

# **The Development of China's Marine Programs**

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Foreword

The ocean, which covers 71 percent of the earth's surface, is a basic component of the global bio-support system. It is also a treasure house of resources and an important regulator of the environment. It is inevitable that the development of human society will come to depend more and more on the ocean.

In the coming 21st century mankind will have new opportunities to develop and utilize the ocean. Upholding the principles of the international marine law as defined by the United Nations Convention on the Law of the Sea, maintaining the wholesomeness of the oceans, protecting the marine environment and guaranteeing the sustainable utilization of marine resources and maritime safety have become common norms for all the people in the world to abide by, and a collective mission for all mankind to undertake. As a major developing country with a long coastline, China attaches great importance to marine development and protection, and takes it as the state's development strategy. It is constantly strengthening comprehensive marine management, steadily improving its marine-related laws, and actively developing science, technology and education pertaining to the oceans. China has made positive contributions to international ocean development and protection by participating positively in UN marine affairs, promoting cooperation between countries and regions and conscientiously carrying out its obligations in this field.

The year 1998 has been designated by the United Nations as the International Ocean Year, and on this occasion the Chinese government would like to introduce the progress of China's work in this particular field to the world.

I. Sustainable Marine Development Strategy

China has a population of more than 1.2 billion, and its land natural resources per capita are lower than the world's average. Official statistics show that China has a land area of 9.6 million sq km, making it the third-biggest country in the world.

However, the land area per capita is only 0.008 sq km, much lower than the world's average of 0.3 sq km per capita. In recent years China's average annual amount of freshwater resources has been 2,800 billion cu m, ranking sixth in the world; but the amount of freshwater resources per capita is only one fourth of the world's average. China is rich in land mineral resources, but the amount per capita is less than half the figure per capita worldwide. As a major developing country with a long coastline, China, therefore, must take exploitation and protection of the ocean as a long-term strategic task before it can achieve the sustainable development of its national economy.

China boasts a mainland coastline of more than 18,000 km. There are more than 5,000 islands in China's territorial waters, each with an area of more than 500 sq m, and the islands' coastlines total more than 14,000 km. China also exercises sovereignty and jurisdiction over the vast continental shelves and exclusive economic zones (EEZs), as defined by the UN Convention on the Law of the Sea. Located in medium and low latitudes, China's sea areas have comparatively advantageous natural environmental and resource conditions. Some 20,278 species of sea creatures have been verified there. The fishing grounds that have been developed in China's sea areas cover 818,000 square nautical miles. The shallow seas and tidelands have a total area of 13.33 million ha, of which 2.6 million ha of water surface are suitable for the raising of aquatic products in terms of the current scientific level. So far, 938,000 ha are being utilized for this purpose. Scattered in these offshore waters are more than 30 sedimentation basins, with a total area of nearly 700,000 sq km. It is estimated that there are about 25 billion tons of oil resources and 8.4 trillion cu m of natural gas in these basins. More than 160 bays are spread along China's coasts, plus the deep-water stretches of coast with a total length of several hundred kilometers. Many spots along the coastline are suitable for constructing harbors and developing marine transportation. There are more than 1,500 tourist, scenic and recreational spots favorable for developing marine tourism. In addition, China's offshore areas abound in seawater resources and regenerable marine energy resources.

The China Ocean Agenda 21 formulated by China in 1996 put forward a sustainable development strategy for China's marine programs. The basic ideas of this strategy are as follows: To effectively safeguard the state's marine rights and interests, rationally develop and utilize marine resources, give positive protection to the marine eco-environment and realize the sustainable utilization of marine resources and the marine environment as well as the coordinated development of the work in this field. In this regard China abides by the following basic policies and principles:

--Safeguarding the new international marine order and the state's marine rights and interests. In February 1992 the Standing Committee of the National People's Congress (NPC) of China adopted the Law of the People's Republic of China on Its Territorial Seas and Adjacent Zones. As China's important law in this particular field, it provides a legal basis for the country to exercise sovereignty over its territorial seas and jurisdiction over the adjacent zones and safeguard the state's safety and marine rights and interests. To uphold the new international marine legal system and the state's marine rights and interests, the NPC Standing Committee approved the UN Convention on the Law of the Sea in May 1996, and solemnly stated: "In accordance with the provisions of the UN Convention on the Law of the Sea, the People's Republic of China enjoys sovereignty and jurisdiction

over the EEZs and continental shelves up to 200 nautical miles off its coasts. Together with the countries with opposite coasts or its neighboring countries, China shall, through consultation and on the basis of international laws and the principle of fairness, fix the dividing lines of each country's marine jurisdiction. China has sovereignty over all archipelagoes and islands listed in the Law of the People's Republic of China on Its Territorial Seas and Adjacent Zones. Regarding disputes over marine issues between China and its neighboring countries, the Chinese government shall, in view of the vital interests bearing on peace and development, stand for their settlement through friendly consultation. With regard to issues that cannot be solved for the time being, China stands for pigeonholing them and for strengthened cooperation and joint development.

--Overall planning for marine development and control. China will strengthen the comprehensive development and administration of its coastal zones, rationally develop and protect the offshore areas, actively participate in the development and utilization of international seabeds and oceans, and exploit the coastal land and sea areas in a unified way in order to gradually form coastal economic belts and marine economic zones, thus making the coastal areas more prosperous and developed.

--Rationally utilizing marine resources and promoting the coordinated development of the marine industries. China adopts the policy of placing equal stress on development and protection, to guarantee the sustainable utilization of marine resources. It will comprehensively develop and utilize its marine resources, continue to explore the oceans for new resources, make use of new technologies, and form and develop new marine industries to promote the sustained, rapid and healthy development of the marine economy.

--Simultaneously planning and implementing the development of marine resources and the protection of the marine environment. China will work out a program for the coordinated development of marine resources and the protection of the marine eco-environment and, in line with the principles of "putting prevention first, combining prevention with control" and "making the causer of pollution responsible for treating it," improve the monitoring, surveillance, law enforcement and management of the marine environment. Stress will be laid on strengthening the control of land-sourced pollutants and implementing the system for controlling the total quantity of pollutants, in order to prevent the marine environment degenerating.

--Reinforcing oceanographic technology research and development. China will pay attention to basic research and marshal all necessary forces to tackle key oceanographic problems, develop marine high-techs, and constantly improve the technological levels of marine development and services. It will speed up the promotion and utilization of advanced and applicable technologies, and consistently narrow the differences between the regions in terms of the technological level of marine development. Furthermore, the discipline of oceanography will be further emphasized in institutions of higher learning, including vocational education, and oceanographic personnel of various levels will be trained. At the same time, oceanographic knowledge will be spread among the general public.

--Setting up a comprehensive marine management system. China will continue to improve its marine function zoning and planning and strengthen the scientific management of marine development and protection, as well as the utilization of sea areas. Experiments in the comprehensive management of the coastal zones will be actively carried out, and a comprehensive control system will be gradually put in place.

--Actively participating in international cooperation in the field of marine development. China will conscientiously fulfill the obligations defined in the UN Convention on the Law of the Sea, actively take part in international marine affairs, promote international and regional cooperation and exchanges related to oceanic matters, and contribute its full share to the prosperity and development of the world's work in this field.

## II. Rational Development and Utilization of Marine Resources

In the light of the bearing capacity of marine resources, China adopts a policy of developing and utilizing them in a comprehensive way, so as to promote the coordinated development of the marine industries. In recent years China has made constant efforts to upgrade the maritime fishing, transportation, salt-making and other traditional industries. At the same time, it has spared no effort to develop the industry of marine reproduction and mariculture, offshore oil and gas, tourism, marine pharmaceuticals and other burgeoning industries. It has actively explored new marine resources as far as possible, and promoted the formation and development of some potential marine industries, such as deep-water mining, comprehensive utilization of seawater, and power generation with marine energy. In 1997 the total output value of the major marine industries, including ocean fishing, salt-making, the salt chemicals industry, marine transportation, shipbuilding, offshore oil and gas, and tourism, topped 300 billion yuan. As a result, these industries have become forces actively promoting the development of China's economy as a whole.

China's ocean fishing industry has a long history steeped in experience. In developing this sector, the country adheres to the principle of "speeding up the development of aquaculture, conserving and rationally utilizing offshore resources, actively expanding deep-sea fishing, emphasizing processing and circulation, and strengthening legal administration." Since the mid-1980s, China's saltwater aquaculture has developed rapidly, with a large increase in species and expansion of breeding areas. The output of such products rose from 1.926 million tons in 1987 to 7.91 million tons in 1997, with their proportion in the total output of the maritime harvest rising from 27 percent to 36 percent. In accordance with the actual conditions of marine fisheries resources, China has actively readjusted the structure of this sector, made efforts to conserve and rationally utilize offshore fisheries resources, and actively exploited new resources and fishing grounds, so as to make the fishing industry constantly adapt to the changes in the structure of marine resources. In 1997 the total output of China's ocean fishing industry came to 13.854 million tons. While expanding deep-sea fishing and international fishing cooperation, China adheres strictly to relevant international maritime laws, pays full attention to protection of the eco-environment and, in the light of the principle of "equality, mutual benefit, rational development of the exploitable resources, and abstention from infringement on the interests of other countries," actively develops fishing cooperation with relevant countries and

regions, in order to jointly expand the fishing economy. Since the 1980s, China has established cooperative fishing relations with more than 30 countries and regions.

China attaches great importance to the protection of marine fisheries resources, and has adopted various measures to conserve such resources so as to guarantee the implementation of a sustainable marine development strategy. It has done this by instituting various closed fishing seasons, closed fishing areas, marine sanctuaries and moratorium systems, banning harmful fishing gear and methods, and restricting the size of net meshes and the proportion of young fish. In 1979 China began to adopt a fishing permit system to curb reckless fishing, and in 1987 the country began to control fishing boats' horsepower. Since 1995 China has practiced a new midsummer moratorium system--every year during July and August fishing is banned in the sea areas north of 27 degrees north latitude. The new system has achieved encouraging economic, ecological and social results, and from this year the midsummer moratorium area will be expanded to 26 degrees north latitude and its duration will be lengthened to three months. China attaches great importance to the marine reproduction and the reproduction of fisheries resources, and has always insisted on the marine reproduction and releasing of prawns and other species, a measure which has achieved positive results.

As far back as in the 1960s China began to explore and exploit offshore oil and gas resources on its own. In the 1980s it started to absorb foreign capital and technology to develop this industry in cooperation with foreign companies. In exploiting offshore oil and natural gas, China follows the policy of placing equal stress on oil and gas, with the balance inclined slightly toward gas, combining domestic exploration and exploitation with cooperation with foreign companies, and integrating upstream and downstream. As a result, great progress has been made. By the end of 1997 China had signed 131 contracts and agreements with 67 oil companies from 18 countries and regions and imported a total capital of close to six billion US dollars for this industry. At the same time, more than 100 structures with oil and gas had been discovered, and 1.7 billion tons of oil reserves and 350 billion cu m of natural gas had been found. Twenty oil and gas fields are under development. With an offshore oil and natural gas industry in place, in 1997 China's offshore oil output exceeded 16.29 million tons, and its natural gas output stood at four billion cu m.

China has worked out a policy of utilizing its deep-sea waters and coastal resources in a rational way. According to the policy, priority shall be given to the construction of harbors in deepwater coastal areas, and vigorous efforts will be made to develop marine transportation. Significant achievements have been attained in marine transportation development since the founding of New China, especially since the implementation of reform and opening to the outside world. By the end of 1997, merchant ships had increased to 320,000 with a total deadweight tonnage of close to 50 million, of which more than 23 million were of the fleets in foreign trade transportation. Harbor construction and marine transportation in China are based on the planning concept of constructing major waterways, harbor hubs and water transport support system. China will put special efforts into the construction of specialized berths for bulk goods such as containers, coal, oil, ore and grain, set up collection and distribution channels in the rear, speed up the establishment of a modern loading-unloading-hauling system, and construct a container transport system with advanced freight-

handling technologies and featuring a combination of trunk lines with branch lines while strengthening the technical transformation of old harbors to improve their handling capacity and efficiency. At present, China has 15 harbors each with an annual handling capacity of more than 10 million tons. In 1997 the volume of freight handled by the country's major coastal harbors totaled 905 million tons. In recent years China's coastal shipbuilding industry has shown a trend of rapid development, and in 1997 China's shipbuilding tonnage ranked third in the world.

China's marine tourism development policy features relying on the coastal cities, stressing marine characteristics, and developing it region by region and sector by sector. In recent years, the coastal areas have created more than 300 marine and island tourism and recreational zones, with a variety of marine features. Marine tourism is now a burgeoning industry. In 1997 this sector received more than 10 million overseas tourists.

China was one of the world's pioneers in making salt from seawater. Some of China's new industries are associated with this aspect of marine resources development and exploitation: salt, salt chemicals, direct seawater utilization and seawater desalination. With an area of 430,000 ha, China's salt pans produced 29.281 million tons of raw salt in 1997. The major salt chemical products are potassium chloride, bromide, anhydrous nitre and magnesium chloride. The annual output of potassium chloride and bromide each exceeds 500,000 tons. In addition, Tianjin, Dalian, Qingdao, Yantai, Qinhuangdao and other coastal cities are now making efforts to use more seawater directly as industrial chilled water and non-potable water, which is of great significance for alleviating China's serious shortage of freshwater resources.

The Chinese government has listed the exploration and exploitation of the mineral resources of the Pacific Ocean as a long-term development project for which it intends to offer special investment. Meanwhile, it has established a special institution in charge of coordinating and administering China's exploratory and exploitative activities in the international seabed region. China is the fifth-largest investor in international efforts for seabed development, and has obtained an exclusive exploration and development area of 75,000 sq km. In the future, China will continue to actively participate in the administration and development of international seabed areas, and develop new exploration and exploitation technologies to make its due contribution to the peaceful utilization of international seabed resources for the benefit of the whole of mankind.

### III. The Protection and Preservation of the Marine Environment

China attaches great importance to the protection of the marine environment. Organs and laws aimed at marine environmental protection have been gradually established, and the people's consciousness of the importance of protecting the marine environment and abiding by the laws have been further strengthened, both of which have speeded up the work of marine environmental protection. As a result, the momentum of serious marine pollution has been slowed; the environmental quality of some of the country's sea areas has been improved; and most offshore waters are of good quality, despite the drastic increase in the

amounts of pollutants brought about by the booming economy of the coastal areas.

In 1982 the Marine Environmental Protection Law of the People's Republic of China, a basic law of the country to protect the marine environment, was approved by the NPC Standing Committee to prevent damage to the marine environment resulting from coastal construction projects, offshore oil exploration and exploitation, navigation of ships, wastes dumping, and discharge of land-sourced pollutants. Later, several concrete regulations were issued by the Chinese government, such as the Regulations of the People's Republic of China on the Prevention and Control of Marine Pollution Caused by Ships, Regulations of the People's Republic of China on Environmental Protection and Control Pertaining to Offshore Oil Exploration and Exploitation, Regulations of the People's Republic of China on Control of the Marine Dumping of Wastes, Regulations of the People's Republic of China on the Prevention and Control of Environmental Pollution from Shipbreaking, Regulations of the People's Republic of China on the Prevention and Control of Pollution Damage to the Marine Environment from Land-Sourced Pollutants, and Regulations of the People's Republic of China on the Prevention and Control of Pollution Damage to the Marine Environment from Coastal Construction Projects. In addition, a dozen rules and standards were enacted concerning marine environmental protection by government departments. All of these laws, regulations and rules have formed a legal framework for marine environmental protection. Besides, programs and plans for marine environmental protection, professional plans for the protection of wetlands and biological diversity, an overall marine monitoring network and a nearshore environmental monitoring network have also been put in place by related state organizations.

In recent years, an administration system for marine environmental protection has been gradually set up: State environmental protection departments are in charge of marine environmental protection for the whole country; state marine administrations are responsible for the organization of survey, monitoring and surveillance of the marine environment, the conduct of scientific research and the prevention of pollution damage to the marine environment resulting from offshore oil exploration and exploitation and the dumping of wastes at sea; state harbor administrations are responsible for the supervision, investigation and disposal of pollutant discharge by ships, the surveillance of harbor waters and the prevention of pollution damage to the marine environment caused by vessels; state fishing port administrations are responsible for the supervision of pollutant discharge by fishing boats and the surveillance of fishing grounds; environmental protection organs of the armed forces are responsible for the supervision of pollutant discharge by military vessels and surveillance of naval port waters; and environmental protection organs of the local people's governments in coastal areas are responsible for the environmental protection work of preventing pollution damage resulting from coastal construction projects and land-sourced pollutants. This coordinated network plays an important role in the implementation of the related laws and the efficient protection of the marine environment.

China carries out the policy of putting prevention first and combining prevention with control in managing existing marine pollution. While endeavoring to make a success in the protection of marine biological resources and the prevention and control of marine pollution, China makes the prevention and control of land-

sourced pollution the focal point of its marine environmental protection work. A series of regulations have been drawn up to check land-sourced pollutant emission, and enhance the monitoring, surveillance and control of the main pollutant-emission outlets. Large and medium-sized cities have paid constant attention to readjusting the distribution of industries, improving technical transformation, and recovering waste gas, waste water and industrial residue (the "three wastes") for multipurpose use. Enterprises creating serious pollution are required to take effective measures to control it within a definite period of time; otherwise they have to close down, suspend operations, merge with other plants, change their products or move to other places. Besides, a number of sewage treatment plants have been built to control new pollution sources and reduce the amount of land-sourced pollutants dumped into the sea. To prevent marine pollution resulting from ship and port discharge, in addition to the formulation of the Crash Program to Combat Ships' Oil Pollution, oil-water separators have been installed aboard ships of all types in accordance with relevant stipulations, and oil-polluted water treatment equipment, including emergency treatment equipment, has been installed at all sea ports. This equipment can help dispose of 3.7 million tons of oil-polluted water from vessels and recover 42,000 tons of waste oil a year. Similarly, to prevent marine environment pollution resulting from offshore oil exploitation, besides the formulation by offshore oilfields of the Crash Program to Combat Oil Spills During Offshore Oil Exploration and Exploitation, oil-polluted water treatment equipment has been installed on all drilling platforms, engine-room oil-water separators have also been installed aboard all drilling ships, and oil barriers, chemical de-oiling agents and spill recovery ships provided in all China's offshore oilfields.

As one of the contracting parties to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matters signed in 1972 in London, China attaches great importance to the fulfillment of the provisions under the convention and is steadily improving its control of the dumping of wastes into the sea. So far, China has designated 34 dumping areas for dredged materials of the third category and four areas for midair oil discharge. It has issued about 2,000 dumping permits and tightened up the monitoring of the environmental quality of dumping areas. Besides, it has strictly prohibited the disposal of any radioactive substance and incineration of toxic waste at sea, and plans to gradually stop the dumping of industrial waste into the sea.

To protect the ecological environment of fishing grounds, the Water Quality Standards of Fishing Grounds have been drawn up by the Chinese government and the Regulations on the Supervision and Control of the Environmental Sanitation of Shellfish-Raising Areas and other regulations have been drawn up by departments concerned. In addition, a sequence of measures have been taken to further strengthen the eco-environmental protection of spawning grounds of saltwater fish and shrimps, feeding grounds, wintering grounds, migration channels and aquatic farms. A multilevel setup for the protection of the fisheries environment has been established by the state and coastal region authorities, including 15 monitoring stations at and above the provincial level around the country and a number of marine life protected areas in major fishing grounds. In 1995 the department concerned worked out the Procedures for the Administration of Marine Reserves, based on the guiding principle of "conservation first, appropriate exploitation and sustainable development," and divided each marine nature reserve into core, buffer and experimental zones, in order to improve the

building and management of the marine nature reserves. At present 59 marine protected areas, covering gulfs, islands, estuaries, coasts, coral reefs, mangrove swamps, coastal lagoons, marine natural history sites, seaweed beds and wetlands, have been built, covering a total area of 12,900 sq km.

China is one of the countries which are most vulnerable to marine calamities. The economic losses suffered by the coastal areas from storms, tidal waves, ice floes, seaquakes, coastal erosion, typhoons, fog and red tides account for about 10 percent of the total of all natural disasters afflicting China. After making unremitting efforts for decades, China has installed a basic marine environment and disaster observation network and forecast-alarm system, covering both offshore areas and distant waters, with the cooperation of several departments. This network engages in analysis, forecast and grading of major marine calamities, and runs maritime rescue centers and coastal emergency stations. As a result, a marine disaster alleviation framework has been put in place.

The rapid economic growth and steady population increase in the coastal areas, coupled with the constant expansion of marine exploitation, mean that China continues to face problems of marine environmental protection and disaster alleviation. To cope with this situation, China has adopted the Ninth Five-Year Plan (1996-2000) and Long-Term Program to the Year 2010 for National Marine Environmental Protection, which further advances the three major policies of ``putting prevention first, combining prevention with control," ``making the causer of pollution responsible for treating it" and ``improving the control of the environment." The following are the principal measures China will take to protect the marine environment:

--Control of pollution sources will be enhanced by setting quality standards for the water in all parts of rivers which flow into the sea, establishing a system to control the total amount of pollutant discharge into the key sea areas, identifying the marine discharge indices of the main pollutants, and strictly restricting discharge above the initial amount;

--The investigation, monitoring and control of marine pollution will be stepped up by improving the pollution monitoring network, strengthening surveillance by satellites, ships and offshore monitoring stations, and perfecting the law enforcement system;

--Fees will gradually be levied for pollutant discharge, and all walks of life will be encouraged to develop marine environmental protection technologies and industries;

--The construction of the system of marine monitoring and disaster forecasting and alarm will be stepped up, complete with an observation network, a data collection and communication network, a forecast-alarm and service network and a data quality control system.

#### IV. The Development of Oceanographic Science, Technology and Education

In recent years China has made further efforts to promote the investigation and exploration of marine resources and the marine environment, search actively for new exploitable resources, study new techniques and methods of marine resources exploitation and protection, train technical personnel in marine development and protection, and spread oceanographic knowledge among the general public in order to rouse the whole nation to protect the marine environment.

On the basis of a multidisciplinary oceanographic research setup, which consists of 109 research institutes and 13,000-some research personnel, China has many achievements to its credit in oceanographic survey and research, studies in basic oceanographic science, development and protection of ocean resources, marine monitoring technologies and manufacturing of oceanographic technical equipment.

Since the founding of the People's Republic of China in 1949 a large amount of work has been done in the field of oceanographic surveys and research, which started in offshore areas with surface observation of the sea and later expanded to deep-sea regions by means of aerospace remote sensing and underwater detection, as well as surface observation. As early as in the period 1958-1960 a national comprehensive survey of China's offshore waters was made; later, from 1980 to 1986, a comprehensive survey of coastal zones and shoals resources was conducted nationwide, along with the launching of a number of pilot projects on the comprehensive development and utilization of coastal zones; and from 1988 to 1995 a general investigation of the country's island resources and an experiment on their comprehensive development were carried out.

China signed the Antarctic Treaty in 1983 and began to make surveys of the Antarctic and the surrounding sea areas in 1984. By 1997 the country had completed 14 programs of scientific investigation in this region, using the Great Wall and Zhongshan survey stations as bases. Thus, China has made positive contributions to the world's peaceful exploitation of the Antarctic. In 1996 China joined the International Scientific Committee on North Pole Research, and has taken an active part in international cooperation projects in the Arctic, such as "The Role of the Polar Region in Global Change."

With more attention paid to the study of the inshore shelf oceanography, China has established a multidisciplinary oceanographic research system with regional characteristics. Under the direction of the oceanographic development strategy and the support programs and plans for the development of oceanography drawn up by relevant state departments, marked progress has been made in recent years in physical oceanography, biological oceanography, marine geology and marine chemistry. These achievements have provided scientific directions and references for the promotion of offshore fishing and oil and gas exploitation, protection of the marine environment, and reduction and prevention of marine disasters.

China makes vigorous efforts for the development of oceanographic technologies, building up an oceanographic technology system focusing mainly on the marine environment, exploration and exploitation of marine resources, and general marine engineering, and covering more than 20 technological fields. The country has now turned its attention to implementing a marine high-tech program, a program for tackling key problems in marine science and technology and one for

marine development by reliance on science and technology. In its marine high-tech research China gives priority to technologies covering marine monitoring, marine exploration and resources exploitation, deep-sea exploration and marine biology. The program for tackling key problems in marine science and technology centers on fields directly related to modern marine development, such as sustainable exploitation of the resources and environment of coastal zones, desalinization of seawater, exploitation of marine energy and comprehensive utilization of seawater resources. In 1996 government departments concerned jointly formulated the National Plan for Implementing the "Program for Marine Development by Reliance on Science and Technology" in the Ninth Five-Year Period (1996-2000) and to the Year 2010, which focuses on research, development and dissemination of the technologies of marine reproduction and mariculture, fine processing of marine biological resources, exploration and extraction of marine pharmaceuticals and exploitation of chemical resources in seawater. Through implementation of this plan, China hopes to foster marine technology enterprises, improve the productivity of the marine industries, and make the technological progress factor rise from 30 percent to 50 percent in the output increase of the marine industries.

China has basically evolved an oceanographic education system embracing professional education, vocational education and popular knowledge education. Oceanography as an area of study is taught in 37 institutions of higher learning and 29 secondary specialized schools in China, training large numbers of technical and managerial personnel. The vocational schools, offering courses in more than 20 oceanographic fields, have trained more than 8,000 people in the past three years. The mass media is frequently used in China to inform young people about oceanographic topics and educate the people living in coastal regions in the proper way to exploit marine resources and protect the marine environment.

In addition, a service system providing oceanographic data and information headed by the National Oceanographic Information Center has been established in China in the wake of the progress in the past dozens of years in this field; it provides comprehensive information services for ocean development, oceanographic research and marine environmental protection. Besides, in the early 1990s China built up a basic network jointly run by government departments concerned, enterprises, research institutes and coastal zones to promote oceanographic information exchanges.

To give a further boost to oceanographic technology, offshore development and marine environment protection, the Chinese government has worked out the Medium- and Long-Term Program for the Development of Oceanographic Science and Technology, the Oceanographic Technology Policy (Blue Paper) and a number of concrete development plans. The main tasks for oceanographic technology development in the future are: To strengthen research into basic oceanographic science; tackle the key technologies of marine resources exploitation and environmental protection; promote the application of oceanographic technologies to marine industries; improve marine resources development and service support for marine disaster prevention and reduction; improve marine environmental protection; and narrow the gap between China and the developed countries in oceanographic technology.

## V. The Implementation of Comprehensive

## Marine Management

The UNCED Agenda 21, formulated at the United Nations Conference on Environment and Development in 1992, recommends that a comprehensive marine management system be established by countries with sea coasts to ensure sustainable utilization of the sea and coordinated development of the marine programs. This recommendation has received endorsement from all the countries in the world, including China. In recent years China has established and perfected state marine management organs as well as local organs in coastal regions, with a fairly large contingent of personnel engaged in marine law enforcement, management, monitoring and scientific research. Marine-related laws and regulations have been formulated and comprehensive management exercised.

China has also improved its legislation work concerning maritime matters. The National People's Congress has adopted the Law of the People's Republic of China on Its Territorial Seas and Adjacent Zones, Marine Environmental Protection Law of the People's Republic of China, Maritime Traffic Safety Law of the People's Republic of China, Fisheries Law of the People's Republic of China, Mineral Resources Law of the People's Republic of China and other related laws. The State Council has promulgated administrative regulations, encompassing the Regulations on the Exploitation of Offshore Petroleum Resources in Cooperation with Foreign Enterprises, Regulations on the Administration of Sino-Foreign Oceanographic Surveys, Regulations Governing the Laying of Submarine Cables and Pipelines, and Procedures for the Registration and Administration of Mineral Resources Survey Zones and Sectors. In content, these laws and administrative regulations are all consistent with the principles and relevant provisions contained in the UN Convention on the Law of the Sea. The formulation and implementation of these laws, rules and regulations has, on the one hand, protected China's state sovereignty and marine rights and interests, and on the other, promoted the rational development of marine resources and the effective protection of the marine environment. Comprehensive management of China's marine areas is beginning to be contained within a legal framework.

Aiming at the scientific, effective and comprehensive management of marine areas, from 1989 to 1995 a total of 3,663 marine zones have been divided into different functional types by the relevant departments of the central and coastal area governments, encompassing development and utilization zones, control and protection zones, nature preservation zones, special function zones and reserved zones. From 1991 to 1994, these departments worked out the National Plan for Marine Development, in which the strategic objective of marine development, marine industrial production and distribution planning, and regional marine development planning were put forward, along with policies and measures to promote marine development.

In recent years, China has achieved gratifying successes in comprehensive management experiments in the coastal zones. The Comprehensive Survey of China's Coastal Zones and Tideland Resources, which was carried out from 1979 to 1986, has accumulated abundant information for further efforts to be made in this field. Since 1994, construction of the Coastal Zone Model Comprehensive Management Area has been going on in Xiamen, with joint efforts by the Chinese government, the UN Development Program (UNDP) and other organizations. This

project, which has achieved good results, has been praised by international organizations and provided experience for China and other countries to draw on for work in this regard. In 1997, China again cooperated with the UNDP in coastal zone comprehensive management experiments carried out in Fangcheng in the Guangxi Zhuang Autonomous Region, Yangjiang in Guangdong Province and Wenchang in Hainan Province.

The basic objective of comprehensive marine management is to ensure a healthy marine environment and the sustainable utilization of marine resources. To make a greater success in this, China will make further efforts in this field, as follows:

It will perfect the legal system pertaining to the use and administration of sea areas;

It will set up and perfect an information system to bolster comprehensive marine management, and expand the survey and appraisal of marine resources and the marine environment;

It will formulate large-scale offshore functional divisions and plans for comprehensive marine development and protection;

It will set up an overall policy-making mechanism to promote the coordinated development of marine programs;

It will gradually perfect the multi-functional force of marine supervision and law enforcement personnel so as to form an integrated air, sea and onshore marine surveillance and management system;

It will mobilize people from all walks of life to take part in the protection of marine resources and the marine environment and enhance their consciousness of the need to cherish and protect the ocean.

## VI. International Cooperation in Maritime Affairs

As the world's oceans are an integral whole, the research, development and protection of the oceans require common efforts by all countries in the world. As an important developing country, China is well aware of its responsibilities and obligations concerning international maritime affairs. China has consistently insisted that the ocean be peacefully utilized, and jointly developed and protected, and disputes over maritime matters be settled in a fair manner. China has always taken an active part in international and regional maritime affairs, promoted cooperation and exchanges in this field, conscientiously fulfilled its duties and contributed its share to international development of the oceans.

China has always supported and actively participated in the various forms of marine-related activities promoted by the United Nations. China has joined nearly 20 international organizations, including the Intergovernmental Oceanographic Commission of the United Nations Educational, Scientific and Cultural Organization (UNESCO/IOC), Scientific Committee on Oceanic Research (SCOR), Commission on Maritime Meteorology (CMM), International Maritime Organization (IMO), UN Food and Agriculture Organization (FAO), North Pacific Marine Science

Organization (PICES), and Pacific Conference on Science and Technology (PACON). China has also engaged extensively in cooperation and exchanges in maritime affairs with scores of countries in the world.

In addition, China has attended all the sessions of the Third Conference on the Law of the Sea of the United Nations (UNCLOS) and joined the formulation of the United Nations Convention on the Law of the Sea, thus becoming a contracting party to the latter. It has also attended the meetings of the preparatory committees on the International Seabed Authority (ISA) and the International Tribunal on the Law of the Sea. China took part in the establishment of the ISA and was elected as one of its first B-level council member states. As one of the first investors in international seabed development, China has put large amounts of capital, technology and qualified personnel into seabed exploration, which has not only safeguarded China's rights and interests in the international seabed but it also constitutes a contribution to man's endeavors to exploit marine resources. Moreover, a Chinese scientist was elected as one of the first judges of the International Tribunal on the Law of the Sea, playing a positive role in international marine affairs.

China sets store by the protection and management of the high seas and their resources. From 1993 to 1995, China participated in the formulation of the Agreement for the Implementation of the Provisions of the December 10, 1982 United Nations Convention on the Law of the Sea Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks. China has successively engaged in negotiations with Russia, the United States and Japan on the development and protection of the fisheries resources of the Bering Sea, and signed and ratified the Convention on the Conservation and Management of Pollack Resources in the Central Bering Sea. In order to protect fisheries resources on the high seas, China has taken part in international activities to protect tunas, whales and other endangered species of marine life, acceded to the International Convention for the Conservation of Atlantic Tunas, and participated in the formulation of the Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas.

Oceans being a main artery across the world, international cooperation in sea transportation is of great importance for promoting the interflow of commodities and economic development globalwide. As a member of the IMO China has signed bilateral maritime transportation agreements with 51 countries, making positive efforts to promote international cooperation and exchanges in maritime transportation. At the 16th to 20th sessions of the IMO, China was successively elected as an A-level council member state. China has also acceded to the 30-some conventions formulated by the IMO, such as the 1965 Convention on Facilitation of International Maritime Traffic, 1990 International Convention on Oil Pollution Preparedness, Response and Cooperation, International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, As Amended, 1974 International Convention for the Safety of Life at Sea, International Convention for the Prevention of Pollution from Ships, 1973, as modified by the protocol of 1978 relating thereto (MARPOL, or 73/78 Convention on Pollution Convention), Athens Convention Relating to the Carriage of Passengers and Their Luggage by Sea, 1974, and International Convention for the Unification of Certain Rules of Law with Respect to Collision Between Vessels.

China has also taken part in global oceanographic activities, including the GSMMP (global studies and monitoring of marine pollution), the TOGA (tropical ocean and global atmospheric project), the WOCE (world ocean circulation experiment), the JGOFS (joint global ocean flux study), the LOICE (land-ocean interaction in the coastal zone), and the GLOBEC (global ocean ecosystem dynamics), making positive efforts to promote worldwide oceanographic cooperation. From 1985 to 1990, China sent three ships and more than 300 scientific workers to conduct the coupled ocean and atmospheric response experiment in the tropical Western Pacific (COARE). Large amounts of scientific data were obtained, providing important materials for understanding the influence of that kind of response in the Western Pacific's "Warm Pool" on global climate changes, for improving global ocean and climate forecast modes and studying the El Nino Phenomena. China joined the North Pacific Marine Science Organization (PICES) and the Regional Committee for the Western Pacific of the Intergovernmental Oceanographic Commission in 1990 and 1992, respectively. China also joined the Working Group on Marine Resources Conservation of the Asia-Pacific Economic Conference and other regional organizations, as well as the Global Ocean Observation System (GOOS) initiated by the UNESCO/IOC and other international organizations, and helped to initiate and organize the Northeast Asia Ocean Observation System.

Since the 1980s, China has engaged in extensive scientific cooperation in marine projects with dozens of countries, including the United States, Germany, France, Canada, Spain, Russia, the DPRK, the ROK and Japan, resulting in fruitful achievements in projects concerning the deltas of the Yangtze and Yellow rivers, Kuroshio, air-sea interaction, and the bio-diversity of Hainan Island. During the Kuroshio survey, jointly conducted by China and Japan from 1986 to 1992, more than 100 field operations were carried out, and meetings of over 20 scientists were arranged, which helped to accumulate a rich store of information for understanding the movement of Kuroshio, its regular pattern of changes and its origin, as well as the resources variations in the fishing grounds of the Western Pacific.

China has made strenuous efforts to foster cooperation in regional marine fisheries on the principles of equality and mutual benefit. Under the Agreement of Fisheries Between the Government of the People's Republic of China and the Government of Japan in 1975, China and Japan arranged for the development and protection of their fisheries resources every year through negotiations. In 1997, China and Japan signed a new agreement on fisheries, laying the foundation for long-term cooperation between the two countries in this regard. China has held talks with the ROK, the Philippines and other neighboring countries on the development and protection of fishery resources in the surrounding sea areas.

China is also committed to helping developing countries train people for marine development and comprehensive management work, and has hosted many international maritime conferences. In 1987, the training course on ocean management of the International Ocean Institute was offered for the first time in Beijing. In October 1994, the China Center of the International Ocean Institute was set up. So far, it has held three training seminars for over 50 people from 19 developing countries, majoring in marine development. In 1996, the Pacem in Maribus XXIV Conference was held in China, at which positive results were attained and a Beijing Declaration was announced.

While making great efforts for the development and protection of the ocean, China is clearly aware of the fact that, as a developing country with inadequate level of development and limited economic strength, China has lagged behind some of the developed countries in this regard. The marine scientific and technological level in China is relatively low, the equipment used in marine development is backward and many development areas are still in rough shape. Especially, the increasing population and rapid economic growth in the coastal areas in recent years have put great pressure on the marine environmental protection and hampered the rational development of marine resources. China has put the issue of rational utilization and protection of marine resources and the marine environment into the overall, cross-century plans for national economic and social development, and has adopted the sustainable development of marine programs as a basic strategy. With the continuing growth of the forces of social production, the further building-up of comprehensive national strength and the gradual awakening of the people's consciousness of the importance of marine protection, China's marine programs will definitely enjoy still greater development. Together with other countries and international organizations concerned, China will, as always, play its part in bringing mankind's work for marine development and protection onto the road of sustainable development.