Journal of Environmental Sciences Vol. 9, No. 2, pp. 129—140, 1997 ISSN 1001—0742

The construction and management of nature reserves in China

Jin Jianming

National Environmental Protection Agency of China, Beijing 100035, China

Abstract—This article briefly outlines the construction and development of natural reserves; it embraces the necessity and main content of the mangement of natural reserves, including theoretical guidance, targets management, planning management, legislative management, technological management, administrative management. It discusses the experience of construction and management of natural reserves and existing problems in this regard as well as correspondent solutions such as policy measures, technology measures and management measures.

Keywords: natural reserve; construction; management.

1 General shape of nature reserves in China

Natural resources and environment have always been the material bases for human existence and development. In the long process of life and production, mankind has fully recognized the importance of protecting natural resources and environment. As crucial and effective means of protecting natural resources environment as well as biological diversity, the construction and management of nature reserves have attracted greater and greater concern. A country with vast territory, long geological history, varied climate and complex natural conditions, China is endowed with rich biological resources and geomorphologic sceneries. The country has a wide range of wild plants and animals. Take plants for example, according to statistics, there are about 2000 species of bryophyte, 2600 sinopteris species, 25000 species of angiosperm, which totally amount to 30000 species. Its fauna and flora make up 10% respectively out of the world's total. Not greatly affected by Quaternary Glaciation, many rare species have survived, such as the giant panda, golden monkey, Lipotes vexillifer, Python molurus, Metasequra glypostroboides, Cathaya argyriphylla and Ginkgo biloba. As the precious bestowal of nature both for China and for the world, the spectacular natural sceneries and rich biological resources have provided China with unique advantages in developing nature reserves.

Attaching great importance to nature reserves, the Chinese government has organized and coordinated various departments to undertake the tasks of construction, management, planning, scientific research, training as well as seeking international cooperation in this regard. By far, great achievement has been made in these fields; however, considering the unique and diversified natural conditions and rich biological species, the need of economic development, and especially as compared with countries with longer history of developing nature reserves, there is still big room for improvement. The paces of nature reserve construction, therefore, should be further quickened so as to bring about continuous development for China's nature reserves.

2 Construction and development of nature reserves in China

2.1 The establishment of nature reserves

Beginning from 1956, the construction of nature reserves in China only has a 40-year history. However, after 1978, nature reserves increased rapidly in number and convered a wide range of types. The construction and management work has enjoyed continued improvement and has entered a period of rapid development(Table 1).

From 1978 to 1991, the number of nature reserves in China increased from 34 to 638, the area expanding from 1265000 hectares to 55056800 hectares, the percentage in total land area rising from 0.13% to 5.73%, the extent of increase being 17.76%, 42.52%, 43.08% respectively. Currently, there are 61 national nature reserves, 302 provincial ones, 275 municipal and country level ones, of which the Qingzang Nature Reserve is the largest, with an area of 24 million hectares, ranking first in Asia.

Table 1 The change of the nature reserves of China

Year	Number	Area, 10^4hm^2	Percentage, %
1965	19	64.88	0.07
1978	34	126.50	0.13
1982	119	408.19	0.43
1987	481	2374.95	2.47
1989	573	2476.30	2.58
1991	638	5505.68	5.73
1995	799	7185.00	7.19

In recent years, rapid progress has been made in the construction of nature reserves and genebases for various species due to the concern for nature conservation cause paid by the State. Many rare species of animals and plants have been reserved effectively. It is estimated that by 2000, rare animals like David Deer and Wild Horse will have reformed their species communities, the number of rare and endangered animals such as Giant Pandas, Black-necked Cranes, Red-crowned Cranes and wild elephants will have increased. Most of the endangered wild plants under vital state protection are included in nature reserves, with only 40 exceptions, which take up 11.6% of the total of plants under vital protection. More than 10 species have been domesticated to fine varieties. As for the other 20 species, there are still a good number of communities available. Nevertheless, the population growth in China as well as its pressure and impact on natural environment an biological diversities, have placed the task of setting up zones for the conservation of nature and ecosystems on the agenda. Meanwhile, efforts should be made to set up a number of new nature reserves in the 8th-five-year-plan period so as to reach the world average level on the whole or in some areas by the end of the century.

2.2 Types of nature reserves

In terms of resource types, there are nature reserves for forest, grassland, wetland, sea beach, geo-section and geomeorphological landscape as well as special types such as deserts and islands. In terms of the target and nature of conservation, these reserves can be divided into six major types, which are primary environment, secondary environment, biospecies origins, geological sites, resource management regions and state parks. The principles for classification according to the latter criterion are listed as follows:

Nature reserves for primary environment, i. e. reserves built for the purpose of protection of representative and original natural complex and ecosystems, such as: Altun National Nature Reserve; Changbaishan Nature Reserve; Wuyishan Nature Reserve; Fanjingshan National Nature Reserve; Dinghushan Mountain National Natural Reserve.

Nature reserves for secondary environment refer to reserves built in areas where the secondary ecosystems have been destroyed but are likely to recover through conservation, such as: Mudanfeng Nature Reserve for secondary forest in Heilongjiang, Xiaolongshan Maicaogou Nature Reserve for secondary forest of Sabia in Gansu, Changanpao Nature Reserve in Jilin, and Taibailing Nature Reserve in Henan.

Nature reserves for biospecies origins, which are reserves constructed for conserving ceratin biological resources or vegetation types, especially rare and endangered species of plants and animals, such as : Wulong Nature Reserve in Sichuan, Wanglang Nature Reserve, Baishuijiang Nature Reserve in Gansu, Zhalong Nature Reserve in Heilongjiang, Chishui Three Fern, Nature Reserve in Guizhou, Camellia Chrysantha Nature Reserve in Guangxi and Wild Calycanthus Chinensis Nature Reserve in Baokang, Hubei Province.

Nature reserves for geological sites, which are built for protecting geological and geomorphologic sites of scientific and tourist values: Wudalianchi National Nature Reserve; Jixian Geologic Section middle and upper proterozoic erathem National Nature Reserve In Tianjin; Wulingyuan Geological Nature Reserve; Yunnan Stone Forest Nature Reserve; Cangshan-Erhai Nature Reserve.

Nature reserves for resource management, which are reserves set up for the purposes of achieving sustainable utilization of renewable resources through rational management and establishing models for rational utilization or resources in forestrial, pastoral, fishing hunting areas. The combination of utilization and conservation, such nature reserves may produce considerable economic benefits. For instance, nature reserves have been built to protect the resources of wild bee in Heilongjiang Province and Yinjiang Uygur Autonomous Region, and Xunkecheluwanzidao Nature Reserve and Xunkekuerbin Nature Reserve in Heilongjiang Province are both constructed for the protection of the resources of Schisandra Chinensis and Vacciniun Palustri.

State parks, which are built for the purpose of protecting complete natural complex or ecosystems with beautiful landscapes and suit for tourism: Jiuzhaigou Nature Reserve in Sichuan; Lushan Nature Reserve; Xiaowuyishan Landscape Reserve.

3 The management of nature reserves in China

3.1 Necessity

Science, technology and management are considered worldwide as the three key factors for modernization, which are interacted and of which management is of the most importance. Practice shows that the speed of a country's economic development depends, to a large degree, on managerial level. The management of environment and nature reserves is an important component of the modernization drive. Facts both in China and abroad prove that the construction and development of nature reserves should rely on the strengthening of management. With the improvement of man-

agerial skills, nature reserve undertakings will enjoy progress and development. Scientific management contains wide-ranging contents, including the systems of the management of administrative affairs, scientific research, ecosystems and natural sceneries as well as business publicity an education. In view of the existing problems, new contents should be added on the basis of the original ones, such as theoretical guidance, targeting, planning legislative, scientific & technological as well as administrative management.

3.2 Main contents of scientific management of nature reserves

3.2.1 Theoretical guidance

As revolutions in science and technology have been more and more combined into an unified process, the interactions between scientific and technological theories, practice and environment have been increasingly strengthened. And it is the request of the time to develop the study of nature reserves.

A. The world nature conservation strategy and the nature conservation strategy of China are the basic theories for nature Conservation.

a. The three objectives provided by WCS are: to maintain basic eco-process and ecosystem, to conserve the diversity of genes and to ensure renewability of species and ecosystems.

b. The main targets for the NCSC. In accordance with the principle of the WCS, the NCSC provides the following targets:

—— The protection of ecosystems and life-supporting systems(forest, grassland, coastal and freshwater as well as agricultural ecosystems);

—— The insurance of sustainable utilization of biological resources(water-quality and land animal and plant resources);

—— The conservation of genetic diversity of biospecies;

—— The maintenance of "souvenirs" of natural history (waterfalls, craters, aerolites, cross sections of stratum, mountain streams, fossils of ancient species and ancient and valuable trees).

B. Ecology constitutes the theoretical foundation for nature reserve cause. As the bridge across natural science and social science, it provides scientific bases for the work of nature reserves, such as: the principles of ecological development; characteristics of ecosystems as a whole or partially; the theory of exchange and circulation for both material and energy in ecosystems; renewability and metablist functions of biological resources; the laws in mutual adaption and coordination in the structure and functions of ecosystems.

C. The theoretical basis for the construction and management of nature reserves includes:

Classification of nature reserves and the designation of the corresponding systems(the evaluation and grading of nature reserves are conducted according to their various types and usages); formulation of index and index-system for conducting the grading of environmental quality of nature reserves; the control of the tendency of growth and decoine of biological species, which calls for forecast techniques as well as optimized designs; the study on managerial skills for nature reserves of special value.

3.2.2 Targeting management

A. The world nature conservation strategy provides three specific targets for biological re-

source protection: maintenance of basic ecological process and life-supporting systems; conservation of genetic diversity; insurance of sustainable functions of ecosystems and biospecies.

These three targets have been accepted by nature conservation workers and experts of various countries and are considered as the necessary conditions for human existence and sustainable development. Meanwhile, it is realized that the attainment of these targets requires international cooperation and consorted efforts.

B. The main targets of nature reserves in China. Guided by the mentioned above three targets and in accordance with the domestic conditions of China, the targets for nature reserves construction are formulated as follows: to protect natural environment and resources and maintain dynamic balance of natural ecosystems; under scientific management, to maintain virtuous balance of ecosystems and to create optimized models of biological community and natural referential systems for regional exploitation; to reserve the diversity of species, which includes the conservation of genebases for animals, plants and microorganisms as well as the protection of rare and endangered species; to maintain sustainable development and utilization of ecosystems which includes biological species and natural resources; to protect natural human geographical environment of special value and provide bases for textual research, status-quo evaluation and future forecast.

C. Research aspect of the targets.

On April 27th, the World Environment and Development Committee published a long report titled "Our Common Future", in which a lot of historical and statistical data were employed to elaborate the 16 serious environmental problems, including the sharp increase of population, soil erosion and degeneration, expansion of deserts, reduction of forests, growing air and water pollution, deteriorating human health conditions, deepened poverty, huge military expenditure, mounting natural disasters, greenhouse effect and destruction of ozone layer, abuse of chemicals, accelerating extinction of specie, growing energy consumption, repeated industrial accidents and serious maritime pollution and so on, of which the problems concerning greenhouse effect, ozone layer protection, acid rain and poisonous chemicals have aroused world attention. These facts show the mankind is faced with severe challenge in terms of ecological environment. Since the two human environmental conferences held in Stockholm in 1972 and 1979, global environmental problem have been manifested mainly in the relations and interactions between population, development, resources and environment. These subjects, along with the target-research of nature reserves in China, decides the macro and comprehensive research in this field should be guided by the development to the following aspects: the study on the structure and function of ecosystems under the influence of different levels; the study on the control, recovery and increase of natural resources, including biological species; the study on human pressure upon and reaction to nature reserves; the study on human input and exploitation of resources, the volume of input of both manpower and material resources as well as the rate of sustainable utilization of natural resources.

3.2.3 Planning management of nature reserves

A. Necessity

The rational distribution of nature reserves nationwide, reasonable proportion among various types and levels(national, provincial, county) of nature reserves as well; as the management and

utilization of resources in each nature reserve, all depend on the formulation and implementation of programme and plans; therefore, planning management constitutes the basic for scientific management of nature reserves. A reflection of the distribution and development of natural regions as well as the guiding and controlling work for the management of resources in nature reserves, it is the reference for target-management and item-designs.

The planning of nature reserves should be based of district-dividing work. In order to set up nature reserves which not only represent the varied natural geographical environments in China, but also form a rational layout across the land so as to establish a complete nature conservation network connected with the grand one of the world, efforts should be made to improve the dividing work of nature reserves, which is an important and basic task of research.

B. The order of planning management

Diversified as the forms and contents of planning management are, there are still some common basic steps.

C. Contents

A draft of a management plan is an important fruit of plan formulation, which should include the following contents: general remarks on nature reserves; analysis and assessment of nature reserves; management plan, including longterm targets and immediate tasks.

There are various sorts of plans, such as environmental management plan, administrative management plan, resource exploitation and utilization plan and so on.

3.2.4 legislative management of nature reserves

A. The significance of legal protection of nature reserves

The law of nature reserves is the total of legal norms coordinating the social relations with regard to the establishment, protection and management of nature reserves, with the purpose of ensuring, through legal means, the proper establishment, effective protection of nature reserves so as to fully demonstrate the positive influence of this form of nature conservation in the long process of promoting human existence and prosperity.

B. The basic contents of the law of nature reserves

Due to the common ground shared in the field of nature reserve construction and management, the basic contents of the laws of nature reserves in different countries are very much similar. However, the forms and systems of legislation for nature reserves are varied in different countries.

The main contents of the law of nature reserves include: The guideline and basic principles of the state concerning the construction, protection and management of nature reserves; the management system of nature reserves, duties of departments of comprehensive management of nature reserves and other departments concerned, the status and tasks of nature reserve management organs; the status, level of establishment and basic requirement of nature reserve divisions; the procedures and conditions for the establishment of nature reserves; the basic systems and measures for the protection and management of nature reserves; the legal responsibility for violations of the law of nature reserves and so on.

3.2.5 Scientific management system

A. The scientific management of nature reserves should be based on science and technology.

The scientific management system includes the following components: organization of comprehensive investigation and assessment; arrangement of subjects for scientific research and organization of research groups; establishment of fixed observation stations and selection of observation items. Computerized database can be built for nature reserves where conditions permit; tests in planting and breeding; formulation of plant for research and evaluation, and examination of plans for nature conservation, exploitation and utilization; appraisal and publication of the achievements of scientific research; establishment of specimen rooms, exhibition halls, offices of scientific & technological files and data; scientific & technological consultation and popular science publicity; establishment of grassroots organizations for scientific & technological information as well as relevant societies, associations and institutes aimed at extending ties among various nature reserves.

B. Scope of business and subjects for research

To conduct investigation and analysis of ecosystems within nature reserves, including studies on their structure, functions, stability, diversity, minerals and energy streams and so on; to make judgement on whether a biological shaper unit is of typical and representative feature and to work out the methods for such judgement; to explore and forecast the factors that may influence the genetic substance in the unit, prevent the declining tendency of the structure of biological community and master the situation concerning possible extinction of biological species; to conduct environmental monitoring, systematically collect data in natural, chemical, physical, biological and human aspects concerning the factors influencing environmental quality; to offer data concerning problems in other regions so as to serve as the crucial basis of the work in the monitored region; to employ advanced techniques, including remote－sensing, computerized and autonomized instruments in the research of nature reserves; to study the basic theories for the assessment of nature reserves and work out index and index systems.

3.2.6 The administrative management of nature reserves

The main contents of administrative management systems are listed as follows: administrative affairs among various levels of departments; foreign affairs, including coordination of interregional relations; labor and personnel affairs; finance and accounting; publicity of policies, laws and decrees; rear-service, capital construction and welfare for staff membres; cultural education for personnel; inspection on the enforcement and implementation of plans, programs, and regulations for nature reserves; computerized management can be adopted if condition permits.

4 Major experience of nature reserve construction and management in China

The Chinese government attaches great importance to the construction of nature reserves and regards the nature reserve cause as a component of national economic development. To protect and develop nature reserve undertakings, several measures have been adopted:

4.1 To include the work of protecting wild plants and animals and establishing nature reserves into national plan

The 7th five-Year Plan and the 8th Five-Year Plan of China provide that the protection and improvement of ecological environment are the basic tasks of the state.

Nature reserves should be increased and more rationally distributed, and nature various types of reserve network be built if necessary and possible. Breeding bases and gene bases should be set up for rare and endangered species. Meanwhile, solid enforcement of environmental protection guidelines and policies, effective strengthening of environmental management and sufficient investments should serve as the guarantee for the implementation of the 7th and 8th Five-Year Plans.

4.2 To formulate relevant regulations and decrees

The state had already issued the law of forest, law of environmental protection, law of grassland, law of land, law of ocean protection, law of wild animal protection, regulations of marine resources, regulations of nature reserves for forests types and wild animal protection and regulations of nature reserves and so on. Regulations of endangered plant protection and the corresponding red books on animals and plants are being formulated.

4.3 To undertake the work of publicity, education and personnel training

March 12th of every year is the day on national tress planting. In addition, the period from April to May is designated for national bird-loving activities. People receive education on the protection of wildlife via bird-loving exhibitions, TV programs, films, journals and magazines, public gathering and academic reports and so on. On the World Environmental Day of June, 5th every year, there are similar activities in China. It's the long-term strategy of the State to integrate education on environment into the various courses taught at school. Besides, students may be guided to draw the layout pictures of rare animals on different continents and the layout of nature reserves in China. Summer camps held within nature reserves also include the above-mentioned educational items on environmental protection.

Training courses, academic seminars are offered to managerial workers of nature reserves.

4.4 To conduct scientific study in nature reserves

Since the founding of the PRC, the State has organized a series of large-scale and comprehensive investigations in accordance with the need of national economic construction, through which the characteristics of the major part of natural environment, the quality, quantity and distribution of natural resources have been clarified, especially with regard to those endangered species. The ecosystems already established or those to the built have been examined, and fixed observation stations and ecological monitoring network have been set up in nature reserves such as Xishuangbanna of Yunnan Province, Dinghushan of Guangdong, Huaping of Guanxi, Changbaishan of Jilin and Baiyingele of Inner Mongolia. Gene bases have been built for endangered species of animals and plants, such as Breeding Bases for endangered plant Camellia Chrysantha in Guangxi, Carpinus Putoensis Base in Hangzhou, Wild Calycanthus Chinensis Base in Hubei. For endangered animals, there are Red-Crowned Crane Breeding Bases in Zhalong in Heilongjiang and Yancheng in Jiangsu, Black Necked Crane Breeding Base in Caohai, Guizhou Province Lipotes Vexillifer Conservation Area in Anhui and Hubei as well as David Deer Breeding Area of David Deer Research Center in

Beijing.

In addition, achievements have been made in the scientific study of reproduction of Cathyaya Argyrothylla, variety-introduction of mask rat and the domestication and breeding of wood frags.

4.5 To promote international cooperation

China has extended ties with international organizations in the field of nature reserves. In 1972, China participated in the "MAB" Plan initiated by UNESCO and became member of the Council. From early 1980s to 1990, many nature reserves were designated to be nature reserves of world biological sphere, such as Dinghushan NR, Changbaishan NR, Wolong NR, Fanjingshan NR, Wuyishan NR, Xilingele NR, Bogedafeng NR, Shennongjia NR, Ranchen NR and so on, which have not only provided scientific data for international nature conservation and ecological monitoring, but also promoted the construction for other nature reserves.

In the recent 1 year or 2, cooperation on a series of items has been carried out with international organizations, such as the research center for giant panda in Wolong NR in Sichuan, which was set up under the auspice of World Wildlife Fund(WWF) aimed at the research of biology and behavior science for pandas, the joint survey in Altun NR in Xinjiang with International Union of Conservation of Nature and Natural Resources (IUCN); the cooperation in the study of Forest Type Nature Reserves and Forestrial wild animals with US Internal Department Fish and Wild Animal Agency; exchange of visits and inspection of Nature Reserves with France; Cooperative research of David Deer Breeding and species biology with British Wubangsi Park; Sino-Japanese joint-breeding program of Crested Ibis and training classes of nature reserves held with WWF and IUCN. International exchange and communication will undoubtedly do good to the development of nature reserve cause.

5 Problems existing in nature reserves in China and countermeasures

5.1 Major problems

The geographical distribution of nature reserves is uneven, their types and structure irrational.

The contradiction between economic development and construction of nature reserves has yet to be removed. In certain regions, such contradiction is even intensifying.

The building of legal systems for nature reserves has yet to see major improvement.

There has been no effective coordination among various departments in the field of nature reserves.

Nature reserves lack funds, the management system imperfect, the managerial level low, which can hardly meet the need for the construction of nature reserves.

5.2 Measures to strengthen nature reserve work

A. General targets and guidelines for China's nature conservation

According to the nature conservation strategy of China, the general goal for the year 2000 is to achieve rational utilization and protection of the country's natural resources, especially renewable resources by the end of the centrary; to curb the deteriorating tendency of national and rural environment so as to form a virtuous circle between ecological environment, population, social an eco-

nomic development; therefore, the general guideline for China's nature conservation cause should be to develop environmental protection urban and rural construction in locksteps in accordance with the general goal for national economic and social development, to turn the exploitative and extensive management into conservative and intensive management and achieve "all-round" planning, active protection, scientific management and sustainable utilization, to bring about unified economic, social and environmental benefits.

B. Specific countermeasures under the general targets and guidelines

To achieve the targets and guidelines mentioned above, effective measures should be taken as regards policy, management and technology.

a. "Policy" measures, i. e., the policies and regulations by the state as a means to conduct macro control in the field of environmental protection and construction, which serve as the guidance for scientific development of national economy and which play a decisive role in coordinating economic construction and nature reserve work.

Policies and measures should be made and implemented to facilitate the construction and development of nature reserves.

——The policy of "The one who destroys nature reserves makes compensation";

——The policy of combined process of rational utilization, protection and reproduction of resources. The nature reserves should be divided into zones of special functions, such as "core zones", buffer zones and business zones and so on.

——The policy of encouraging paid service of limited scale within the nature reserves.

Nature reserves are not only laboratories for professional study, but also classrooms to publicize scientific knowledge. They are the gene bases for species and the museum of nature. The profit got from the service will flow back to the construction of nature reserves.

——The policy of self-reliance and self-assistance.

Except for a small number of national nature reserves which can get state subsidiaries, most nature reserves at provincial and county levels can hardly get the financial support from the State and have to rely on their own strength. As a combination of social, economic and natural elements, nature reserves should offer benefits to the society and the state. Appropriate exploitation and management can be made, such as the establishment of breeding bases for rare endangered wild animal and plants as well as those of ornamental and economic value, such as nursery stocks, flowers, potted landscape and so on.

b. Technical measures

Science and technology constitute the primary productive force.

The solution of major problems in the terms of ecology and environments lies in the breakthrough of science and technology. In selecting the strategy for scientific and technological development, we should take into consideration domestic conditions as well as economic, technological and social elements so as to gain the best results at the lowest price. Several points are stressed as follows:

——Technical and economic policies in favor of the development of nature reserves should be formulated and adopted.

——Scientific research should serve the scientific management within nature reserves. The scientific research centers in NRs should serve the need for the reproduction of biological species and effective management.

The criteria for the classification of nature reserves, the assessment index and methods as well as the promotion of modernized management all rely on the acquirement and utilization of scientific achievements.

It is an urgent task to work out criteria for classifying nature reserves of different levels, the guiding principles and evaluating standard for the appraisal of ecosystems and managerial measures, including scientific principles and measures adopted by the management, which are the guarantee for ecological conditions and the quality of management in nature reserves.

——Techniques for the study of the improvement of resource exploitation from the environment both within and outside nature reserves should be developed.

——Effective patterns of management should be adopted.

Macro guidance should provide the longterm and immediate plans for the planned target.

Rational distribution should be planned, the programs and plans for nature reserves among various department be coordinated and their implementation be inspected.

National network of nature reserves should be built on the basis of three natural areas and 14 climatic and biological communities, and should gradually be connected with the world nature conservation network.

Models of sustainable development and combined benefits should be established. As the foundation to create wealth for the state, nature reserves should be economic entities. Under the prerequisite of active protection, they may bear the functions of farms, pasture land and enterprises that turn out their own produces and products. Nature reserves should make full use of their advantages in regard to resources to conduct variety-introduction, domestication, breeding and cultivation so as to utilized biological resources in a sustainable way.

——Techniques of biological diversity.

The problems such as ozone layer protection, prevention of global warming, prohibition of transboundary transportation of poisonous and deserted substances and the control of acid rain have attracted world attention. However, there is a new heated point, i.e., the protection of global biological diversity. Composes of diversities in inheritance, species and ecosystems, biological diversity is the basis for human existence.

Species are extincting at a high speed and in as expanding share. To protect the gene bases and sustainable utilization of species and avoid the destruction of species and ecosystems, in June 1992, the UN environment and development conference held in Brazil approved the convention on biological diversity signed by 283 countries. Initiating the principles for sustainable utilization of natural resources, this convention is of great significance to the publicity and adoption of biological diversity techniques and to the maintenance of the balance of biological sphere as well as the development for nature reserves.

c. Management measure

Environmental management stands for the management in the economic and social activities of

human beings through legal, economic and administrative, technical, educational means in accordance with the economic and biological laws purpose for coordinating the relations between development and environment, acquiring best environmental result with limited investment and attaining the goal of better developing nature reserves and protecting natural environment.

——Improving the legislation of nature reserves and strengthening legal management.

——Strengthening planning management and combining nature reserve plans into the plan for national economic and social development.

——Strengthening institutional construction in nature reserve; strengthening the role of inspection in term of the enforcement of relevant law, regulations, guidelines and policies.

——Regularly conducting monitoring and appraisal on the managerial level of nature reserves.

——Publicizing and popularizing knowledge concerning biological diversity and nature reserves so as to promote the national consciousness with regard to ecology and environment.

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(Received September 24, 1996)