservation scheme should include information on site selection, scale and potential environmental impact. It should predict the potential harm from water and soil loss, define any likely environmental problems and confirm the targets for control. Other aspects should include design of prevention measures to manage potential environmental harm, provide for emergency situations and outline financing arrangements for monitoring.

6.3.6.4 Agent for preparing the water and soil conservation scheme

A water and soil conservation scheme would usually be prepared by the construction owner or individual. However, where a detailed water and soil conservation scheme is required, with higher standards and specialized works, it should be prepared by a qualified authorized agent on behalf of the proponents. Any professional institution engaged to prepare a water and soil conservation scheme should be accredited (qualified and certified) by the requisite authority by law and prepare the scheme according to the standards specified in a qualification certificate. In preparing a water

and soil conservation scheme, the principle of public participation should be strictly followed. In particular, the scheme should be fully appraised by the appropriate government unit, specified experts and the public, and fully demonstrate the feasibility of the scheme.

6.3.6.5 Enforcing a water and soil conservation scheme

An approved water and soil conservation scheme is a prerequisite to commencement of construction by an owner under the law, and conditions of approval must be adhered to. Should it be necessary for any aspect of a scheme to be changed, then it will be subject to a new approval. Under the circumstances, where an owner commences without initial approval, or changes any aspect of the approved scheme without prior approval, this constitutes an offence and the owner should be punished by law, including administrative, criminal and civil liabilities.

6.4 Improving policies for the prevention and control of LD in dryland PRC

As outlined in Chapter 5, the PRC has made significant progress in the development and implementation of policy on the prevention and control of LD in the dryland region. The type and extent of policy development has been a stimulus for broadening the role of policy, *per se*, in LD control in the PRC, but it also has provided substantial information on the practicalities of LD, and guidelines and criteria for further policy development by the relevant administrative agents. However, there is still room for improvement in the following areas.

6.4.1 Role of science in LD policy

Sustainable development is the ultimate societal goal and includes five key areas: general urban and rural development planning; regional development; development of the economy and society; harmonious development of humans and nature; and domestic development. The IEM concept should be applied in the development of the economy, society and humans as an integrated whole. The Legal and Policy Component of the Capacity Building Project has shown that IEM is compatible with the objective of “general planning for harmonious development of humans and nature”, as a scientific development concept. It confirms that a scientific approach is an important aspect of sustainable development in terms of policy reform and is significant as a guide to policy development to prevent and control LD. Policy should be compatible with the scientific concept of IEM. The scientific concept should form the basis of economic construction in conjunction with the harmonious development of society and the economy, and scientific standards would be a part of modern industrialization, characterized by environmentally friendly technology, favourable economic benefits, reduced resource consumption, reduced environmental pollution and full development of human resources. Scientific development emphasizes sustainable development in a manner that requires a reconciliation of economic construction, population increase and use of resources with environmental protection with the social objectives of sustainable production, adequate livelihoods, food security and a healthy environment. Attention should focus on the sustainable use of resources and the environment with increased capacity for the long-term sustainable development of the PRC.

6.4.2 Strengthening coordination between policy areas

The objective of policy making under the IEM approach will be strengthened by improving coordination between different policy areas. Policies for economic development and poverty support in Western PRC will be integrated by introducing a market mechanism for LD prevention and control. Improved coordination of environmental protection policies in forest utilization, grassland and water resources is necessary to sustain these limited natural resources. Policy coordination will also be improved to prevent, eliminate or minimize environmental pollution and damage from development of natural resources.

6.4.3 Strengthening the continuity of policy

In general, policy is subject to on-going development and review, with regular reform, to ensure it meets the needs of society, including its timeliness and practicality for LD control. For example, once the policy to rehabilitate farmland to forest and grassland in Western PRC is implemented the related compensation policy should then be introduced to ensure woodland is properly managed and protected.

6.4.4 Policy objectives and market mechanisms

Policy makers will constantly review the performance of policies associated with prevention and control of LD against market economy conditions. Use of market mechanisms to mobilize public enthusiasm to participate in LD management represents the core value of the scientific concept, public participation and awareness. This will enable the financial limitations in LD control to be more effectively managed by removing a proportion of the financial burden from government. The use of the market mechanism as an essential instrument in LD control can help increase the income of agricultural and livestock farmers in Western PRC, by combining policies for poverty support with those for the prevention and control of LD.

7 International application of the legal and policy component of the capacity building project

Ian Hannam¹⁸³ and Du Qun¹⁸⁴

7.1 Introduction

Chapter 7 describes the contribution the Legal and Policy Component of the Capacity Building Project makes to the implementation and development of international environmental law and policy in the areas of ecosystem management, sustainable use of natural resources, and LD control and desertification management. Investigations have shown that legal aspects of LD have, in the past, generally been neglected at the international level and, in many of the world's regions, at the domestic level.¹⁸⁵ Chapter 2 pointed out that the PRC began to introduce comprehensive environmental laws in the 1980s when it became apparent that more specialized laws were needed to manage the ecological environment and LD.¹⁸⁶ However, because of the manner in which these early laws were developed, coupled with institutional inadequacies, they had become quite ineffective in controlling LD and managing land resources.¹⁸⁷ The realization of this situation, combined with assistance from international agencies, enabled the PRC to undertake the Legal and Policy Component of the Capacity Building Project, where, by the number of laws and regulations analyzed, the PRC Project greatly exceeds any other legal reform project for LD management in the world.¹⁸⁸ The global value of the PRC Project is regarded as manifold: through the knowledge and experience of the PRC Project the international community can cooperate more effectively in the prevention and control of LD; developing countries or countries in dryland ecosystems can draw from the experiences and lessons of the national legal reform in the PRC, to achieve national strategic goals set by international

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185 Hannam with Boer, *supra* note 25. Section 3 discusses national legal regimes for land degradation control and Section 4 outlines the current state of national legal frameworks for land degradation control; see also Boer, B.W. and Hannam, I.D. 2003. "Legal Aspects of Sustainable Soils: International and National". *Review of European Community and International Environmental Law (RECIEL)* 12(2):149-163.

186 ADB, *supra* note 76.

187 ADB, *supra* note 159.

188 Based on comparison between this project and other national environmental law investigations concerning soil and land degradation by the IUCN Commission on Environmental Law through its Specialist Group for Sustainable Use of Soils and Desertification.

environmental treaties and standards for LD control; and western countries which may have more advanced technology and economic capacity than the PRC can still learn from the experiences of the PRC Project as it provides a useful reference and benchmark in environmental law development.

7.1.1 Global application

The Legal and Policy Component of the Capacity Building Project provided the PRC an opportunity to understand and take action to improve the capability of its environmental laws, policies and institutional arrangements to manage LD in the dryland region. Many of the legislative tools, guidelines and procedures prepared under the Capacity Building Project (described in Chapters 4, 5 and 6) are transferable to other regions and countries with similar climatic, ecological and socio-economic characteristics to that of dryland PRC.¹⁸⁹ Despite the big challenges ahead for the PRC in the management of its natural resources, the legislative and policy reform programme for LD control outlined in this paper is not only of major significance to the PRC but to the world. The depth and diversity of the PRC project goes beyond any other integrated environmental law assessment programme for LD control attempted in the world to date.¹⁹⁰ In this regard, the knowledge gained and lessons learned from this project can be utilized to help expand the foundations of an international front against LD. Currently, many important strategies and actions on global land utilization and management advocate and employ an IEM approach to realize the goals of sustainable natural resource management and reducing poverty. Through the Legal and Policy Component of the Capacity Building Project, the IEM approach placed emphasis on integrated management of natural and living resources such as land, water and biodiversity, and promoted a fair and equitable manner with regard to natural resource conservation and sustainable utilization. In particular, the Project considered ecological, social and natural resource values within the decision-making process and for legal, regulation and policy reform. This participative approach introduced key officials and decision makers to the knowledge and methods of ecological conservation, and additionally, it promoted a democratic and legal consciousness to the public in natural resource management, especially through the training and promotional activities of the Capacity Building Project.

The legislative and practical experiences of the Project make a useful contribution to the objectives of many international environmental law reform initiatives and strategies for developing countries with LD and desertification problems,¹⁹¹ but they are also of considerable value to more technologically advanced economies and the method used in the PRC project could be adopted to examine environmental law, policy and institutional systems in any State.¹⁹²

189 Millennium Ecosystem Assessment. 2005. *Ecosystems and Human Well-being: Desertification Synthesis*. Washington (DC), USA: World Resources Institute. Appendix A, p. 23, states that drylands comprise 41.3 percent of global terrestrial area and drylands are home to 34.7 percent of the global population.

190 Under the nine law areas, the Capacity Building Project examined over 200 individual laws, regulations and policies relevant to ecosystem management, land degradation and desertification.

191 Hannam with Boer, *supra* note 25. Section IV describes national legal and institutional frameworks of many countries.

192 E.g., Commission of the European Communities 2006/0086, Directive of the European Parliament and of the Council establishing a framework for the protection of soil and amending Directive 2004/35/EC; Hurni and Meyer, *supra* note 77, at p. 26, "The need for national soil policies and legislation"; Adeel, Z. *et al.*, 2007.

7.2 Significant outcomes of the PRC project for other countries

The key aspects of the Legal and Policy Component of the PRC Capacity Building Project relevant to international environmental law implementation and development include:

1. The approach and methodology: including the use of IEM; role of expert teams of legislative and policy officials; method and steps used to develop the legal and policy framework; measuring capacity, capacity building; a model approach;
2. Influence on international environmental law and policy strategy: including the Montevideo Programme III; World Soils Agenda; various multilateral treaties and conventions; the WSSD Plan of Implementation; IUCN ELP; UNEP Strategy on Land Use Management and Soil Conservation.

7.2.1 Approach and methodology

7.2.1.1 The IEM approach

The role of IEM in the Legal and Policy Component of the Capacity Building Project was explained in Chapters 1 and 4. The use of the IEM approach as a key strategy and action for land-use management is advocated by numerous global environmental strategies where the ultimate mandate is to contribute to sustainable development and poverty reduction by focusing on specific environmental dimensions.¹⁹³ The ecosystem approach focuses on the integrated management of land, water and living resources and promotes conservation and sustainable use of natural resources in an equitable way. The Legal and Policy Component effectively showed how laws and regulations reflect aspects of land-use management in a functional, cross-sector and integrative manner underlining the ecological and sociological functioning of land resources. Through the use of the IEM approach, the Legal and Policy Component made direct links between environmental issues associated with LD, sustainable development and poverty reduction in the PRC's western dryland area. Moreover, the implementation of the IEM approach as the dominant underlying parameter in the assessment of laws, regulations and policy, by using the 12 IEM Principles advocated by the IUCN as part of the standard assessment procedure, proved very effective in detecting gaps and weaknesses in the laws, regulations and policies. In turn, these were used by the provinces and regions to prepare their recommendations for legislative and policy reform.

7.2.1.1.1 Value of the method as a learning experience for other countries

The assessment method was adopted from the legislative experience in Asian and European countries concerning sustainable management of water and land resources, and then considered the principal requirements of ecosystem management as developed by the process of the CBD. The method was adopted to examine the capacity of the PRC legislation by the PRC and foreign

Overcoming One of the Greatest Environmental Challenges of our Times: Re-thinking Policies to Cope with Desertification. Hamilton, Ontario, Canada: United Nations University. See Section 7 "Connecting Policies for Desertification, Climate Change and Biodiversity Loss"; Chalifour *et al.*, *supra* note 6.

193 Hannam with Boer, *supra* note 25, Section II, 8, p. 17, an ecosystem-based approach. Also UNEP. 2004. *UNEP's Strategy on Land Use Management and Soil Conservation, A Strengthened Functional Approach.* UNEP Policy Series. Nairobi, Kenya: UNEP, which promotes the ecosystem approach for land-use management (see p. 18, Box 5 and Graphic 8).

experts after many discussions and consideration of ecological conditions in the western region of the PRC, as well as the PRC legal tradition. It proves that the development of the assessment methodology and criteria themselves, which involved many legal specialists and legislative officials at the provincial and autonomous region level, is a valuable process of capacity building that enables the legal specialists and legislative officials at these levels to actively apply their knowledge and skills about ecosystem management and ecological conservation and carry out the project tasks smoothly. From the perspective of a legal study technique, the innovation of the capacity analysis criteria and method employed in the Legal and Policy Component of the Capacity Building Project is examined as follows:

- In the circumstance where the comprehensive substantive law (national law or local regulations) on LD control is absent, the PRC Project did not dogmatically propose to formulate a special substantive law, but instead applied a comprehensive framework of nine special legislative areas including law for water pollution control, water resource conservation, water and soil conservation, wildlife conservation, environmental protection, agriculture, grassland and desertification control;
- The criteria and method of legal assessment has been adapted from international and national experience to accommodate the PRC western region elements;
- The adoption and operation of legal and ecological criteria and the method of legal assessment discarded the traditional legal and policy assessment approach of focusing only on qualitative analysis, and explored a new way of legal and policy capacity evaluation, which incorporated quantitative analysis in legal research (e.g., the 20 essential legal elements and their content which demonstrated the requirements of natural resource sustainable utilization and integrated management were established to assess whether laws or statutory provisions, administrative measures and technical methods of a legal system in a special field attain such capacity).¹⁹⁴

The experience of the Legal and Policy Component shows that the method of choosing basic or core legal elements, which reflect the requirement of legal reform, to assess and analyze can also be applied to other countries that are in need of such reform of environmental and resource law and policy. The Legal and Policy Component showed that the basic legal elements serve as fundamental components of any law and system (as legal principles, rules of conduct and entitlements for a certain special legal objective) and therefore they can be used by other legal systems or jurisdictions around the world. Furthermore, from the aspect of legislative technique, these legal elements, solely or with other legal elements, can be used in a law or several special laws in a legal field, thereby promoting the development of LD control. The method of essential legal element analysis applied two fundamental functions in the PRC Project: first, to assess whether current law or regulations have the capacity to control LD, then, based on such assessment to decide whether to formulate other legal elements to supplement the capacity if needed; and second, using the guidance of the legal elements and the requirements of ecosystem management, to reform current law or formulate new law and regulations for LD control.

194 See the six provincial legal and policy framework reports and the central legal report.

These lessons, obtained from applying the IEM approach in this Project, provide a useful model for other countries as they show that the complex and dynamic nature of ecosystems can be effectively understood when all aspects of the environment are considered within the context of a legal system. The Project experiences also improved the understanding of ecosystem functioning as well as providing useful knowledge and suggestions for a variety of conservation approaches, societal choices and management practices between the local, provincial and national levels. The operation of IEM foresees the implementation of all principles of the ecosystem approach together and can be adapted to a wide variety of ecological, sociological and economic situations and conditions.¹⁹⁵

7.2.1.2 Specialist legal and policy expert advisory groups and investigation teams

The legal and policy expert advisory groups and legal and policy expert investigation teams established at central level and in each province and autonomous region were the leading force of all parties in the implementation of the Legal and Policy Component. This practice proved successful in terms of environmental law reform and is a useful reference for other countries with similar needs in legal capacity building. Members of the expert advisory groups were experienced officials and researchers from land-related departments and they provided advice and suggestions to the expert investigations teams. Members of the expert advisory group were legislators from provincial governments and the People's Congress, or professors from universities. In some circumstances, a member of an expert group came from the private sector such as a law firm. The duties of the legal expert groups were: to provide overall guidance and ensure consistency in the implementation of the Legal and Policy Component; to select laws and policy documents on LD control; to prepare expert statements on legal and policy reform; to submit final advice to the relevant provincial or autonomous decision-making body after negotiating with the expert legal and policy investigation teams, government officials and other experts; and to undertake the training in legal and policy reform.

The central, provincial and regional legal and policy investigation teams established under the Capacity Building Project is a major success story of the Project and provides other countries with useful experiences they could consider in designing an approach to environmental law reform. The teams managed all tasks associated with the selection and assessment of legal and policy materials, prepared interpretative information, and consulted with government officials and specialist groups to prepare recommendations for the provincial and regional legal and policy frameworks. The teams included members of government agencies with responsibilities from the nine law areas examined, as well as leading academic legal experts. In some cases legal expertise was drawn from the private sector.¹⁹⁶ The teams worked in parallel in selecting, analyzing and assessing provincial laws and regulations, and in developing the six provincial and regional legal and policy frameworks.

195 UNEP, *supra* note 193, Graphic 8 summarizes elements and rationale of the Ecosystem Approach, including ecosystem functional relationships, management practices, management systems, sustainable outcomes, societal choices and the operational regime; also CBD Subsidiary Body on Scientific, Technical and Technological Advice, Ecosystem Approach Annex 1, *supra* note 9.

196 The six teams were formed in the early part of the Project and although there were some changes in membership they generally remained intact for the duration of the Project.

Joint field investigations were made with scientists and ecologists from other Components of the Capacity Building Project to discuss technical aspects of LD and desertification before making final recommendations.

The working mechanism of the legal and policy investigation teams is consistent with the general requirements of IEM. Firstly, each made a comprehensive assessment of the laws and policies; secondly, they liaised with communities and rural people and with scientific experts and conducted field studies to determine concrete issues concerning LD and its solutions; and thirdly, they put forward proposals to improve the provincial and autonomous regional law and policy framework.

Experiences from the PRC law and policy investigation team approach have since been used in other international environmental law reform projects funded by GEF, World Bank, UNEP and UNDP.¹⁹⁷

7.2.1.3 Analytical method

The IEM-based method used for the legislative analysis in the Legal and Policy Component was based on the method developed from a worldwide investigation of environmental laws associated with sustainable land management and LD and applied in various jurisdictions in Asia and Europe.¹⁹⁸ Lessons from the Capacity Building Project indicate that the basis of the methodology, being the 17 “core” legal elements, is suitable for use by other States undertaking environmental law reform, with appropriate adaptation to their national legal structure.¹⁹⁹ Because the 17 elements are basic essential components found in many natural resource legal and institutional systems (in the form of a principle, rule of conduct or a power to achieve a particular legal purpose), they have worldwide application. The Legal and Policy Component shows they can be used singly, or in combination with other elements, to promote actions for LD control. It also shows that individual laws include many elements in a format that gives an organization (or organizational system) the power it needs through its executive responsibilities to control LD. As has been effectively shown in the PRC, these elements may be distributed among a number of individual laws, rules and regulations in a legal system.²⁰⁰ The 19 core “essential legal elements” used in the PRC Project were developed from an evaluation of legal and ecological principles aimed at achieving a desired standard of performance in sustainable land management for the PRC.²⁰¹ In this regard, the “legal elements” approach used in the PRC Project could be used by other countries, in at least two roles, including:

197 The close working relationship between the PRC environmental lawyers and environmental lawyers of the IUCN Commission on Environmental Law Specialist Group for Sustainable Use of Soils and Desertification enabled information on the PRC Project to pass quickly around the international environmental law network.

198 Hannam, *supra* note 24; the method applied in the PRC study was based on methodology applied in the study conducted for the International Water Management Institute.

199 E.g., the method was used in UNDP Project “Strengthening Environmental Governance in Mongolia”; see Hannam, I.D. 2008. *Methodological Framework and Guidelines for Assessing the Capacity of Legal and Policy Aspects of Sustainable Management in Mongolia*. Mongolia: UNDP.

200 The 19 elements used in the Capacity Building Project were applied to over 200 provincial, regional and central laws and regulations, which comprised the “legal system” for LD.

201 Hannam and Boer, *supra* note 32, Section I, 2.2, pp. 6–10.

- To assess *the capacity* of an existing law or regulation to meet prescribed standards of performance for LD control, and depending on the assessed capacity of the law to achieve these standards, additional elements may be formulated.
- To *guide the reform* of an existing law, or to develop new legislation for LD control. Each legal element must have the capacity to achieve a prescribed level of ecological management or standard for land management.

7.2.1.4 Measuring the capacity of the legal and policy framework

A main objective of the Legal and Policy Component of the Capacity Building Project, which is useful for other States, is the measurement of the *capacity* of central, provincial and regional level laws and regulations to manage LD and desertification. *Capacity* is determined by the number and type of essential legal elements present within relevant laws and legal instruments, in a format that enables the sustainable use of natural resources to be identified, and with the legal, administrative and technical capability within the particular instrument to take some form of positive action.²⁰² As found in the PRC Project, in some instances, *capacity* is direct and obvious, but, in other instances, it exists in a format that enables some form of indirect action (e.g., as discussed in Chapter 6).²⁰³ *Capacity* is represented in the form of legal rights, type of legal mechanisms and, importantly, the number and comprehensiveness of the essential elements is discussed.²⁰⁴ The discussion in Chapters 5 and 6 confirms that land management issues are multi-factorial (i.e., many include a sociological, a legal and a technical component) which means that other countries would also have to examine many environmental laws and regulations to effectively determine their role in managing LD issues. Moreover, the Legal and Policy Component proved that many types of legal and institutional elements and mechanisms are required to manage LD, further reinforcing the necessity for any State to analyze environmental laws from all jurisdictions in order to properly identify the current management regimes and their interactions. The information generated by the Legal and Policy Component analysis proved to be a confident guide to the type of legislative and institutional elements necessary to include within the overall legislative regime to control and manage LD.²⁰⁵

7.2.1.4.1 A legal and institutional system

The Legal and Policy Component showed that a complex legal and institutional system and organizational and operational regime for the control of LD can be reliably examined and the weaknesses in that system and its capability to control LD and implement management measures can be competently determined. The confirmation that several organizations have a role to play in LD control and that some would need to be partly or wholly reorganized to effectively administer their legal and institutional responsibilities in the control of LD is useful knowledge for other countries when planning reform.²⁰⁶

202 Hannam, *supra* note 24; Boer and Hannam, 2003, *supra* note 185, at p. 155.

203 See provincial legal and policy framework reports and the report on central-level laws.

204 Boer and Hannam, 2003, *supra* note 185, at p. 155.

205 *Ibid.*

206 Hannam with Boer, *supra* note 25, see Section 4 for examples where legislation has been used to establish specific organizations for LD control.

7.2.1.4.2 *Establishing the profile of a legislative system*

The PRC legal and policy investigation effectively showed that an individual State can adopt a variety of approaches to frame domestic legislation. Comprehensive procedures for land management can be integrated into broader legislation that sets out responsibilities to protect and manage the environment, e.g., forests, water, biodiversity, desertification, land management and land administration.²⁰⁷ The approach used by the PRC was applied according to the specific administrative and procedural legislative standards of the PRC to protect and manage land, water, grasslands, biodiversity, and wetland resources. Based on the PRC experience, other States could also consider a similar approach to identify the specific characteristics of the administrative, institutional and legislative systems, and apply it as a basis to frame specialized legislation, address environmental management matters, or assist the process of integrating legislative elements for land management within an existing environmental law, or frame a new environmental law.

7.2.1.4.3 *Reform program and priorities*

The main outcome of the Legal and Policy Component was a report for legislative reform prepared by each of the six provinces and regions – *Report on the Assessment of Regulations, Policies and Institutional Capacity for Land Degradation*.²⁰⁸ They discuss the status of current laws, regulations, policies, and institutional capacity building for LD control. For the benefit of other states, the following specific items taken from the PRC Reports could be considered a useful structure when deciding an environmental law reform programme:

- Legislative area – the legislative system for IEM and LD control; legal and regulatory framework of IEM and LD control at State, provincial and local levels; measures used for IEM and LD control; legal framework for rural land-use rights; deficient elements, inconsistent interpretations, contradictory clauses in laws and regulations; gaps in legislation; impediments to implementation; judicial safeguards;
- Policy area – policies for IEM and LD control; economic development policies and priorities for ecological construction; policies for biodiversity protection; policies on production and development of agriculture and forestry; policies for crop safety and poverty relief; inadequacies in present policies; coordination between policy and regulations; reasonableness, justice and efficiency;

207 In the practical sense, the types of legislation that may fall within the parameters of “land degradation control legislation” will often have a direct role and relationship with the management and use of agricultural land or “agrarian land”. Agrarian land (as outlined in the Introduction, p.xiii, to Grossman, M.R. and Brussaard, W. 1992. *Agrarian Land Law in the Western World*. Wallingford, UK: C.A.B International) “forms an important component of the world’s land surface, and in many nations, agricultural, forestry, and other rural uses occupy a majority of the area. The agrarian land provides the basic resource for cultivating the food and fibre products essential for humankind. But in addition, agrarian land is valued for its open space, for its contribution to the natural environment, and for its conservation, landscape, and aesthetic values”. Law that falls within the concept of “land degradation control legislation”, as presented in the PRC Capacity Building Project, plays an important role in the allocation and use of agrarian land and it is expected that there will be many instances where other countries might consider the role and benefits of “land degradation control legislation” in this context.

208 E.g., Gansu PRC-GEF Project Coordination Office, 2008, *Report on the Assessment of Regulations, Policies and Institutional Capacity for Land Degradation in Gansu Province*, PRC-GEF Partnership on Land Degradation in Dryland Ecosystems.

- Institutional area – functions and responsibilities of institutions involved in LD control and IEM; functions and responsibilities of government institutions at city, county, township level; functions and responsibilities of ministries, commissions and central government in LD control and IEM; coordination mechanisms; functions and responsibilities of research institutions and universities; functions and responsibilities of private enterprise and non-government institutions; functions and responsibilities of community/rural organizations; capabilities, limitations and deficiencies of the institutional environment.

7.2.1.5 Capacity building experiences for law, policies and institutions

One of the main objectives of the Capacity Building Project was to improve the skills and capabilities of the provincial and regional legal and policy investigation teams in developing and applying the method to identify, categorize, interpret and present results of the analytical procedure for legal, policy and institutional information. In carrying out these tasks, the legal and policy experts developed experience in the following areas:

7.2.1.5.1 Legal experience – identifying relevant legislation; implementation of legislation; identifying judicial safeguards; developing reform programmes and prioritizing activities to improve legislation for LD control; preparing detailed provincial and regional legal and policy frameworks for long-term reform;

7.2.1.5.2 Policy experience – identifying coordination mechanisms between policies, laws and regulations; identifying rationality, fairness and efficiency in policy materials; identifying adherence to democratic and scientific processes and decision-making procedures; introducing reform using the IEM concept; examining market mechanisms; education and awareness of environmental knowledge; law building as a fundamental guarantee for policy; prioritizing activities to improve policy for LD control;

7.2.1.5.3 Institutional experience – collective experience of institutions; identifying institutional responsibilities and tasks; experience in procedural guarantee of institutional participation; experience in institutional coordination; understanding implementation; prioritizing activities to improve capacity building of institutions with responsibilities in LD control.

7.2.1.6 Capacity building activities

The identification of administrative structures, competence of organizations and administrative operations was one of the core tasks of the Legal and Policy Component of the Capacity Building Project in developing and understanding of institutional capacity for LD control. In this regard, the series of capacity-building activities under the Project made a substantial contribution. The following experiences, which the PRC regards as necessary to carry forward in its LD control, provide a useful reference for other countries to deal with LD, issues that are of common and global concern.

7.2.1.6.1 A cooperative and coordinative inter-departmental management mechanism was set up to implement the PRC Project

The inter-departmental project steering committee and project offices consisted of all departments related to LD at both central government and provincial and autonomous government level. Its duties were to take charge of management coordination and unified decision making among departments

for Project activities. This model of project management is effective and can be generalized and adopted in daily management.

7.2.1.6.2 River basin management was put forward in legislation and management practice

Some of the provinces and autonomous regions established a specific local law and institutional structure for integrated river basin management.²⁰⁹

7.2.1.6.3 Legal and policy framework addressed comprehensive institutional management

As an important part of the legal and policy assessment procedure, each province and autonomous region examined the performance of current institutional management, and proposed legal countermeasures and policy suggestions for capacity strengthening.

7.2.1.7 Exploration of the PRC approach to accommodate IEM into the legal framework

The following observations were made that are useful for other countries to take note of:

7.2.1.7.1 Build a unified legislative framework on LD control in accordance with the PRC's reality

The effective implementation of IEM relies on the use of a diversity of mechanisms and systems to manage land and water resources and this requires establishing a unified and coordinated legal and policy framework at various jurisdictional levels. The Legal and Policy Component of the Capacity Building Project maintains that a country could establish and strengthen its legal and policy framework by adopting various approaches including formulating a comprehensive law or local regulation on LD control, building a unified cluster of laws on LD control which consists of the laws on forestry, water, biodiversity, desertification, land utilization and land management. In the case of the PRC Project, the PRC adopted the approach of building a cluster of laws to address LD control issues, through which legal and policy assessment and countermeasures were taken into account, as an alternative to adopting a comprehensive law or regulation specifically for LD control. To use a special cluster of laws, as against one special law on LD, is an open and flexible approach that was proposed by the legal and policy expert advisory group to address all concerned issues by using legal norms. The special cluster of laws comprises specific laws and regulations on land, water, grassland, bio-diversity, and agricultural resources and has the capability to express the complexity of IEM issues through the 19 core "essential legal elements". This approach corresponds with the PRC's legislative reality, and effectively facilitates the improvement and innovation of the existing legal and policy framework, where, when and if the time is appropriate, a special law for LD control could be formulated. The reasons behind this approach are a useful reference point for other countries.

7.2.1.7.2 Formulate a legal and policy reform plan to prioritize reform objectives

One of the important outcomes from the Legal and Policy Component of the Capacity Building Project was that each province and autonomous region formulated a reform plan on law and policy to address LD issues on the basis of a detailed investigation, analysis and assessment process. The reform plan is a comprehensive report, enriched with priorities and objectives for legal, policy

209 Under the support of the Project, the Standing Committee of the People's Congress of Gansu Province adopted the *Regulations for Water Resources Management of Shiyang River Basin in Gansu Province*, where a river basin management mechanism, the Shiyang River Basin Management Bureau, is being established.

and institutional reform in the province and autonomous region for the future. The legal, policy and institutional reform plans developed by the six provinces and autonomous regions outline legal priorities and policy ideas that tackle many issues on natural resource management that are common in other developing countries. Various aspects of these plans can be a reference point for other countries to carry out natural resource management reforms.

- Legal reform: enhance the harmonious and unified legislative framework on LD control at national, provincial and autonomous region level; introduce or improve legal measures which meet the requirement of IEM; strengthen legislation on a user's right to rural land; overcome legislative conflict and overlap; improve the implementation and enforcement of law; and promote the judicial role in this field;
- Policy reform: introduce or improve policies on LD control in accordance with IEM; balance economic development with ecological conservation; improve policies on biodiversity, agriculture and forest conservation; enhance policies on food security and poverty relief; coordinate policies and local regulations; enhance rationality, justice and efficiency of policy;
- Institutional reform: improve institutional duties of cooperation and coordination among various departments on LD control; strengthen governmental responsibilities at city, town and rural area level; improve the responsibility and duties of an inter-departmental organ and a coordinative mechanism between governmental departments and the private sector; enhance the position, function and duties of river basin management bureaus; improve the function and responsibilities of research institutes, universities, private enterprise, NGOs as well as communities and rural organizations.

7.2.1.8 Adaptability by other states – a model approach

The specific lessons learned and benefits gained from the Legal and Policy Component of the Capacity Building Project provide a useful model for other countries to consider as an approach to evaluate laws, policies and institutional aspects and develop a legal and institutional framework to manage LD,²¹⁰ and the following steps are proposed as a guide.²¹¹

7.2.1.8.1 Step 1. Preliminary

- Identify key issues of LD.
- Identify institutions relevant to LD control.
- Identify environmental law relevant to LD control at all levels and jurisdictions.

210 E.g., the approach and method developed to implement the legal component of the UNEP “Sustainable Land Management in the High Pamir-Alai Mountains” Project (Kyrgyzstan and Tajikistan, Central Asia) and to assess the environmental laws of Mongolia were based on the method developed for the Legal and Policy Component of the PRC Capacity Building Project.

211 Modified from the outline presented in Hannam, *supra* note 24.

7.2.1.8.2 Step 2. Analysis

- Analyze and interpret environmental law within an internationally accepted legal and institutional standard for land management.²¹²
- For legislation in each group: (i) identify specific articles, principles or clauses relevant to LD control; and (ii) categorize relevant articles and clauses according to which of the essential elements they satisfy.
- Determine the legal and institutional profile at each level; includes the presence or absence of elements and a determination of the most represented elements and the least represented elements for each particular instrument.

7.2.1.8.3 Step 3. Discussion, results, outcomes

- Determine the specific characteristics of the legal and institutional profiles, summaries and patterns.
- Determine the capacity of the legal and institutional system.
- Document the principal characteristics, strengths and weaknesses of individual laws and instruments at all levels.
- Prepare recommendations for reform of policy and prepare land management guidelines.
- Identify areas for legislative and institutional improvement and make suggestions for legal and institutional reform to improve sustainable use.

7.3 Contribution to international environmental law strategy

The Legal and Policy Component of the Capacity Building Project has contributed considerable knowledge to several aspects of international environmental law and policy to manage LD and a number of specific international environmental law initiatives have benefited from the PRC Project.

7.3.1 The Montevideo Programme III

The Montevideo Programme III – the Programme for the Development and Periodic Review of Environmental Law for the First Decade of the Twenty-First Century was adopted by the UNEP Governing Council in February 2001.²¹³ Of relevance to LD control, the Montevideo Programme includes specific objectives for *Soils* (Objective 12), *Forests* (Objective 13), *Biodiversity* (Objective 14) and *Pollution prevention and control* (Objective 15), which form part of the Strategic Environmental Law Programme. The Montevideo Programme provides for the development of international agreements, international guidelines, principles and standards, and for development of capacity to formulate and implement these actions. In this context, the Legal and Policy Component of the PRC

212 This “standard” refers to the basic legal and institutional elements considered as essential to include within the structure of an individual instrument for its effective implementation within a jurisdiction to achieve LD control.

213 Decision 21/23 UNEP Governing Council, February 2001; overall the Programme includes 20 components, organized under three major themes: Effectiveness of Environmental Law, Conservation and Management, and Relationship with Other Fields.

Capacity Building Project made a significant contribution to the general aims of the Montevideo Programme, in particular its actions to:

- Improve the effectiveness of environmental law for LD control.
- Improve the conservation and management of ecosystems in dryland areas (objectives for Soils, Forests, Biodiversity, Pollution Prevention and Control).
- Forge better links between the environmental laws for soils, forests, biodiversity, wetlands, nature reserves, agriculture, grasslands, land, water and environmental management.

7.3.1.1 Programme areas

Various programme areas of the Montevideo Programme, together with their objectives, strategies and actions, provide a useful list of elements to compare against the outcomes of the PRC Legal and Policy Component. The Montevideo Programme advocates that UNEP, in accordance with its catalytic role, will take action in these areas in coordination with States, Conferences of the Parties and MEA Secretariats, other international organizations, non-State actors and persons. Moreover, many outcomes of the Legal and Policy Component make a direct contribution to these programmes as follows:²¹⁴

7.3.1.1.1 Effectiveness of environmental law programme:²¹⁵ where the objective is to achieve effective implementation of, compliance with, and enforcement of environmental law and the strategy is to promote the effective implementation of environmental law through, inter alia, the widest possible participation in multilateral environmental agreements and the development of relevant strategies, mechanisms and national laws.

The following specific actions of programme area I-1, “Effectiveness of Environmental Law: Implementation” were experienced in the Legal and Policy Component of the Capacity Building Project:

- Commenting on compliance with international environmental law;
- Investigating the effectiveness of domestic environmental law;
- Identifying the effective means to address major constraints in implementing environmental law for LD control;
- Results of assistance being supplied to Capacity Building Project in:
 - Establishing and strengthening its domestic law to improve compliance with international environmental standards and enforcement of such obligations through domestic law;²¹⁶

214 Interpretation of programme areas is made with regard to the way the Legal and Policy Component of the Capacity Building Project was implemented, and its outcomes and findings.

215 UNEP. 2001. *Montevideo Programme III*, programme area I-1, “Effectiveness of Environmental Law: Implementation, compliance and enforcement”, Actions (a)–(k).

216 Method of analysis developed for Legal and Policy Component of Capacity Building Project considered the objectives of international environmental law relevant to LD control.

- Developing environmental action plans and strategies to assist in the implementation of international environmental obligations;
- Developing advice to competent national authorities, model laws and guidance materials to implement international environmental standards;
- Preparing comparative analyses of compliance mechanisms, including reporting and verification mechanisms;
- Promoting ways to implement international environmental law standards;
- Promoting the use of civil liability mechanisms;
- Evaluating and promoting the wider use of criminal and administrative law in the enforcement of domestic environmental laws and standards;
- Exploring options for advancing the effective involvement of non-State actors in promoting implementation of, and compliance with, environmental law and its enforcement at the domestic level.

7.3.1.1.2 Capacity-building programme:²¹⁷ where the objective is to strengthen the regulatory and institutional capacity of developing countries, in particular, the least developed and small island developing States, and countries with economies in transition, to develop and implement environmental law, and the strategy is to provide appropriate technical assistance, education and training to those concerned, based on assessment of needs.

Specific actions undertaken by the Legal and Policy Component in relation to this programme include:

- Assisting the development and strengthening of domestic environmental legislation, regulations, procedures and institutions;
- Arranging seminars and workshops for government officials, the judiciary, the legal profession and others concerned, on environmental law and policy, including the implementation of international environmental instruments;²¹⁸
- Providing training and support related to environmental law and tools of capacity building;
- Promoting the teaching of domestic, international and comparative environmental law in universities and law schools, and developing teaching materials;
- Collaborating with governments and relevant international bodies in facilitating educational programmes in environmental law at the provincial and national levels;

²¹⁷ *Montevideo Programme III, supra* note 213, programme area I-2, “Capacity building”, Actions (a)–(g).

²¹⁸ Training manuals developed by the Legal and Policy Component of the Capacity Building Project discuss the role of various international environmental law instruments in improving the PRC national, provincial and local laws and regulations.

- Strengthening coordination among international organizations and institutions, including those that provide financing, on educational projects and programmes related to environmental law, its implementation and enforcement and the underlying causes of environmental damage.²¹⁹

7.3.1.1.3 Harmonization and coordination programme: ²²⁰ where the objective is to promote, where appropriate, harmonized approaches to the development and implementation of environmental law and encourage coordination of relevant institutions, using a strategy that promotes domestic, regional and global actions towards the development and application of appropriate harmonized approaches to environmental law and encourage coherence and coordination of international environmental law and institutions.

Specific actions undertaken by the Legal and Policy Component in relation to programme area I-6, “Innovative approaches to environmental law” include:

- Improving environmental law standards;
- Promoting coherence between environmental law and other laws at the domestic level to ensure that they are mutually supportive and complementary;
- Studying the integrated environmental policy and governmental processes;
- Conducting studies on the legal aspects of, obstacles to and opportunities for consolidating and rationalizing the implementation of environmental laws, to avoid duplication of their work and functions;²²¹
- Improving ways of harmonizing and otherwise rationalizing the reporting obligations in environmental laws.

7.3.1.1.4 Innovative approaches to environmental law: ²²² where the objective is to improve the effectiveness of environmental law through the application of innovative approaches and the strategy is to identify and promote innovative approaches, tools and mechanisms that will improve the effectiveness of environmental law.

Specific actions undertaken by Legal and Policy Component in relation to this programme include:

- Assessing State practice in utilizing tools such as eco-labelling, certification, pollution fees, natural resource taxes and emissions trading and assist in the use of such tools;

219 During the implementation period of the Legal and Policy Component of the Capacity Building Project there were many meetings between project management and representatives of foreign donor organizations, the PRC institutions and organizations, to comment on the Project and to exchange information and experiences.

220 *Montevideo Programme III, supra* note 213, programme area I-6, “Harmonization and coordination”, Actions (a)–(c).

221 Capacity Building project called for improvements in the PRC’s ability to coordinate major LD control activities.

222 *Montevideo Programme III, supra* note 213, programme area I-9, “Innovative approaches to environmental law”, Actions (a)–(g).

- Promoting the development and assessing the effectiveness of voluntary codes of conduct and comparable initiatives that promote environmentally and socially responsible corporate and institutional behaviour to complement domestic law;²²³
- Encouraging consideration of the use of spokesmen for environmental values and concerns, including for the interests of future generations;
- Studying the contribution other fields of law can make to environmental protection and sustainable development;
- Enhancing, through studies, the relationship of indigenous and local communities embodying traditional lifestyles to the management and protection of the environment;²²⁴
- Promoting ecosystem management in law and practice, including the valuation of services provided by ecosystems, such as environmental benefits;
- Encouraging the development of legal and policy frameworks in ways that benefit the environment.

7.3.2 Implementation of the World Soils Agenda

The *World Soils Agenda* was introduced in 2002 and outlines nine principal agenda for sustainable land management. Many aspects of the Legal and Policy Component of the PRC Capacity Building Project are directly relevant to achieving the *World Soils Agenda*²²⁵ and make a significant contribution to the implementation of the nine agenda at a national, provincial and autonomous region level, in particular: *Agenda 6* in providing guidance to develop and implement national soil and water conservation policies; and *Agenda 9*, in providing guidance for national and local action, including reform of national laws and regulations for sustainable use of soil. The agenda were prepared using a wide range of international experience in all aspects of sustainable land management and are useful bases to evaluate and frame national legislation and policy for different types of natural resource management issues.²²⁶ The Legal and Policy Component successfully implemented many activities

223 The Legal and Policy Component of the Capacity Building Project calls for improvements in environmental law to eliminate corruption and administrative interference in decision making, where development interests are placed over environmental management interests.

224 The Legal and Policy Component of the Capacity Building Project called for improvement in the PRC's national and provincial environmental law and regulations to improve the economic and social situation of disadvantaged people.

225 Hurni and Meyer, *supra* note 77; Hannam, I.D. 2006. *Working Paper No 1: International Laws and Regulations for Soil and Water Conservation*, Implementation of the National Strategy for Soil and Water Conservation TA 4404, Report and Recommendations on Revising the 1991 Water and Soil Conservation Law of the People's Republic of China.

226 Hurni and Meyer, *ibid.*; see also Hurni, H., Giger, M. and Meyer, K. (eds.) 2006. *Soils on the Global Agenda. Developing international mechanisms for sustainable land management*, prepared with the support of an international group of specialists of the IASUS Working Group of the International Union of Soil Sciences (IUSS). Centre for Development and Environment, Bern.

from these agenda and the same approach could be adopted by other countries that have similar LD and sustainable management issues to the western dryland region of the PRC.²²⁷

7.3.2.1 Tasks for science, monitoring and evaluation

Agenda 1: Assessing the status and trends of soil degradation:

- Recommending that the PRC provincial laws and regulations be amended to ensure monitoring and evaluation procedures for LD and desertification;
- Improving the PRC legislation to ensure problems are based on scientific opinions and specialist opinions; improving the basis for technical work;
- Improving the research capabilities of the PRC legislative system.

Agenda 2: Defining impact indicators and tools for monitoring and evaluation:

- Recommending that the PRC legislation be improved to enable research agencies to develop indicators and install monitoring systems to enable assessment of all dimensions of ecological sustainability.

Agenda 3: Developing principles, technologies and approaches and enabling frameworks:

- Recommending that the PRC ministries and agencies with sustainable land management responsibilities have adequate legislative tools to implement sustainable land management;
- Recommending reform of the PRC provincial and regional legislation to enable research monitoring and evaluation and to develop and test sustainable technologies, their ecological, social and economic suitability, and institutional feasibility;
- Recommending that the PRC science and technology expert groups provide better guidance.

7.3.2.2 Tasks for policy

Agenda 4: Identifying a multidisciplinary network:

- Recommending that the PRC legislation be improved to raise awareness among policy makers on the need to develop integrated policy and institutional structures;
- Improving the PRC legislative mechanisms to obtain advice from multidisciplinary specialists and specialist institutions;
- Ensuring the PRC policy is compatible;
- Improving the use of networks and advisory panels.

Agenda 5: Establishing specialist panels:

- Recommending that the PRC expert panels decide on key issues of land management;
- Synthesizing relevant information at provincial and local levels;
- Providing information on the impacts of LD and desertification;
- Improving the PRC policy making at all levels to achieve sustainable land management.

²²⁷ Comments on each Agenda based on experience, outcome and lessons learned in the Legal and Policy Component of the Capacity Building Project.

Agenda 6: Providing guidance to develop and implement national integrated land management policies:

- Recommending development of integrated national sustainable land management policies in the PRC;
- Using special PRC task forces with multidisciplinary representation;
- Developing a stronger legislative basis for policy in the PRC.

7.3.2.3 Tasks for support of implementation

Agenda 7: Promoting initiatives for sustainable land management:

- Recommending the replacement of subsidies for agricultural practices in the PRC with payment systems compensating for additional investments or alternative sustainable production systems;
- Encouraging the PRC government agencies and private enterprise to invest in sustainable land management technologies and approaches;
- Replacing incentive-based conservation projects in the PRC with more economically focused investment programmes for sustainable agriculture;
- Targeting disadvantaged people in the PRC for assistance including poor farmers, herders, women, and minorities.

Agenda 8: Ensuring inclusion of sustainable land management issues in development programmes:

- Recommending that the PRC development agencies evaluate impacts of their programmes on natural resources;
- Including the PRC legislation in areas of watershed protection, mitigation of site impacts, biodiversity protection, and improvement of environmental education.

Agenda 9: Providing guidance for national and local action:

- Recommending that the PRC policies, projects and programmes be improved at local to national levels in all stages of implementation, planning, stakeholder involvement, field activities, monitoring and impact assessment;
- Improving backstopping for implementation;
- Improving the PRC national research institutes to provide expertise and capacity back-up.

7.3.3 Implementation of conventions

The Legal and Policy Component makes a significant contribution to the practical implementation of various multilateral environmental treaties that have a role in LD control and sustainable land management, in particular UNCCD, CBD and the Ramsar Convention. Each of the six provincial and regional legal and policy frameworks evaluates the objectives and key features of these conventions as regards their role in provincial and regional legislation and policy reform and propose actions to control LD and desertification. While it is regarded that each of the conventions has limitations

when it comes to protecting natural resources, they do have an important role in promoting the management of many activities that can control LD and desertification.²²⁸

7.3.3.1 UN Convention to Combat Desertification

The Legal and Policy Component determined that the following outcomes of the evaluation could be implemented to meet specific aspects of the UNCCD at the provincial and regional level:²²⁹

- Implement laws, regulations and policies stipulated by the State, formulate local decrees, special decrees, government regulations and policies with the actual desertification conditions of the province and autonomous region being included;
- Implement the PRC's State Strategy and Action Plan on Desertification Prevention, and integrate the Strategy and Action Plan into local plans for economic and social development and ecological protection;
- Compile and implement plans for desertification prevention;
- Develop and implement a monitoring system for desertification, conduct scientific research on prevention and control of desertification and introduce relevant desertification control technologies;
- Control the cutting of wind breaks and sand-fixing forests, and manage the closure of desertified land and protect the closed lands;
- Implement the *Environment Impact Assessment Law* for construction projects, particularly in sandy areas, and rationally utilize resources in the sand area;²³⁰
- Encourage public participation, safeguard legal interests and benefits of parties involved in management of sand areas, and implement tax preferences and credit support;
- Undertake publicity and educational activities, raise public awareness of the importance and necessity of preventing and controlling desertification.

These outcomes from the Legal and Policy Component put the PRC in a good position to meet its obligations to the 10 Year Strategy for the implementation of the UNCCD 2008–2018, as agreed at the 8th Conference of the Parties to the Convention in 2007.²³¹ It also enables the PRC to implement the objectives of the Secretariat of the Convention in relation to soil security, as part of the new process for the implementation of the UNCCD and improve the management of desertification, LD and drought.²³²

228 Boer and Hannam, 2003, *supra* note 185, pp. 152–154.

229 UNCCD 1995.

230 As provided in *Environmental Impact Assessment Law* 2003.

231 UNCCD COP8, 2007, Report of Conference of the Parties on its eighth session, ICCD/COP (8)/16/Add.1, 23 October 2007.

232 UNCCD Secretariat. 2009. *Securitizing the Ground, Grounding the Security*. Bonn, Germany: Secretariat of UN Convention to Combat Desertification. [Scientific Reviewers – Kalbermatten, G., Rubio, J.I., Huber-Sannwald, E., Arredondo Moreno, T., Montorio, M. and Zelaya, S.].

7.3.3.2 Convention on Biological Diversity

The Legal and Policy Component indicated that the following aspects of the CBD should be implemented at the provincial and regional level:²³³

- Implement laws, regulations and policies introduced by the State for protection of biological diversity, and formulate relevant local decrees, special decrees and government regulations and policies with the actual conditions of the provinces and autonomous regions taken into consideration;
- Implement the State Strategy and Action Plan for the Protection of Biological Diversity, and integrate the Strategy and Action Plan into local plans for the economy, social development and ecological protection;
- Identify and monitor the key components of biological diversity;
- Establish protection zones to protect biodiversity, and promote development in a way that is favourable for environmental protection;
- Cooperate with local citizens in the repair and restoration of ecosystems and promote the rehabilitation of endangered species;
- Control risks caused by live organisms transformed by modern biotechnology, and avoid invasion of foreign species that may endanger existing ecosystems, populations and species, and adopt measures to control and eradicate potential dangers;
- Encourage public participation in biodiversity activities, and evaluate the environmental impact caused by development projects that endanger biodiversity;
- Undertake publicity and education, and raise public awareness of the importance and necessity of biodiversity, and respect, protect and retain local citizens' traditional knowledge regarding biodiversity.

7.3.3.3 Convention on Wetlands of International Importance

The Legal and Policy Component indicated the following aspects of the Ramsar Convention should be implemented at the provincial and autonomous region level:²³⁴

- Implement the laws, regulations and policies stipulated by the State concerning protection and development of wetlands, and formulate relevant local decrees, special decrees and government regulations and policies with the actual conditions of the province and autonomous region taken into consideration;
- Implement the State Strategy and Action Plan for the Protection and Development of Wetlands, and integrate the Strategy and Action Plan into local plans for the economy, social development and ecological protection;
- Compile and organize the implementation of plans for wetland preservation;
- Implement a system of natural wetland preservation zones;

233 CBD 1992.

234 *Ramsar Convention on Wetlands* 1971.

- establish a province-wide network of wetland protection;
- conduct surveys, scientific research, surveillance and technological popularization on wetland resources;
- For activities involving discharging pollutants into a wetland, changing the form of a wetland or occupation of a wetland by a construction project, a construction unit must conduct an environmental impact assessment and ecology impact assessment, to rationally utilize the wetland resources;
- Encourage public participation, safeguard legal interests and benefits of parties in wetland protection, implement tax preference and credit support;
- Undertake publicity and education, and raise public awareness of the importance and necessity for protection of wetlands.

7.3.4 Plan of implementation of the World Summit on Sustainable Development 2002

The World Summit on Sustainable Development (WSSD) held in Johannesburg in September 2002 reaffirmed sustainable development as a central element of the international agenda and gave new impetus to global action to fight poverty and protect the environment.²³⁵ The outcomes of the Legal and Policy Component of the Capacity Building Project place the PRC in a good position to meet the wide range of concrete commitments and targets for action in the western dryland region that Governments agreed to at the WSSD, which focused on improvement of implementation of sustainable development objectives. Of particular importance to the PRC is the recognition by the WSSD for countries to increase land protection as a major strategy to promote poverty eradication, reduce the loss of fertile soil and increase the effectiveness of use of water. In this regard, the Legal and Policy Component fulfils the main objective of the WSSD *Plan of Implementation* by applying the IEM approach in the review of laws and regulations and outlining its role in the development of integrated land management plans, improving the productivity of land and adoption of policies and laws that guarantee well-defined and enforceable land and water use rights, and promoting the security of tenure.

7.3.5 The IUCN Environmental Law Programme

The IUCN ELP advances environmental law by developing new legal concepts and instruments, and by building the capacity of societies to employ environmental law for conservation and sustainable development. Its primary areas of activity include environmental aspects of biodiversity, climate change and energy, ecosystem services, environmental governance, forests, protected areas, sustainable use of soils and water resources.²³⁶ The Legal and Policy Component of the Capacity Building Project makes a significant contribution to all of these areas through its programme of strengthening and developing its environmental law to build on existing legal foundations. The strategy used by the Capacity Building Project supports the ELP's programme of international action by addressing gaps and weaknesses in environmental law and responding to the environmental challenges of LD and

235 WSSD and WEHAB, *supra* note 38.

236 See <http://www.iucn.org/law/>.

desertification.²³⁷ In particular, the Legal and Policy Component contributes to specific aspects of the ELP by developing and testing a range of environmental law and policy procedures that are now available to other countries through the ELP network, including:

- Testing the method to determine the capacity of environmental law to manage widespread LD and desertification problems;
- Showing how the evaluation of a large mass of environmental law can be managed effectively and meaningful results can be efficiently obtained and interpreted;
- Developing a format to comprehensively report environmental law, policy and institutional issues in the structure of a reform programme;
- Successfully showing how the concept of ecosystem management can be integrated within a complex regime of environmental laws, regulations, policies and institutional arrangements for LD and desertification control.

7.3.5.1 Strengthening and development of international environmental law

The Legal and Policy Component of the Capacity Building Project makes a specific contribution to Area 5 of the Montevideo Programme III, “Strengthening and development of international environmental law”. Specific actions undertaken by the Legal and Policy Component that contribute to this objective and the IUCN ELP include:²³⁸

- (a) Undertaking assessments of existing and emerging challenges to the environment to identify gaps and weaknesses, including inter-linkages and cross-cutting issues in domestic environmental law and specifying the role it will play in responding to those challenges;
- (b) Developing criteria for determining the need for and feasibility of new domestic environmental instruments, taking into account existing instruments and practice;
- (c) Reviewing the application of the principles contained in the *1972 Stockholm Declaration of the United Nations Conference on the Human Environment* and the *1992 Rio Declaration on Environment and Development* – identifying the extent to which they apply nationally and disseminating the information to the provinces;²³⁹
- (d) Examining other fields of law for the purpose of identifying emerging concepts, principles and practices relevant to the development and implementation of environmental law for LD control;
- (e) Assisting provincial and autonomous region governments to develop legal instruments for the environment, and providing expertise and experience to those concerned;

237 Includes verifying many aspects of *Draft Protocol for Protection and Sustainable Use of Soil* [Revised Draft 30 June 2007]; see also Draft version of Protocol for Security and Sustainable Use of Soil [28 October 2009]; drafts were prepared by IUCN Commission on Environmental Law Specialist Group for Sustainable Use of Soil and Desertification.

238 *Montevideo Programme III*, *supra* note 213, programme area 1-5, *Strengthening and development of international environmental law*, Actions (a)–(g).

239 Principles and actions from these instruments were taken into account in development of the IEM assessment method used to analyze provincial, regional and central laws and regulations.

- (f) Strengthening the PRC's collaboration with the UN system and intergovernmental bodies in the development of environmental instruments and encouraging the integration of sustainable development in those instruments;²⁴⁰
- (g) Encouraging efforts by academics and researchers towards better organization of international environmental law, starting with a possible step towards codification.

7.3.6 The UNEP Strategy on Land Use Management

The *UNEP Strategy on Land Use Management* outlines critical issues in environmental assessment, policy guidance and implementation to improve the integration of environmental, land and soil aspects across other environmental focal areas and relevant international, regional and national development processes, in particular to meet the UN MDGs.²⁴¹ The MDGs identified by UNEP as directly or indirectly relevant to sustainable land-use management and soil conservation compare favourably with many issues identified by the Legal and Policy Component, including the eradication of extreme poverty and hunger, promotion of gender equality and empowerment of women, ensuring environmental sustainability and developing a global partnership for development. Specifically, the Legal and Policy Component contributed to the Objectives and Goals of the *UNEP Strategy* in the following ways:²⁴²

- By applying the ecosystem approach for land-use management and soil conservation and developing inter-linkages and synergies within and across the different sectors of the provincial and regional administrative system.²⁴³ The provincial and regional legal and policy frameworks reflect land management aspects in a functional and integrative manner and underline the ecological and sociological functioning of land resources.²⁴⁴ The IEM approach used by the PRC Project makes direct links between environmental issues, sustainable development and poverty reduction issues at the provincial and autonomous region level. The Legal and Policy Component identifies synergies in environmental assessment, policy development and implementation and contributes to the implementation of MEAs and recognizes synergies between mitigation and adaptation measures in land use and forestry, which provided opportunities to improve how impacts of LD and climate change can be addressed.²⁴⁵

240 Includes ADB, World Bank, UNEP, UNDP and AusAid.

241 UNEP. 2004. *UNEP's Strategy on Land Use Management and Soil Conservation, a Strengthened Functional Approach*. UNEP Policy Series. Nairobi, Kenya: UNEP; WSSD, *supra* note 38; Millennium Ecosystem Assessment, *supra* note 189, see seven key questions on desertification.

242 *Ibid.*, UNEP, Strategy Goals and Objectives, pp. 18–19.

243 *Ibid.*, UNEP, pp. 19–34.

244 Refer to the six provincial and autonomous region *Reports on the Assessment of Regulations, Policies and Institutional Capacity for Land Degradation Control*.

245 UNEP, *supra* note 241, Goal and Strategy A, pp. 19–38, including the integration of sustainable use and conservation of biodiversity which are important for the drylands; improving links between biodiversity management and prevention and mitigation of LD; improved reporting; a more coherent scientific and technical advisory process and capacity building across and within different sectors; improving the understanding of agriculture for income generation, food and fibre production; environmental benefits such as provision of biodiversity, water, recreation; and the links between biodiversity and alternative management options.

- By recognizing the importance of improving land cover monitoring processes and the assessment of the condition of ecological resources, as a multidisciplinary process. It also recognizes that the reliable assessment of the status and trends of land cover is a prerequisite for environmental policy development and implementation.²⁴⁶
- By recognizing that environment-focused and development-oriented policies on sustainable land use should be developed and implemented; achieved through capacity building, information management and public participation, and to respond to environmental emergencies; and the right type of legislation and cooperation is needed to do this effectively. The Legal and Policy Component emphasized policy development and guidance to prevent and mitigate the environmental and social impacts of LD, identifying: (a) constraints and barriers in current policy, administration and culture; (b) ways to create an enabling environment, including capacity building and institutional arrangements for participatory partnerships; (c) mechanisms to access public information systems; (d) areas of technical support to government and society for decision making; and (e) ways to mainstream land and soil-related issues into development policies.²⁴⁷
- By supporting the use of national legal processes and structures to integrate the environmental dimension of land-use management and soil conservation as a key component of policy development. The Legal and Policy Component recommends a focus for policy implementation on capacity building, responding to environmental emergencies, analyzing policy implications, developing tools and guidelines, and raising awareness, education and training. More effective and improved land management legislation developed by the Legal and Policy Component plays a critical role in implementing the *UNEP Strategy* at a national level, as part of a comprehensive and integrated approach to land-use management and soil conservation.²⁴⁸
- By recommending improvements to science-policy interaction in order to strengthen and extend knowledge systems. Continued compilation and dissemination of information on best practices in land-use management, including the development of databases, are important components in supporting policy implementation in the PRC Project.²⁴⁹

246 *Ibid.*, *Goal and Strategy B*, p. 38; UNEP assessment strategy supports the development and strengthening of regional and national capacities for collection, harmonization, analysis and reporting of land and soil data for a coherent global assessment system; it also includes development of improved access to land assessment products and information and specifies that integrated land and soil assessments require further development of cross-sectoral, science-based indicators, especially as growing evidence shows that current concepts are partly misleading, resulting in ineffective remedy policy concepts.

247 *Ibid.*, *Goal and Strategy C*, p. 41.

248 *Ibid.*, *Goal and Strategy C*, pp. 41–42.

249 *Ibid.*, *Goal and Strategy D*, p. 45.

- By recommending the mobilization of additional financial, institutional and human resources for LD and desertification management and a more cost-effective development and implementation of policies. Increasing the involvement of the private sector in the early stages of the programme and project development in the PRC's western dryland region was recognized as crucial by the Legal and Policy Component.²⁵⁰

²⁵⁰ *Ibid.*, *Goal and Strategy F*, p. 49; this strategy also contributes to the WSSD *Plan of Implementation and WEHAB Framework for Action on Agriculture, Water and Biodiversity*, *supra* note 38.

8

Conclusions and lessons

Wang Canfa²⁵¹

8.1 Introduction

As one of the most severely affected areas by LD in the world, the western dryland environment seriously impacts on the national economy and social development of the PRC. It was these factors that initially raised the awareness of international society to the situation in Western PRC that led to the Capacity Building Project under the framework of the PRC-GEF Partnership on Land Degradation in Dryland Ecosystems and in particular, the Legal and Policy Component, to assess the capacity of the existing laws, regulations and policies for LD control and make recommendations for improvement. The information on which this report is based was contributed by many PRC experts including the legal and policy experts from the six provincial and autonomous region Legal and Policy Investigation Teams, the Legal and Policy Expert Advisory Group, the Research Institute of Environmental Law of Wuhan University PRC, Central Project Management Office, Project Coordination Office, Asian Development Bank, and the experts and officials from many central and local government departments. A small number of international environmental law and policy experts provided guidance and back-up under the Project. The results from the Legal and Policy Component of the Capacity Building Project reported in this publication have produced comprehensive and timely information to improve the policy and legislative framework for prevention and control of LD in Western PRC.²⁵² While making a significant contribution to the PRC provincial and autonomous region law and policy, the outcomes of the Legal and Policy Component are also substantially contributing to international environmental law and policy development for LD control and through this publication and the many publications prepared by the Capacity Building Project, other countries and regions of the world can directly benefit from the PRC's significant achievements. Many of the legislative tools, guidelines and procedures prepared under the Legal and Policy Component of the Capacity Building Project (described in Chapters 4, 5 and 6) are transferable to other regions and States with similar climatic, ecological and socio-economic characteristics to that of dryland PRC.²⁵³

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252 PRC-GEF Partnership on Land Degradation in Dryland Ecosystems, *Strategy and Action Plan*, *supra* note 76, Section 6 "Action Plan Priority Targets".

253 *Millennium Ecosystem Assessment*, *supra* note 189.

8.2 Conclusions

The following concluding points are drawn from the systematic research and analysis of the Legal and Policy Component of the Capacity Building Project and the relationship and overall contribution it has made to the PRC-GEF Partnership Program on Land Degradation in Dryland Ecosystems in general:²⁵⁴

8.2.1 IEM concept

The Legal and Policy Component concluded that the IEM concept and approach is a sound practical basis for environmental resource management, legal analysis and environmental law development for western dryland PRC. Based on the legal and policy outcomes of the Capacity Building Project, the IEM approach proved a good basis for proposing reforms, and in particular, it effectively integrates scientific and legal principles. It acted as an effective participatory process and the method adapted to all physical, social, economic and environmental circumstances encountered. These values were used to develop the frameworks to improve legislation and policy to prevent and control LD in the six provinces and autonomous regions and to achieve sustainable natural resource management and environmental protection – as presented in the *Reports on the Assessment of Regulations, Policies and Institutional Capacity for Land Degradation Control* from the Gansu, Shaanxi and Qinghai Provinces and Inner Mongolia, Xinjiang Uygur and Ningxia Hui Autonomous Regions. The provincial and regional law and policy to prevent and control LD was classified into nine law areas under the evaluation system, and the conclusions drawn from the application of the six-step method presented the policy makers with an understanding of the capacity of the law and policy to manage different aspects of LD and the human and environmental conditions surrounding these problems. In addition, the evaluation method has now become an important reference point for the PRC in improving natural resources law and policy in the future.

8.2.2 Land degradation and society

Land degradation in dryland Western PRC is a function of the region's natural characteristics and the effects of exploitive human activities. The PRC government has made great efforts to prevent LD and bring it under control. Nevertheless, the situation is worsening and the biggest challenge is to control the conflicts arising from increasing population, limited arable land, the fragile environment, excessive reclamation and intensity of land use, limited grassland resources, overstocking, diminishing water resources and inappropriate land uses. The consequences of LD are significant in terms of the declining productivity of cultivated land, increased degraded land, declining condition of land resources, reduced efficiency of productive agriculture and livestock raising, reduced biodiversity and increasing frequency of natural disasters and extreme weather events. The legal and policy information developed under the Capacity Building Project is playing a significant role in improving the understanding and managing the conflicts that are arising from these consequences of LD.

254 Jian Zehui, *Join Hands to Promote Sustainable and Healthy Development of the PRC-GEF Partnership*, Keynote Speech at Opening Ceremony of International Workshop on IEM Application, 6 November 2008, Beijing PRC; Hu Zhangcui, *Application of IEM in Land Degradation Control in West of China, Successful Stories of PRC-GEF Partnership on Land Degradation in Dryland Ecosystems*, International Workshop on IEM Application, 6 November 2008, Beijing PRC; PRC-GEF Partnership on Land Degradation in Dryland Ecosystems, *Strategy and Action Plan*, *supra* note 76.

8.2.3 Legal framework

The Legal and Policy Component of the Capacity Building Project very effectively identified a large number of national and regional laws, regulations, guidelines and policies that form the comprehensive legal and policy framework to prevent and control LD. It found that the IEM concept is generally well represented within this framework and that some individual laws within the nine law areas were represented by the 19 core “essential legal elements” of the evaluation method. In particular, it found that specific national and regional laws and policies have already played a significant role in preventing and controlling LD and are fundamentally achieving their objectives and goals. In this regard, the six provincial and autonomous regions’ Legal and Policy Frameworks are the blueprint for future law and policy decision making under the respective provincial and autonomous region *Strategy and Action Plans to Combat Land Degradation*.

Moreover, with increasing impacts from global climate change and the high pace of economic development in the PRC, the Legal and Policy Component of the Capacity Building Project effectively shows that the PRC is still faced with an enormous challenge to keep designing new forms of law and policy to prevent and control LD, including: (i) enacting specialized laws and rules governing prevention and control of LD in areas of wetland protection, nature preservation, and prevention and control of soil pollution; and (ii) introducing specialized policy for prevention and control of LD conjunctively with the law, e.g., the principles and policy for special protection zones and fragile environmental protection zones, rehabilitation of forest and grassland from farmland, preferential taxation schemes and other economic rewards for activities concerned with environmental recovery and prevention and control of LD, and environmental compensation. It has demonstrated that single-issue laws that focus on individual problems and do not embody the IEM concept are no longer acceptable.

The causes of LD in the PRC have been complicated by the complex of natural and social elements. Over-cultivation of land, over-grazing of grassland, and irrational logging and use of water resources are the main human causes of LD. Moreover, the underlying causes of LD are viewed as being the unfair and unjust mechanisms of land allocation, self-interest, inappropriate incentives, and poor land-use techniques. The implementation of an integrated approach to combat LD is necessary, including the use of more comprehensive and innovative legal tools: but legal tools are not the only effective means to LD control. The law should define the rights and liabilities of humans and specify those objectives agreed by the public in light of IEM principles. The compliance of civil society, the State, private enterprise and the different levels of governments lies at the heart of whether the law can achieve its goal. This study makes it clear that economic incentives, research and promotion programmes, and the application of advanced technologies and techniques are of equal importance in the control of LD as the legal means, and each should be comprehensively adopted in the management of the natural resources.

8.3 Lessons learned

The systematic analysis of LD in dryland Western PRC, together with the development of knowledge on the capability of the legal and policy system, was a necessary pre-requisite to the design of the comprehensive legal and policy frameworks for the six provinces and autonomous regions.

In this regard, a number of significant lessons emerged from the Legal and Policy Component of the Capacity Building Project:

8.3.1 Integrated Ecosystem Management

The concept and approach of IEM is internationally recognized as a practical and ecologically responsible way to analyze and understand the environment, and the Capacity Building Project proved IEM is a successful way to firstly, understand, and secondly, to approach the management of LD in dryland Western PRC. In this regard, the PRC will continue to apply IEM to further understand and improve the law, policy and institutional management for the prevention and control of LD in all dryland areas. Moreover, the rich experience gained by the PRC in implementing the IEM concept and method can be applied by other countries and regions with similar environmental, social and economic issues.

8.3.2 Law reform

The law and policy to prevent and control LD in the PRC were rigorously examined under the IEM concept and method. More effort will now be made to improve existing legislation through its revision and removal of conflict areas, and new types of law will be introduced to fill much-needed gaps in the legislative system and therefore improve the overall operation of the national legislative base for LD control. Efforts will be made to ensure compatibility between the legislative and policy systems to provide a powerful guarantee of law and policy necessary to prevent and control LD.

8.3.3 Public participation

The success of the legal and policy system for the control of LD depends on the public being able to participate in the implementation process including a facility to make informed opinions which are then taken into consideration in decision-making processes. In addition, the public should have ready access to government information to familiarize themselves with, understand and consciously abide by and participate in the general enforcement of the law.

8.3.4 Enforcement

Law enforcement should be strengthened continuously. The law is valid only if it is enacted and followed. The efficiency of law, rule, regulation, criterion and policy regarding prevention and control of LD in the PRC will be guaranteed through the establishment of a workable law enforcement mechanism, including enforcement by administrative organs, judicial organs, and supported through public involvement, so that those who are bound by legal obligations will consciously abide by the law through strict enforcement, administration and supervision to achieve the full intent of the law.



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