

Policy Recommendations to the Government of China

The 4th Annual General Meeting of the China Council for International Cooperation on Environment and Development (CCICED) Phase IV was held from November 10th to 12th 2010 in Beijing. The theme of the meeting was “Ecosystem Management and Green Development.” This theme is an important means for exploring a new path for environmental protection in China—a path in which ecology and economy come into a more harmonious relationship.

The council members are pleased to see that a roadmap to “green transformation” and “people-centered” development during the 12th Five Year Plan period and beyond was put forward by the recently concluded 5th Plenary Session of the 17th CPC Central Committee. The theme of this roadmap is “scientific development”, and the main thread is to “accelerate the transformation of economic development pattern”. We understand that to realize such a vision, the Chinese government will formulate strategic measures on adjusting economic structure and vigorously promote science and technology development and innovation. Also, we support the government in its emphasis that the fundamental purpose for transforming the country’s economic development pattern is to ensure that all people can enjoy a better quality of life, and that the force driving such a transformation is deeper reform and opening up. Emphasis on inclusive development is a welcome addition since it is an essential ingredient for successful sustainable development.

In particular, the council members noted that the Chinese government has identified the building of a resource-conserving and environment-friendly society as an important approach to promote the shift in the country’s economic development pattern. On the one hand, the Chinese government hopes to “green” its economy by consuming less natural resources and better protecting the environment, while on the other hand, it aims to reduce the over-dependence of economic growth on natural resources, and to mitigate

environmental damage through green transformation. In order to implement this approach, China has started exploration for a new path of environmental protection that features minimum environmental cost, good benefits, low pollution and sustainability. People naturally should have high expectations for this new path since it is an innovation in terms of both philosophy and methodology.

The council members speak highly of the efforts and substantial achievements of the Chinese government over the past year: at a time when the world was coping with the post financial crisis period, China managed to maintain rapid economic growth, promote green development and continue its focus on creating an ecological civilization. We understand that for the 11th Five Year Plan period China has met the targets ahead of time for SO₂ and COD reductions; and that the energy target is also likely to be achieved. The attainment of these targets is a major step towards optimizing the economic structure and improving environmental quality in some areas of China. Issuing the National Plan on Ecological Functional Zones is an important step in supporting the country's green development by identifying resource availability and environmental carrying capacity as a key factor in determining the development direction of each specific region.

We look forward to seeing further progress being made in tackling climate change now that the concept of low carbon development has been widely accepted within China. Certainly the successful Shanghai Expo has become a highlight in the exploration for low-carbon cities and green development. Moreover, the Chinese government's commitment to support the faster development of seven strategic emerging industries, featuring clean, green and low-carbon development, along with the various pilot programs on low carbon economy are additional encouraging evidence of China's commitment to pragmatic action on energy and environment concerns.

The concepts of green economy and green development gained international recognition during the financial crisis and will gain more attention in the post-crisis period as nations try to find new engines for growth. However, the council members note that, despite the plethora of approaches to promoting green development, one issue in this context has not gained as much attention as it deserves, either within China or elsewhere: the protection of ecosystems and enhancing their ecological function and services. Certainly China has undertaken major initiatives to restore forests, grasslands, wetlands and to designate nature reserves and protect species and other components of the country's natural capital. Yet much more remains to be done and the situation will grow more urgent with rising domestic consumption and continuing high rates of economic growth.

Ecosystems serve as the foundation of the subsistence and development of human

beings, as well as all other forms of life on the planet. This natural capital, which is comprised of the richness of species, their diverse habitats, and the genetic resources that ecosystems hold, can provide various services. For instance, ecosystems provide resources for economic and social development, they satisfy people's spiritual need to enjoy nature, and support and regulate the physical environment upon which mankind depends.

Harmonious relationships between people and nature are at the core of green development. It is development underpinned by healthy ecosystems and sound eco-services. Development that damages biodiversity and exceeds ecological carrying capacity is unsustainable. 60 percent of the world's ecosystems are being degraded, while the global ecological footprint per capita is overwhelming the world's biological carrying capacity. Already in 2007, the footprint was 50 percent larger than the Earth can sustain, which poses serious challenges to the green development goals being pursued by the international community. Therefore, in this International Year of Biodiversity, and at a time when green development is becoming a world trend and China enters its critical stage of green transformation, the council members consider it exceedingly important to focus on the issue of ecosystem protection and ecological services.

After years of tremendous efforts, in particular the continued restoration and enhancement of forest and grasslands, China has achieved considerable progress in ecological protection and recovery, and has laid a fairly solid basis for social and economic development as well as for ecological security. But the council members also note the conflict between the country's limited resources and ecological carrying capacity and the increasing economic and social demands being made on natural systems of all types. This conflict is resulting in continued ecological degradation, serious environmental pollution that affects ecological functions, and a weakened basis for green development. The council members voice their special concern over the frequent natural disasters that have plagued China this year, such as droughts, floods, landslides, typhoons and earthquakes. These disasters have rung alarm bells. They have exposed the fragility of the country's ecosystems and, in some instances, the desperate need for enhanced eco-services. In the future, climate change will place even more pressure on already overworked ecosystems.

Both theory and practice show that improved ecological management can help protect biodiversity and enhance ecological services. CCICED has two task forces reporting this year. One studied key ecological factors in terrestrial ecosystems (forest, grassland and wetland), and the second examined the sustainable use of China's marine and coastal ecosystems. Other studies were carried out regarding soil pollution, conservation of aquatic ecosystem services, the need for mainstreaming biodiversity conservation, and on the status

of China's ecological footprint.

Based on the discussions during the Annual General Meeting and the results of the task forces and other studies, the CCICED AGM 2010 proposes the following policy recommendations to China's central government.

1 Change Views and Management Approaches Regarding Ecosystem Services and Management, and Update the National Strategy on Ecological Protection and Rehabilitation

Serious problems exist in ecological protection and development in China, starting with the difficulty in protecting those values of ecosystems which are hard to price or are presumed to be simply a part of nature's abundance. A great deal of attention is given to the *provisioning services* (e.g., the production of food, fibre and other economic products) that ecosystems provide. But other functions and services of ecosystems are often undervalued or neglected. These other functions include *natural regulatory services* (e.g., flood control by forest ecosystems, climate regulation by type of land cover, pollutant absorption by wetlands), *support services* (e.g., natural regeneration of soil) as well as *cultural services* (e.g., high quality of life benefits such as recreation, knowledge). This problem exists not only in China but also elsewhere. The coming climate changes will stress and impact all of the services provided by natural ecosystems, creating a new urgency for improved ecosystem management at the present time.

In terms of management approaches, the mandates of regulating agencies are basically divided by sectors related to economic goods and jurisdictions. This approach is not well suited to the holistic and trans-regional nature of ecosystems. The implementation mechanism is largely "top-down", with the government playing a guiding role, while the spontaneous engagement of communities and the general public remains seriously inadequate. In addition, the overlapping of mandates among different regulating authorities blurs their responsibilities, powers and interests related to ecosystems. As a result, these agencies may implement sectoral laws, regulations and policies on ecosystems, and focus on problems like low efficiency, poor performance, and economic development of ecosystems, while neglecting, to varying degrees, conservation aspects and while avoiding the tackling of problems related to integrated management of the overall ecological system and of the interlinkages among ecosystems.

The council members therefore recommend that **China should change its views and approaches regarding the use of natural capital; set healthy ecosystems and highly functional eco-services as a key goal; and take a holistic ecosystem management**



approach. The council members further recommend that with these changes, key goal and management approach in mind, China should update the national strategy on ecological conservation and development in an effort to enhance the overall economic and social value of China's natural capital.

(1) Change views and recognize the holistic and multi-functional nature of China's ecosystems from a scientific development point of view. Scientific research and public education about ecosystems should be strengthened to raise the awareness of both policy makers and the general public about the multiple services and high value that ecosystems and their biodiversity can provide. This should lead to greater public participation in ecosystem protection. Of critical importance is the introduction of the ideas that improvement of ecosystem management could bring about multiple benefits of economic development, poverty alleviation, as well as job creation. It is of critical importance that both the quantity and quality of ecosystem services are improved at the same time.

In addition, management approaches should place as much attention on the functions of ecological regulatory processes, cultural enjoyment and ecological support as on the supply function of ecosystems. The former functions should be well protected, improved and given long-term attention. The goal for ecological conservation and development should be a healthy and resilient ecosystem with continuously improved eco-services. Biodiversity conservation should be mainstreamed into development strategies, and into the general efforts for ecological protection. A holistic and integrated view of ecosystem management embracing the linkages from China's mountaintops to its seas should be upheld as a basic approach in ecosystem management.

(2) Introduce National Medium and Long Term Strategic Guidelines on Ecological Protection and Development, and establish a coordinated action framework. During a nation's development, science and technology provide the driving force, education is the basis, talents are the key, and natural capital the roots. By drawing upon the modality of national guidelines on science and technology, education and human resources development, and taking into consideration the National Plan for Ecological Development (1998-2050), the National Guidelines on Ecological Conservation (2000-2030), and the results of the recently completed Macro Environmental Strategy Study, China should draft National Medium to Long Term Strategic Guidelines on Ecological Protection and Development.

The Guidelines can integrate various functions of the ecosystem and help the government to manage the country's ecosystems holistically. Consequently, the problems brought about by the current separated and jurisdiction-based management system will be resolved. Bearing in mind the National Plan on Ecological Functional Zoning, the

Guidelines should incorporate the protection of all ecosystems, including forest, grassland, soil, wetland, rivers, lakes, seas, and groundwater, as well as the endeavors of biodiversity conservation, ecological preservation and pollution control. The umbrella Guidelines should also identify the medium to long term targets and tasks for ecological protection and development in China. Based on the proposed Guidelines, subordinate plans or measures targeting specific types of important ecosystems should be developed.

(3) Establish a more comprehensive cross-sector and trans-regional coordination mechanism and an effective ecosystem management system. For an integrated use and management of ecosystems to be feasible, China should take a long term view and work towards the establishment of an administrative body that holds more fully the powers for regulating ecological conservation and development, with the current need being the establishment of an effective inter-ministerial and trans-regional coordination mechanism. Many problems such as: overlap of mandates; blurred responsibilities, powers and interests; coordination difficulties; and high management costs will have a better chance to be resolved.

At the central government level, a cross-sector and trans-regional coordination mechanism needs to be established that focuses on the entire ecosystem management and trans-regional river basin systems. It is important to streamline the responsibilities between central and local; between different ministries; and between upstream and downstream jurisdictions. At the local level, particularly in middle and western regions of China, it is important to establish an inter-provincial and intra-provincial ecosystem management coordination mechanism that becomes the decision-making body for ecological development, planning and management. This mechanism will facilitate inter-agency coordination and prevent unilateral and uncoordinated decision making.

The responsibility for biodiversity conservation and ecological preservation should not be limited only to national authorities on forestry, environmental protection, land and resources, and water resources, but also should be mainstreamed into the portfolio of the economic, industrial and agricultural agencies.

(4) China should encourage wider participation of the general public, enterprises, communities and NGOs in ecosystem management. Among other means this can be accomplished through education and awareness raising, market mechanisms such as eco-compensation that links their incomes with ecosystem health. Of critical importance is the creation of incentives, such as eco-product labeling and certifying process, to encourage the private sector to get involved and manage certain ecological services, foster certain new sectors, strengthen enterprises' social responsibilities, and reduce their ecological footprint.



It is important to engage communities and individuals, especially those living in and directly exploiting natural ecosystems, to raise their awareness of the importance of the ecosystem health, explore sustainable community action mechanisms, improve information disclosure, and alter their behaviors. Ecosystem service and management should be included into school curriculums and education programs. One critical path is to engage NGOs in ecosystem management and ask them to lead, support, monitor and implement the system themselves. A combination of both top-down and bottom-up approaches would help form a stronger force in ecosystem protection.

2 Strengthen Environmental Management and Allow Key Terrestrial Ecosystems to Recover

More than 96% of the Chinese population lives on 34.9% of the land territory. Continuous and fast growth of economic and social activities brings about huge demands for multiple services from the country's terrestrial ecosystems, including its forests, grasslands, wetlands and other freshwater aquatic systems. In 2007, China's ecological footprint per capita was lower than the world average, but it is still 2 times the biological carrying capacity of the country's ecosystems. Meanwhile, the ecological deficit is annually becoming larger. There are many daunting challenges ahead in protecting and recovering ecosystems and their services. In spite of increasing forest coverage, most of China's forests remain inadequate in total volume, imbalanced in distribution and poor in eco-services; the overall grassland and wetland quality continues to deteriorate despite improvement in certain areas; soil problems, including soil erosion, desertification, salinization, nutrient impoverishment, and soil pollution, have become increasingly serious. In some areas, soil has been so badly polluted that it becomes a threat to ecological safety, food safety and human health. Furthermore, water ecosystems provide much poorer eco-services than before and their biodiversity has decreased. The status of endangered species is deteriorating, genetic resources are being lost. The Chinese government needs to strengthen terrestrial ecosystems management and enhance their functions, so as to form a sound natural underpinning for sustained and stable economic growth and a better life for the people.

Therefore, the council members recommend that: **China should regard the terrestrial ecosystems as a whole; use systematic and coordinated approaches to improve terrestrial ecosystems management; introduce relevant laws and regulations, plans, policies, and measures; and grant more financial support to ensure success of these measures. The measures will help the important terrestrial and their associated aquatic ecosystems to rehabilitate.**

(1) Amend or draft protection and recovery plans on important terrestrial ecosystems. In light of the proposed National Medium to Long Term Strategic Guidelines on Ecological Protection and Rehabilitation, sub-plans on specific terrestrial and freshwater aquatic ecosystems should be formulated on the basis of geographical distribution and ecological boundaries. These sub-plans should be mutually supportive and linked. It is important to establish a dedicated prevention, supervision and rehabilitation planning and management system that deals with social and economic activities with possible serious ecological concerns, such as mining and large infrastructure projects.

(2) Strengthen legislation on ecosystem management. The legal system for ecosystem management should be continuously improved. The following actions are needed: a) Revise the more than 20-year-old Environmental Protection Law, to better coordinate ecosystem management with pollution control, as well as to update principles, views and provisions. b) During the legislative improvement of related laws and regulation, China should safeguard the holistic nature of ecosystem protection. c) In the legislative upgrading of economic laws and regulations, it is important to factor in the requirements of natural systems and “green” such pieces of legislations. d) On the basis of a comprehensive review of existing biodiversity protection laws and regulations, facilitate the convergence between international conventions and domestic regulations. An umbrella law on biodiversity conservation should be mapped out in order to fully implement the National Biodiversity Protection Strategy and Action Plan (2011-2030) and to comply with the Convention on Biological Diversity, thus fulfilling China’s international commitment to biological diversity protection. And, e) Strengthen the enforcement of ecosystem management laws and regulations.

(3) It is important to strengthen the capacity of the society and ecosystem in the event of natural disasters. Natural rehabilitation should be given more priority over human intervention, so as to strengthen the ecosystem’s own capacity in coping with natural disasters. Preservation and protection should start from the beginning of social and economic activities. Where appropriate, watersheds, rivers, lakes should be equipped with more capacity in flood control, with reinforced hydraulic infrastructure. It is important to establish various systems in disaster-prone areas, including assessing, monitoring, emergency response and contingency plans, as well as post-disaster reconstruction process.

(4) Increase long term input for the protection and management of terrestrial ecosystems. The long term nature of ecological preservation and recovery requires long term financial support and stable policies of the government. China should increase long term financial input by exploring and leveraging multiple investments and financing channels,



and formulate a stable policy environment. Existing ecological programs need to be continued, including those aimed at converting farmland back to forest/grassland, at preserving virgin forests, at treating the source of sandstorms affecting Beijing and Tianjin, at restoring grasslands from overgrazing, at conserving water and soil and for protecting wetlands, lakes and river aquatic ecosystems. The channels and total sum of financial support should be guaranteed in order to consolidate the progress achieved so far. Greater attention needs to be paid to refining the ecological objectives of each of these program areas, with better guarantees that the stated goals will be fully met.

For the ecologically fragile regions in central and western China, plans should be developed, and new ecological programs introduced to cover, river basins and their source water areas, seriously eroded areas, key ecological-function conservation areas, and China's extensive network of nature reserves. These new programs should be planned by the central government, implemented by the provinces, and supported by stable financial resources, such as financial transfers by the central government, specialized funds, and ecological compensation schemes.

In addition, China should foster ecologically-dependent industries and markets, and build an evaluation and auditing system to oversee the collection, distribution and use of ecological funds, ensuring the effectiveness of these funds.

3 Place Marine Ecosystem Management High on the Policy Agenda and Promote Sustainable Ocean and Coasts Development

China has a vast marine territory with a coastline over 18 000 km and around 6 900 islands larger than 500 m². Its territorial seas and exclusive economic zones cover an area of 380 000 km² and over 2 million km² respectively. The ocean is a strategic base for food, energy and water resources and an important extension of terrestrial production and activities. It also bears the brunt of many land-based unsustainable practices such as waste dumping, excessive land reclamation, and agriculture, and industrial pollution. The sea is also a significant driving force for economic and social progress as well as a foundation for sustainable development.

China's ocean is currently facing challenges at an unprecedented scale including serious marine ecological degradation, drastic depletion of marine resources and continued decrease of marine ecological capacity. And what makes it worse, if China's marine environmental management today cannot meet such challenges, how will tomorrow's challenges be addressed? They will be much greater since the exploitation of marine natural resources and proposed future economic development in the ocean and coastal areas will rise.

There is much room for improvement and only limited time to do so.

However, at present China's ocean ecological and environmental status has been worsening. Offshore environmental pollution in many ocean areas is heavy. In 2009, the offshore polluted ocean area exceeds 50% of the total offshore ocean area. The offshore ocean ecosystem has been severely damaged. Compared with the 1950's, China has cumulatively lost some 50% of coastal wetlands, 57% of the mangrove areas, 80% of its coral reefs, with more than two thirds of the coast eroded. The length of eroded beaches is more than 2 500 kilometers. Ocean ecology and environment disasters have frequently happened, for instance, red tides have occurred 79 times annually on average from 2001-2009, with the red tide area reaching 16 300 square kilometers. Ocean biological resources have declined severely. Overfishing dramatically reduced the fishery; and at the same time, land reclamation destroyed the spawning ground of fish or the habitats of their larvae/juveniles, resulting in resource exhaustion of some fishery species. The ocean ecological carrying capacity is declining at an increasing rate. In a word, China's ocean is currently facing challenges at an unprecedented scale.

But China's ocean ecological and environmental management has significantly lagged behind the demand for improving the degraded ocean ecology and environment. An umbrella national law on the sea is still absent; a comprehensive strategic plan that incorporates the impacts of rivers and coastal land use on the sea is also lacking; and there is a number of institutional deficiencies in China's marine environmental management system. For instance, different marine resources or ecological factors are managed by different agencies. As a result, it has not been possible to carry out management of the ocean and coasts from a comprehensive or holistic point of view. The most critical case in point is the serious ecological situation of the Bohai Sea, which suffers from high levels of resource exploitation, coastal reclamation and development, and from land-based sources of pollution.

The Chinese government needs to pay more attention to growing problems of China's seas and coasts, including the major contributions to these problems from inland and coastal land and river development and use. Better protection of the marine environment should be a more important part of its environment and development portfolio as soon as possible.

The council members recommend that: **taking into account the impacts of development in river basins and coastal lands on China's ocean and coastal ecosystems, and of marine effects on cities and terrestrial areas, the government of China should develop mechanisms to reduce the impact of land-based sources of environmental and ecological problems in the seas of China. China should strengthen marine ecological**



protection and scientific sustainable development as the basis for all present and future economic development in the ocean. China should also strengthen global and regional exchanges and cooperation on marine ecosystem protection. Only in these ways it will be possible to guarantee sustainable use of the ocean, with continued growth in the contribution of the ocean economy to China's GDP growth. Currently there is no green development strategy for China's sea. The most obvious and immediate case in need of such a strategy is the Bohai Sea.

(1) Set up and improve the legal system of marine management. The central government should initiate the legislation process for a Basic Law of the Sea of the People's Republic of China as soon as possible. This Law should be designed to serve as the basis for marine development and management, marine economy development and ecological protection of the sea. It should be the fundamental law promoting sustainable use and development of the sea. Moreover, there is a need to draft the Coastal Zone Management Law of the People's Republic of China and the Bohai Sea Environmental Management Law of the People's Republic of China. The supporting regulations, methods, rules and standards of the Marine Environmental Protection Law should be formulated or improved at the earliest date. In all laws concerning use of the sea, China should abide by the principle of holistic ecosystem management and set substantial protection and rehabilitation of marine ecosystems as a goal.

(2) Map out a national strategy and plan on marine ecological protection as soon as possible. Drawing upon the China Ocean Agenda 21, China should consider formulating a new China Strategy on Marine and Coastal Sustainable Development. This new strategy will map out the basic principles, guiding philosophy and strategic targets in the next 20 years, and detail the key tasks for coastal and marine economic development, marine environmental protection and resource preservation. The strategy should prioritize such issues as sea enclosure and land reclamation, addressing marine eutrophication and its impacts such as toxic red tides and green algae blooms, as well as fishery development issues in light of the overfishing pressure.

(3) Establish a coordination mechanism for the marine environment with participation by relevant agencies including those with marine mandates, and some with terrestrial and freshwater mandates. In the near future, there will continue to be multiple players in the field of marine management and it is not yet realistic to set up a unified agency with full powers over marine issues. It is thus necessary and appropriate to set up a National Ocean Committee for the time being, which coordinates and draws upon the powers of relevant authorities in order to facilitate better management of marine and

coastal affairs. Considering the current serious marine environmental problems, the main tasks of the Committee should include formulating a national strategy on marine development, promoting communications among relevant agencies, and coordinating major marine affairs that involve different agencies, sectors and regions. Among these tasks, the first priority should be solving the ecological problems in the Bohai Sea.

(4) Introduce an ecosystem-based approach to marine management. The ecosystem should be viewed as a whole, and the following comprehensive measures need to be taken in marine management: a) formulate an ecosystem-based sea zoning plan; b) evaluate ecological safety and environmental capacity of offshore waters, and identify off-limits for sea reclamation, identify ecologically sensitive and fragile areas as well as key regions of ecological safety, and mark the protected areas on the sea; c) in addition to maintaining existing protected areas of the sea, new marine nature reserves, special protected zones and marine parks should be established for typical and representative ecosystems as well as for protecting rare and endangered species; through this means a network of protected areas on the sea will be formed; d) in islands and areas rich in typical marine ecosystems, affected by invasive species or sensitive to climate change, ecological recovery programs should be carried out; set up demonstration areas of marine preservation, and recover the capacity of the seas for maintaining biodiversity and strengthening resilience against marine disasters and climate change; e) establish conservation and recovery systems for marine species under the ecosystem-based ocean management framework; f) expand sea farming in an environment-friendly way, promote the carbon sink functions of fishery and improve ecosystem capabilities; g) introduce the approach of determining an inland pollution cap based on the receiving capacity of the sea, and when technically and economically feasible, formulate upstream-river mouth pollution control plans; reducing agricultural and industrial pollution loads on the ocean should be high priorities; and h) strengthen mud and sand regulation by dams and minimize negative effects of delta erosion caused by sudden decrease of mud and sand volume.

(5) Build up the early warning and emergency response system of serious marine pollution incidents. According to relevant international practices, China should set up and continuously improve the early warning and emergency response system of serious pollution incidents on the sea. Under the proposed National Marine Committee, China could establish Leading Group on Emergency Response to Major Marine Pollution, with the responsibility for setting up an emergency response mechanism and coordinating actions of relevant agencies in the wake of serious incidents of marine pollution. In the meantime, China should establish mechanisms on notification of major marine pollution, for evaluation of potential



environmental risks, and for improving early warning and information sharing issues. China also should improve emergency response mechanisms for regional marine pollution, strengthen supervision and management of potential pollution sources, and ensure the implementation of emergency response measures.

(6) Set up an integrated environmental monitoring and analysis system that covers both the land and the sea. China should combine the work of upstream, river mouth and sea monitoring; set unified monitoring indicators and technical standards; build an integrated monitoring system that covers air, river basins, the sea and coastal areas, and set up an information sharing system. In the short term, China should add NO_x as a new indicator for air monitoring and control, and total nitrogen and phosphorus as new indicators for water monitoring and control over the river basin. In addition, China should carry out scientific research on river basin-ocean linked ecosystems and deepen understanding of the marine ecosystems, laying a sound scientific basis for better marine management. In the populous and economically prosperous coastal areas, China should create an integrated research and monitoring network comprised of environmental monitoring facilities, research institutions, laboratories, outdoor observatories, and ecological recovery demonstration projects.

4 Promote Scientific Innovation, Improve Technological Support, and Strengthen Capacity Building on Ecosystem Management

Currently, one prominent problem in ecosystem management is the lack of scientific support and weak management capacity. Relevant policies on ecosystem management and the implementation process of these policies are not well supported by scientific results. This can be seen in the following aspects. First, China does not have adequate monitoring of its main ecosystems and their changes. Hence timely, accountable and transparent data on ecosystems is limited for researchers, policy makers, supervisors and the general public. Second, each relevant agency has its own independent network of ecosystem monitoring and research, and the data and results gained are neither commonly applicable for decision-making nor readily available to other agencies. Third, basic research, applied research and technological development on ecosystem services and management remain weak and they cannot satisfy the needs of decision-making and policy implementation. Fourth, China lacks a mechanism for the scientific results to be successfully applied in policy-making and implementation. What we see right now is that large amounts of available scientific results cannot be applied in daily work, and policies and plans on ecosystem protection and recovery are not well founded on scientific studies. As a result, such policies and plans are either impractical or poorly implemented.

Therefore, in light of the main problems and demands, China should carry out strengthened monitoring, research and demonstration activities on ecosystem management and restoration/recovery, develop an optimized ecosystem management model that suits China's realities and provides scientific support to ecosystem monitoring, evaluation, demonstration projects and decision-making. This optimized model is badly needed since it is an indispensable factor in improving ecosystem management in China.

The council members recommend that: **China should set up and continuously improve a measurable, verifiable and reportable monitoring and evaluation system on China's ecosystems to cover the whole country and in particular the key ecological regions. More input should be given to scientific research and capacity building on ecosystem management.**

(1) Set up an improved national observation and research network on the ecosystem. The central government should improve the outdoor observation and research network for regional ecosystems and biodiversity studies, support the network by long-term and stable financial resources, unify relevant technical and data standards, and establish a basic database and national digital atlas for biodiversity and ecosystems. These measures will help provide key scientific data, develop key technologies, and improve management of ecosystems and their services.

(2) Carry out regular evaluation on the status of China's ecosystems, and set up monitoring and evaluation systems for adaptive management of ecosystems in key regions. Comprehensive evaluation of China's ecosystems should be carried out every five years in order to illustrate a full picture of the ecosystem and support the formulation of the Five Year Plans. These evaluations should utilize the results of various censuses and surveys on forests, grasslands, wetlands, oceans, soil, water and biodiversity; make use of the national observation and research network on ecosystems, and apply remote sensing, modeling and other technologies. By doing these activities, an objective understanding on the changing ecosystems and their eco-services will be gained. Furthermore, China should establish an air to ground monitoring system for key ecosystems and have systematic and non-stop monitoring in these regions. Such monitoring systems will not only help to follow closely the trends of ecosystem change and record the progress China is making, but also to expose existing problems. This monitoring could then be the basis for developing solutions to the problems and contribute to better protection and recovery of ecosystems.

(3) Carry out basic studies on and develop key technologies of ecosystem services and management, and promote the application of the results gained. China should study the features and regional distribution of the main types of degrading ecosystems in order to



define the mechanisms and patterns of their degradation. Based on these studies, key technologies for ecological recovery should be developed, and their application promoted. Technologies for recovering different ecosystems and in different regions should be developed. It is important to establish a green accounting system for ecosystem services, link this system to the national system of accounts, and incorporate relevant indicators into performance evaluation system. Scientific and technological studies should be carried out to study the impact of climate change on ecosystem adaption and mitigation, as well as the impact on ecosystems from new energy exploitation and new technique applications. Meanwhile, it is necessary to review different management models and apply the management systems that suit the localities best. In this way, the country's ecological preservation efforts can be more effective and sustainable.

5 Attach Greater Importance to Weak Links, Step up Efforts in Key Fields, and Help Promote the Green Transformation of Economic Development Pattern during the 12th Five Year Plan Period

The 12th Five Year Plan period is critical for China's efforts towards an all-round well-off society. This period is also a pivotal time to transform the existing economic development pattern, and it brings strategic opportunities for green transformation and green development. Council members have full confidence in China achieving the targets towards green transformation in the next five years put forward by the 5th Plenary Session of the 17th CPC Central Committee. However, it is clear that there will be both foreseeable and unexpected difficulties and challenges during the process of green transformation. In the next five years, China will face heavier resource and environmental pressures, people's call for a good ecological environment will become stronger, the country will face more challenges in tackling climate change, and it will be more difficult to achieve environment and development targets due to diminishing marginal utility.

The council members therefore recommend that: **China's core mission in the field of environment and development during the next five years is to integrate environmental protection with the transformation of economic growth pattern; to achieve success in both improving environmental quality and promoting green development; and to explore a new path for environmental protection. To fulfill this mission, it is necessary to not only step up efforts on traditional priorities and strengthen policies and programs that have proved to be effective, including the energy conservation and pollution reduction program, but also give more attention to weak links that require immediate actions, including ecosystem management, rural environmental protection,**

soil pollution prevention, and the inclusion of climate change mitigation and adaptation targets into ecosystem management initiatives. These actions will help give full play to the role of ecological protection in promoting the green transformation of economic development pattern.

(1) Step up efforts in key fields and promote the green transformation of economic development pattern. Efforts should be made in the following aspects: set up mandatory objectives for improving environmental quality and promote nationwide; carry out environmental impact assessments more strictly and systematically; adjust industrial structure and regional distribution; raise environmental standards, tighten environmental enforcement and force the industrial structure to adjust both by improvements in upstream sectors and end-of-pipeline measures; promote environmental product certification and encourage green consumption; introduce environmental economic instruments, guide the traditional enterprises to “green” themselves and foster emerging and green industries; deepen environmental information disclosure programs and encourage public participation in green development; and provide technical and scientific support to green development through environmental innovation and technological application.

(2) Boost rural environmental protection across the board and bridge the gap between urban and rural areas in terms of ecological civilization. Currently, rural environmental degradation stands out as a prominent problem. Compared with the urban and industrial areas, rural areas have become a weak link in China’s environmental protection work, affecting the living standards and equitable sharing of development results in rural areas.

In the 12th Five Year Plan period, the Chinese government must greatly strengthen environmental protection in rural areas and try to make breakthroughs in this regard; a) formulate an environmental protection plan for the rural areas and move rural environmental issues higher on the agenda of national environmental work; b) improve the legal system of rural environmental protection, accelerate the legislative process on animal husbandry pollution control, non-point pollution control, soil pollution control and agricultural waste recycling; c) step up infrastructure building for rural environmental protection, provide more guidance on environmental management and disseminate pollution control technologies; d) expand the coverage of “award for treatment” policy (a policy that financially rewards the villages doing a good job in environmental treatment), raise the amount of such awards and study the feasibility of introducing “award for prevention” policy (a policy that financially awards the villages that successfully prevent environmental pollution and degradation); e) set up rural environmental supervision institutions from the central government down to



the grassroots level and improve rural management capacity across the board; and f) strengthen education and publicity, raise awareness and recognition of rural environmental issues.

(3) Strengthen soil environment protection and safeguard public and ecosystem health. Soil pollution poses a great threat to food safety, public health and ecosystem integrity. The Chinese government already attaches a great deal of importance to this issue but needs to implement a comprehensive action plan during the 12th FYP, including prevention, restoration and remediation, and supervision. There is an urgent need to: a) commission a national soil environmental protection plan; b) issue a law on soil environmental protection and pollution treatment, to introduce standards, and to establish national and local guidelines for soil protection and environmental quality; c) set up a national monitoring system for soil protection, allocate responsibilities and establish a liability and accountability system; d) establish a funding mechanism for soil pollution prevention and reclamation; e) strengthen scientific research for soil pollution management and study and develop reclamation techniques and equipments; f) establish a pollutant watch list by regions and food products; g) establish, monitor and evaluate the supply chain for food safety; and h) study and act on the carbon sink and water resource protection potential of soil, and strengthen soil's role in climate mitigation and adaptation.

(4) Focus on priorities, and incorporate the target of improving various ecological services and the principle of holistic ecosystem management into the daily work of ecological protection and development during the 12th Five Year Plan period. The approach of holistic ecosystem management is something new; there will be many challenges ahead in ideological, institutional and legal terms to be addressed in order to put it into practice in China. With so much preparatory work to be done in order for integrated management to be successful, it will be a fairly long time before full implementation of this approach takes place. In the coming five years, China should first raise the awareness of this holistic and integrated ecosystem management approach among policy makers and stakeholders, and formulate and promulgate the National Medium to Long Term Strategic Guidelines on Ecological Protection and Development as well as specialized plans on key ecosystems. Then China should implement this approach first in key and vulnerable ecosystems like the soil and the sea. Pilots could be first established in important areas such as Bohai Sea and other priority ecosystems and sub-regions. In addition, China should also strengthen scientific research, technological development, management model demonstration, and monitoring system development in order to better support the holistic approach of ecosystem management.

(5) Expedite the process of legislation on ecological compensation, and improve

relevant policies and mechanisms. There are many useful tools that can be introduced in China, but among them ecological compensation, which has been studied and piloted for many years and initiated into legal procedure, is particularly important for both ecological preservation and pollution control. China should issue the State Council Regulation on Ecological Compensation as soon as possible, and promote the widespread establishment of ecological compensation schemes. In light of the current status of the country's ecosystems, there are several key tasks in this regard: a) establish a non-profit compensation fund for forests, grasslands and wetlands; b) the central government should grant sufficient budget to national nature reserves under the framework of the national ecological compensation scheme; c) gradually incorporate the forests and grasslands restored from farmlands into the scheme; d) establish marine ecological compensation mechanisms, carry out compensation demonstration for key marine programs, including sea reclamation projects, as well as for oil spills and protected areas. Compensation should also be piloted in places where inland activities have affected river mouths and sea; e) establish eco-compensation mechanisms for mining projects; and f) ecological compensation scheme for freshwater ecosystems.

(6) Implement green regional development strategies by taking into account resources and environmental capacity, biodiversity conservation needs, and establish within China regional cooperation mechanisms for ecological protection. Over the past two years, China has issued a number of regional development strategies and plans, which will be essential to bridge the development gap among the different regions and to foster new growth engines. It is equally pivotal, however, to strike a balance between regional rejuvenation and green transformation: a) regional strategies and plans should conform to the National Plan on Ecological Zoning, and the development direction of a region should be determined by its resource and environmental capacity so that pollution and ecological damage will not come together with the industries that gradually transfer to these regions; b) in the richer eastern region, ecological preservation should be a priority and optimized development strategy should be implemented; while in the ecologically vulnerable west, a green development strategy should be introduced, focusing on ecological innovation and giving greater attention to biodiversity conservation. These strategies will help build a resource-conserving and environment-friendly society; c) in light of the current status of the environment, it is not enough for one local government alone to curb the degrading trend of the ecosystem and substantially improve environmental quality, but rather coordination and cooperation among the localities is needed. It is desirable to review experience so far and establish a comprehensive cooperative mechanism on regional ecological protection and joint pollution prevention, control and treatment.