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Report 3: Recommendations for Policies and Institutional Arrangements

Prepared by the consultants of TA 8537-PRC: Institutionalization of Urban-Rural
Environmental Master Planning to Guide Environmentally Sustainable Urbanization in the
People's Republic of China

For the Ministry of Environmental Protection

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Asian Development Bank
TA8537 (47061) PRC

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**Institutionalization of Urban-Rural Environmental
Master Planning to Guide
Environmentally Sustainable Urbanization
in the People's Republic of China**

*Protecting the PRC's Green Land from Urban
Development, Urban Sprawl and Overdevelopment*

Report 3
**RECOMMENDATIONS FOR POLICIES AND
INSTITUTIONAL ARRANGEMENTS**

Asian Development Bank
TA8537 (47061) PRC

**Institutionalization of Urban-Rural Environmental Master
Planning (UREMP) to Promote Environmentally
Sustainable Urbanization in the People's Republic of China**

A note on the outputs of this project

The Asian Development Bank Technical Assistance Project TA8537 (47061) PRC, Institutionalization of Urban-Rural Environmental Master Planning (UREMP) to Promote Environmentally Sustainable Urbanization in the People's Republic of China, delivered the following **four reports**.

Executive Report: Summary of UREMP in the PRC - Protecting China's Green Land from Urban Development, Urban Sprawl and Overdevelopment provides a comprehensive summary of UREMP and of the issues to be addressed in protecting China's Green Land in the context of continued rapid urbanization. The report provides a description of the methods and techniques to be used, recommendations for policies and for institutionalising urban-rural environmental master planning at various levels of government in the PRC, and lessons from successful examples of environmental protection in China and elsewhere.

Report Two: Technical Guidelines of UREMP provides technical details in the form of a manual and step-by-step guide for how to practically plan and implement UREMP, including approach, methods and techniques for mapping, analysing, assessing, zoning and evaluating Green Land within and surrounding urban areas where environmental assets may be at risk from development.

Report Three: Recommendations for Policies and Institutional Arrangements of UREMP (this report) provides details on procedures for setting up a legal framework and administrative regulations, and an institutional framework to enable UREMP to become an effective and operational instrument.

Report Four: Domestic Pilots and International Best Practice Cases of UREMP offers lessons from best practices in the PRC and elsewhere as a basis for possible solutions for protecting the PRC's Green Land, using theory, policies, institutional arrangements, methods and techniques from best practice cases.

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1. The Current Planning and Management System in the PRC

1.1. Overall Planning System

There are many types of planning in the People's Republic of China, of which the most relevant, for UREMP, are national economic and social development planning, main functional zoning planning, land use master planning and urban master planning. Measures to protect the environment are incorporated in these and other types of planning. As shown in detail below, the existing measures for environmental protection are often weak, and generally are subordinated to other priorities such as economic and social development.

UREMP is based on the proposition that the policies and plans of the many agencies responsible for protecting the environment – Ministry of Environmental Protection, Ministry of Land and Resources, Ministry of Water Resources, State Forestry Administration, Ministry of Agriculture, and others, as well as departments and bureaus at provincial and lower levels – can be aligned and made more effective through integration in UREMP plans. UREMP is also based on the proposition that the *environment* must be set as the highest priority, and the protection of natural ecosystems should be planned first. This report addresses the implications of this proposition.

1.1.1. Five fundamental types of planning

The introduction of UREMP as an integrating environmental planning instrument calls for a fresh perspective on the existing planning and management institutions in two ways: firstly, how to integrate UREMP into the existing system, and secondly what changes to the system are necessary if the current system is to be supplemented by UREMP as a new instrument.

The planning system in the PRC faces great challenges from rapid urbanisation and environmental degradation with severe loss of ecosystem services. Planning is the basic instrument for guiding urban development and land use in urban, suburban, peri-urban and rural areas. The existing and institutionalized planning and management system in PRC is well-developed. Nevertheless it has to be strengthened to respond to new challenges including challenges to environmental sustainability. The following four fields have been identified, in which overcoming current problems would be particularly effective.

- There is no environmental equivalent to economic and social targeting for sustainable development.
- There is no comprehensive spatially explicit environmental planning instrument (including a technical platform) to systematically compile the necessary information and prioritization of environmental topics for supporting decisions on different political levels.
- The management, implementation, control and evaluation of area-specific environmental goals policies and implementation instruments are scarce.
- Contents and competencies of environmental management are fragmented in various sectors and allocated in different departments; time frames of plans are not always harmonized; this hampers integrated, effective, coordinated and cost-efficient solutions.

There various types of existing planning in China include national and local level plans, and plans from different departments of different levels of governments and sectors. All kinds of planning play a leading role in the development all around the country. In the existing planning system, the national economic and social development plan, city development master planning,

land use master planning and main functional zoning planning occupy an important position, and it is the basis of planning in comparison with the urban economic and social development and space utilization. In addition, there are also specific plans like environmental protection planning. Table 1 summarizes four fundamental types of planning, and environmental planning.

Table 1 Summary of the Macro Planning System in China

Planning	Responsible department, political level	Planning period	Main content	Environmental related content
National economic and social development planning	Development and Reform Department, national	5 years	Economic development, industrial layout, population and employment, and social welfare, etc	Pollutant emission reduction
Main functional zoning planning	Development and Reform Department, national	10 years	Space development pattern based on main functional zone	The environmental policy specific to different main functional zones
Land use master planning	Land and Resource Department, governments of all levels	About 15 years	Structure and layout of various types of urban land	Ecological land
Urban master planning	Housing and Urban-Rural Development Department, City, county and township (town) levels	About 20 years	Urban spatial pattern, development goal and urban scale, etc	Treatment facilities for public pollution
Environmental protection planning	Environmental Protection Department, national, provincial, municipal, county	5 years	Objectives, tasks and measures of ecological protection and pollution prevention, etc	Environmental protection

The task of planning on different levels such as namely the land use master planning can be understood in its dimension and complexity in the light of the structure of the political administrative division of the PRC.

The Chinese administrative division comprises 4 tiers: the first Provincial level with 34 divisions , includes also four municipalities which are province ranked cities under the direct control of the central government, , five autonomous regions, and two Special Administrative Regions; the second level consists of 333 prefecture-level divisions which include 17 prefectures and 283 prefecture-level cities. The third County level consist of 1,464 counties in Mainland China out of a total of 2,862 county-level divisions. The fourth level administrative unit the Township are similar to municipalities and communes in other countries include about 30, 000 townships and 17,500 towns. Environmental protection planning up to now is performed on national and provincial level (including municipalities) as well as for counties but not on the level of the townships and the respective cities. There governmental levels are referred to by urban master planning and land use master planning (performed on all governmental levels). However, these plans cover only some selected environmental aspects. In this report, each type of macro planning is analyzed in detail to summarize the related experiences with reference to the master environmental planning.

1.1.2. Macroeconomic Development Planning

The **National and provincial level economic and social development planning** is not spatially explicit on a small scale. Up to now the main environmental protection objective is to reduce pollutant emissions. The 12th five year plan puts more emphasis on prevention of environmental risks and strengthens environmental regulation for a broader range of ecosystem services.

The national economic and social development planning is the overall plan of economic and social development for the country or a region, which takes national economy, science and technology progress and social development as its objective. It embodies the national or regional comprehensive planning, deployment and arrangements for the main activities of the national economy, science and technology progress and social development during the planning period. It puts forward the policies, strategic objectives, main task and implement key of the economic and social development for the government during the planning period. The body content of the planning includes economic development, industrial layout, resources development, population, employment, housing, social welfare, environmental protection and so on. It usually takes five years as a planning period.

The section on environmental protection is part of the national economic and social development plan. The 12th five-year plan for national economic and social development of the nation for example, includes content related to the environment as follows:

- (1) Strengthen the pollutant emission reduction and governance. Implement total discharge of major pollutants control, apply drinking water source protection system, establish and improve regional air pollution joint prevention and control mechanism and so on.
- (2) Prevent environmental risks. Strengthen the comprehensive management of heavy metal pollution, increase the prevention and control efforts of persistent organic, hazardous chemical pollution carry out pollution control and remediation of contaminated sites pilot demonstration, soil, water bodies.
- (3) Strengthen environmental regulation. Sound environmental laws, regulations and standards, strengthen environmental law enforcement, strict environmental access, implement the environmental impact assessment in accordance with law, and strengthen the environmental protection of undertaking industrial transfer. Strictly implement the responsibility system for environmental protection target, and so on.

The planning on national economic and social development primarily aims at implementing key development objectives and projects which are featured as fast change, weak inheritance and large elasticity, the management pattern of this kind of planning is mainly based on supervision and examination, so its binding effect is weak. Generally, the development planning focuses on guidance and objectivity, its development objective does not reflect on the territory space.

1.1.3. Spatial Development Planning

The **national and provincial level main functional zoning planning** determines the future spatial land use patterns. In terms of environmental information, it takes into account environmental resources and carrying capacity. Furthermore, established national protection areas are considered and designated as zones where development is prohibited; still, the consideration of environmental concerns has to be improved and institutionalized in order to sufficiently implement and enforce environmental concerns of national and provincial relevance. This may also require the up-scaling of regional environmental information for a better data basis at the national level.

The Main Functional Zoning Plan, mainly according to the different areas of the resources and environment carrying capacity, existing development density and development potential, plans the future population distribution, economic layout, land use and urbanization pattern,

determines the main body function orientation, development direction, development intensity control, standardizes the order of development and improve development policies, gradually forms the spatial development pattern that is in harmony with population, economy, resources. It is usually led and managed by development and reform department.

In June 2011, the National Major function oriented zoning was released. The planning divides the development priority zones into optimized development area, key development area, limit development zone and prohibited development zone, and provides the corresponding function orientation, development direction and development control principle. Among them, the optimized development area refers to the area that land development density is higher and resources and environment carrying capacity subsidies; the key development area refers to the area that the resources and environment carrying capacity is stronger and economy and population agglomeration conditions are better; the limit development area refers to the area that the resources carrying capacity is weaker, mass concentration, the economic and demographic conditions are not good and is related to the ecological safety of a nation or a large area. Prohibit development area refers to all kinds of natural protection area established in accordance with the law.

The main functional area planning focuses on the policy attributes of functional area, ignoring its spatial properties and development properties, so that partial contents failed to be effectively implemented.

Land Use Master Planning is the long-term plan for the adjustment and configuration of various types of land use structure and layout made by governments at all levels. The main content of the overall land use planning includes: the evaluation of the implementation of the current plan; the analysis of the planning background and the land's supply and demand situation; the land use strategies; the determination of main target, including cultivated land ownership, the protection of basic farmland area, scale of construction land and land consolidation reclamation development arrangement and so on; land use structure, layout and the optimized scheme of economical and intensive use of land; differentiation policy of land use; the responsibility and safeguard measures of the planning and implementation. The core of land use planning is to strengthen the national macroscopic control and plan of land use management, and pay attention to the coordination of various departments and demand as well. At the same time, the land use planning also has related requirements for environment protection in the process of land use overall plan.

Parts of the land use planning are related to the environment, such as “The national general land use planning (2006-2020)”, approved by the state council in October 2008, not only put forwards to keep the goal of the red line of 1.8 billion mu of arable land, but also put forwards specific requirements on agricultural land, construction land, the development and utilization of regional land and so on. It has made the related requirements for the construction on the ecological protection, including: (1) Strengthen the protection of basic ecological land. During the planning period, the cultivated land, garden land, forest land, grassland, water area and part of the unused land area which has important ecological function of total stay above 75%, and build ecological land use pattern. (2) Strengthen land ecological environment improvement. Consolidate for reforestation achievement, recover industrial and mining land ecological function, and strengthen prevention and control of degraded land. (3) Adjust measures to local conditions to improve the land ecological environment and so on.

Municipal and county level land use planning is under the responsibility of Land and Resources Bureaus, under the direction of the National Ministry of Land and Resources. Land use master planning does not cover urban areas. It should explicitly include environmental concerns including various dimensions of environmental protection. Already land use planning implements and emphasizes the protection of farmland (by a land quota given for the province by the national government and broken down to district/county level by the provincial government, but not area-specific i.e. a defined red line is not established). Other aspects that are already included in the current planning system are reforestation and rehabilitation or redevelopment of mining and industrial sites. The planning designation of the land use master plan are binding and reinforced by monitoring via satellite imagery and reality checks on the ground. Still, land use master planning does not sufficiently protect and conserve green land and ecosystems beyond farmland and forest. Consequently is not able to sufficiently regulate the urban rural interface, in particular urban sprawl.

Land use planning focuses on areas defined by natural boundaries, insufficiently considering future urbanization, which caused the incomplete urban layout structure and difficult construction of the infrastructure. Land use planning is entitled to the higher legal status with emphasis on links with the urban planning; however, it doesn't clarify the link ways and procedures of dispute resolution. Land use planning could be characterized as mainly based on precedent with a strong binding force, such as satellite monitoring and spot check.

Urban Master Planning is the comprehensive deployment and specific arrangement made by the people's government of a city on the basis of the national economic and social development plan as well as the local conditions, to achieve the economic and social development goals of a city. The main purposes of the overall urban planning include:

- (1) Determine the nature and city development direction, estimate overall urban population and construction land scale, determine the overall urban planning of the technical and economic indicators.
- (2) Select urban land, determine the scope of the planning and urban land function zoning.
- (3) Estimate the urban construction investment, determine key project construction etc.

Municipal and county level urban master planning is under the responsibility of the local Urban and Rural Development Planning Bureaus and carried out typically for a period of 20 years. Approval is either with the National Ministry of Housing, Urban and Rural Development or with the Provincial Development and Reform Commission. It covers the entire municipal territory including urbanised areas, planned urban expansions, and rural areas including county seats, townships and villages. Land use planning is one of the key outputs of the Urban Master Plan of a Municipality. While urban master planning includes open space planning and environmental management systems and facilities such as for wastewater and solid waste management, the urban master planning does not include sufficiently spatial environmental concerns and has not yet developed adequate procedures for coordinating environmental protection and rehabilitation with the land use master planning.

The urban master planning focuses on overall utilization of space resources with comprehensive consideration on the short-term and long-term arrangement of spatial resources, covering the periodic development goals and base line of development, and reasonably arranging various facilities in the limited space. This kind of planning is featured as relative flexible management model, medium inheritance, balance between elasticity and rigidity, and stronger binding force, so it is more effective at stage of the project planning approval.

However, the overall urban planning also has some problems; for example, it focuses on land use, development intensity and development opportunity. There is a lack of overall consideration on requisition-compensation balance of arable land. It stresses on linkage with overall land use planning, but does not define how and procedures of dispute resolution.

1.1.4. Other sectoral environmental planning

National, provincial, municipal and county level water resources protection and management, flood risk management and drainage is under the responsibility of the National Ministry of Water Resources, the provincial departments of water resources, and municipal and county level Water Affairs Bureaus.

National, provincial, municipal and county level forest protection, reforestation and forestry management is under the responsibility of the State Forestry Administration, and provincial, municipal and county agencies.

National, provincial, municipal and county level agricultural land management is under the responsibility of the National Ministry of Agriculture, the Provincial Department of Agriculture, and the municipal and county level Agriculture Bureaus.

Municipal and county level open space planning is under the supervision of the National Ministry of Housing, Urban and Rural Development, the Provincial Level Department of Housing and Urban Rural Development, and under the responsibility of the municipal and county level Planning Bureaus.

1.1.5. Environmental Protection Planning

National, provincial, municipal and county level environmental protection planning is under the responsibility of the Ministry of Environmental Protection, and the provincial, municipal, and county level Environmental Protection Bureaus. Planning by the latter is carried out for a period of five years. On the national and provincial levels it includes the four functional zones and aims at protecting nationally and provincially relevant environment and cultural heritage.

In addition environmental protection and management includes non area-specific technical protection such as pollution control of water, soil, and air. The area-specific functional zoning plans and the technical environmental protection plans are legally binding and will be inputs and conditions for the land use master planning on the municipal levels. Besides the national protection and zoning plans, several other specific environmental planning instruments exist which are directed to sectoral environmental problems (atmospheric, water and soil pollution). The State Council issued the “the Action Plan on Atmospheric Pollution Prevention and Control” and “the Action Plan on Water Pollution Prevention and Control” in recent years and will also promulgate “the Action Plan on Soil Pollution Prevention and Control” soon. In addition, local governments also issued relevant environmental protection planning and specific plans.

There is a serious lack of coordination between the many types of planning, and a need for institutional cooperation integrating overall spatial planning and sectoral land use planning covering some environmental aspects with overall spatial environmental protection, rehabilitation and open space system planning. Due to a general priority of economic and social development, the status of environmental concerns in concrete planning designations of

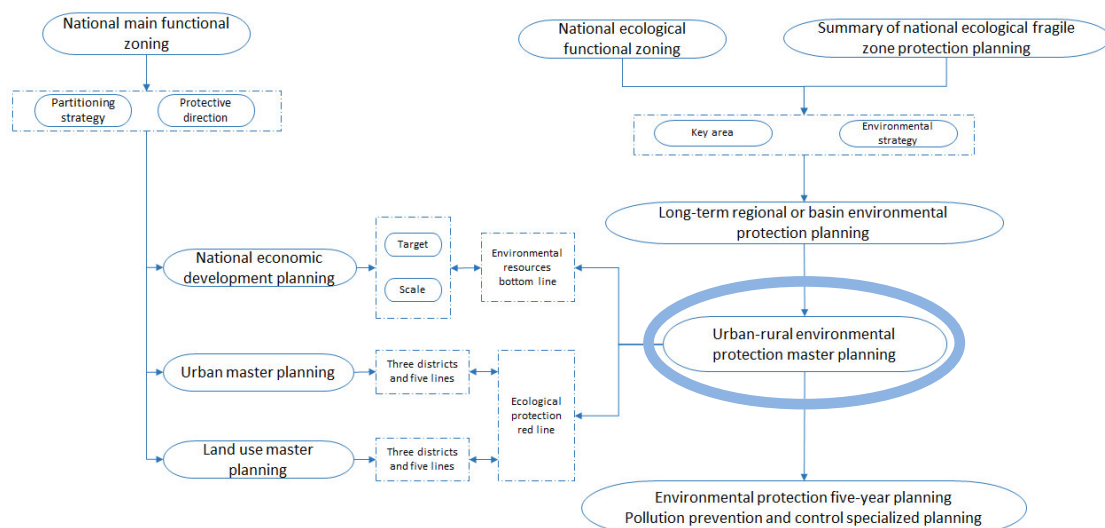
the overall (spatial) plans are weak.

1.1.6. The Relationship of the Environmental Protection Plan and the Other Plans

Environmental planning and other relevant planning types are already linked and reflect each other to a limited degree. All kinds of fundamental planning have an environmental chapter, however, its status is low. In order to play a more important role the environmental contents need to be strengthened e.g. by using red line zones. The following conclusions describe the key relations between the relationships of the domestic plans and environment protection:

- (1) All forms of existing comprehensive planning address some aspects of environmental protection. For example, the national economic and social development planning has two chapters of environmental protection and ecological restoration, which put forward planning requirements for the control of total pollutants, prevention of environmental risk, ecological compensation, respectively; and there is also a section in land use planning called land use and ecological protection coordinated development; the urban master planning has a chapter of environmental protection as well.
- (2) These kinds of basic planning focus on different key points of environment protection. For example, the national economic and social development plan requires to reduce the total quantity of pollutant emission, the land use planning has made the objectives and requirements from the view of the use of ecology land in the process of ecological construction, the urban master planning pays more attention to public pollution treatment facilities (sewage treatment plants, garbage treatment factory).
- (3) Among these comprehensive planning, the status of ecological environment is relatively weak. The core goal of planning is mainly set around the city's economic development, construction of the city and land use. When conflicts between environmental protection and economy appear, environment may be in the second thought.

Figure 1 Framework of the Relationship of UREMP and Other Planning



UREMP is intended to fill the described gaps in the existing planning system and play an integrative role bringing together the various institutions and their planning processes. Urban-rural environmental protection and planning will become a key input to economic and

social development planning, land use planning and urban master planning. In particular as this relates to:

- being present on all political levels where environmentally relevant decision are taken;
- integrating all the different environmental sectors;
- filling the gaps concerning spatially relevant environmental concerns such as climate protection and adaptation, conservation of areas important for recreation, drinking water replenishment and protection, storm water retention, biodiversity protection etc;
- finding institutionalized ways for integration with economic and socially oriented overall (spatial) planning;
- improving the coordination of interrelated regions as well as between departmental spheres of action.

In order to complement the planning systems in a targeted way, it should be considered how existing plans cover environmental issues in detail.

1.2. Coverage of environmental issues by different plans

In the existing planning system, national economic and social development plan, the overall planning of the city, the overall planning of land use, and the main functional zoning planning are important, and form the basis of planning relative to the urban economic, social development and space utilization.

Generally, the development and reform departments are responsible for the formation of general economic development planning. Housing and urban-rural development departments, land and resource departments, and environmental protection departments are responsible for specific planning respectively. The "fundamental" or "integrated" status of planning is embodied in the legal force, planning system, the planning standard, mandatory content and management system, etc., which is worthy of reference for the urban and rural environmental master planning. Table 2 compares the planning type, planning system, mandatory content, approval mechanism, and implementation review among the current basic planning and environmental protection plan.

Table 2 Comparison of the Characteristics of the PRC's Principal Forms of Planning and Environmental Protection Planning

Name	Type	Planning System and government level	Mandatory content	Approval System	Implementation Review
Planning for National Economic and Social Development	5-year period Non-spatial planning	Three categories and three types: According to the administrative hierarchy, it is divided into categories national, provincial (Autonomous region, Municipalities), and city; According to the objects and functions, it is divided into categories of overall planning, special planning, regional planning	Implementation of key development goals and projects	National special planning is approved by the State Council, or the authority's relative. The planning involving multi-provinces (autonomous regions and municipalities) is approved by the State Council. Overall the draft planning is prepared by the same level of development and reform department, and it is approved by People's Congress for consideration at the same level.	Attention to the development objectives and strategies, emphasis on macroscopic, and neglect the construction, resulting in difficult implementation of project, lack of policy space.
Main functional zoning planning	20years Spatial Planning	National and local level	Based on the main functional areas, locating the space development pattern	State Council is responsible for approval of the national main functional areas planning. For the provinces and cities, the main functional area planning is prepared according to the main functional areas of the country.	Too much considerations about the policy attribute of functional areas, ignoring its spatial properties and development properties, resulting in failure to effectively implement

Urban Master Planning	20-30years Spatial Planning From bottom to top "Land decided by population", "Supply decided by needs"	No national level, only the city, county and township (town) levels	Urban Development range, control development area, development intensity, urban construction land, and so on	Grading approval. State Council is responsible for approval of provinces, autonomous regions and municipalities with the city government, cities with populations over 1 million. In addition to the cities above, the government of provinces, autonomous regions and municipalities, is responsible for approving the overall planning of other cities and towns; the government of the town level is responsible for approving for the other township overall planning. The government of the city is responsible for the approving the city zoning planning.	Focus on land-use, development intensity and development opportunity, but the lack of balance of arable land into consideration. Emphasizing compliance with land legislation, but the way of convergence and dispute resolution procedures are not clear
Land use master planning	15-20years Spatial Planning From top to bottom "Preserve the red line of farmland"	According to China's administrative divisions, planning is divided into five levels, including national, provincial (autonomous regions and municipalities), city (prefecture) and county (city) and township (town)	Emphasis on long-term control of basic farmland red line of arable land of 18million mu.	Grading approval. Only the State Council and provincial governments are responsible for the approval of the overall land use planning. The land use overall planning of township is approved by the city or autonomous region government authorized by the province government.	Focus on natural boundaries of land, lack of consideration of urbanization, resulting in incomplete urban layout structure, it is difficult to build infrastructure. With higher legal status, emphasizing compliance with city legislation, but the way of convergence and dispute resolution procedures are not clear
Environmental protection planning	5-year period Non-spatial planning	According to China's administrative divisions, including national, provincial (autonomous regions and municipalities), city (prefecture) and county (city)	Main objective indexes, such as pollutant emission reduction, water quality, air quality	Assign tasks → formulate a general plan → declaration of the planning (towards same-level government and upper-level environmental protection departments) → approval (the upper-level environment protection departments will organize the experts to review, and provide the suggestions) → the implementation of the planning (after same-level government receives and approves the planning)	It is subject to contents and tasks of the pollution prevention planning, so it is difficult to integrate into the economic and social development process. It is also limited by the environmental management mode, as sub-elements the planning contents are scattered in various sectors

Planning type: national economic and social development and environmental planning are five-year non-spatial planning, the remaining three kinds of planning are 10-20-year spatial planning.

Planning system: except that the overall urban planning contains the local planning without national planning, the remaining kinds of planning cover both national and local planning.

Mandatory content: the spatial planning mainly related to the mandatory provisions on main functional areas, urban land use and farmland, while the mandatory contents of non-spatial planning mainly focus on development goals and projects.

Approval system: each kind of planning at the highest level will be examined and approved by the State Council; the local planning will be approved by the people's congresses at the corresponding level.

Implementation review: the effect of planning is mainly reflected on the implementation of planning contents and project, the planning link and coordination mechanism, etc.

1.3. The Legal and Regulation System of Environmentally Relevant Planning

1.3.1. Introduction into the Legal and Regulative Policies of the Basic Planning

The different plan types are rooted in different laws, which is typical in many countries but makes coordination in practice challenging. In case of urban planning, there is the *Urban and Rural Planning Law of the People's Republic of China*. Land use planning and environmental planning are respectively supported by the *Land Administration Law of the People's Republic of China* and the *Environmental Protection Law of the People's Republic of China*. Planning for national economic and social development and the planning of main functional areas have no applicable laws, but some policy documents, such as *Several Opinions on Strengthening Formulation of the Planning on National Economic and Social Development*, the "11th Five-Year" *Plan Outline on National Economic and Social Development* and the *Opinions of the State Council on Formulating the Planning on the National Master Functional Areas*.

The non-spatial environmental policies and regulations such as for the restriction of air and water pollution or total amount control are related to three kinds of spatial planning the main functional area, overall urban planning and land use planning. The policies are for subsidies for soil testing and formulated fertilization; resettlement compensation for farmers who lose their

land; protection of fundamental farmland; and compensation for farmland occupation. They motivate and stimulate the land users towards environmental protection and resource conservation to a certain degree. Such policies are either the supporting policies of each kind of planning, they provide legal standards used in environmental planning for assessment and responses or these policies supplementary to the environmental protection beyond the planning.

1.3.2. Environmental Protection Law

The practice of environmental management was started since 1973 in China after the State Council held the first national conference on environmental protection. With the rapid development of economy, the environmental problems were becoming more and more serious. China has established eight environmental management systems, “Old Three”: the system of Environmental Impact Assessment (EIA), “Three at the same time” (short for main project and emission abatement facilities designed, constructed, and operated at the same time) and Pollution Levy, and “New Five”: City the system of comprehensive improvement and quantitative assessment for urban environment, the Environmental-protection Responsibility system, Pollutant Discharge Permit, Time-limited Abatement and Management, and Centralized Pollution Control. After that, several efficient systems have been set up, such as Environmental Protection Planning, Environmental Quality Standard, Total Emission Control, and Environmental Monitoring and so on. The environmental management system played an important role on solving the structural, compressed and comprehensive environmental problems during China’s 30 years reforming and opening. The revised *Environmental Protection Law* was promulgated in April 2014. Table 3 describes 13 UREMP-related systems in the new law.

Table 3 Environmental Protection Planning under the Environmental Protection Law

No	Environmental Management System	Classification	Corresponding content of UREMP
1	The standards of environmental quality	Supervision and management	Environmental function zoning system, “the baseline of quality” and “upper limit of emission”
2	Environmental monitoring system		The basic public service systems of urban-rural environment
3	EIA		During EIA, check UREMP red line and environmental function zoning
4	Environmental protection responsibility and assessment system		The outcomes of UREMP can be incorporated into the evaluation indicators
5	Eco-compensation	Protection and improvement of environment	“The format of the red line” and “ecological red line”
6	Environmental and health monitoring, investigation and risk assessment system		“Environmental function zoning system” and “quality baseline”
7	“Three at the same time”	Pollution prevention and control	Environmental risk prevention facilities can be incorporate into the “Three at the same time” system
8	Pollutant-emission charge		Upper limit of emission
9	Total emission control		Upper limit of emission
10	The management of discharge permit		Upper limit of emission
11	Elimination of the high-polluted technology, facility and products		Projects for UREMP implementation
12	Unexpected environmental risk control and emergency-response mechanism		“Risk red line” and “the basic public service system of urban and rural environment”
13	Environmental information disclosure	Information disclosure and public participation	The basic public service system of urban and rural environment

1.3.3. Environmental Quality Standards in the Environmental Protection Law

The principal of Environmental Quality Standard is to protect human health and improve the ecological environment. The standard limits the concentration of hazardous substances at a

certain range of time and scope. According to the Article 15 of revised *Environmental Protection Law*, MEP (Ministry of Environmental Protection) formulates the national environmental quality standards. MEP also formulates the national pollutant-discharged standards in accordance with national environmental quality standards and national economics, and technologies. The governments of provinces, autonomous regions and municipalities directly under the government of the PRC can formulate their own regional standards for those items, which are unidentified by the national government. However, the revised *Environmental Protection Law* does not provide municipal government and lower-leveled governments with the rights to formulate local standards for environmental quality and discharge of pollutants.

MEP is responsible for formulating, approving, issuing and managing the national environmental standards, and report to the State Standard Bureau. The general processes are shown as follows: issue the project plan for formulating the environmental standards→organize the formulation of the standards (draft、consulting draft, draft for examination, and draft for approval) →examine and approve→ issue. Regional standards are formulated by the provincial environmental management departments and should be submitted to local governments for approval. The regional standards must to be informed and reported to the MEP.

Environmental Quality Standards are a very significant basis for URMEP. They represent an environmental target at the certain time. The demand of environmental quality can be quantified and protected by the Environmental Quality Standards. Any plans and projects should consider these standards as defining limits for other i.e. industrial and urban development and as needs for sustainable development.

1.3.4. Total Pollution Emission Control System

Pollution emission control system is to consider a controlled area as a complete system (such as administrative, watershed, environment function zones, etc.). Taking measurement to control the total amount of pollutants discharged into this area within a certain amount, and to meet the requirements of the regional environmental quality.

Article 44 of revised Environmental Protection Law regulates that the pollutant emission control targets are issued by the State Council, and implemented by provinces, autonomous regions and municipalities. Enterprises and institutions shall not only implement the national and local emission standards, but also comply with their own total pollutant emission control standards. If the emissions of pollutants exceed the national total control standards or the area did not complete the national environmental quality objectives, the provincial environmental protection departments shall suspend the EIA approval for the new construction projects in that region.

The analysis of the limit of environmental carrying capacities needs to determine the “emission upper-limits” permission. In other words, it is required to determine the control target of carrying capacity-related total amount of emission. Suggestion on urban layout and industrial adjustment is based on the assessment comparison among the layout of urban environmental carrying capacities and urban space, and industrial layout.

1.3.5. Discharge Permits Management

The discharge permits system according to Article 45 of revised Environmental Law is directly related to the polluters of pollutant discharge. The goal is to determine the total amount of pollutants. Polluters have to apply for the permission from the department of environmental

protection administration in advance. After getting the permission they can only discharge the permitted amount.

The process of pollution permit management usually includes the registration of pollutant discharge → allocation of pollutant emission targets → audit certification.

1.3.6. Environmental information disclosure and public participation

Chapter V of *Environmental Protection Law of the People's Republic of China (2014)* stipulated that, “Citizens, legal persons and other organizations shall have the right to obtain environmental information, participate and supervise the activities of environment protection in accordance with the law,” and “The competent department of environmental protection administration under the State Council shall release national environmental quality, monitoring data of key pollutant sources and other major environmental information. Competent environmental departments of governments at or above provincial levels shall regularly publish environmental status bulletins.”

In the implementation of the environmental planning includes stakeholders’ participation to a certain degree. For example, during developing model cities according to the *Program of Constructing National Environment-Friendly Model City*, it is required that the urban government shall set up a special column of urban model construction, all related materials shall be publicized online and accept supervision from whole society. All urban environment monitoring data shall be released to the public in real time; the social supervisors for national environmental model city shall be assigned for full oversight from all sectors of the society. In addition, the environmental sector shall set up a hotline of 12369 to accept any environmental information and complaints. However, it is further to strengthen the public role during formulation and implementation of environmental planning.

Currently, the channels from which the public can learn about the impact of environmental policy and other policies on the environment mainly include main television, radio, network, WeChat, the environmental column of newspaper and magazines, environmental journals, the official website of the environmental sectors at various levels, the international and domestic environmental NGOs’ propaganda, etc.

1.3.7. Environmental economic policy

The environmental and economic policy related to environment planning mainly includes the pollution charge policy and eco-compensation policy. Pollution fee is an environmental policy of China to promote emission reduction by economic means according to the polluter-pays principle. Article 43 of the New Environmental Law stipulated that: “Enterprises, public institutions and other producers and business operators that discharge pollutants shall pay pollution fees in accordance with relevant state provisions. Pollution fees collected shall be exclusively used for environmental pollution prevention and control.”

Eco-compensation is aimed at the ecological environment protection, utilize the governmental and market means to adjust the ecological relations between the interests of stakeholders in view of the ecosystem service value, ecological protection cost and opportunity cost. Article 31 of New Environmental Law stipulated that: “The State shall establish and improve ecological protection compensation mechanism, and increase fiscal transfer to areas of ecological protection. The State provides guidance to local people’s governments of beneficiary areas and

ecological protected areas on ecological compensation through consultation or market rules.”

The two environmental economic policies above can effectively supplement environment planning. The pollution charge system can cause the polluters to take steps for compliance with the emission standards, and make them to undertake the economic responsibility for their pollution behaviors. Eco-compensation system can make the ecological beneficiary area pay for such environmental benefits, and the development-limited area gets the corresponding economic compensation. Both policies require data collection and monitoring and may be economic ways of implementing or supplementing environmental planning

1.3.8. Lessons from the current planning system for environment master planning

First, UREMP is missing a clear legal basis. This is impeding its effectiveness for coordinating other environmental plans and legal requirements. To ensure the status of the overall planning of the environment and the smooth implementation of the overall planning of the environment, clarifying its legal position is very critical.

Second, UREMP needs mature technical regulations. Overall urban and land planning, have already formed a relatively complete set of technical methods through the accumulation of decades of experience. Urban and rural environmental planning still has to establish a complete and standardized set of planning guidelines.

Third, UREMP needs standardized approval and management procedures. They should be streamlined with those of the current urban master plan and rural land use planning which have already routines for the preparation process, the approval and management procedures, as well as clear laws and regulations. Furthermore in the preparation process, there are requirements for the sector organization of preparation to assess the plan implementation. The new UREMP should make use of the existing structures and experiences and established norms, the process of approval, management and evaluation.

Fourth, UREMP should have spatial operability and include the various elements of time and space arrangements. For the ambiguous boundary of the space planning, it is urgent to match the spatial scales scale of the overall planning with the overall urban planning, land use planning and other boundaries of political decision making.

Fifth, UREMP should clarify requirements for environmental protection and define the leeway of sustainable development. The traditional plan has the key elements, such as urban property of the overall urban planning, population size, spatial layout, and land size and distribution of planning. This requires a clear key link to the overall planning of the environment. It is recommended that the ecological red line and environmental carrying capacity are set as its core content, and it should be consistent with other planning requirements.

Sixth, UREMP must be set as the priority condition relative to other conditions. There are some uncoordinated contents in China's existing planning. Therefore, in the planning process, it should focus on building the mechanism of coordination convergence and sharing integration. High quality ecological environment is the basis for social harmony and economic development. First a "natural" ecosystems map needs to be established. Then "human" economic and social development planning, land use planning and urban overall planning, etc. are prepared to reflect the concept of eco-development priorities.

1.4. Success Factors for UREMP Drawn from Best Practice Examples

Best practice solutions from the UREMP pilot cities in China and from international experiences shed light on how to overcome the above challenges of lack of integration and synthesis of segmented tasks for UREMP as well as other challenges of environmental planning systems.

As every country is different, solutions from other political and spatial contexts cannot be simply transferred to the specific PRC context. The main risks arising to the success of policy solution from other countries are that the adaptation of solutions to the PRC context is insufficient or that the transfer may be incomplete and important elements are left out. The PRC is now in a position to cherry-pick the best specific ideas from around the world. Also some general principles seem to apply to most policy contexts. The legal and cultural context of environmental planning systems plays an important role for understanding the origins of specific solutions and for judging the suitability for transferring them to China. As a general principle, systems with weaker property rights and a more hierarchical structure of the planning system are closer to the Chinese preconditions than systems with very strong property rights and relatively weak or non-existent spatial planning authority. The following is a summary of success factors for UREMP drawn from best practice examples.

1.4.1. Planning systems in the context of environmental legislation

Process rules are an important component to ensure that environmental concerns are empowered (see Dühr et al 2010: 329 about environmental externalities and market failures). Environmental interest, for instance, can be supported in decision making by a legally prescribed normative dominance of the environmental concern. This is an appropriate solution, when the driving forces that harm the environment are so strong, that they regularly overpower the (public) environmental concerns. An example for an almost absolute dominance of biodiversity objectives is the EU Habitat Directive, in which every development application impacting on species and habitats of European relevance is audited according to precise criteria. The resulting decisions have to comply with very strict rules of habitat protection. It is also specified which public interests can overpower the protected properties of the Habitat Directive and how to compensate inevitable damage. Other examples are the precautionary principle and the polluter pays principle. These principles are also part of the European legal system and are binding for decision making. Further instruments are the Strategic Environmental Assessment (SEA) and the Environmental Impact Assessment (EIA) that ensure that environmental concerns are taken into account in every decision with relevance for the environment. Germany has non-binding landscape planning objectives. But the authorities are obliged to provide a specific justification when landscape planning objectives are overruled in the decision making process. This mechanism is particularly effective in combination with strong public participation and control by higher level authorities.

The public right for information disclosure and participation are already part of the PRC's planning system. Nevertheless, further development can be inspired by the example of the Aarhus Convention, which also includes the right to sue and take collective action against the government or an entity violating environmental protection. A Best Practice Example is the Netherlands, with a long standing history of public participation. Although the process is relatively long it also facilitates implementation.

Mechanisms of integrating environmental planning with both sector and spatial planning are, for instance, the establishment and common use of a cross-sector environmental

information system, merging information and analytical results of various sector plans into one environmental master planning platform, as well as strictly dedicating implementation instruments and funds (possibly of different sector policies) to the objectives of master planning. In the Netherlands, for instance, the Environment Assessment Agency is responsible for assessing spatial plans on all levels. In Germany this assessment is integrated into the process of the preparation of a spatial plan or sector plans that are binding, and if they are deviating from the landscape planning objectives and measures planners are obliged to defend it through reasoning. Also the SEA can take on this role. Such institutionalized mechanisms can foster the efficient integration of plans at an early stage, and coordination between the space control department and the environmental protection department.

Public and private interests should not be intermingled in public planning. Nevertheless, the inclusion of synergistic private interests into an implementation concept will usually support realization of environmental objectives (such as in the marketing of environmentally sound agricultural products. A best practice example is the approach of the Texas parks and Wildlife authority¹. The economic valuation of ecosystem services is a means to this end.

1.4.2. Planning content

- Planning content can be translated and processed for addressees. This may be done by “translation” maps, economic valuation or landscape design.
- Planning content should be generated by standardized methods. Otherwise up-scaling of environmental information /objectives to higher planning levels, comparability of the results between different areas and the use of the information for instruments such as the SEA and EIA is not possible. Often simple data and simplified methods have to be used on local level. Nevertheless the results are usually differentiated enough for a lot of local decisions. In other cases, the uncertainty of the information presented should be communicated.
- The Chinese pilot cities have demonstrated that an ecosystem functions/services evaluation is possible and that this can result into a prioritization of areas as to their importance for safeguarding the functioning of the green space. It has also been pointed out, that such landscape analysis should cover all ecosystem services and biodiversity and not concentrate on water and air pollution. The Chinese examples also show that besides ecosystem services evaluation also the assessment of present pressures and sensitivities against pollution are important information to be included into UREMP. The extension of the red or yellow line zones are dependent on how strict the obligations are defined which come with the area designations. If very strict obligations are defined for red line than smaller areas will need such strict protection. If also the green line includes a medium level of protection than that area include more space. Furthermore, in most of the pilots it becomes obvious, that the red, yellow and green lines (zones), if depicted at a regional scale need an internal (spatial) differentiation as to what is allowed or encouraged in these zones. For example, human activities can be allowed certain parts of the red line areas and smaller areas in the green line zones may need a strict protection. It has to be decided on which decision level this differentiation is performed. If left to the local level control by upper levels is necessary about meeting the overall goals for the respective zone. Otherwise the basic purpose of the zones may be compromised.
- Furthermore the Chinese pilots (for example, Yichang Municipality) have demonstrated that a formal approval procedure, in that case by the Municipal People’s Congress, is a good

¹ http://tpwd.texas.gov/landwater/land/programs/tourism/your_business/marketing/

- precondition for implementation.
- As Green Land becomes urbanized and also in regions with industrial scale intensive farming, green open space has become a “battleground” of different interests. Voices that defend the need of ecosystem functions continuously are seeking justification and creating strong concepts. Green space visions and concepts can help strengthen and defend green space protection under a compelling conceptually coherent concept, which can be integrated in spatial plans and green area protection. Examples include green belts such as around London, UK; regional parks, such as the Regional Park Emscher, Germany, including regeneration of former mining and industrial areas; formalised urban-rural patterns with green lungs and water elements, such as the Green Heart in the Randstad, the Netherlands; and Central Park, Hyde Park, Berlin Tiergarten, Englischer Garten Munich. Recently the European Union has agreed on implementing the concept of Green Infrastructures, as an umbrella for the above mentioned concepts, also including inner-city urban green spaces, habitat networks and possibly Blue Infrastructures, water bodies and their catchment areas.

1.4.3. Implementation and monitoring of environmental protection and management plans

For the implementation of environmental planning and protection a set of instruments can be used. Zoning ordinances and protected areas of different strictness levels and sizes are the most common instruments to protect the most valuable and sensitive environmental territories. In general, spatially defining general land use restrictions through planning improves the chance for mandatory specific actions and behaviour. Usually, conflicts and possible synergies between different land use interests are only revealed when specific areas are disputed and the need for finding solutions is acknowledged. Targeted economic incentives according to planning objectives, and success oriented incentives can be used in combination with legal restrictions or in areas of medium priority. Offset mechanisms and eco-compensation according to the polluter pays principle are a very effective means in order to implement the no net loss objective. Development operated by target driven development rights can check land conversion. Taxes, levies on environmental harmful action (internalization of external costs = polluter pays principle) will supplement legal limitations of emissions and land use.

2. Recommendations for the Institutionalization of UREMP

2.1. The principles and goals of UREMP institutionalization

The urban and rural environment master planning (UREMP) is a management and technical innovation as a new planning instrument, which plays an important role in promoting the coordinated development between the urban and rural in our country, protecting ecosystem services and promoting a coordinated spatial development.. UREMP is based on and strongly linked to existing legislation and planning instruments. The described status quo of environmental and planning legislation and institutionalization in the PRC (section 1.1 to 1.3) show the potential interfaces with UREMP and clarify the current gaps in the system. On this basis the main tasks of UREMP in the PRC emerge. These are:

- coordinate and integrate the spatial and sectoral plans, which already exist on all relevant scales/political levels (table 1, section 1.1., 1.2) of the PRC as well as integrate the existent environmental standards and control procedures;
- to express in a spatially explicit manner the environmental objectives (section 1.1, 1.2) and standards (section 1.3) embedded in legislation and environmentally relevant plans;
- to supplement existing environmental protection - which hitherto put an emphasis on the urgent problems of pollution - by strengthening the conservation of valuable and impacted ecosystem services and biodiversity – a goal which is expressed also in the new environmental protection law;

Thus UREMP will lead to integrated planning on the different political-administrative levels where spatial and environmentally relevant planning is already performed. The UREMP planning content can be worked out according to the needs of the specific level with division of the work in a way that the different contents each will be primarily shown on those planning levels on which they can cover the functional units where the problems have to be solved and where they can most effectively be implemented (level-specific tiering). This may in practice also include the close cooperation of adjacent political-administrative units. The most urgent need for UREMP seems to be in the fast growing municipalities or other dynamic urban agglomerations. In such areas UREMP pilots have already started.

Institutional innovation will be needed to achieve such effective inclusion of environmental objectives into spatial planning, in urban as well as in rural areas, . Such institutionalization of UREMP will include legalization, coordination mechanisms, institutions, procedure design and capacity building.

2.2. Accelerating UREMP Legalization

2.2.1. Establishing UREMP on Legal Basis

UREMP institutionalization builds on and complements present legislation and particularly the new environmental protection law already paves the way for comprehensive environmental planning on different administrative levels and for considering all ecosystem services and biodiversity. Nevertheless UREMP needs a more explicit establishment in the law. The current laws related to urban planning and land use include the *Urban and Rural Planning Law of the People's Republic of China* and *Land Administration Law of the People's Republic of China*. Among them, the former stipulated the scope of urban development, development-controlled area, development intensity and urban construction land etc; the latter implements the systems, such as land use administration, protection of fundamental farmland and compensation to land occupation, which emphasizes on the long-term control of fundamental farmland, and define a red line of 1.8 billion mu of arable land.

Although there are no explicit regulations on UREMP establishment in existing laws, there exist provisions related to environmental protection planning in the newly revised Environment Protection Law which can act as a fundamental basis, based on which regulation or management measures could be established to further strengthen the legal basis of UREMP. Article 13 of New Environment Protection Law stipulates: “Competent environmental protection departments of the State Council in conjunction with relevant departments formulate national environmental protection planning according to national economic and social development planning, apply for approval of the State Council, publish and then carry out the result. While **competent environmental protection departments of Local People's Governments at or above the county level in conjunction with relevant departments shall work out environmental protection planning of their own administrative regions** according to requirements of national environmental protection planning, apply for approval of People's Government at the same level, publish and then carry out the result.” (accentuation by the author). UREMP is fundamental in systematic environmental protection planning and this clause provides a basic legal ground for overall planning and other environmental protection planning formulation.

Furthermore, Article 18 of New Environment Protection Law stipulates: “People's Governments at or above the provincial level should organize relevant departments or entrust professional agencies to investigate and evaluate environmental conditions and establish resources and environmental carrying capacity monitoring and warning mechanism.”, which provides a legal ground for making overall planning of urban and rural environmental carrying capacity.

Article 29 of New Environment Protection Law stipulates: “Ecological protection red lines should be defined in key ecological function areas, ecological and environmental sensitive and fragile areas, etc. and strict protection should be implemented by the state. **People's Governments at all levels should take measures to preserve different representative natural ecosystem zones, natural distribution areas with rare and endangered wildlife, important water conservation areas, natural relics with enormous scientific and cultural value, cultural relics, old trees and famous wood species. Any damage is forbidden.**” (accentuation by the author), providing a legal basis for confirming urban and rural ecological protection red lines and strengthening urban and rural ecological function protection.

In addition, in Article 30: “Develop and utilize natural resources in a reasonable way, conserve biodiversity, safeguard ecological safety, and formulate and carry out ecological protection, restoration and management schemes in accordance with laws.”, supplying a legal basis for speeding up the improvement of urban and rural ecological function services.

2.2.2. Legislative Proposal to Further Strengthen UREMP Institutionalization

To clarify the legal status of UREMP can better impel China's UREMP work. Considering the situation that there are no clear rules in planning and environmental protection laws at present, but some general and indirect regulations, especially macroscopic regulations in revised Environmental Protection Law, diverse legislation ways can be adopted to strengthen UREMP legalization in China.

Scheme 1: Writing in content about urban and rural environment overall planning in relevant national legal regulation revision. First, since provincial environmental protection regulations must be revised and promulgated after the issue of generally environment protection laws, then urban and rural environment overall planning by prefecture-level cities is explicated in this

ordinances; second, clear and define requirements for key cities to formulate urban and rural environment overall planning in revision of *Atmospheric Pollution Prevention Law of the People's Republic of China* and other laws; third, in revision process of *Urban and Rural Planning Law* and other laws, clearly put forward urban and rural planning and other related planning as well as corresponding content in relation to UREMP.

Scheme 2: Declare legal status of overall urban environmental planning by relevant planning. One is to study how to bring requirements of overall planning formulation into the process of making *Thirteenth Five-year Planning of National Environmental Protection* and to require People's Governments at all levels to organize and work out urban and rural overall environmental planning; the other is to explore how to make regulations about UREMP ecological protection red lines when formulating *National Ecological Red Line Protection Planning*, including schemes of protecting ecological red lines, hierarchical classification control measures, ecological red line supervision, related policies, performance evaluation, etc., which can embody UREMP legalization content in the form of planning.

Scheme 3: Determine legal status of overall urban environmental planning through formulating and issuing departmental rules. The first is to formulate *National Environmental Protection Program Regulations* and other related guidance documents. Meanwhile, bring overall planning formulation content into them; the second is to summarize pilot experience of overall urban environmental planning, then formulate and issue “Instructions for Further Promoting Urban and Rural Environment Overall Planning”.

2.2.3. Promote UREMP Legalization through Local Legislation

Embody relevant regulations of UREMP in provincial and municipal laws and regulations. For example, issuing relevant guidance documents by Ministry of Environmental Protection of the PRC to suggest People's Governments at all levels formulating urban and rural environment overall planning, then the documents should be deliberated by People's Congresses at corresponding level, then printed, distributed and implemented by People's Government at the same level; People's Governments at all levels should bring requirements of overall planning formulation into these “Thirteenth Five-year” Planning, encompassing the *Thirteenth Five-year Planning of National Economic and Social Development*, *Thirteenth Five-year Planning of Environmental Protection*, etc., as well as guidance documents like *Formulation Guidance of Urban and Rural Environment Overall Planning* issued by all provinces. Overall urban environmental planning operated by cities can be passed and issued by People's Congress at the same level, so as to make the planning more binding and guiding.

Box: Overall Urban Environmental Planning of Yichang City in Hubei Province Has Been Passed, Issued and Implemented by Municipal People's Congress

Yichang city in Hubei province is one of the first 12 overall UREMP pilot cities confirmed by the Ministry of Environmental Protection of the PRC. The municipal government of Yichang attaches great importance to UREMP and all departments as well as district and county governments cooperate with each other actively to complete the work. Since its launched in January, 2013, the planning has been completed in two years. In January, 2015, Standing Committee of National People's Congress of Yichang has approved, issued and implemented the plan. In Yichang UREMP has achieved better constraining force and higher decision-making position as well.

2.2.4. Legal principles

The specific position of UREMP is that of a proactive, conceptual precautionary spatial planning, which covers and integrates all environmental compartments such as land, air, water, soil, flora, fauna etc. and all ecosystem services. Therefore UREMP needs to be independently legally anchored in the Environmental Protection Law of the PRC, which should be amended to include UREMP as a legally binding planning instrument. This requirement is urgent because already to date Articles 18, 29, and 30 of the Chinese Environment Protection Law cannot be implemented without a spatially explicit instrument such as UREMP. The legal basis of UREMP will require the implementation of the following principles.

- Carrying out UREMP should start in all municipalities and existing and planned city-clusters everywhere in the PRC, and within a certain period (i.e. within the 13th Five-Year Plan).
- Ultimately, every political level which sets up spatial environmentally relevant plans or takes important decisions on spatial issues should participate in UREMP.
- In this way the spatial scales of other plans (which on the one hand provide information for UREMP and on the other have to implement UREMP) are met and the task of UREMP to coordinate the different environmental sectors can be performed. The administrative structure and respective spatial plans for this UREMP institutionalization is already existent and will facilitate UREMP institutionalization.
- It should be mandatory to apply the environmental protection areas and zones, and the recommended environmental management measures, of a UREMP Plan when planning for economic, social, land use, transportation and other development. The general priority for environmental concerns can only be set aside by strictly predefined exceptions which are considered more important, such as human and environmental health, safety and security, or other vital public benefits which are conflicting with less valuable environmental concerns (an example of binding the weighing process is the Habitat Directive of the EU). If such projects cannot be avoided or located in environmentally less sensitive areas, it is essential to establish in the UREMP Plan offset mechanisms that require restoration of the ecosystem services destroyed by the planned project.
- Technical guidelines for UREMP have to be followed in order to ensure quality and comparability of assessments and planning results, and compatibility of digital mapping and information platforms and standards and documentation to enable coordination across jurisdictional boundaries and to facilitate the use of the information and plans in EIAs and for more detailed and for more regional scale planning.
- UREMP will be approved by standardized procedures, firstly by the government(s) which prepared the UREMP, secondly by higher levels of authority including provincial and national levels as applicable.
- Implementation of UREMP has to be systematically monitored and evaluated, and UREMP Plans should be updated every ten years, synchronized with but ahead of and subsequently integrated with the Urban Master Planning by the municipalities.

2.2.5. Legal context

UREMP legislation needs to be integrated with the existing legal system of environmental protection laws and regulations. When linking UREMP in the Environment Protection Law to these instruments, included in other legislation, the legal basis of mentioned related instruments should be revised by the same legislative act, strengthening support for implementation of UREMP. Particularly relevant will be offset mechanisms, monitoring and spatial control mechanisms. The key environmental protection laws and regulations are as follows.

- Regulations for pollution control including environmental quality standards, the total emission control system and discharge permits management. The present system creates good conditions for UREMP as there is already a spatial approach to emission control, by including the carrying capacities of the regions. UREMP can take existing national environmental standards as a basis for evaluation (i.e. existing upper limits of emission or environmental quality baseline) and it also should specify the standards for lower planning levels such as municipalities. Currently there are many environmental policies on pollutant control i.e. for water and air. Not all ecosystem services are currently covered by standards. It is recommended that UREMP establishes local and regional quality standards and threshold values for all environmental media.
- Total-amount control policies can use UREMP to scale down national targets to lower political levels (provinces, districts, local industries); total amount control policies should be extended beyond the subject of emissions to other environmental goods and services: For example urbanization rates, green-house-gas emissions, nitrate surplus, no-net-loss of biodiversity and organic soil, no-net-loss of farmland and forest, etc.
- The environmental monitoring system including health monitoring can be combined well with UREMP by using UREMP as an environmental information system. This EIS uses and feeds a common environmental information platform, which is the basis for updating UREMP objectives and measures. Environmental monitoring should be extended to function as ecological asset accounting system. Information for this accounting system can be provided by UREMP.
- Environmental assessments are reactive instruments, which respond to a planned project; they can rely on UREMP as an information basis and source of evaluation standards. An eco-compensation should be installed as a new instrument for offsetting environmental impacts caused by new development. This facilitates substantially sustainable development (BPE: German compensation regulation, EU Habitat Directive compensation mechanisms, US Swamp Buster). The compensation should be planned according to UREMP objectives.
- Environmental protection should be initiated by UREMP on the basis of a sound evaluation and prioritization of land functions leading to an appropriate implementation of UREMP objectives. On the other hand, UREMP has to incorporate existing protected areas.
- Existing economic policy instruments which can be used by UREMP are pollution charges and eco-compensation. The legal institutionalization of UREMP should mention them as means for implementation. If UREMP defines quantitative target loads for ecosystems, pollution fees could be used as a means for implementation. Eco-compensation can make the beneficiary areas of ecosystem services pay for ecosystem services above a minimum mandatory level of provision. The money goes to development limited areas.
- Environmental disclosure and public participation legislation should be connected to UREMP legislation. UREMP should have the duty to perform public participation as well as to provide information which is suitable for public participation.

The opportunity given by the upcoming revision of the national environmental law could be used to integrate UREMP into the existing environmental legislative framework. As a consequence, provincial environmental law also has to be updated – providing an opportunity to include concrete UREMP regulations at local level, which will support municipal, county and township level application of UREMP. Alternatively, either UREMP should be integrated as a goal into the 13th Five-year Planning of National Environmental Protection. This will require the PRC Government to implement UREMP at all levels or to introduce UREMP by issuing departmental directives.

Furthermore, the interrelation of UREMP with the Rural Planning Law, the Land Administration Law as well as with policy document such as the five year plans have to be defined both on the side of UREMP legislation in the Environmental Protection Law as well as on the side of the other legislations.

2.3. Establish and Improve UREMP Coordination Mechanism

Environmental master planning implemented in China is mainly based on the administrative divisions, such demarcation cannot fully cover the urban natural ecology boundary, like the UREMP of Guangzhou shows. Planning inside political administrative boundaries inevitably faces problems of spatial fit, which arise if ecological functional spatial entities or processes cross the administrative boundaries. Problems of fit also occur or if resources of relevance on bigger scales (nationally endangered species, heritage landscapes etc.) have to be handled. This problem can be met by two strategies which can also be combined: On the one hand cross-boundary ecological problems can be solved by cooperation of the affected neighboring political-administrative units (municipalities, counties). On the other hand the problem can be delegated to the political level which can handle it in terms of spatial expansion as well as in terms of competencies and responsibility.

2.3.1. Integrated UREMP Plans for Multi-City UREMP Areas

If the urban master planning covers the natural ecological boundary, it is bound to involve some inter-city, even trans-provincial agencies and sectors. In this case trans-regional and inter-sector coordination mechanism are indispensable. In this case the cities to implement the UREMP shall establish the comprehensive coordination system to coordinate relationship between the city and surrounding areas. When preparing and implementing the UREMP within city area, due to the administrative limits during coordinating the superior sector and surrounding cities, it is necessary to establish a coordination and advisory committee led by the mayor, communicate and coordinate the provincial departments and the surrounding cities and counties by form of consultation, and communicate and consult the development and implementation of the master urban environmental planning. A steering team led by the competent deputy mayor shall be formed to guide the formulation and implementation of such planning as a whole. The steering team consists of the leaderships from the departments of environment, construction, development & reform, and agriculture, etc. as well as County and District leadership under the jurisdiction of the city. The responsibilities of steering team cover the decision-making of overall environmental planning, internal coordination, division and implementation, etc. General office of a steering team is set under the environmental protection bureau.

The benefits of this such arrangement is that cross-jurisdictional cooperation is fostered and communication structures are built which may also be used for other purposes and other needs of cross-boundary planning. The challenge may be relatively weak incentives to reach agreement due to lack of institutionalized and required cross-jurisdictional cooperation. The need for UREMP to be arranged across jurisdiction is because different ecosystem services and processes have very different boundaries and spatial expansions. The habitat of a threatened species will not cover the same space as the catchment area of a water course. Thus decisions have to be taken about spatial priorities.

The Chinese pilot cities have gained experience in implementing UREMP by the local environmental protection bureaus. Experience with the interplay with higher operational and target levels already exists in spatial and economic planning. Cooperation of different spatial and political units which cross political boundaries is necessary if implementation tasks have to be solved which concern all involved parties. Such tasks may be common agreements on where to allocate industry or housing development across municipal borders, if misallocations are

provoked by incentives for example by different taxes across boundaries. Best practice examples include the regional associations in Germany or Portland's Growth Boundary..

2.3.2. Layered UREMP Plans in a Hierarchy of countervailing Influences

On the other hand, a multi-tiered planning system corresponding to administrative levels and aligned with scale-related planning and implementation responsibilities may be suitable for multi-tiered political systems like in the PRC. There spatial or different environmentally relevant planning is present on the different political-administrative levels. Multilevel planning systems work on the basis of shared labor between the tiers and can manage problems of fit across jurisdictional boundaries covering entire functional ecological areas. It is area-specific for all levels with specific lines on maps, and may function according to the principle of vertical mutual feedback. Examples are the federal systems of Switzerland with its 22 Cantons, and Germany with its 16 Provinces, and lower administrative regions, cities, and counties. Also the EU represents such a multi-tier political system. Here the competencies and responsibilities of the different political levels for protection and restoration of ecosystem services are defined mainly in hierarchical order for the different political levels according to the spatial extent of the ecosystems and the value of their ecosystem services. Examples for such streamlining of scale of problem and responsible administrative level/jurisdiction include the following.

- Rivers crossing administrative borders should principally be handled by the administrative level which covers the entire river-ecosystem, such as the national or provincial levels; for example the responsibility for the Yangtze river with its water quality and the retention capacities of its catchment area is and should be handled on national level because no other decision level is able to solve the full range of problems; legal emission standards and limits for water extraction make trading of emission rights, water usage rights between up- and downstream water users unnecessary.
- Further ecosystems that should be regulated and possibly managed on the national level are national parks, and nationally endangered and rare species. As an example, the legal and even the executive management responsibility for national parks in the USA lies with the national government.
- Examples for local level environmental management responsibilities are creeks, rivers with only local extension, locally rare species or habitats (which may be abundant at provincial level). This level includes all responsibilities for pressures that affect only locally valuable ecosystems services and/or local people.

A key principle of a multi-tiered planning system is that upper planning levels hand down specific thresholds, issues, problems which have to be dealt with on the next lower planning level. The lower levels pass more detailed information to the upper levels and may elaborate on and substantiate general objectives and thus ensure vertical integration. This 'principle of countervailing influence' acknowledges that the best information and contact with stakeholders exists on the local level. Thus it is differentiating the implementation of the principle of subsidiarity, which is applied in many different ways around the world. nevertheless, it is also acknowledged that local political driving forces often do not support higher level environmental interests and responsibilities. Should these be handed down to local communities strong obligations for including environmental concerns and control mechanisms by higher political levels are needed. Thus, responsibility on a higher level must not mean that this level has to undertake every single implementation task for the respective problem. Tasks can be delegated to lower levels but sufficient frame conditions and control mechanisms have to be installed. A best practice example is the supervision of urban growth boundaries by the State of

Oregon in the US. In general such layered environmental planning becomes more effective and more task can be delegated to low political administrative levels if binding environmental standards with blanket coverage (for example, for pollution control) ensure a certain minimum level of pollution control. Such regulations are then combined and supplemented by area specific regulations in spatial planning. The objectives and regulations laid down in spatial planning can be more specific and be put forward with more emphasis.

2.3.3. Integration of UREMP into the present planning system

UREMP Plans at different planning levels (corresponding to the other areas specific spatial planning instruments) support spatial decisions by clearly arranged information and arguments from a socio-economic as well as an environmental perspective. Solutions for conflicting interest will be developed in the process of UREMP from a technical perspective first. They will normatively be based on priorities in national legislation and national plans (National Main Functional Zoning and National Ecological Functional Zoning). It has to be considered whether the National Ecological Functional Zoning will be developed into a spatially explicit National UREMP, which comprises the national goals and spatial designations also beyond the designation of national parks. Conflicts which cannot be solved by spatial separation, clear prioritization of the importance of different concerns or finding synergistic measures will need political decisions in UREMP. Within such a framework of procedural rules UREMP planning designations will be integrated into both Urban Master Planning and Land Use Planning on different planning levels with priority to UREMP red line zones. UREMP red line zones will usually represent the objectives with priority from the next higher planning tier.

UREMP will not have to cover every environmental topic or deal with every spatial unit at every planning tier. Share of labor in this respect is a requirement of efficiency and helps to avoid unnecessary redundancies and conflicts. The local political level which is most important for implementation should primarily be in charge for UREMP which can be the cities with different political status, counties and townships. Nevertheless, at higher planning tiers selected issues of national, provincial or regional importance will have to be covered. Such contents have to be included by the subordinate planning tiers, and taken as prerequisite for their plans. The national or provincial objectives can but must not necessarily be implemented by national or provincial executive institutions and instruments. Implementation can be delegated to the city/township level if respective instruments as well as monitoring and control mechanisms are in place (2.1.4 and 2.1.5). Table 4 proposes contents which should be included in UREMP on national, provincial or regional level.

Table 4 Share of Labor between Different UREMP Planning Tiers

UREMP content	National	Provincial/ Regional	Municipal/ Local
Legislation about emission standards for industry, traffic, households and land uses, total amount policies; general ban on building in flooded areas, nationally endangered and protected species and habitat types, geological sites; general protection of organic soils (no draining, grassland protection),...	National legislation		
Spatially explicit ecological protection red lines zones of national importance: National air restoration zones with specific emission standards, National parks, national natural or cultural heritage landscapes, Important areas in big water sheds (expanding over provincial borders), which require stricter emission standards or should not be built up because of river	National UREMP or upgrading of national environmental protection planning, national ecological function zone planning; integration into: national urban system		

water quality and flood protection, protection of areas with nationally important fertile top soils, ...	planning, land use planning, mineral resources planning		
Legislation on regionally rare and endangered species, habitats,		Legislation	
Regional parks, nature protection reserves, drinking water protection areas, regional heritage landscape areas, recreation areas		Provincial UREMP or upgrading of provincial environmental protection plan and function zoning. Integration into provincial land use, mineral resources planning	
Local nature conservation areas and objects; local habitat networks; urban parks/urban rural recreational areas; locally important drinking water reserves; Smaller water bodies with local extension and protected riparian strips....			UREMP. Integration into: Economic and social development plan, urban major function oriented zoning, environmental protection plan, municipal air quality function zoning, urban master plan, modern agricultural development plan, water resource protection planning, forest planning, transportation and infrastructure planning....
Zones with further land use restrictions on agriculture, forestry			
Urban development limitations			
Local emission restriction zones; differentiated development types such as industrial, living, mixed/commercial, etc			

The List is not exhaustive. Everything which is not dealt with on the national or regional tiers has to be dealt with on municipal level. Implementation can be delegated to lower executive levels

The provincial/regional and the municipal level can increase and differentiate restrictions and zoning given by upper levels but cannot fall behind higher tier planning designations. Differentiation and proposed corrections are communicated back to the higher levels (counter flow principle).

Even if a good share of labor is established between planning tiers, a many coordination tasks will remain for efficient implementation, the following tasks in particular.

- Horizontal coordination mechanisms are needed to overcome the demarcations between sector administrative divisions; UREMP itself may support in the future a better coordination, because sectoral administration will have to work together on compiling the necessary information and agree on multifunctional environmental zoning. A common environmental information system is a very good but hard to achieve means to this end. Steering teams led by the competent deputy mayor and consisting of competent departmental representatives can support cooperation on municipal level; multilateral planning integration is already jointly operated by the National Development and Reform Commission and different ministries.
- The mutual implementation of traffic, industrial and housing development by neighboring cities or between a city and the surrounding rural area needs coordination in order to avoid destructive competition or one-sided exploitation; cross regional planning bodies, who are given executive power for selected issues, may support such integrated development concepts. At the same time, UREMP will already be a means for automatically achieving better cooperation in this case: many cross border conflicts will already be decided on higher planning tiers; the exchange of information and data will be a common interest; performing executive tasks together will save capacities; and bilateral planning of specific infrastructure and industries will be of mutual benefit if there are no contrary incentives.
- The vertical coordination of planning objectives across planning tiers needs a good flow of information in both directions as well as regular meetings of representatives of all planning levels.

2.4. Establish and Improve Institutional Mechanism of Formulation and Implementation of UREMP

Urban and rural environment overall planning formulation aims to build up a complete system under unified leadership of governments, comprehensive coordination of environmental-protection departments, positive cooperation of all departments, areas and countries, supervision and suggestion of National People's Congress and Chinese People's Political Consultative, leadership of experts, supported from technical units and public participation. Competent environmental-protection departments of superior People's Governments should guide and support the formulation and implementation of urban and rural environment overall planning. At present, the regulatory framework to promote institutionalization of overall environmental planning is still deficient. First, the organization mechanism led by the government, negotiated by all departments and required by overall environmental planning are still not sufficient; second, relevant regulations on planning approval and record are not perfect; third, there is no scientific supervision and evaluation system, thus it is difficult to ensure effective implementation of the planning. Therefore, in order to establish a management mechanism for the formulation and implementation of planning, several suggestions are listed as following.

Explicating subjects of overall environmental planning formulation: Municipal People's Governments should be the main body. Urban and rural environment overall planning formulation should be under the unified leadership of Municipal People's Governments, comprehensive coordination of municipal environmental-protection departments and cooperation of departments and country governments in corresponding jurisdiction. A work steering group should be established by Municipal People's government to comprehensively guide planning formulation. Entrusted by Municipal People's Government, competent municipal environmental-protection departments can assume organization and coordination work of planning formulation. All departments should actively participate in and support planning study and formulation according to their own functions. Besides competent municipal financial departments should classify planning study and formulation fees into annual financial budget of government at the same level.

Improving organization mechanism of planning formulation: According to requirements of Municipal People's Government, planning formulation task should be proposed by the Municipal Environment Protection Bureau, and preferably undertaken by the municipality in-house, resulting in ownership and understanding of the plan. If a municipality does not have the competencies and capacities to prepare a UREMP Plan some specific tasks may be outsourced. Letting a tender by bidding is dangerous, as it usually leads to a quality problem if the city council is not interested in the accuracy of results. In Germany therefore a (national) governmental directive exists in which minimum prices for certain planning tasks are defined. Technical support units with relevant qualifications can be entrusted to take technical work in planning formulation. Agencies which take planning formulation work should have relevant qualifications in environmental consultant field and the units should have senior technical personnel with reasonable professional structure. Project leaders and technical teams should possess experience related to UREMP and be capable to provide technical support for environmental planning and management. Implementation outline, research report and other planning texts are needed to be discussed and proved by experts without exception. In addition, Ministry of Environmental Protection of the PRC sets up expert database of urban and rural environment overall planning, so that People's Governments of pilot cities can choose experts from the database to participate in planning and planning outline discussion.

Perfect working mechanism of planning formulation which contains two stages – planning outline and formulation: First of all, outlines should be established to confirm primary scheme in relation to basic concepts, general goals, technical methods and spatial layout of the plan. Planning text should be written according to plan outline discussed and approved by experts. As for major problems related to urban development, such as resources and environmental carrying capacity, ecological protection red lines, etc., competent municipal environmental-protection administrative departments should organize experts to carry out monographic study and argumentation. They should also ask opinions of relevant departments and the public and hold hearings in terms of planning content directly related to legal interests of citizens, legal persons and other organizations. At the hearing, public opinions should be fully listened and public opinion solicitation should run through the whole planning formulation process.

Establishing planning approval mechanism: The Municipal People's Government organizes plan analysis on the basis of an agreed outline, then plan formulation units make revision and improves overall planning in light of investigation suggestions, and finally for approval. After the final plan is submitted to Municipal People's Government and was discussed and passed by Standing Committee of People's Congress at the same level, it can be distributed and carried out by Municipal People's Government. Urban and rural environment overall planning of municipalities directly under the central government, cities specifically designated in state plan and provincial capitals should be investigated and discussed by competent environmental-protection departments of the State Council and submitted to the State Council for examination and approval. The conservation, response and development measures proposed by the plan should be differentiated into those which have or need clear political legitimization (mandatory objectives) and those which are more open to alternatives and variation stemming from public participation, implementation conditions and uncertain future development of frame conditions. The latter call for adaptive and flexible planning objectives and implementation pathways, which react to changing conditions by an iterative process based on feedback loops.

Setting up planning implementation and supervision mechanism: Mandatory content confirmed by overall urban environmental planning should be implemented throughout government's comprehensive decision-making, urban construction, resource exploitation, economic development and other activities. In terms of main planning content, Municipal People's Government can entrust competent municipal environmental-protection departments to make periodic assessment and the results should be reported to Municipal People's Government and National People's Congress.

Establishing planning implementation evaluation mechanism: To evaluate implementation condition of the planning and its effect on economy and society. Assess the social and economic benefits and potential negative social and economic effects of urban and rural environment overall planning based on sustainable development of urban and rural human settlement environment evaluation as well as urban and rural suitability analysis, at the same time, put forward measures to eliminate negative impacts. For social effect assessment can run through the whole planning process, public participation in it should be strengthened and relevant technical researches on it should be conducted. Carry out ecological environment benefit evaluation of urban and rural environment overall planning to assess ecological environment benefit, protection of significant environmental functions and implementation of planning tasks since operation of planning evaluation.

Strengthening organization and guidance of urban and rural environment overall planning: Competent environmental-protection departments of the State Council and all Provincial People's Governments (autonomous regions and municipalities directly under the central government) should strengthen their guidance and control of overall urban (urban and rural areas) environmental planning. Summarize formulation experience of urban and rural environment overall planning of all cities, make and complete management regulations, rules of technical methods and planning implementation methods, and propose legislative suggestions for urban and rural environment overall planning. Participate in the planning discussion and receive planning record.

2.5. Establish a UREMP Supporting System

Taking UREMP as a platform, improve the current environmental-protection management policies on the basis of management differentiation, promoting planning implementation by policies. First, make a comprehensive analysis of ecosystem functions and services as well as the sensitivity against different pressures, the existent situation of pressures on the environment, the bearing capacity for specific pressures on specific functions on specific ecosystems, total , such as pollutants, nutrient application, deforestation, urban developments, etc. Second, rationally confirm urban and rural environment function orientation, providing basic environmental guidance for urban and rural industrial layout, economic and social development, spatial layout and structural adjustment. Third, environmental management policies of our country, such as total amount control, ecological compensation, etc. need to be docked with related content of UREMP. Meanwhile, corresponding environmental management policies should be established to realize the planning content when implementing UREMP.

Formulate the policy of environmental spatial management and control. The red line of ecological functions and the baseline of environmental quality are the basis for the regional resource exploration and the establishment of projects. The relevant planning, resource explorations and the establishment of projects shall match the scheme of ecological functional red lines and the environmental quality baseline, and focus on arguing whether the spatial arrangement, scale, and the types of the industries meet the requirements of the planning control. Strengthen the connection between the assessment of areas protected by the red lines and policies, establishing the integrated system of urban environmental resource management, which is based on the three red lines of ecosystem protection. Gradually prohibit the industries that discharge the pollutants to the atmosphere and water system that are marked within the areas enclosed by red lines. The required dimension of the spatial control of industries will depend on the national level of mandatory pollution thresholds. If those are strict, the need for action will be low in sensitive regions. If general pollution standards are lax, the need for action will be high in red line zones. Nevertheless, it has to be considered that there is a trade-off combined with very strict general standards. Some pollutants such as nutrients are harmful only in sensitive areas and it may be less cost-effective to define marginal general restrictions and define strict specific restrictions only in the sensitive areas under red line protection.

Improve total amount control policies. Strictly carry out control policies of total emission amount of major pollutants issued by the state and provinces, share requirements of emission control of major pollutants to various districts, countries and key industries. Adjust measures to local conditions and optimize total amount control policies from bottom to top on the basis of sub-stream basin and unit delicacy management and starting from environmental quality. Total amount control is supplementing general/national emission thresholds. It is needed because emission thresholds will regulate only single polluter and not control the summative effects of a

growing number of emitters. With total amount control space crowding effects are prevented.

Formulate the policy of environmental risk prevention. Implement the control mechanism; forbid and warn the relevant activities in the areas enclosed by red lines and yellow lines respectively. Determine the major responsibilities of environmental risk preventions, the new project must implement the assessment of environmental risk. The facilities of environmental risk prevention should be included in “three at the same time”, the existed projects have to be launched the assessment of environmental risk, list the sources of environmental risk and manage the pollutants with the specific classifications. Establish the mechanism about the assessment of environmental loss and the compensations of environmental damage.

Establish monitoring-warning system for environmental-resource carrying capacity.

Where feasible, measure, calculate and evaluate resources and environmental carrying capacity for places. In certain cases, carrying capacity may be estimated for regions, for instance where there are legislative standards for the share of water bodies that have to be in good condition. Analyze resources and environmental bearing pressure and changing trends of different areas, and establish disposition and management mechanism including monitoring, assessment, scheduling, early warning, etc. Combine resources and environmental carrying capacity monitoring and warning system with planning and project environmental impact assessment, total amount control, emergency monitoring, etc. Optimize environmental management policies based on regional and time difference of resources and environmental carrying capacity. Evaluate the budget of carrying capacity of water, land and atmosphere in different districts and counties; analyze the status of environmental carrying capacity and changing trend in different areas. Then, establish the processing mechanism with monitoring, assessing, changing, and alter. Combine the emission control and monitoring alter of environmental resource carrying capacity, strictly implement the policies of the emission control of major pollutants. Integrate the reduction of major pollutant emission and the structure of urban industries, adjust the major industrial scale and structure, and put the target of reducing emission at the first place. According to the carrying capacity of environmental resources of each stream and areas, it requires to formulate the characteristic policies about the control of pollutant emission.

Build environmental space management and control policies. Ecological function red lines and environmental quality baselines designated by planning should be taken as the fundamental basis of regional resource development and project construction. At the meantime, strengthen the cohesion of ecological red line protection space assessment with policies and build an urban resources and environment comprehensive management and control system on the basis of three ecological protection red lines. Planning and project environmental impact assessment, backward production facilities, environmental risk prevention, pollution reduction, etc. should be managed differently relying on different requirements of the three red lines.

Establish management system of environmental quality assessment. Set up environmental management policies focusing on environmental quality assessment, increasing index weights of environmental quality assessment in each district and county. Monitor and evaluate air and environment quality, centralized drinking water quality, water quality in transition section between districts and countries, etc. and publish monitoring results to the public.

Establish environmental risk prevention policies. Implement management and control mechanism of environmental risk red line area prohibition and yellow line area alerting. Establish mechanisms related to environmental risk assessment, environmental damage assessment and environmental pollution damage compensation.

Improve eco-compensation policy. Formulate the policies about the compensation of the land use for the ecosystem purpose; compensating the residents who live in the areas enclosed by the red line of ecological functions and water quality. Formulate the policy of eco-compensation about the protected areas of drinking water resource. Establish the mechanism of eco-compensation about natural protected areas; enhance the construction level of protected areas and compensate the citizens who are affected by the relevant activities. Formulate the compensation policy about the equalization of environmental public services; compensate the areas which cannot reach the standards of basic public services about environmental monitoring and relevant environmental facilities. In order to equalize the environmental public services in the urban areas, for those areas cannot reach the standards of public services, it could imitate the government to purchase the services from the society.

Establish ecological assets accounting system. Construct a series of ecological assets accounting system composed of ecological assets statistics, valuation, account balance and reports. Set up technical support institutions of ecological assets at the central level, study and formulate technical specification of ecological assets assessment, strengthen ecological assets regulation and establish talent training and follow-up training mechanism.

2.6. Reinforce Planning Connection and Capacity Building

2.6.1. Improve Planning Connection System

Consummate connection institution of overall urban environmental-protection planning and other urban planning. Strengthen the connection of urban and rural environment overall planning with national economic and social development planning, overall urban planning, overall land planning, main functional area planning etc. with respect to five aspects: These are planning system, planning objectives, spatial layout, management policies and planning data. UTREMP will be an important means for streamlining the different plans and integrating environmental considerations. Insist on environment priority according to legislation and process rules and confirm ecological protection red lines, environmental quality baselines and resources and environmental limitation, especially in constraining force index, spatial layout and space control, providing fundamental environmental basis for other planning formulation.

Improve department connection institution of overall urban environmental-protection planning formulation and implementation. Establish coordination and connection institution of technics, data and schemes required by planning among Environmental Protection Department, Ministry of Land and Resources, Urban and Rural Construction Department, etc. For example, Urban and Rural Construction Department designates basic ecological control lines, while Ministry of Land and Resources masters fine spatial data and develops a number of technical specifications, such as making detailed specification on figure types, drawing board and other requirements. In order to improve planning connection system, it is necessary to establish and complete institutions linking to each department and planning, and be fully connected and integrated with planning of each department form essential data map, specification of spatial database, spatial hierarchical control technology, planning levels, planning objectives, planning schemes and other aspects.

2.6.2. Enhance Capacity Building

Build basic data platform of overall urban environmental planning and integrate essential data of environmental fields, such as environmental monitoring, environmental pollution source

investigation, environmental supervision, environmental functional district planning, ecological monitoring and evaluation, etc., integrating data in relation to basic geographic information, national economic and social development, relevant resources and energy, urban planning and construction, etc. Establish and improve standard data system, classification and grading system as well as planning, application and control system of urban and rural environment overall planning, and tightly combine achievements of the planning with decisions and management of urban development, economic construction, resource exploitation and environment protection. At the meantime, reinforce software, procurement and simulated information platform construction of planning formulation.

Enhance capacity building of UREMP preparation units. UREMP should first be undertaken by provincial environmental planning agencies (including autonomous regions and municipalities directly under the central government) which built up qualifications and abilities. These units should set up an environmental planning team with complete business areas, professional skills and reasonable personnel structure and equip with necessary instrument and equipment, service system and modeling tools. Meanwhile, the professional teams should receive UREMP training for the purpose of better finishing UREMP preparation tasks. UREMP on lower political-administrative levels can draw from the competencies built up on provincial level.

2.7. Proposal to Promote UREMP in the 13th Five Year Plan

The technical standards of planning should be enhanced continuously in order to tackle the increasing challenges of environmental protection. The first step to this end is to comprehensively summarize planning formulation, implementation and management experience as well as technical methods of 24 pilot cities. The second is to speed up research on technical specification of overall environmental planning, strengthen technical summary and extract, and summarize and improve key technics and methods in overall urban environment planning researches and practices as soon as possible, so as to form technical specification of overall urban environmental planning formulation.

Promote the formulation and implementation of UREMP. Taking overall environmental planning formulation as key task of the 13th FYP. It is suggested to first conduct overall environmental planning formulation in a batch of typical cities selecting from national environmental-protection model cities, key national environmental-protection cities, key cities involved in air and water pollution plan and cities in newly established areas and districts, expanding the scope of implementation.

Explore to establish UREMP management system. Further perfect management policies of overall environmental planning formulation, discussion, approval, implementation, evaluation, assessment, etc., and gradually establish legal status of the planning. It is suggested that overall environmental planning should be discussed, approved and implemented by Municipal People's Congress at the same level and its formulation of key cities should be reported to Ministry of Environmental Protection of the PRC for record.

Actively promote UREMP to participate in “multi planning integration”. In cities and counties, explore and promote “multilateral integration” jointly operated by National Development and Reform Commission, Ministry of Land and Resources of the People's Republic of China, Ministry of Environmental Protection of the PRC and Ministry of Housing and Urban-Rural Development of the People's Republic of China (MOHURD), realizing environmental priority and organic link, especially in spatial function layout, resources and environmental carrying

capacity constraints and other aspects.

Promote the 18 city clusters to formulate UREMP. Based on the key development areas, the 18 city clusters regulated in the *National Main Functional Zoning Plan*, formulate UREMP for the cities located in the 18 city clusters jointly or separately.

Build knowledge sharing and innovation platform of UREMP. Firstly, innovate planning formulation mechanism and work out planning in an open way by absorbing opinions of local pilot governments, research institutions, relevant experts and representatives of local residents maximum, ensuring that the policies conform to actual local situation and laying a foundation for planning implementation. Secondly, share achievements of project researches and practices by relying on existing domestic and international cooperation platforms. Thirdly, expand financing channels of planning formulation, raise fund from central government, local governments, international agencies, etc. and support the promotion of overall environmental planning and achievement application.

2.8. What will UREMP look like as a new planning institution?

2.8.1. Content of the plans

UREMP will consist of, first, a data analysis and, second, an evaluation of the state of all ecosystem services as well as pressures and impacts. This will include natural productivity for crops and fiber (especially natural soil fertility), renewable energy potential (solar, wind), water provision, storm water retention, GHG-storage, biodiversity and cultural ecosystem services, and bioclimatic services. The evaluation results reflect to which degree the state of the environment can fulfill objectives and targets laid down in legislation and how many emissions and other pressures impair the functioning of the ecosystems. Also the sensitivity of the ecosystems/ the provision of ecosystem services against certain pressures is assessed. This is a basis for the projection of future impacts of pressures and thus supports not only precautionary protection measures but also future Environmental Impact Assessments. From evaluation results spatially explicit objectives and targets are deduced. In order to support UREMP's status and implementation, content of UREMP should relate to environmental policy mechanisms such as total amount control or eco-compensation which are influential and established.

The most prominent results will be a zoning concept including red, yellow and green line zones, representing different valuable and endangered or impaired areas. Priorities for the responses usually are deduced from the value and endangerment of the ecosystem services. Areas with predominantly highly valuable assets such as very important water resources or endangered species and habitats have to be protected in nature reserves in the context of legally binding red line zones. The red line zones will be differentiated into areas with different necessary land use restrictions. In areas of predominantly medium valuable ecosystem services, selected impairing land uses should be restricted beyond minimum legal land use restrictions or emission standards in order to safeguard the functioning of ecosystem services. These areas can maintain multiple ecological services and provide concepts for multifunctional measures. Small areas of high value can be strictly protected inside yellow line zones. Urban development of relevant scale should be excluded in such zones because sealing the soil destroys the ecosystem functions.

Green line zones represent areas with dominant lower value of ecosystem services. Minimum protection standards are provided by legal emission thresholds, minimum requirement on good land use practices and environmental quality baselines. Generally urban development is possible but also here on specific sites a stronger protection level and exclusion of development or

certain industries is possible. The recommendations are discussed in early planning stages in a multi-agent process, including public participation. In all zones restoration of impaired sites may be an important task for the future.

2.8.2. Ensuring quality of plans and implementation

The basis of UREMP will be the building of a comprehensive *data platform* with essential data about all environmental media from air to flora and fauna, relevant evaluations and objectives, pollution sources and other pressure as well as existing relevant planning designations of other plans. At the same time the development of standard methodologies for evaluation on different scale as well as respective software developments should be promoted. *Methodological standardization* and support is an important means of ensuring the quality of the plans. The *mandatory content* of UREMP should be prescribed by national legislation or sub-statutory provisions. Another basic precondition is to *improve capacities* for UREMP preparation units in terms of knowledge, training (UREMP training schemes), finances and personnel.

Quality assurance mechanisms include also building a *knowledge sharing and innovation* platform for the dissemination of innovative solutions. Most importantly, *environmental monitoring and control of compliance* with legislation and targets of higher political levels will support the quality of planning and decision processes. The monitoring system should include environmental quality assessment. Furthermore, the design of *planning approval* processes will play an important role in ensuring compliance. Planning decisions taken by local or regional bodies can be approved by higher political levels: People's Republic governments should submit the proposed UREMP to the Standing Committee of the People's Republic Congress at the same level or for discussion to the competent environmental protection departments of the State Council and for approval to the State Council. The *assessment of ecological, social and economic benefits* of UREMP outcomes will support further development of UREMP but most importantly strengthen its status in the political system.

2.8.3. Preparing UREMP implementation

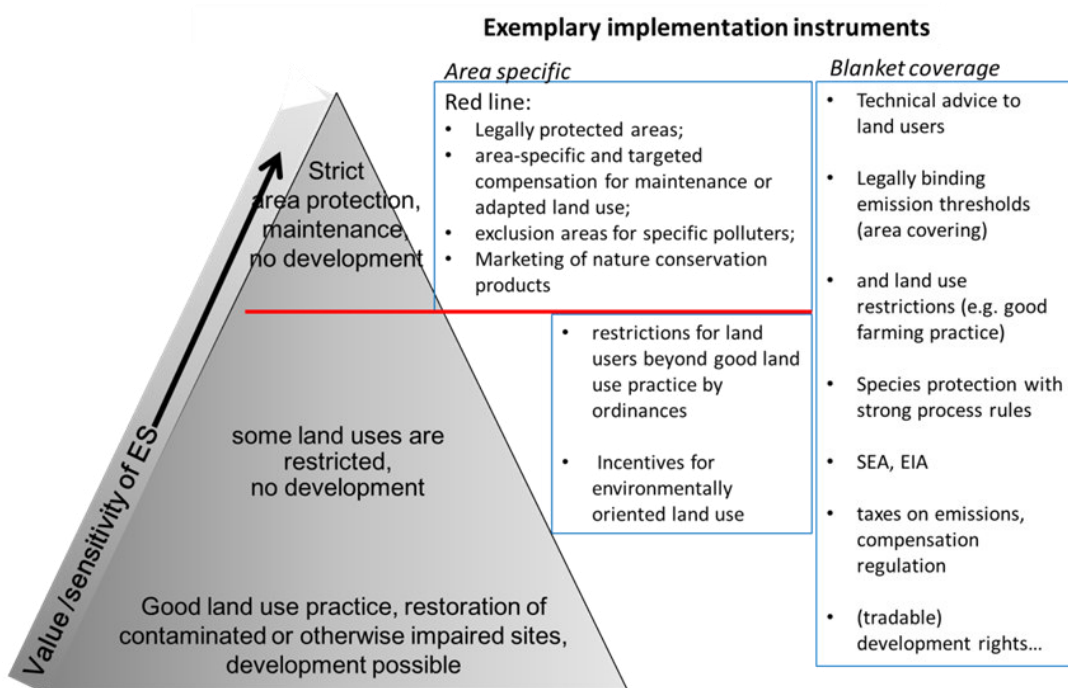
In order to be effective, UREMP must be given a strong institutional status. The implementation can be executed (i) by the mandatory status of the environmental zoning; (ii) by integration of the objectives and restrictions into economic and social planning instruments and (iii) by using existing instruments of implementation) and developing new mechanisms. Figure 2 gives examples for implementation instruments to be used in the different environmental zones.

It is crucial, that the legislative establishment of UREMP will include links to environmental implementation instruments and vice versa. For example, the existing Eco-compensation should be bound to UREMP planning designation. Thus, the need of a region for support is proven and can be compared to other regions. Accounting systems can support such prioritization for implementation. Area protection in nature reserves should be based on such UREMP evaluations of protection needs too.

The introduction of UREMP is a strategic task which has to account for the flow of decisions in the Chinese planning system. The steps may be to first summarize good arguments for UREMP also using the experiences from the Chinese pilots and demonstrating that UREMP is technically manageable. The establishment of UREMP as a key task in the 13th Five Years Plan and in the environmental protection legislation will also be crucial steps. Further stages may be to start UREMP in the 18 city clusters, build the environmental information as well as

the knowledge and innovation platforms including standardized mapping and assessment methods, to provide the financing and to initiate training schemes

Figure 2: Instrumental Options for UREMP Implementation in Red Line Zones and beyond



3. Administrative arrangements for UREMP

3.1. Arrangements in pilot cities

All municipal departments including Development and Reform Commission, Land and Resources Bureau, Urban and Rural Planning Bureau, Water Conservancy Bureau, Forestry Bureau, Road Transport Bureau, etc play an important role in the process of formulating UREMP of pilot cities. Furthermore, county-level governments and departments also play a role to certain degree. A planning formulation kick-off meeting participated by representatives from all relevant municipal departments shall be held to determine formulation tasks of overall environmental planning. At the conference, first of all, confirm overall environmental planning along with overall urban planning, overall land use planning, and other specialized department planning are on the same level and explicate the link of overall environmental planning with various planning in general goals and city function orientation. Development directions and targets, spatial planning, restrictive requirements, etc. related to each relevant field put forward by each department should be introduced in overall environmental planning as important content. National and provincial relevant agencies will provide necessary guidance, suggestion, and coordination among different sectors and regions during the UREMP formulation, approval and implementation.

The compilation of UREMP should hold symposiums with each department respectively, ask for related information and do a better handover job in urban spatial control, basic data, base map and other aspects. The following table lists internal units and responsibilities in relation to ecological environment protection, roles in UREMP formulation, content to connect with UREMP in relevant planning, etc. of different national, provincial, and municipal agencies. In addition, Municipal People's Government shall organize and set up a work steering group which is responsible for organization, guidance and approval of planning formulation.

Where the UREMP of a city is solely the responsibility of the city government, there are links to surrounding cities which require coordination between the city and the surrounding cities. In order to facilitate such dialogue and coordination, it is suggested that a consultative committee be set up. The consultative committee consists of senior officials such as mayors or vice mayors from the surrounding cities. The committee is designed to solve the trans-boundary planning issues such as joint protection zone and water quality management.

Table 5 Administrative Arrangements for Different Levels of Agencies to carry out UREMP

Department	Planning	Internal Units Involved in Environmental Protection Planning	Function of Relevant Internal Units	Roles and Functions in UREMP Formulation and Implementation	Content to Connect with UREMP
National level					
Ministry of Environmental Protection	National environmental protection planning, National ecological function zone planning etc.	Department of Planning and Finance	Organize the formulation and implementation of national environmental protection planning and environmental function zone planning	Provide technical guidelines, training, and suggestions for specific UREMP formulation, help on coordinating with other ministries	UREMP related content in the National Environmental Protection Planning
Ministry of Housing and Urban-Rural Development	National urban system planning	Department of Urban-Rural Planning	Establish the policy and regulation for the formulation of urban-rural planning; Organize the formulation and implementation of national urban system planning; guide and supervise the formulation and	Provide suggestions on the UREMP formulation, and help on its connection with urban master	UREMP related content in the National Urban System Planning

			implementation of urban-rural planning; undertake examination and supervision of urban-rural master planning and provincial urban system planning	planning	
Ministry of Land and Resources	National land use planning, annual land use plan, mineral resources planning etc.	Department of planning	Formulate and implement comprehensive planning (land and resources, land use, mineral resources, and geological environment etc.	Provide suggestion and coordination	UREMP related content in the National Land Use Planning
Provincial level					
Department of Environmental Protection	Provincial environmental protection planning, provincial environment function zoning, etc.	Planning and Finance Division	Organize the formulation and implementation of provincial environmental protection planning and environmental function zone planning and review specialized environmental protection planning and environmental protection content in comprehensive planning.	help on coordinating with other provincial agencies	UREMP related content in the Provincial Environmental Protection Planning
Department of Housing and Urban-Rural Development	—	Urban-Rural Planning Division	Establish the policy of provincial urban-rural planning, and guide its implementation; guide the formulation and implementation of local planning; approve the urban-rural master planning and provincial and key regional urban system planning	Provide suggestion and coordination	—
Department of Land and Resources	Provincial land use planning, annual land use plan, mineral resources planning etc.	Planning Division	Formulate and implement provincial comprehensive planning (land and resources, land use, mineral resources), annual provincial land use plan	Provide relevant provincial or regional (if necessary) database and base map, overall land use planning, annual land use plans and other documents, give suggestions to UREMP formulation.	Provincial or regional (if necessary) land utilization index control and prohibited development area zoning
Municipal level					
Municipal People's Government	—	Financing Budget Office and Urban Development Section of Research Department	Responsible for investigation and research, message management, meeting arrangement and supervision of development plans and other aspects; besides, they are in charge of investigation and research of major problems in urban and rural planning, construction, land and housing, water affairs, environmental protection, urban management, etc. and put forward policy suggestions.	Establish and organize work steering group responsible for organization, guidance and approval of planning formulation.	—
Municipal Development and Reform Commission	National economic and social development planning and urban major function oriented zoning	Development Planning and Resources and Environment Department (Branch)	Organize to work out municipal regional economic development planning; coordinate important problems of ecological construction, environmental protection, energy conservation and emission reduction, resource saving and response to climate change; organize to formulate and implement planning to response to climate change.	Provide national economic and social development planning (plan), main urban functional zone division and other documents, for giving suggestions to UREMP formulation.	Pollutant emission reduction targets and prohibited development zone protection
Municipal Environmental Protection Bureau	Municipal environmental-protection planning, ecological city construction planning, municipal environment and air quality function zoning, etc.	Financing Planning Section (Branch)	Organize the formulation and implementation of municipal environmental protection and ecological construction planning and review specialized environmental-protection planning and environmental protection content in comprehensive planning.	Entrusted by Municipal Party Committee and Municipal Government, they are responsible for organization, formulation and coordination of overall environmental	As a strategic and guiding planning, overall environmental planning is the foundation of any other specialized environmental planning.

				planning.	
Land and Resources Bureau at Municipal and Country Level	Municipal land utilization overall planning and annual land utilization plan	Planning Section (Branch)	Formulate and implement comprehensive planning of the whole city's territory, land utilization, mineral resources, geological environment, etc; instruct and review relevant national land and resources planning in accordance with laws; work out annual land utilization plan; and take part in urban planning and other specialized planning.	Provide relevant database and base map, overall land utilization planning, annual land utilization plans and other documents, give suggestions to UREMP formulation.	Land utilization index control and prohibited development area zoning
Urban and Rural Planning Bureau at Municipal and County Level	Urban master planning	Planning Formulation Section (Branch)	They are in charge of administrative examination, approval application and approval of urban planning formulation projects; participate in land utilization overall planning formulation.	Provide relevant database and base map, overall urban planning documents, and give suggestions to UREMP formulation.	Spatial protection of the "blue line, green line, purple line, etc." in overall urban environmental planning, prohibited development area zoning, layout and settings of urban public pollution treatment facilities
Municipal Agricultural Bureau	Special planning of municipal modern agricultural development, protective cultivation project construction planning, grassland protection construction and utilization overall planning, mineral resource planning, etc.	Financing Budget Section (Branch)	Organize to draft medium and long term development planning and annual plan of agriculture and rural areas.	Provide relevant database and planning documents, give suggestions to UREMP formulation.	Cultivated land protection, prime farmland protection and mineral development and protection
Municipal Water Conservancy (Water and Electricity) Bureau	Water resource protection planning, urban water conservancy development planning, urban fishery industry development planning, etc.	Financing Planning Section (Branch)	Formulate municipal water resource development and strategy planning, and formulate comprehensive planning, professional planning and special planning of major municipal water conservancy.	Provide relevant database and planning documents, give suggestions to UREMP formulation.	Water resource conservation and comprehensive utilization, drainage basin red lines, water resource red lines and flood control
Municipal Forestry Bureau	Urban garden plant development planning, forest city construction planning, relevant afforestation and plant plan, ecological public-welfare forest management system, wetland conservation planning, etc.	Financing Budget Section (Branch) and Resource and Forest Administrative Division of Regulation (Branch)	Draft relevant municipal forestry development planning and plans; organize and guide the establishment and implementation of ecological compensation system of forestry and its ecological construction.	Provide relevant database, base map and relevant urban forestry development planning documents, give suggestions to UREMP formulation.	Animals, plants and other biological resource system conservation
Municipal Transportation Bureau (Commission)	Comprehensive urban transportation planning, urban public transportation development planning, transportation infrastructure planning, etc.	Development Planning Section (Branch)	Draw up, organize and realize highway and waterway transportation industry development planning as well as annual plans; participate in the formulation of overall transportation planning.	Provide relevant database, base map and relevant urban transportation planning documents, give suggestions to UREMP formulation.	Green corridor and ecological transportation

4. Training Program in Pilot Cities

4.1. Training Program

Pilot cities for first implementing UREMP were selected by the following criteria: 1) has a certain representative meaning, mainly in the aspects of urban ecosystem, atmosphere and water environment, economic development, population density and others; 2) has a certain demonstration effect, the implementation of UREMP in this type of city has good propaganda effect, such as Beijing, Shanghai, Guangzhou; 3) has a strong environmental protection demand, take the initiative to apply for the preparation of UREMP.

As to the training work of pilot cities, it followed two schemes: plan A and plan B.

Plan A The three batch of pilot cities who need to compile UREMP would be invited to Beijing to participate in the training workshop, and cities that were not included in the three batch of cities within the MEP, but have the desire to carry out UREMP, were welcome. One-day training was conducted in three series of lectures, respectively is the preparation technology of UREMP, policies and institutions of UREMP, technical guidelines of UREMP.

Plan B Select 2 to 3 pilot cities for representative, the project technical assistance experts would go to pilot city to promote the benefits of this project. The preparation of UREMP, multi-planning integration, supporting policies and institutional arrangement was reported. Half-day trainings in each city were organized by the related business department of Environmental Protection Bureau. The participants were representatives from Agriculture Bureau, Development and reform Bureau, Planning Bureau, Water conservancy Bureau and other relevant departments, advisory services were provided for practical application and other problems that city managers concerned.

4.2. Training Concept

Carry out planning exchange and training for pilot cities. Competent environmental-protection departments organized relevant experts to train government staff of representative cities with different sizes and endowment of resources and environment in different regions, widely spread background information, pilot experience, operation methods, etc. of urban and rural environment overall planning and help local governments to raise relevant abilities. The Ministry of Environmental Protection organized the initial pilot cities to carry out overall environmental planning formulation to summarize pilot and UREMP experience and to do planning experience exchange and technical training. Relevant ministries participated in the discussion to enlarge the effects in order to better promote the UREMP and its institutionalization.

Implement planning exchange and training for city administrators and planning formulation staff. First of all, strengthen planning formulation, management personnel training and capacity construction of environmental planning institutes; improve technical support abilities of overall urban environmental planning formulation and implementation. Organize symposiums and technical exchange conferences about overall environmental planning regularly to in-depth change the view of planning formulation experience and problems, thus reinforcing business communication and discussion. Second, do promotion. Spread ideas, train of thought, experience and policies of urban and rural environment overall planning to decision makers, managers and builders of urban construction management, raising relevant recognition and abilities of local governments.

Share experience and achievements of pilot cities and UREMP to international exchange platforms. Enhance exchange and sharing with international organizations, relevant industries and fields as well as relevant technical research institutes. A training concept of urban and rural environment overall planning made for government sectors at all levels, planning formulation technicians, interested parties and the public has been listed in the Table 6 below.

Table 6 Training Schemes in Pilot Cities

Item	Subject or content	Trainee	Purpose	Training method	Arrangement	Remarks
UREMP seminar	Training on UREMP implementation and supervision	The related representatives from sectors of urban environment, development & reform, land, and urban construction of cities with UREMP formulated	Systematically interpret files, such as the technical requirements and management measures of UREMP, comprehensively understand the progress of pilot UREMP compilation, learn the regulatory requirements for UREMP review and implementation	The leaders' speech, experts' lecture	Training for 2-3 batches for pilot cities, two days for each batch; in the first 5 years since the UREMP institutionalization, training for 1 batch annually, and 1 day for each batch	Held and organized by Department of Planning and Finance, MEP
	Training on UREMP integration	Pilot cities and planning-formulated technical sectors	Learn experiences and lessons of interaction with other planning and departments during the pilot UREMP formulation, and learn about the scheme of "multiple planning integration"	Expert lecture and discussion	Training for 2-3 batches for pilot cities, two days for each batch; in the first 5 years since the UREMP institutionalization, training for 1 batch annually, and 1 day for each batch	Held by Department of Planning and Finance, MEP; taught by CAEP and pilot cities
UREMP technical training	Training on key techniques of the UREMP formulation	Pilot cities and planning-formulated technical sectors	Comprehensively learn key issues and difficult problems of UREMP formulation, such as the requirements for environment protection, spatial division, resources environmental bearing capacity and the industry layout optimization, zoning controls of environment functional division, basic public services to promote total gauge compile technical methods	Expert lecture	Training for 2-3 batches for pilot cities, two days for each batch; in the first 5 years since the UREMP institutionalization, training for 1 batch annually, and 2 days for each batch	Held by Department of Planning and Finance, MEP; taught by CAEP and pilot cities
	Training on formulation experiences of pilot UREMP cities	Pilot cities and planning-formulated technical sectors	Know the progress of pilot city UREMPs, deeply study the experiences of 3-5 pilot cities in the UREMP	Expert lecture and discussion	Training for 2-3 batches for pilot cities, two days for each batch; in the first 5 years since the UREMP institutionalization, training for 1 batch annually, and 2 days for each batch	Held by Department of Planning and Finance, MEP; taught by CAEP and pilot cities
	Training on practices of relevant planning formulation	Pilot cities and planning-formulated technical sectors	Learn the development history, technical specification and preparation requirements of overall land planning, the overall urban planning and planning EIA, and learn the relationship and coordination among overall environment planning and planning EIA and other planning	Expert lecture and discussion	Training for 2-3 batches for pilot cities, two days for each batch; in the first 5 years since the UREMP institutionalization, training for 1 batch annually, and 1 day for each batch	Held by Department of Planning and Finance, MEP; taught by CAEP and pilot cities
UREMP popular lecture	UREMP propaganda lecture	Social organizations, the public and other stakeholders	Understand the positioning, purpose, significance and role of overall environmental planning; explain the procedures of soliciting the public comments during the UREMP formulation	Expert lecture /media publicity and education	Lectured by each city according to the actual situations, half a day for each batch	Held by Department of Planning and Finance, MEP; organized by departments of propaganda and education of environmental protection bureau of each city

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