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on Environment and Development

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CCICED Secretariat





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Opening Session

Opening Speech

Promoting Sustainable Development through the integration of land and ocean ecosystem management

Li Ganjie

CCICED Secretary General; Vice Minister, Ministry of
Environmental Protection

Established in 1992 with the approval of the State Council, CCICED is a high-level non-profit advisory body composed of high-profile Chinese and international personages and experts in the field of environment and development. The major task is to exchange and disseminate successful international experience in the field of environment and development, study and explore the key environment and development issues of China; present projecting and strategic policy recommendations to the Chinese Government and decision makers at all levels; support and facilitate the implementation of sustainable development strategy in China and promote development of resource-saving and environment-friendly society.

CCICED has put forward a series of important policy recommendations to the Chinese Government on key issues in the field of environment and development over the past 20 years, many of them have been introduced and adopted by the Chinese Government. It has made unique contributions to economic development and environmental protection of China. Introducing international experience of sustainable development into China, CCICED also facilitates exchange and cooperation between China and international communities in the field of environment and development. CCICED has become one of the environment and development international cooperation programs with the longest history,



highest level and biggest impacts in China. As a landmark cooperation platform for high-level dialogue and exchanges between China and foreign stakeholders in the field of environment and development, CCICED has attracted wide attention of international communities.

In the past two years, centering on the theme of ecosystem management and green development, CCICED has organized Chinese and international experts to study eco environment issues and policies relevant to sustained marine development in China and put forward policy recommendations such as the idea of sea-land based management, implementation of ecosystem-based comprehensive plans and promotion of sustained marine development in China. These policy recommendations are highly consistent with the systematic environmental management idea “from mountain to the seas” actively advocated by international communities.

Marine economy enjoys rapid development in our country in recent years. Ecosystem based development in coastal regions has become a historic trend under the guidance of outlook on scientific development. With “Promoting a blue economy through ecosystem-based management” as the theme, we hold a round table meeting here today on the one hand to share CCICED policy recommendation findings with officials from marine and environment management departments of the central and local governments as well as Chinese and international experts and scholars. On the other hand, I hope we have further discussions with all participants on this theme.

We all know that life originates from ocean and human beings develop on land. Facing current pressure of lack of land resources, human beings turn their eyes to oceans again and put forward a series of ideas such as “return to oceans” and “blue economy”. Many countries in the world establish the “pan-land” concept and take acceleration of development & utilization of marine resources as well as development of marine economy as national strategic objectives.

China has a population of over 1.3 billion, the per capita land natural resources is lower than the world average. As a big developing country with long coastal line, China has bright prospects in developing marine economy to obtain sustainable development of its national economy.





But the prerequisite is that we must take overall consideration of land and marine development and protection and carry out it as a long-term national strategy.

At present, the seas in particular coastal ecosystems of China are facing much pressure. The coastal environment of China shows combined pollution trend due to inappropriate industrial layout and economic structure. Land source pollution leads to aggravation of marine eutrophication. There is large-area degradation of coastal marine ecosystems with frequent marine eco environment disasters because of the factors such as excessive catch, climate change and pollution. These problems have brought huge impacts on the services and output functions of marine ecosystems of China.

The Outline of the “12th Five-Year National Plan for National Economic and Social Development” suggests that we will facilitate development of marine economy and takes it as an important component for economic transformation and improvement of core competitive force of industry. The Outlines clearly requires that we will “develop marine economy, adhere to ecosystem based management, formulate and carry out marine development strategy and raise our capacity in development, control and comprehensive management of marine resources.” In fact, each coastal province or autonomous region has attached great importance to the development of marine economy since the beginning of this new century. Examples include “five points one line” coastal economic zone in Liaoning Province, Tianjin Binhai New Development Zone, Blue Economic Zone in Shandong Peninsula, coastal development strategy in Jiangsu, marine economic development demonstration zone in Zhejiang Province, Haixi Economic Development Zone in Fujian and Beibuwan Economic Development Zone in Guangxi Zhuang Autonomous Region. Each province and autonomous region has developed its development plan and established a number of development modes. This roundtable meeting also especially invites the people in charge from relevant provinces and cities in China. I hope that we could share with relevant experts and participants of practical experience in and specific issues on promotion of sustained marine development.

According to the requirement of promoting the development of



marine economy specified in the outline of the “12th Five-Year Plan”, environmental protection department is willing to carry out active cooperation with marine administrative department, we have put forward the following suggestions:

First, facilitate the policy that combines marine blue economy with land green economy and pay attention to the sustainability of marine economy and marine ecosystem service functions. To achieve sound and fast development of marine economy, it is very important to combine relevant economic development and environmental management policies. This requires that we should further integrate development of marine economy with transformation of economic development mode, that is, achieving good combination of marine “blue economy” with “green economy” on land.

Second, strictly control land-based pollution, appropriately develop and utilize marine resources and achieve sustainable development of marine economy. Although marine territory is vast in area and rich in resources, it is not limitless. To develop marine economy, each province should in the beginning pay attention to overall arrangements for sustainable development of land and marine environment. Apart from raising marine development capacity, they should strictly control land-based pollution; raise capacity in the control and comprehensive management of marine pollution; pay attention to the safety of relevant industries and protect islands, costal zones and marine eco environment.

Third, vigorously develop marine science & technology conducive to promotion of conservation of ecosystems. Science and technology is the first productivity. The development of marine economy and protection of marine ecosystems depend on the progress of marine science & technology. Self-innovation, great progress in focal tasks and obtaining marine science & technology that supports development and guides future is one of key factors determining conservation of marine ecology and development of marine economy. To this end, we should strengthen research & development of fundamental, projecting and key technologies and raise scientific supporting capacity in facilitating sustained marine development.





Promoting reasonable utilization of ocean resources with effective environmental protection

Chen Lianzeng
Deputy Administrator, State Oceanic
Administration of China

As you know, seas, creatures and wetlands are listed as three big ecosystems on Earth. They are important shield for safeguarding global ecological security and main space for development of blue economy and determine the survival and development of human beings. With vast marine area, long coastal line, many islands and rich resources, there is very broad prospect for development and conservation of marine resources in China. The Chinese Government has always attached great importance to the development of marine undertakings. The just closed Fourth Meeting of the 11th National People's Congress approved the Outline of the "12th Five-Year National Plan for Economic and Social Development". The Outline requires that China will promote the development of marine economy and takes it as a special chapter. This is the first time for the Five-Year Plan of China. In addition, in his 2011 Report of the Government, Premier Wen Jiabao said we should facilitate the development of marine economy, meanwhile we should strengthen the control of marine pollution. This fully demonstrates the determination of the Chinese Government in following the sustainable development path with harmony between development of blue economy and protection of marine environment.

At present, new regional pattern for development of blue economy in China is under rapid development. A number of marine development plan of coastal regions including the Blue Economic Zone in Shandong Peninsula have become a part of national strategy. Therefore, we





expected that there will be unprecedented expansion and depth of marine development in China in the future years. Presently, economic and social development of coastal regions of China is very rapid. However, it brings about some ecological environment problems. Just as Secretary General Li Ganjie said, problems such as degradation of resources, environmental pollution and frequent disasters mainly occur in coastal areas. These areas are subject to dual impacts of both land-based and marine activities. The relations between socioeconomic development and protection of resources and environment are complicated. In addition, regional, industrial and sectoral division breaks the internal link of land ecosystem to marine ecosystem.

Therefore, we suggest that during the development of marine economy and promotion of sound and fast economic and social development in coastal regions, we must adhere to overall planning for land and marine development; consider both rivers and seas; comprehensively coordinate development with marine environmental protection; and maintain service function of marine ecosystem. We believe that it is effective approach for promoting sustainable development of oceans.

As a functional department for comprehensive coordination of marine affairs, the State Oceanic Administration will take effective facilitation of rational development and protection as our focus. Confronting with current situation and challenge in development and protection of marine resources, State Oceanic Administration will actively facilitate the work of the following areas based on the requirements of “adhering to overall planning for land and marine development and improving the capacity in development, control and comprehensive management of marine resources” identified by the Central Government: First, developing and carrying out marine development strategy and strengthening the planning and legislation in marine field. Second, adhering to overall plan for land and seas and facilitating sound and fast development of blue economy. Third, strengthening protection of marine environment and creating a pattern of safe eco environment of seas. Fourth, actively preventing marine disasters and environmental pollution accidents and addressing the impacts of climate change on oceans. Fifth, exploring the establishment of coordination mechanism to facilitate



effective link between protection of marine environment and prevention and control of water pollution of river basins. Sixth, make more efforts in publicity on development of ecological civilization related to seas, setting up and improving public participation mechanism, actively promoting international cooperation on conservation of marine ecology.

With nearly 20-years history, CCICED has conducted in-depth research on major issues of environment and development in China and put forward many precious policy recommendations on achievement of sustainable development in China. We believe that with in-depth discussion and communications between Chinese and international experts, this meeting will put forward new thinking and ideas that will address the hot and difficult issues confronting the development and conservation of marine resources in China. We will carefully study and actively adopt relevant suggestions in our specific work in the future. Meanwhile, we hope that we could further strengthen our cooperation and exchanges with all experts of CCICED in the future. We also hope that each expert continuously pay high attention to and support the development of marine undertakings in China, jointly facilitate the development of ecological civilization of oceans, promote the harmony between man and ocean and achieve sustainable marine development.



China's Green Prosperity Future

Wang Jianxiang
Vice Mayor of Qingdao Municipal Government

As a high-level advisory body in China, CCICED has made important and active contributions to the development of environment cause and expansion of international cooperation. CCICED chooses Qingdao to hold its 2011 Roundtable Meeting with senior officials, experts and scholars gathering here, we feel it a great honour.

The 21st century is a marine century. All countries in the world take the development and utilization of ocean as important national development strategy. Our country has identified the goal of developing into a strong marine country. However, when we are engaged in development of marine economy with great achievements, economic activities generate strong impacts on marine environment. As a result, marine environment is subject to damage at different degrees. Promoting a blue economy through ecosystem-based management is prompt response to this major issue. I believe with this roundtable meeting, we will work out scientific solution and facilitate sustainable development of marine economy.

Qingdao is an important regional city in terms of economic development. It is also a famous port city and coastal tourist city. The development of Qingdao depends on seas, which plays a vital role in economic and social development of Qingdao, and we fully understand the importance of protecting marine environment. In the past few years in particular the “11th Five-Year Plan” period, Qingdao has identified and carried out the “Pan-Jiaozhou Bay Protection and Development” strategy; taken environmental protection as the first priority in economic and social development; adhered to Sound Ecology policy and implemented the “Blue Sky and Seas” and “Energy Saving and Emission Reduction”



projects. During the “11th Five-Year Plan” period in Qingdao, there was 26.9% reduction of SO₂ emission and 18% reduction in COD discharge; the meet-standard-rate of water quality of coastal marine function areas went up by 14.5 percentage points at 87.5%. Qingdao has successfully developed urban clusters of National Model Cities on Environmental Protection. In April, 2009, CPC Secretary General Hu Jintao visited Shandong Province and gave an important instruction of developing a blue economic zone in Shandong Peninsula. The State Council officially approved the Plan of Shandong Province for the Development of Blue Economic Zone in Shandong Peninsula in April of this year and integrated into national strategy. As a beach city, Qingdao has basically developed relatively complete blue economic industry system. It has well-developed marine fishery, port transportation and coastal tourism and developed port industry clusters such as petrochemicals, ships and marine engineering. Marine industry becomes one of key pillars of its national economy, accounting for 1/4 of total output of marine industry of Shandong Peninsula.

The development of blue economic zone in Shandong Peninsula provides an important opportunity for development of blue economy in Qingdao and brings a huge challenge, too. Centering on the development of blue economic zone and adhering to the outlook on scientific development, we will carry out “Pan-Jiaozhou Bay Protection and Development” strategy, accelerate comprehensive development of marine resources, vigorously develop traditional advantageous marine industry, actively cultivate emerging marine and sea-based industries, continuously expand blue economy scale, establish advantageous marine industry and improve marine eco environment. By the year 2015, we will strive for developing Qingdao into the first area for development of science of marine economy in China, core area of blue economy in Shandong Peninsula, area with concentration of research & development industry and high-end marine industries and demonstration site on protection of marine eco environment. By the year 2020, we will develop Qingdao into a world-class city on blue economy.

During the development of blue economy, we will make more efforts in facilitating scientific development of blue economy.





Qingdao will adhere to the following five principles: “ecosystem-based management, support by scientific innovation; development of high-end industries; open and cooperation; paying equal attention to protection and development”. Qingdao will facilitate the transformation of development mode of marine economy and strive for a big player in blue economy. In particular, focusing on ecosystem-based management, we will keep on promoting marine industry, port industry and sea-related industries as a new program, and achieve a new ecosystem based pattern with overall plan for marine and land industries, overall distribution of elements of resources, construction of infrastructure, control of eco environment that facilitate interaction, complementation with mutual promotion and coordinated development between seas and land. Focusing on sustainable development, we will closely combine scientific development of marine resources with protection of marine eco environment; vigorously promote concentrated utilization of marine resources; make more efforts in ecological restoration; facilitate good circulation of marine ecology; effectively protect marine environment; adapt development scale & speed to carrying capacity of resources & eco environment; and achieve the transformation from pure economic development to harmonious development of economy and ecology.

Development of blue economy and a strong marine country is our common pursuit. We are willing to strengthen exchange and cooperation with domestic and international organizations; share development achievements of blue economy; jointly facilitate protection of marine eco environment; and promote sustained marine development. I sincerely hope that you contribute to your wisdom to the development of blue economy zone and harmonious development of economy, society and the environment of Qingdao. I believe that experts and scholars will present excellent presentations, which will help to open a new chapter for promoting blue economy through ecosystem-based management!



Keynote Speech

CCICED Policy Recommendations of the 2010 AGM to the GOC

Shen Guofang

CCICED Member and Chinese Chief Advisor, Chinese
Academician of Engineering

Every year, the Council proposes a theme in light of the need of the country and the development of the situations, and sets up task forces and special policy study groups who conduct studies around this theme and deliver reports at the Annual General Meeting. Policy recommendations to the Chinese Government are proposed in the reports, according to which and the situations of the year, the Council comes up with the issues paper and policy recommendations to the Chinese Government.

The Council has focused its studies in recent years on how to advance transformation to green development, that is, the transformation of development mode for building a resource-saving and environment-friendly society. For example, the theme for the year 2009 was “energy and environment”, and that for the year 2010 was “eco-system management and green development”. There were two task forces in 2010, one was the task force on the management of terrestrial ecosystems, and the other was the task force on the sustainable development of marine ecosystems and eco-environmental problems. There was also a special policy study program on soil pollution. The policy recommendations were proposed based on the above-said studies and adopted at the Annual General Meeting last year. Premier Wen Jiabao was briefed orally on the policy recommendations when he met with the Council Members during the AGM, which have been handed out to the State Council and relevant departments.



The Council has organized a roundtable meeting every year since three years ago, aiming to spread the research findings of the previous AGM (AGM is held in every November), attract more organizations and individuals to join the Council, have more discussions, and deepen the understandings. Accordingly, the theme of this year's roundtable meeting, "considerations to both terrestrial and marine issues & sustainable development of the sea" is echoing last year's AGM theme. Of course, both terrestrial and marine issues were addressed last year, but in order to focus, this roundtable meeting highlights marine issues. Moreover, the sea has been a key issue concerning the development of the country lately, and it is the first time the Council has ever identified marine issues as the theme of its meeting, so that's why we discuss marine issues now.

Today, I'm going to brief you on the policy recommendations adopted by last AGM. Since there is a full text of the policy recommendations on the manual of the meeting and my colleagues have prepared a PPT document on them, I'm going to give presentations on the key points. Moreover, member with the Chinese Academy of Sciences Su Jilan is making a work report later on the marine issues, so my presentation will be brief due to the tight agenda.

Generally, each of the policy recommendation falls into several parts, and it begins with the backgrounds for proposing it, as well as the theme. These are included in the foreword, which generally lasts more than one page. The last AGM was held in the context of the fifth Plenum of the 17th CPC Central Committee as well as the recommendations to the 12th Five-Year Plan for National Economic and Social Development, so the policy recommendations began with an analysis of what is asked for by this situation in the fields of environment and development. I won't give more details here.

Five policy recommendations have been proposed based on analyzing the need of the country and the then political and economic situations.

First are recommendations on renewing ideas on ecosystems and a





variety of services they provide. They are proposed to advance the green development, and close attention has been paid to the ecosystem services. They fall into four parts.

a) The ecosystem is an integral whole and we should be aware of this fact. It provides multiple services and we should bear in mind that as well. We should first and foremost share such a common idea. The reason that we put it first is that government departments, non-professionals and the public are normally not fully aware of the holistic nature of the ecosystems and the multiple services they provide. As for the integrity of the ecosystem, taking forest, one of the terrestrial ecosystems, for an example, a forest is regarded by some as a lot of trees, which means, many trees constitute a forest, just as the Chinese character “森”, which is composed of three characters “木” (meaning tree). But actually a forest constitutes an ecosystem. It is integral and has certain structures. It has canopy which includes the primary storey and sub-storey, and if it is a tropical forest, the canopy may include five to seven storeys. Under the canopy there is undergrowth which is mainly shrubs, then the ground vegetation which consists of moss and herbaceous plants, and down further are the litters, and then the biological communities in the forest soils, including animals and microorganisms. To make full use of its functions, we need to understand the whole ecosystem. It is the same case with the marine ecosystem, which is also a complete and integral ecosystem that constitutes species at the upper and bottom levels including fish, shellfish, and algae.

Also, we need to understand that the functions of ecosystems are holistic. We used to highlight the benefits of ecosystems, generally the economic, ecological and social benefits. But, how do we gain these benefits? It is through the ecosystem performing its functions. The ecosystem services fall into four kinds according to international practice, i.e., the regulating service, supporting service, provision service and cultural service. An ecosystem is capable of regulating a number of environmental factors, for example, the water, air, soil, nutrients, and circulation of minerals. The supporting service of all the ecosystems on



the entire planet is provided by serving as carbon sinks and sustaining biodiversity. Ecosystem also produces farm produce, wood products and fishery products, providing the material provision service. And then the cultural service, for example, the eco-tourism. We need to understand the ecosystem functions from all dimensions and give play to all of its functions instead of making use of just one of them and harming the others.

So, what I've said is the first aspect regarding ecosystem that is in need of our attention. We need to shift our understandings and have a scientific understanding on the integrity of ecosystem and their multiple functions.

b) Recommendations on developing an outline for the medium-and long-term national strategies for the conservation and improvement of ecological environment and establishing a unified framework of action. There was an outline for national eco-environmental development back in the year 1998 (it was a long time ago and the situations have changed greatly). Although there are plans regarding many fields and aspects, a unified, balanced and all-dimensional plan is not yet in place. So, we propose to develop such a medium-and long-term plan based on the scientific understandings and actions.

c) We need to establish the systems and mechanisms under a super-ministry for the conservation and improvement of the ecological environment, and enhance the public participation including participation of social organizations. One substantial matter is that we need to stress the comprehensive coordination once again. A super-ministry for ecological improvement is necessary because many fields are involved in it. The Council's recommendations have advanced the establishment of the Ministry for Environmental Protection (MEP). But even MEP is not possible to include all aspects regarding the conservation and improvement of ecosystems, because that involves agricultural, forestry, water resources, meteorological, and marine departments. However, it is also not possible to combine these departments, half of the organs under



the State Council, into one super ministry. So, a multi-department joint coordination mechanism is necessary for conservation and improvement of ecosystem. Meanwhile, public participation is also important.

d) Market mechanism and eco-compensation mechanism can be used to facilitate the conservation and development of ecosystem.

Progress has been made in the country since these policy recommendations were proposed last year. We've got responses, but more publicity is needed to renew people's ideas. At the action level, preparations are under way in NDRC for developing the outline for long-term development of eco-environmental conservation, which will replace the 1998 outline. NDRC has adopted (and the State has approved) the "three in one" ecological improvement project, that is, the project on small-and medium-scale water conservancy and farmland development, the project on improvement of defective and dangerous reservoirs, and the project on prevention and control of disasters in mountainous areas. The three projects were interconnected because severe drought and floods plagued the country last year. And, this year's No.1 document of the Central Government focuses on improvement of water conservancy facilities. We call it the "three in one" project in short. Over 200 billion yuan has been allocated for this project, which involves many departments.

Also, NDRC is working on eco-compensation regulations. I'm head of the expert group on developing these regulations and have been at many meetings on it. The regulations will be introduced soon to support the conservation and improvement of the ecological environment.

In my presentation, I've focused on the first recommendation, that is, recommendation on how to advance the work on ecosystem management. And clearly, the country has taken actions on it over the last six months.

The following four recommendations are originally proposed by task forces and then included in the policy recommendations to the Chinese





Government.

The second recommendation is to strengthen environmental management and allow key terrestrial ecosystems to rehabilitate. It is about terrestrial ecosystem.

The third one is about promoting scientific innovation, improving technological support, and strengthen capacity building on ecosystem management.

The fourth one is about marine ecosystem. I will not go into details since Mr. Su Jilan is going to give us a report on it later.

And the last one is to attach greater importance to weak links, step up efforts in key fields, and help promote the green transition of economic development pattern during the 12th Five Year Plan Period. The activities of the Council under the fourth phase have been focusing on green transformations. We proposed to facilitate this transformation at the last AGM, the timing at the junction of the 11th Five-Year Plan period and the 12th Five-Year Plan period. And this proposal has been reflected in the 12th Five-Year Plan, which identifies the need to take the outlook on scientific development as the theme, regard the shift of economic development mode as the main thread, advance the shift of extensive development mode to a more intensive and scientific development mode, and build a resource-saving and eco-friendly society. We've just made a start for these.

So, the above-said are the five recommendations, including a general recommendation and four specific ones. Tremendous efforts are needed to publicize and spread them. And departments concerned are asked to implement them, since the policy of the Central authorities are consistent with these recommendations.



Ecosystems and Green Development: Linking Land and Sea

Arthur Hanson

CCICED Member and International Chief Advisor

We have a common dream, one that can take from mountains to the sea; and takes from local areas to international areas, because all these problems in particular those of the ocean link countries together. We sometimes talk about one ocean because those waters flow from China or from Canada where I am from or anywhere else, all influencing each other, in the development potential, fishery and other ways.

But I think as we look ahead, we have to take into account this idea of transformative change. The theme of the “12th Five-Year Plan” after all is talking about transforming the development of China towards a better path way. One that takes into account of economic change, but I think it is also important from our perspective of CCICED as we recognize that it is also transformative change of the environment and how we consider the environment. So what I see is the need now to move from thinking about our common dream to our common future, which has to be something quite different I think in terms of how we deal with oceans and how we deal with the land. And this idea that very much originates in China of moving towards ecological civilization. One in fact really does link ecosystems and development. I am inclined not to say green development, because for those of you who have any kind of biological background know that when we start talking about blue development and green development, we come up with blue-green. We also know how devastating blue and green algae can be in coastal areas of China.

So any way, I am an ecologist by background, but I must say that I am a development oriented person by what we do. I start with three fundamentals: one is the ecology and economy are linked. Every body has



said that. But the important point is that inevitably changing one changes the other. We learned the hard way — often, but it also sometimes possible to do things in a positive way. So What I am going to say today, I want to ensure that we think about both challenges and opportunities. And that is something I have learned from the years I spend working in China on environment and development.

The second point is ecosystem service. I will come back to this point as well. But the important point here is that this involves its own set of economic goals and principles to deal with for example compensation. The third point we have heard a lot things on integrated ecosystem management.

So these are the fundamental concepts we need to keep in mind. And I see if we have to try and explain this, and I think it is particularly important for our colleagues from local areas when we talk to people about ecological economic challenge. It is really green economy and blue economy which is the economic development side, plus healthy ecosystems, equal and optimized development that benefit both people and the planet. To me that is simple. It is really difficult to implement, but it is simple to explain. If we do not have healthy ecosystems, we are not going to be able to have good green economy, and we are not going to be able to have good blue economy. And secondly, if we put all our efforts in economic side, no matter how good these efforts are, without healthy ecosystem underpinning them, we will not have optimized development benefits that the Government of China and other governments see.

So Professor Shen already talked about these different kinds of ecological services. I am going to show a lot of pictures because they always make more sense to me. We can see the above picture on the left are the forests in the uplands. It probably is going to conserve water and conserve all sorts of things and try to curb the circumstance like the disaster in Sichun that damaged ecological system. So we are not going to get the same kind of ecological services.

The important point about is that those are different kinds of ecosystem services and what we are going to get out of both the landside and seaside is many more provisioning services, whether it is agriculture or anything else, but we also have these other difficult things are trying





to do regulating ecological services so that we maintain the ecological integrity of systems. And I think this is a huge challenge. I try to describe this in a fairly simple diagram. But here is the challenge: at the present time, we are trying to extract more from ecosystems whether it is through agriculture, whether through growing more rice etc. So we have very intensive agriculture and agriculture systems. At the same time, what we know from ecological theory is that the more intense the system is the regulating functions tend not to work so well.

So the actual ecological regulating function of clean water, purifying waste and so forth, that function tends to be destroyed. Then we end up with degraded ecosystems. That is the diagram on the above. That is today's situation not only here in China, but also elsewhere. The natural ecosystems provide good level of ecological services that are regulating variety, but when we start using those systems intensively, we get more economic benefits, but at the cost of the regulatory functions. Now the things are really difficult in China because of the population and the need for development.

If we actually get more from the services, we are going to have at the same time the curve is now going down are the regulating a variety of services, clean water and so forth. We are going to turn it up the curve, even under very intensive systems of food, production and other services like that; we are still going to have to get ecological services that really are the lever, because it is very difficult to do that in practice. So we are going to demand more from ecosystems whether it is in inland side, up in the uplands of Western China or whether it is in coastal zone. We are going to demand more and somehow at the same time provide the ecological protection. That is the challenge. I think it is important to stress how difficult that challenge is going to be and how is going to require the national government, industry, cities like Qingdao and many others in China to be able to make that actual work. That is the challenge of as I see it for our current generation and for generations to come because this is not a short-term problem. So the good news is that many of the underpinnings I believe are already in place in China, we have these integrated ecosystem management approaches, we have river basin approaches, the English term here say the Yangtze River Basin Commission and Yellow River Basin Commission.



The trouble is they do not work all that well, quite frankly. That is not a surprise. I can tell you what we have of the river basin management in Canada, it certainly happens in other areas. We will hear more from some of my colleagues this afternoon. But we also have very interesting efforts underway in China what I call the ecological economic regional development. So the Bohai Sea, the Pearl River delta is very interesting experiment still at experimental stage about how we should integrate ecosystem management. And we have some real success stories, I believe, in Xiamen for example coastal management, there is a lot of experience; it could be spread into other parts of China. So in brief, “mountain to sea” is a very good and easy to understand approach to talk about ecosystem management. And I took the diagram from the international source. But it explains the delta, the mountains and so forth. I think every body in the room understand the need of this, the question is how to make it work.

So as we think about these challenges and why they are going to be more complex and difficult. All we have to think of is the interior part of China and the uplands, water and climate change, just think of that, neither too much too little, need for control the water in the bottom line of the left corner. And these have real impacts on people But as we know internationally and in China, land-based source pollution are absolutely key to be able to enhance the quality of the oceans in China, based on the situation of the Yellow Sea and Bohai Sea and so forth. What we find of course many impacts in immediate coastal zone areas if we can control those land-based sources. We have legacy situations in China. One of our Task Forces—a special study this past year looking at the soil pollution. This is something that China is trying to address at the beginning stages rather than fully developed approaches to address legacy brown fields in all industrial sites one sort or another. The below is a picture that I took from China Daily, a pollution case in Ningxia Autonomous Region. Again, where is that pollution going to end up, it is going to end up in the ocean, even though Ningxia is far from oceans.

One of the particular concerns to CCICED for a number of years now is actually the high applications of fertilizer and pesticides in the interior part. This is ending up of course in coastal zone and it is a major issue and one is very difficult to resolve. But it is a problem China could face, and I





think we have to face if we truly are going to have blue economy.

Well these people know the picture better than I in Qingdao. The major potential problem because fortunately wind shift it so forth, but the algae bloom in 2008 Olympic Games was widely covered internationally. It was seen by those as something that really was a difficulty (I will not say a failure) in addressing environmental problem in China. Last year even as we were working here in Qingdao on a Task Force, there was another bloom. Fortunately, the wind cut it short.

Land reclamation is another big issue. Vast changes have taken place on coastal zone in China, representing existing and future problem. It is an international problem because when you convert wetlands, you affect migratory species of birds throughout the area from Siberia all the way to Australia. One is also affecting fishery to a considerable extent and other ecological services associated with wetlands. But overall I will not say much about this because there are better experts in the room than me on the subject.

But what I say at present time the health of China's marine ecosystem is not good. This is something of a reality and something that can be addressed. We from the point of view of CCICED put forward our recommendations. But the reality is that people in this room that are going to make the changes in management approach in order to fully address this, whether these people are in upstream of the Yellow River or the Yangtze River, or whether they work in big cities like Tianjin or elsewhere. These are where the problems should be solved.

The Dalian oil spill. No matter how good the systems in place, there still is problem like this and create difficulties. We saw the most dramatic example in the United States in the Gulf of Mexico case last year. So the point here is, in dealing with integrated management, you have to be prepared for the things that happened to you. No matter how good your preparations are, there is still going to be problems.

I think one of the most interesting and significant things in China is the rise of aquaculture in the last 20 years. China is a leader now in world aquaculture. But China still faces with growth of new sets of problems as a consequence. So what we see in coastal zone management now one of the critical matters is aquaculture. And the way the aquaculture all



sorts of different issues which I won't going to mention, along with that is the sustainability of fish population. What we need to think about in addressing these problems is the structure of ecosystems, the structure of the way fish populations are constructed so the so that there are top predators, there is fish that might be taken to feed aquaculture products, may be creating from other element of ecosystem.

So this is the big issue. But I think this is a solvable issue for China. Another important point that has not been mentioned yet, but I think should be, that is the ocean is also the entry point for species that can affect land and fresh water. So in China there are all sorts of marine species that come in from ships around the world, and these ending up in rivers end up like little shellfish, they clog up the water intake lines and harbours and so forth.

For China which is introducing the United State now growth of weed in some of coastal areas, so there is always the kind of problems as well. The problems are both ways from marine side, inland and sometimes the other way around. There are lots of examinations last year on the Bohai Sea. This is a system in crisis. Some people would say that certainly it needs the integrated ecosystem management approach. It is vital to the blue economy. If the Bohai Sea is not adequately managed in the future, the blue economy will not achieve success. I can say that based on my understanding of many other systems around the world. And what I see is some of the trend lines in this area.

Again, this is a lot of experience to draw upon. There are a couple of things our systems are already in place. Many of the municipalities in the year 2000 set themselves on paper as adhering to the guiding principles of the Bohai Sea Declaration 2000. I actually have the website showing the signatures of the various people in different municipalities.

The important point here is that there are several really important principles: integrated planning for land and sea; moderate development with environment protection; administrative and legislative approach to management; and sustainable development of natural resources. So, if these guiding principles were put in place and were followed rigorously, I think the Bohai Sea in the future will be much more sustainable set of ecosystems.



There are things in SOA book here we notice of course the Bohai Sea Environment Management Project that took place after signing the Declaration, then in 2006, the Development of Bohai Sea Sustainable Development Strategy. In my view, this is my personal view and it could be wrong, these are good words, they are very good scientific approaches to development laid out particularly in the Development of Bohai Sea Sustainable Development Strategy. But it has been very difficult to implement. Its implementation primarily focuses on the municipalities surrounding the Bohai Sea and not fully taken in account inter-regions and many rivers that flow into the Bohai Sea. But it seems to me the good news is that the Bohai Sea Sustainable Development Strategy helps to shape the vision of blue economy. It helps to make the opportunity for blue economy to be solid and attainable.

So again I think again there is positive message here. The positive message is that many of the underpinnings for integrated management, for an approach that truly would allow us to have blue economy, and save ecosystems, sustainable ecosystems, the knowledge base is already pretty well as that. So for the future, I say we first of all have to go back to the things we know about and fully implement the existing ecological economic initiatives, whether the Bohai Sea or Pearl River Delta etc.

We have also think very hard particularly during the “12th Five-Year Plan” how can we create new and adaptive and participatory (approaches), bring together various factors including government, industry and so forth that do truly links mountains to sea. Thirdly, we have to think about new impacts, new technologies and new approaches that we will have access to in the coming years.



Session 1

Protecting Ecosystem Services: Rivers and the Sea

Chaired by Ms. Fang Li, Assistant Secretary General of CCICED, deputy Director General, Foreign Economic Cooperation Office, MEP; Prof. Su Jilan, Chinese Co-chair of CCICED TF on Ocean

Session Speakers

Ocean Environmental Protection and Coastal Pollution Control Plan in the Period of 12th Five Year Plan

Zhao Hualin,
Director General, Department of Pollution Prevention and Control, MEP

We are very delighted to hear the wonderful presentations in the first half of the session. Today I will talk about China's effort to protect the marine environment. It includes two parts. The first is on the progress of marine environmental protection and the second is about the situation and problems facing marine environmental work. Then I will report on our work arrangement.

Under the correct leadership of the CPC Central Committee and the State Council and based on the principle of attending to both land and marine environment, rivers and oceans and from mountaintop to oceans, MEP coordinated with related departments to actively promote the





sustainable development of marine environment and explore a new path to environmental protection that suits China's national conditions.

Looking back, we have done the following tasks:

First, we implemented the overall plan for environmental protection of the Bohai Sea in cooperation of NDRC. The second was to complete the implementing scheme for China's environmental biodiversity protection and defined priority areas for protection of marine biodiversity. The third one was to finish the Plan for Prevention and Control of Water Pollution in River Basins and Sea Areas in Middle and Lower Reaches of the Yangtze River, which has been submitted to the State Council for discussion. The fourth one was to print and issue Guidelines for Preparing Blue Sea Action Plan of Coastal Provinces for the 12th Five-Year Plan. The fifth one was that we started the compilation of the plan.

Next, we have stepped up effort to control land-based pollution and paid great attention to pollution control in land, marine and rivers. It is known to us that 80% of the marine pollution comes from the land. If we cannot control pollution in land, we won't be able to improve the marine environment. Therefore, we have focused on reduction of water pollution and incorporated it into the binding targets. Thanks to our effort the 11th Five-Year Plan period, discharges of COD dropped by 12% as compared to the early stage the 11th phase. As we have made great effort to control pollution from rivers flowing into sea, some rivers showed better water quality. We also strengthened control of industrial pollution in coastal cities. In specific, we have accelerated construction of municipal sewage treatment facilities in these cities, adjusted industrial structure and product mix, tightened pollution control of key industries and enhanced environmental supervision in corporations. The 11th Five-Year Plan period witnessed leapfrogging development in the development of sewage treatment facilities. The present treatment capacity has reached 125 million tons per day, more than doubled that of the early stage of the 11th phase.

Third, we strengthened supervision on marine protection in coastal



provinces. We worked with related departments to launch inspection of marine environmental protection in provinces along the coast and the work will continue this year. The inspection received high attention from the public and the State Council. The inspection results are announced to the public every year and reported to the State Council as well.

Fourth, we worked conscientiously in monitoring marine environment. We cooperated with other departments to prepare Report on Environmental Quality of Coastal Waters of China. If we are to ensure transparency in information release, we must find out the real problems and make them public to arouse public attention and serve the purpose of improving marine environment. We have established a monitoring network on the environment of coastal waters; tracked environmental quality of coastal waters, pollutants discharged into sea from rivers and direct pollution sources and carried out emergency response monitoring. Since 2001, MEP has joined hands with Ministry of Agriculture and Transportation departments to release report on China's environmental quality of coastal waters.

Fifth, we laid emphasis on communications and coordination to cement the foundation of marine environmental protection. We have established good relationship with State Oceanic Administration. As suggested by experts on several occasions, marine work calls for cooperation of different departments. So we signed a strategic cooperation agreement with State Oceanic Administration, which helped to consolidate our effort to protect the marine environment and achieved good results.

Sixth, we have been active in promoting international cooperation on marine environmental protection. Many international cooperative projects on marine protection have been carried out in recent years such as the Action Plan for the Protection, Management and Development of the Marine and Coastal Environment of the Northwest Pacific Region (NOWPAP), Action Plan on the Seas of East Asia, Global Program of Action for the Protection of the Marine Environment from Land-based Activities and China-Korea joint investigation of the Yellow Sea environment. We also implemented the UNEP South China Sea Project. I





myself once was the project's coordinator. The project has been wrapped up and was affirmed by UNEP officials in the review not long ago.

Marine environmental protection still faces severe problems and situation, which can be seen from the following three aspects. First, pollution and ecological damage in coastal waters remain serious. Second, economic development continues to bring mounting pressure on marine environmental protection. Some officials and experts present have said we have built many industrial parks along the coastal areas in order to develop blue economy. On the one hand, they powered economic development with evident effect, such as the economic zones in Fujian across Taiwan Strait. We also established industrial areas along the coast of Guangxi Autonomous Region. These coastal areas are expected to be the engine for future economic development. But on the other hand, economic development also brings about much pressure on marine environmental protection which needs our active response. Third, our monitoring capacity on marine environment is far from sufficient.

The main problems include unbalanced nutrition structure in coastal waters, severe eutrophication that leads to more and more red tide and green tide, severe damage of offshore ecosystem, serious pollution of rivers flowing into sea and frequent pollution accidents. On the whole, the challenges ahead are very daunting.

In this case, we will focus on the following work:

First, we will pay attention to the preparation and implementation of the plan for pollution control of coastal waters and promote transformation of economic development mode in coastal areas. We will make great effort to prepare the pollution control plan for coastal waters in the 12th Five-Year Plan period, coordinate and guide national work on marine pollution control under the framework of the plan. We have decided to make an overall plan for offshore waters, which will be divided into four sections. In the past we called it Bohai Sea Blue Sea Action and so on. This time we will incorporate all sea areas in the national plan for pollution control in coastal waters and urge all provinces to formulate the



blue sea action plan of the 12th Five-Year Plan period based on the set of coastal development plans made by the country. We will also coordinate pollution control of river basins and sea areas with a view to improving the quality of eco environment at key estuaries. My Department is both responsible for protection of marine environment and pollution control of river basins. Therefore, we can take account of both plans for marine environment and plans for pollution control of river basins.

Second, we will improve the mechanism and system for marine environmental protection and enhance supervision of law enforcement. I have mentioned this just now.

Third, we will strengthen pollution control and ecological conservation of marine environment. The most important measures include: one, to tighten up environmental threshold; the other is to emphasize construction of facilities for marine environmental protection, such as sewage treatment plants, dephosphorizing and denitration facilities and collection systems on the land as well as enhanced supervision of pollution sources directly discharging into sea and overhauling of discharging outlets into sea; and the next one is to make more efforts in protecting marine ecology, planting shelter forest along the coast and restoring and conserving important seashore landscape. We must leave some undeveloped coastal lines to our children and grandchildren and for future development. We can't simply use up all the coastal lines.

Fourth, we will further consolidate the foundation for marine environmental protection. For instance, we should work on the emergency response mechanism, capacity building in marine environmental protection, information communication and sharing mechanism among different departments and improving laws and regulations.

Lastly, I will brief you on the plan for pollution control of coastal waters of the 12th Five-Year Plan period. The basic principle is to divide the waters into four sections and control them one by one. The next





principle is to coordinate land and marine environmental protection. The third one is to encourage participation of multiple stakeholders and coordinate their efforts. The fourth is to let the government play a leading role and define its responsibilities. The plan divides the waters into four sea areas. While making the plan, we identified the major environmental problems of each sea area and proposed priority fields and problems. These problems will be reflected in the comprehensive plan for land and marine environmental protection and attention paid to the coordination among different regions and river basins. Another part of the plan is to strengthen ecological protection along the coast targeting various destructive factors while carrying out pollution control in coastal waters. The fourth one is to enhance supervision of marine environment and conduct environmental risk management.

The key tasks include the following: to make overall plan for key estuaries, bays, land and sea; control the total amount of nitrogen and phosphor flowing into sea; and build up our capacity in comprehensive control of water pollution in coastal areas. We have an outline for the time table and it's quite substantial. You may refer to it for details.



Policy Recommendations of CCICED Task Force on Ocean

Su Jilan,
Former Director of the Second Institute of Oceanography –
SOA
Academician of Chinese Academy of Science.

I will give a presentation on behalf of the Task Force on Ecosystem Issues and Policy Options Addressing Sustainable Development of China's Ocean and Coast. From the statements of many leaders including the introduction made by Director General Zhao Hualin we know a lot has been done in the past year whether on the side of State Oceanic Administration or MEP. Now that this Task Force Report was wrapped up last year, I prefer to talk about it based on last year's framework. Another reason is that I found the previous presentations did not approach the issue adequately from the perspective of ecosystem itself, so I'd like to explain from this perspective.

My presentation includes six parts: the first one is about fast development of China's ocean economy; the next is on the relationship between marine development and marine ecosystem and this part is followed by scientific outlook on marine sustainable development, major issues on China's marine ecosystem, the challenges ahead and policy recommendations.

China is developing its economy in a stunning way. The overall economic development is fantastic and the economy in the coastal area plays an important role in it. With just 13% of the total land territory and 42% of the country's population, the coastal region contributes about 60%





to China's GDP. Of course, coastal economy and marine economy is not the same thing. The former includes many industries and heavy industries which has little to do with marine economy. Now I'll talk about the value added of marine industry, which accounts for 6% of total GDP. In 2009, the major industries include tourism, transport and fishery. Taking the US as an example, its marine industry took up 1.2% of its GDP, followed by tourism, transport and mining industry along the coast. All these are important industries.

Let's take a look at the relationship between marine development and ecosystem. Just now President Shen talked about this issue. The service function of ecosystem refers to the conditions that people can provide for their well being. Why do people prefer to live in the coastal area? One reason is because the beautiful environment suits human settlement. The other is that these areas enjoy convenient transport and developed economy, hence more attractive to people.

Both human activities and natural changes can impose various pressures on ecosystem, affecting the service function of ecosystem. I will make an example with prawns, which used to be a famous industry in China. Let's see how the pressures affect the functions of ecosystem.

The output of prawns in the past was very high but it started to plummet in 1990 and has since remained slack. Many people attributed this to overfishing. This is probably the main reason. But there are other reasons that contributed to its sluggish growth. The life history of prawns tells us that they spend winter in the southern part of the Yellow Sea and turn back in the spring to lay eggs at those bays of Bohai Sea. Taking Laizhou Bay for instance, prawns lay eggs in shallow waters and then the ocean current move the eggs to the shore, estuary or wetland to hatch. Then they flow into estuaries and become juvenile shrimps and return to the cold water mass of the Bohai Sea. After growing up, they will swim back to the south in the winter. During the whole process they need to travel nearly 1000 km. Let's see how natural activities and human disturbance affect them. Overfishing takes place both in the area where they spend winter and lay eggs. And eutrophication has a big impact on



spawning in the spring, the growth of juvenile shrimps and wintering.

Land reclamation has serious destruction on wetlands and thus affecting the growth of young lobsters, near-bank flow, estuary and wetlands, the overall impacts are quite big. In addition, it has the impacts on climate change and entire marine environment. Land reclamation wreaks havoc on wetland and further affects the growth of juvenile shrimps. Runoff also has an impact on estuary and wetland. The overall impact is big. In addition, the changing climate system affects the whole marine environment as well. Therefore, prawns are subjective to the influence of many factors.

When it comes to scientific outlook on marine development, we should exactly what ecosystem means. As a highly nonlinear system, the ecosystem will undergo dramatic change when it is pressured, leading to loss of functional services. What is the worse case scenario? For example, in the past lakes used to have quite clear water, but eutrophication gradually turns the water turbid as what we see in the case of blue and green algae. Xuanwu Lake is just a case in point. It is following this trend and it is a difficult task to manage turbid lakes. What nonlinear system is about? The horizontal coordinate represents the level of eutrophication while the vertical is on the state from being turbid to clear. When water gets turbid, it cannot become clear from along the previous path. The cases of Dianchi Lake and Taihu Lake were testaments to it. Once eutrophication takes place, it will not show much improvement even with several billion yuan investment. The fundamental way is to reduce eutrophication to very a low level.

All in all, we must pay attention to protection of marine environment if we want to achieve sustainable marine development. What are the problems with China's marine environment? Director General Zhao just talked about it just now. Coastal waters are experiencing worsening eutrophication, which has led to red tides and green tides like what happened in Qingdao. We also see the outbreak of jellyfish, the dead zone of the Yangtze River estuary and the level of dissolved oxygen of no more than 2.0 mg/l with its total area of 20000-30000 km² in 2002,



more than the area of the Hainan Province. Another problem is that we are losing control of land reclamation. This morning the Minister of Oceanic Administration mentioned that ocean is one of the world most important ecospheres in addition to forest and wetland. In effect, most part of wetland belongs to ocean. What is the definition of marine wetland? Sea area less than 6-meter deep all belongs to marine wetland, quite a big area. Land reclamation in China is fabulous, going from solar salt, to farming, aquaculture and port industrial development. In this shocking picture, we can see large scale reclamation in our small Bohai Bay. Some small scale activities are not clearly presented due to the scale of the map. We have a small scale map about Laizhou Bay. The picture is zoomed in and it is clear that no wetland is left and there are all breeding pools. Therefore, land reclamation in China and loss of coastal wetland is astonishing. Being an important link in marine ecosystem, if coastal wetland is not protected, we will lose a majority of the services provided by marine ecosystem.

The second part is about excessive development of fishery. China's fishery takes a large part compared with that of the world. Half of the fishery is about aquaculture and the other half is fishing. Fishing activities mostly take place in coastal waters, hence exerting considerable pressure on coastal ecosystem. How do we know this? The fish stock is suffering from serious decline and the change is enormous from year to year. The proportion of low quality fish is increasing. In this sense, the added value does not grow much though production has risen.

We also face other problems that cause various negative effects, such as marine pollution from land-based sources, large water conservancy across river basins and embankment projects. Furthermore, global climate change results in rising sea levels and temperature of coastal waters. These problems also deserve our attention.

As a result, China faces great challenge in sustainable marine development. Central leadership has stressed again and again that eco environment must be cared while developing marine economy and green



economy has to be developed through scientific methods. Of course in the context of marine development, green economy equals to blue economy. In the 12th Five-Year Plan, a long statement on marine economy was made at the 5th Plenum of 17th CPC Congress in October 2010, which emphasized coordination of land and marine development, improving overall management and protection of seaweed, coastal belt and marine environment.

The following part concerns what to do. In reality China's marine environment is faced with daunting challenges as a new round of coastal development is emerging. Just now Minister Li and the head of State Oceanic Administration have both mentioned the set of rejuvenation plans of key industries that were unveiled one after another. Many of these industries are located along the coast. In this case, our marine ecosystem is facing tremendous pressure. What should we do? A simple answer is that we should strengthen ecosystem protection. However, I will elaborate a bit on the term ecosystem. In English it is one word rather than two separate words as in its Chinese translation. It is about a system as a whole. What do the challenges include in our Task Force study? First is on the environment such as eutrophication, land reclamation and overfishing. Second is on the economy as we see the accelerated development of coastal belt. All local officials are pressured by performance evaluation. The third one is on management. On the one hand, we lack national strategy for sustainable marine development. Vice Minister Chen said this morning that we are going about it. On the other hand, coordination of management is not well done. For countermeasures, we should approach the problems by coordinating management of land and sea environment. For land reclamation, environmental impact assessment should play its role whether it is related to regional EIA or project EIA. This should involve a lot of ecological problems instead of the environmental part that we used to talk about. Another aspect is overfishing, which is about the number of fishing boats and bottom trawling. To solve social and economic problems, we need to make proper development strategies for regional projects. This is an important part of our policy recommendation.



Now let's take a look at the problems with marine management. First, we lack a strategic plan that covers both river basins and the marine. This is what we call coordination of land and sea management. Second, our management system should be further straightened out. Third, the legal system needs improvement. The fourth one is about overlapping policies and absence of management structure. The last one, which is also very important, is inadequate law enforcement.

Our policy recommendations include the following. First, we need to make a national strategy for sustainable development of marine and coastal belt. Second, a national marine council should be established and it will be powerful if the council is led by Vice Premier of the State Council. Third, we should set up and improve laws and legal system on marine management. Fourth, ecosystem-based comprehensive marine management should be carried out. Fifth, a best scheme should be made to prevent and control the negative effect of river basins on marine. There are other proposals on monitoring and public participation. All these are available in the meeting handbook.



International Trends in Marine and Coastal Ecosystem Management

Peter Harrison

Stauffer-Dunning Chair and Director, School of Policy Studies, Queens University, Canada.

Ecosystem-based management implies that we understand the ecosystem. Because if we do not understand it, then how can we manage it.

In particular we went to the Hague and Rotterdam, and secondly we visited Halifax, Nova Scotia in Canada, the best institute for oceanography. There we learned that the challenges China is facing are being faced everywhere in the world.

The second thing as a Task Force we undertook was to have two major pieces written by major consultants. One was by Professor Puhatti from the University of Washington, and the other by Ms. Sounberald who is here with us today. I will not repeat what they said. They looked into the whole question of international trend in marine management and into the issues of governance. I will not repeat what they said, but I would like to review some of the thinking that is taking place recently. A big challenge is to move from knowledge to action. How do we get science to inform policy, and how do we get policy makers to tell the scientists what is they need.

We heard today that there are a number of significant pressures on the world oceans, the biological disturbances, this includes fishing overcapacity, it includes challenges to the food web, and there are



pressures of eutrophication that happens because of excessive nitrates and phosphates. There is introduction of hazardous substances, all from land and in the ocean, whether it be from vessels, or from resource development such as hydrocarbons. We see worldwide physical disturbances of coastal habitats, either by land reclamation or by natural forces.

And finally, we see the on-going impacts of climate change, but I would like to add another concept of this point: and that is climate variability. Climate change is a general concept in my view covers the fact that the impact is not the same everywhere. What we are seeing is a paradigm shift over the last number of years. In the 1970s around the world, the focus was very much on the economic opportunity. And what we heard today in China is that China is going through a similar paradigm shift toward the challenge of environment protection. This shift requires very different legislative bases, very different regulations and different way of thinking about ocean health.

Let me briefly review the trends that we see around the world. We see the trend towards a green policy statement by national administrations. We have heard that China has done that in the “12th Five-Year Plan”. We will talk about this more later. We see the challenge of marine environmental management. There is concern that the ocean is at a tipping point, where not only will it become worse, it will become worse more quickly. So the challenge is around repair and protection.

We see the need for assessment of the status of the oceans. How do we the things are better or worse if we do not have an assessment. A better scientific understanding is clearly something which we all need.

We have heard today about the need to look at things from mountain to ocean. If I can put it very simply, everything that goes into rivers ends in the sea. So the challenge of integrated management is central. We also see particularly in Europe a move towards the principle of “good environmental status” and what it means for the oceans. And we also see



a move towards marine spatial management. China was the first country in the world to do this. China focuses on the concept of marine spatial management before many others did.

So let me go through these a little more quickly. What is marine policy statement. It states of issues, it talks the need for clean, healthy, safe, productive and biologically diverse oceans, it sets the stage at macro level. It only lists the objectives of society in terms of what it wants to achieve in the oceans. For example, achieving sustainable marine economy—the blue economy, then goes on to talk about policy objectives for various key sectors as we heard today in China, then provide a guidance to local authorities and others in terms of specifics.

Marine environment management. The seas are at risk and the expression I have used in many fora is that we assume that the seas are infinite. But the infinity is lost. The seas are not longer infinite. They are in danger. We have used the ocean as a dumping ground; we have seen a concentration of major chemicals around the world. We have seen hazardous substances that end up in the ocean. We have seen the lost of coastal areas of wetlands, and we've seen major pressure on fisheries and so on. And now the impact of climate change, we have a major network of research in Canada that is called the Canadian Healthy Oceans Network. As a part of that network I found the learnings in the world are very similar — the ocean is at risk.

Marine assessment and status. Simply put as I said earlier, if we do not know the status of the ocean, then how we know that it is getting better. So the focus of many countries is on the need for knowledge to understand the baseline for evaluating the effectiveness of measures, improved scientific evidence and improved understanding of new pressures, whether it is invasive species, radioactivity from drilling operations, microbial pathogens and so on. And this is the area where all countries are focusing their attention.

We have heard a lot today, and I will not repeat about the importance





of maintaining healthy sea.

River basin on marine management. Linking integrated river basin management grows with those responsible for coastal zone management. As I mentioned earlier, everything goes into rivers ends in the sea, agriculture runoff, urban pollution and so forth.

Good environmental status is a concept that is receiving a lot of attention. We have prepared a handout that will be provided later on this. In particular, the Europe Union has put a lot of emphasis on good environmental status.

What is it involved? Describing the sea environmentally, economically and socially, describing what good environmental status means in terms of target and criteria, establishing a monitoring program so that the state knows what is happening and establishing regulations to move forward. Indeed, the European Union has put in place the objectives of achieving this by the year 2020. Here, several European descriptors of what they expect. They will measure biodiversity, main indigenous species, fisheries, the food web. You can read the rest of them here.

One of the interesting challenges — we certainly see it in my own country particularly in areas of exploring oil and gas. That is the question of marine noise and its impacts on marine mammals. Each European Union Member must reach GES as mentioned by 2020.

Marine spatial management. How do we avoid conflicts in the use of marine area? How do we ensure that in fact things are managed properly? Marine spatial management is an attempt to make sure that marine areas are used in a way that conflict between different uses is avoided to the extent possible, a rational use of marine space and an attempt to balance the development and the need to protect the environment.

In general we see conflicting priorities. We see the shift from the left to the right from economic opportunities only to marine environmental management as a priority. Moving from this connective monitoring to



holistic marine assessment and status and the link with river systems, we see the shift from disconnected river basin management and marine management, working together towards integrated river basin and marine management. We see a shift from a multitude of disconnected indicators to the concept of good environmental status. And we see a shift from disconnected decisions to marine spatial planning in a way it is very similar to what we have heard today. It is happening in China.





Debate and Discussion

To protect ocean's ecology and environment by
reducing the pollution resources from land

Daniel J. Dudek
CCICED Member

Chief Economist, Environmental Defense Fund, USA

This morning we have had excellent presentations which I believe given you very clear idea from ecosystem perspective of the complexity of both the environment and the nature of problems that we are trying to grapple with in terms of protecting marine ecosystem.

I am going to just briefly summarize a few of what I see are the key determinants to ecosystem health. I'm going to focus on the blue components of blue economy, in particular the water resource aspect, while simultaneously looking at the interaction with brown component that is the land-based aspect.

When we talk about ecosystem health, we really are in river basin and coastal zone areas, we really talk about water quantity and water quality. In terms of quantity, you all what the issues are. It has to deal with what is happening upstream. How much are we diverting the natural flow of rivers. How much is that been allocated to consumptive users, whether in municipal or industrial applications or whether it is for irrigation and agriculture?

Mr. Harrison just mentioned that if you want to add climate viability, and of course that is a critically important component and as a determinant precipitation patterns, things like the shift between snow pack and rainfall determining the available storage in upstream watersheds and water quality. You cannot talk about the supply of water without talking about quality simultaneously because a large supply of polluted water is not a



very productive and useful resource.

Here again, upstream discharges in terms of municipal and industrial waste are important. And China has made great progress in the “11th Five-Year Plan” period in terms of municipal waste water treatment.

But agricultural non-point sources not only in China but also around the world remain a serious challenge. And of course there is the question about wetlands.

So with this very basic characterization I am going to do something a little different from other presentations. I am going to draw down a little bit and focus particularly upon agriculture and upstream part of agriculture. We saw from the slides of Professor Su that coastal economy and ocean-based economy is about 6% of China’s GDP. In terms of agriculture, it is about 40% of national GDP. We have more than 700 million people still living in the countryside, all of whom are in the upstream. Professor Harrison reminded us that whatever goes into rivers will ultimately end up in the oceans.

So when we think about agriculture, and we think about it from the standpoint of the blue economy, water conservation, the effectiveness and efficiency of use of water in agriculture is absolutely imperative. Nitrogen fertilizer, we heard about eutrophication, that of course primary cause of eutrophication is over fertilization, of course livestock waste management.

We have got some examples of something that can be done here and have been done effectively—things like methane digesters which aid in animal waste management, this can be individual farm scale, household scale, it can also be attached to large feed lines. Things like the improved management of irrigation in relation to water use as well as reducing agricultural chemicals in terms of return flows both of groundwater and rivers.

I mentioned nitrogen, when I met with the Premier in November after our Annual General Meeting in Beijing, the issue about nitrogen fertilizer management was raised with him. He was very much aware of this problem from his own personal background and perspective and commented how challenging this particular aspect of the problem has been. China has put a lot of resource trying to improve on-farm nitrogen management but has not succeeded very much in terms of reducing the



overuse of fertilizers, whether nitrogen and phosphorus, both of which are key in terms of eutrophication of downstream systems.

There has been some interesting analysis done in the United States by the Environmental Protection Agency. They looked at the co-benefits associated with greenhouse gases regulation in the United States. They looked at that from the standpoint of the impacts of agricultural pollution on key constituents of nitrogen, phosphorus, erosion and pesticides, all of which have a huge impact on the health of downstream ecosystems.

What we found was very significant reductions from 40% ~ 50% in many of these key pollutants. As a part of Task Force on Rural Economy of CCICED there was a study done by Professor Li Chengsheng of the 2,500 counties in China about what is the potentials for improved nitrogen management in relation to the resulting NO₂ reductions. And the number comes out is something in the order of about 350 million t CO₂ equivalent per year simply as a result of improving the on-farm efficiency of nitrogen. There have been other field studies about what the challenges, what the nature of problem is. And these field studies show the main issue is one of providing incentives, information and guidance to farmers.

Before we apply this type of strategy more broadly, and think about a few approaches that we might use to improve efficiency of agriculture production in China, recognizing the importance of food security and increasing challenge are associated with coming climate changes, things like reduced tillage, fertilizer, the irrigation of efficiency and integrated of straw and water management and rice production. You see the potential rises up to roughly a billion t per year in terms of CO₂ equivalent in terms of greenhouse gas reductions. This of course is not focusing on the co-benefits associated with the downstream ecosystem.

Why do I focus on this? I focus on this because of the challenge I mentioned which is how to get, how to mobilize farmers in terms of changing their farm behavior. One strategy that has been developed right now is called low-carbon transit car, actually developed on-farm production practice changes the thoughts we are talking about—use the upcoming voluntary emission reduction regulations which the National Development and Reform Commission is producing, the existing



environmental exchanges in Beijing, Shanghai and Tianjin, the low-carbon transit car voluntary purchase programs now in Shanghai, Beijing, Tianjin and Guangdong and we have one shortly in Shenzhen are those funds from the voluntary purchases of low-carbon transit cars for factory green commuting fund which is then reinvested upstream in terms of additional reductions.

This gives farmers a reason to change production practices. It gives them a reward for doing so.

So in conclusion, I think that the new 12th Five-Year Plan means that we really do need to focus and draw down on specific policies that not only create efficiency, but also better directly and practically implement them. These need to be integrated across the globe. Remember Mr. Shen told us about holistic and multifunction. I try to give you an example how linking downstream ecosystem benefits with upstream changes, a practice known here in China as eco compensation, for which the Ministry of Environmental Protection will be launching some pilot projects. I think that if we were able to develop some practical experience of this sort, we would in fact achieve some of the goals of the “12th Five-Year Plan” for not only the ecosystem protection, but also inclusive growth by improving our farmer’s income and at the same time reducing pollution downstream to key ecosystems that we would like to protect.



To protect the resources and environment of ocean through the ecological compensation mechanism

Young-Woo Park

Regional Director and Representative for Asia and the
Pacific, UNEP

Frankly speaking, when I heard the blue economy through ecosystem-based management. At first, I misunderstood blue economy. I was thinking of the blue economy which is now promoted by Clock Worm — the ecosystem approaches and learning from nature and so on. But now, we are focusing on how to preserve the oceans and through that how the oceans can be the engines of economic development.

So this morning from the keynote speeches and presentations, again China set the right directions. I learned clearly and why we have to protect ocean and what we have to do and also principles science-based integrated ecosystem management and also strengthening coordination mechanism and among the related ministries, local governments and also stakeholders and so on and holistic approach. Most importantly, the emphasis on the connectivity of whole system, land-based ecosystems and also how they affect the blue economy, the ocean.

Congratulate the Chinese Government again setting the right direction. So I think the challenge we have is how we can achieve it. Several policy implementation tools, the goals are also explained.

Here, I would like to take this opportunity to focus on the compensation and value ecosystem services. When we have the holistic approach, the compensation mechanism is very important. But to set up the right compensation mechanism, we have to put a value on the ecosystem services and products. The value we assumed by from



ecosystem services and products, and then we would be able to come out with better compensation which was also emphasized by previous speaker.

We have heard the agriculture sector, which is very important in China. But we do not have appropriate compensation schemes or appropriate methodology for farmers to practice sustainable agriculture farming and so on. It is really hard to push the policy approach. In China you know, the poverty issue is the crucial and it is difficult when they are suffering from hunger and poverty. We ask them to protect the environment and so that making a trade off. It is really difficult. So we have to come out with better compensation schemes.

But sometimes it is very difficult with ocean. There are many other compensation issues but ocean is important. Another reason that compensation scheme is very important in China is that up to now the development, urbanization and industrialization in China has been done in coastal cities and coastal zones. For example, Qingdao has large petrochemical industries here and also the industries related to petrol chemicals so how can we make Qingdao as an eco-industry zone so that we can have land-based manufacturing industries considering the impacts on ocean in the planning. In this sense, the Chinese Government, the policies and principles, coordination mechanisms and holistic approaches, by bringing in all related industries and local government, I strongly believe that China can do this for two reasons: First, because of its political system, once the decision is made by the State Council, then the whole country follows. And the market-based economy provides right incentives to all the stakeholders. And also the cultural aspect, the majority of the people in China still fortunately unlike developed western countries, they have to and they have been live in harmony with nature. And so in that sense, the awareness raising is important part of successful implementation of the new government policy and also new blue economy policy.

Also, China has been strengthening its international cooperation as it was mentioned by the Chinese Government, because China shares the oceans with neighboring countries, the Yellow Sea with Korea, South China Sea with ASEAN countries like Philippines, Viet Nam and so on.

If China does its things right, but the neighboring countries do not,





then the impacts at the end of the day may be at best zero or negative. So it has to strengthen its international cooperation with neighboring countries. In that sense, the Chinese Government focuses on strengthening on the South-South cooperation. I would say very important and also the creation of China-ASEAN Environmental Center will contribute to the successful implementation of this blue economy through ecosystem management.

So in summary, compensation mechanism by valuing ecosystem services and also increase awareness, the nature and people living together, which is the cultural aspect, and strengthening international cooperation especially with neighboring countries such as Korea, Philippines, Viet Nam and the other countries that China shares with the South China Sea.





To safeguard the lifeline of ocean

Lin Guoyao

Vice Mayor of Xiamen municipality government

Xiamen Municipality, Fujian Province in East China is among the first four economic zones in China and renown as “a sea-borne garden”. It has 234 km of coastline, 31 islands of all sizes, 390 km² of territorial seas, and nearly 2,000 marine species. The ocean is regarded as the advantage and lifeline of Xiamen Municipality, and the municipal Party Committee and government have always adhered to the basic policy of “making overall plans for the land and sea, basing the city on ecological conservation, giving first priority to conservation, and embracing scientific development”, highly valued both the conservation and development of the ocean, followed the outlook of overall situation and outlook of developing economy with ecological balance, and correctly handled the relation between developing marine resources and protecting the environment in a scientific manner and by keeping in mind the overall situation and the long-term interests. Xiamen has also unified the economic development with the conservation of marine environment, insisted on “protecting the environment during economic development and facilitating economic development by protecting the environment”, and tried to achieve the virtuous cycle of the two matters. It has won many honors such as “national environmental protection model city”, “international garden city”, “national city of ethic and ideological progress”, “UN Habitat Prize” and “Golden Award for Outstanding Achievements in Integrated Coastal Management in East Asia Seas”. Now I would like to brief the meeting on the practice of Xiamen in making overall plans for the development of land and sea, facilitating economic development and protecting the environment.



1. Adhering to scientific planning and considering both marine environment and economic development

With the Plan of Xiamen Municipality on Dividing Marine Function Zones as the guidance and basis for decision-making on marine development activities, the municipality has respected the law of nature and set the functions of sea areas in accordance with the reproduction capacity of marine resources and the carrying capacity of marine environment. While developing the marine industries and tapping marine resources, Xiamen has overcome the blindness in marine development activities, established sound order for marine development, allocated marine resources rationally, and maximized the overall benefits of marine resources. It has matched the marine economic growth scale and rate with the carrying capacity of the resources and environment, and unified the economic development, ecological conservation and benefits. It has also tried to use marine resources in a scientific manner, be eco-friendly to the marine environment, and enhanced the comprehensive, balanced and sustainable development capacity of marine economy. Based on division of the marine function zones, Xiamen has scientifically divided the marine eco-sensitive areas and areas forbidding tapping of marine resources, intensified the supervision on the development and conservation of key resources, and prevented significant ecological damages caused by marine resource development projects. The city has also made great efforts to develop the navigation-oriented ocean, the tourism-oriented ocean, and the eco-sound sea, trying to set an example for marine development activities and development of conservation culture. Relying on the ocean and bays, Xiamen has focused on the development of coastal industry, port navigation, port logistics, coastal tourism and high-tech industry, developing into a complete marine economic system. Marine economy has increasingly become an integral part of the city's national economy. The added-value of marine economy in the previous year amounted to over 22 billion yuan, accounting for 13.2% of the city's GDP.

2. Improving the legislation and setting up a supervision system for marine environmental and economic development



Xiamen has administered the ocean in accordance with law, developed and put into force supporting documents such as Some Regulations of Xiamen on Marine Environmental Protection and Measures of Xiamen on the Administration of Uninhabited Islands, setting standards for the development and utilization of oceans, effectively improving the eco-environmental quality of the ocean, and facilitating the comprehensive, balanced and sustainable development of the marine environment and economy. Xiamen has improved its capacity for modernized management of marine ecological environment and management tools by establishing unified and effective monitoring, forecast, and enforcement systems. It has also upgraded the capacity for prevention of red tides and the disaster relief by setting up marine red tide monitoring and pre-warning system; enhanced the capacity for response to major marine pollution incidents by setting up marine environment monitoring and disaster pre-warning system, and developing contingency plans for oil spill incidents and pollution incidents caused by hazardous chemical products; constantly upgraded the overall environmental protection level by improving the marine environment monitoring network.

3. Rigorously controlling pollution and preventing and controlling both land-based pollution and marine pollution

Xiamen has exercised total water pollutant load control and advanced the integrated land-sea management in accordance with the levels of “sea area-river basins-control region-control unit”, in order to link the pollution control in offshore areas with the environmental protection in land areas and river basins. The city has also set up joint inspection, monitoring and treatment mechanism in Jiulong River Basins, facilitated and carried out water pollution control and ecological conservation in the basins and urban areas; considered the eco-compensation mechanism in the upstream and downstream of Jiulong River Basins as well as the pilot projects on the accountability system for control of total pollutant load in crisscrossing sections within the basins. Moreover, Xiamen introduced the system for control of the total pollutant load entering the sea, organized joint environmental supervision, implemented the marine environment



impact assessment system, rigorously controlled the discharge of land-based pollutant and pollutants from vessels and aquaculture farms, introduced cleaner production audit, adjusted the industrial mix, strengthened pollution control at the source, set standards for the environmental management for construction projects, made sure that industrial companies which discharge pollutant directly into the sea meet with emission standards, and intensified the environmental infrastructure construction. As a result, the total pollutant load has been controlled and the pollutants entering the sea dropped sharply despite significant increases in the economic size and the generation of pollutants.

4. Increasing the environmental inputs and implementing the projects on restoration of ecological conditions of bays and ocean

First, Xiamen has implemented the model projects for prevention and management of marine pollution in North Asia seas. The municipal government developed and implemented the Strategic Plan of Xiamen Model Area for Prevention and Management of Marine Pollution in East Asia Seas, and organized the first and second rounds of integrated coastal management (ICM) from 1994 to 2010, under the financial supports of GEF, UNDP and IMO. Thanks to this, Xiamen has found out a path for integrated coastal management, a path characterized with “relevant legislation as the first priority, mobilizing resources for coordination, giving scientific supports, exercising integrated supervision and encouraging public participation”. By enhancing the ICM, Xiamen has effectively protected the marine ecological environment and advanced the efforts to develop into a bay-based eco-city and sustainable development of marine economy. Through implementing a series of ICM action plans, the ICM mechanism and coordination mechanism have been improved, various resources in Xiamen coastal areas has been tapped in a scientific, rational, and sustainable manner, the marine ecological system and total pollutant load have been monitored effectively, the mechanism for pre-warning and forecast of marine disasters has been set up, the environmental quality of marine function zones has met with relevant standards, the marine ecological environment has been restored, and the



ecological system has achieved virtuous cycle. In 2006, Xiamen won the only golden prize for government management of coastal areas under PEMSEA program. Secondly, Xiamen has carried out the projects on opening sea walls and ecological restoration. Three problems have beset Xiamen seas, including poor water powers, sediments, and pollution by organic substances. In order to set up a well-structured marine ecological system with coordinated functions, enhance the capacity for flood control and disaster prevention, Xiamen has spent nearly one billion yuan in the major project on dredging the opening of sea walls. It is the largest marine eco-restoration project recorded in this city. The project has resumed the organic link of the east and west seas, improved the water power conditions in the seas, upgraded the self-purification capacity of sea waters, and helped the seas to gain virtuous cycle in terms of ecological balance. Thirdly, Xiamen has implemented in full scale the project on clearing up the aquaculture farms in Xiamen seas and restoring the ecology in the bays. Integrated treatment has been introduced in the west seas, east seas, Xinglin Bay, Wuyuan Bay, Maluan Bay, Yuandang Lake, and Haicang Bay, and aquaculture farms with extensive development mode and intensive pollution have been removed. The integrated treatment covered an area of 161 km² and cost over 750 million yuan; more than 85,000 aquaculture net-cages were torn down, the hanging culture covered 30,300 mu, the shoal aquaculture covered over 113,100 mu, 4.5 km of area was returned to sea, and 220 million m³ of sediments on shoals were removed, man-made sand area reached 5 km, and 1.5 km² of wetland parks were restored. The removal of aquaculture farms and eco-restoration project in bays have helped adjust the sea development structure, make sure that Kangkou plays its leading role in shipment and coastal tourism, improve the marine environment and eco-landscape, develop beautiful coastline, and achieve sound social, economic and environmental benefits.

5. Highlighting the effectiveness and integrating the restoration of marine ecology with the development and utilization of the ocean

First, Xiamen has implemented the project on restoration, conservation and development of coastal sands. The city has spent more



than 20 million yuan since the year 2006 in the Xiangshan-Changweijiao sand restoration project, and built 1.5 km of artificial sand belts which covered 16,000 m². It is going to build a national ocean park near the island ring road and Wuyuan Bay in the coming one or two years, and develop beautiful and clean sea bathing beaches and recreational and tourism resorts. For the moment, the city is restoring and developing about 5km of sand belts. Second, the city has conducted the project on restoration and utilization of marine ecological resources. The city dredged the sediments and destroyed sea walls after aquaculture farms were removed, and built Wuyuan Bay Wetland Park and Xinglin Bay Expo Park, in accordance with the working thoughts of achieving “deep-win” situation. The project has helped expand the deep-water area in the Xinglin Bay and Wuyuan Bay, increase the capacity for accepting tides, improve the self-purification capacity of waters, mitigate the pollution caused by aquaculture farms, and develop high-value coastal lands, enabling the two bays to become eco-friendly coastal towns with sound ecological conditions and beautiful environment, and achieving the win-win of environment and economy. Third, the city implemented the project for eco-restoration and development of uninhabited islands. The city has in recent years worked harder to implement this project. It is planned to restore and utilize one or two islands on a yearly basis, and enabling the uninhabited islands to become sparkling jade necklace of Xiamen seas. Meanwhile, the city has also intensified the construction and utilization of national nature reserves for rare marine species, actively conducted scientific research on marine species, and contributed to the eco-environmental conservation and development of the oceans.

The environmental protection and sustainable development of the ocean involve many aspects, multiple departments and the public. The integrated treatment of marine environmental pollution is still an arduous task, so are the tasks including the prevention and control of land-based pollution. The public participation is not enough and the awareness of the whole society is still very poor. In the future, Xiamen will continue efforts in environmental supervision, strengthen the publicity of environmental and marine laws and regulations at the national, provincial and municipal



levels, enhance the public awareness on environmental protection and sustainable development of the ocean, increase the financial inputs in environmental protection, adhere to the principle of integrating the conservation with the development activities, upgrade the ecological functions of the coastline, intensify the regional alliance and cooperation, constantly prevent and treat land-based pollution, and go all out to protect the blue sea and sky of this city.





Session 2

Marine and Coastal Ecosystem Management

Chaired by Prof. Su Jilan, Chinese Co-chair of CCICED
TF on Ocean; Prof. Peter Harrison, International Co-chair
of CCICED TF on Ocean

Laws, Regulations of Management on Oceans and Coasts in China

Wang Bin

DDG, Department of Environmental Protection on
Ocean, State Oceanic Administration of China

The presentation includes three parts, first, the basic theories and backgrounds for marine management; second, the laws and regulations related to the marine management in China, which is the main part; and third, a brief analysis of ongoing systems provided by these laws and the trends in the future.

i. The theories and background of marine management

My views on the basic theories and backgrounds are for your reference, since most of you here are engaged in this field and have a say in this matter.

In my opinion, marine management is defined as the investigation,



research, planning, organization, coordination and control activities conducted in accordance with relevant laws and regulations, for the purpose of safeguarding the control, conservation, and utilization of the marine space, resources and environment in the sea areas within the jurisdiction of a State, establishing and maintaining normal orders of the seas, and setting standards for the acts of all the organizations and individuals active in the sea areas. It is a definition in a broad sense. Accordingly, the laws and regulations on marine management, which is to be introduced afterwards, are also in the broad sense, not limited to the environment field or even the environment and resource field, but including more activities related to the seas.

Marine management has originated and evolved from mankind's development and exploitation activities of the sea. It includes two developmental stages in the international community. The first stage is the period before 1970s, when the sea is managed by sectors and industries engaged in fishery, shipping and salt production. However, some of the western countries have phased in the coastal management since 1970s, as known by some of the international experts presented here. Later a milestone event happened. It was the United Nations Conference on Environment and Development (UNCED) held in Brazil in 1992, which is also one of the bases of the foundation of the CCICED. There is also a milestone in the maritime affairs, that is, the United Nations Convention on the Law of the Sea, which was effective in 1994. Accordingly, two important concepts were proposed for marine management, that is, the concept of sustainable development of the sea and the concept of the integrated sea management. These concepts were put forward at an important timing of the international community. Entering the new century, the marine management based on the marine ecological system has and will become the mainstream worldwide.

To be brief, the developmental stages of marine management can be shown by the table on this slide, which demonstrates the management targets and spatial and chronological dimensions, as well as the positioning of the managers and management targets. Each of the stages



has its own features, as shown by this table. For example, the simple sectoral management may be small-scale activities for development of a single species. As for the integrated coastal management, like the relation between man and nature, considerations should be given to how to unify the social, economic and natural or environmental benefits. As for the management of ecological system, more attention is paid now to the services provided by the ecosystem and its health. So, great differences can be inferred from the guiding concepts and ideas on marine management.

Accordingly, the marine management also falls into several stages, on which I will not elaborate. The coastal management in China is of great relevance to the marine development course, as well as to the schemes, mechanisms and institutions for marine management. It was the same case in the early 1980s. I know it because I work in the State Ocean Administration and am familiar with its work. At that time, the marine management was largely based on sectors and industries. From the early 1980s to the mid-1990s, China realized the need to adjust the original way of sea management by sectors and industries. Especially, the State Oceanic Administration was empowered the functions of conducting investigations, scientific research, management and providing services in the interests of the public. Many senior colleagues, experts and leaders here knew that the State Oceanic Administration did not have such functions back in the early 1980s. Along with the reform and opening-up of the society and economy, the administrative restructuring, and the separation of the government and businesses, some of the industrial departments including salt, petroleum and natural gas reshuffled from administrative departments to state-owned enterprises whose operations are independent. The Chinese Government acceded to the United Nations Convention on the Law of the Sea in 1996, and put forward the strategy for integrated sea management and sustainable development of the sea in accordance with the 21st Agenda set forth by the UN Convention, hence inaugurating the new scheme for integrated sea management or, in other words, for linking the integrated management with the sectoral management.



ii. Laws and regulations relevant to the marine management

I'll begin with an overview of International Marine and Coastal Law. Ancient Roman laws already involved marine issues because Rome was also a place of close relationship with the sea in ancient Western Europe. As a matter of fact, there was no such concept as the sea right in the ancient times, and the sea, as the air and water, was shared by all. However, in recent times, along with the Great Navigation and the claim of territorial seas by recent capitalism, the command of sea has been put on the agenda of a State. The recent allegations of freedom of high seas and the expansion of territorial seas have divided the world seas into areas with different legal status, increased the marine interests and rights of coastal countries, and identified the ideas that high seas are open to all countries and that the international sea bed area is the common heritage of the mankind. There are now over 450 marine treaties and agreements at the international and regional levels, which are developed by international and regional organizations about international maritime rules, protection of marine environment, conservation of marine fishery resources, protection of underwater cultural heritage, biodiversity conservation, etc. There are some laws and regulations on this slide for your reference.

As for China's marine laws and regulations, in terms of the applicable geological scope, they mainly apply to the seas (internal waters, territorial sea and contiguous zone, exclusive economic zone, and continental shelf) and sea islands within the jurisdiction of the People's Republic of China; in terms of the rights and obligations concerned, they mainly include the sovereign right, jurisdiction right, and corresponding obligations; in terms of the activities under their regulation, they regulate activities including the maintenance of marine rights and interests, the use of sea areas and management of sea islands, the development and management of marine resources, marine environmental protection, seaborne transportation safety, and marine scientific research. The marine legal system is different from that of the land, which can be shown by a couple of aspects.

- 1) The legal system related to the marine rights and interests. a) the



declaration on territorial sea, the law on the territorial sea and contiguous zone, and the declaration on baseline of territorial sea. It is provided that internal waters and territorial land have equal legal status, and there are also provisions on the navigation on and fly over the territorial seas; b) the exclusive economic zone. The Law on Exclusive Economic Zone and Continental Shelf was enforced in 1998, which provides a set of sovereign rights of the Chinese Government, including the construction of artificial islands, facilities and structures on the continental shelf, as well as the scientific research, environmental protection, and exploration and exploitation of resources. You may refer to relevant articles in these laws for further details.

These are laws and regulations at the national level. As for the rules of implementation, there are specific requirements on resources and management about the exclusive economic zone and the continental shelf, including the exploration of oils, scientific research, cables and pipelines. Many marine authorities perform these functions by direct management. There are also provisions on fishery and mapping. Coastal countries may take necessary measures such as landing, inspection, arrest, seizure and judicial procedures to pursue legal liabilities, in accordance with the above-said laws and regulations and the powers empowered by the United Nations Convention on the Law of Seas. These are laws regarding the marine rights and interests and most of them are foreign-related laws.

2) The legal system concerning resource management, with the focus on the use of sea areas and the management of sea islands. It is more relevant to the theme of the meeting. As for the particular sea space and resources, some of us mentioned this morning that China is by far the first country in the world that employs the marine space system (marine space zoning system provided in Chinese laws) in the marine management. It is provided by Law of the People's Republic of China on the Administration of the Use of Sea Areas. It is an innovation in the integrated sea management in China, which sets forth three principle systems.

a) Marine function zoning system, which is similar but not equal to



the space planning system mentioned earlier. To divide marine function zones means dividing sea areas into different types in accordance with their location, natural environment, natural resources, the status quo for development and conservation, and the demand for social and economic development. They need to meet different environmental standards. There are supporting regulations and technical standards for relevant articles of these laws. This system, based on a legal footing, is used to control and guide the use of sea areas. For example, the plan on division of marine function zones in Shandong Province is approved by the State Council and has legal effect once announced. All the marine development activities in relevant sea areas shall be conducted in accordance with such plans.

b) The system regarding the right to use sea areas. Similar to the land use right, the right to use sea areas is an exclusive and usufruct property right. Interests can be gained through occupying the sea space. Its ownership belongs to the State, and the right to use can be circulated via market transactions, like land use right.

c) As for the third system, the right to use sea areas is not free of charge. The owner has to, on behalf of the State, charge for the use of the sea areas. The revenues are handsome. The fee collected in the year 2009 for use of sea areas in China amounted to 7.9 billion yuan, while the pollution discharge fee collected by the environmental protection authorities that year was over 20 billion yuan. Considering the space under jurisdiction, the fee for use of sea areas was a very big sum. Also, it may demonstrate how intensive the sea has been developed.

For the use of Sea Islands there are also some relevant laws and systems, which I shall not go to details. There are also systems for the rights and ownership, the conservation and the planning, and the special utilization of Sea Islands. The quotes in this slide are basic contents of the sea island conservation law, including the protection and appropriate utilization of Sea Islands within jurisdiction.

3) The legal system for the marine resources. I talked about space



resources, that is, the sea areas and Sea Islands just now. Now I'm talking about traditional material resources as follows.

a) Fishery resources. It is a very traditional industry and has relatively sound laws and regulations, mainly the Fisheries Law, which has been amended for three times over the past two decades, in accordance with the development of fishery industry and the change in fishery resources. The law includes the conservation of aquatic resources. As known by the fishery experts here, it also has provisions on fishing, cultivation, and resource conservation, as well as international practices on development of fishery resources, such as the licensing system, quota system, fishing ban area and periods, and the permitting system of fishing methods. It also includes the systems concerning the conservation area of fishery resources, and the rational utilization of such resources.

b) Mineral resources. While the Mineral Resources Law has provisions on mineral resources, mainly petroleum, natural gas and non-metal minerals, there are regulations on the exploration, exploitation and conservation of mineral resources, as well as the management, planning, permitting, and paid use of mineral resources.

c) Emerging industries. There are no specific laws governing the desalination of seawater and utilization of seawater as resources, but the Law on Promotion of Circular Economy encourages such activities. Emerging marine energy sources such as tides and waves are provided by Renewable Energy Law as emerging and renewable energy sources. As for the underwater cultural heritage, there are regulations for the conservation and management of underwater cultural relics, developed in accordance with UNESCO Convention on the Protection of the Underwater Cultural Heritage. These regulations provide the ownership of underwater cultural relics, the protection of the management rights, as well as the illegal exploration and exploitation, and businesses and sales. I won't give more details in this regard.

4) The legal system on the marine environmental protection, which



is highly relevant to the theme of the meeting. I work for the protection of marine environment as well. In general, a set of laws and regulations on marine environmental protection have been established, with the core as Marine Environmental Protection Law. They provide general and common systems for prevention and control of pollution, ecological conservation, and supervision and management, as well as systems for the administration of environmental protection for major human activities at sea. MEP Director General Mr. Zhao introduced special regulations for prevention and control of pollution from land-based sources, which are developed in accordance with the proposals of international organizations on GPA land-based activities. There are administrative regulations, i.e., the regulations of the State Council, provided by Marine Environmental Protection Law, regarding the coastal projects, marine projects, the exploration and exploitation of marine petroleum, information activities at sea, ships, and ship dismantling. Detailed provisions are included in the law and regulations, on which I will not elaborate. There are also some local and sectoral rules. For example, the marine authorities, environmental protection authorities and agricultural authorities including coastal local governments have developed relevant rules and local regulations.

5) The legal system for the management of marine transportation safety. You may not be familiar with this aspect but it indeed belongs to the marine management. Representatives from the transportation departments would be delighted to talk about it if they were here. The development of the sea is not possible without the platform of the seaborne transportation. So, a set of regulations regarding the administration of the safety of seaborne transportation have been set up for safer voyage and cleaner marine environment. These regulations including those on port, sea-route, beacons, crew, and ships are the maritime regulations. There are some specific and technical provisions.

iii. Analysis of the regulations



The majority of the systems, which are provided by administrative regulations, are related to the theme of the meeting, that is, marine management. Some of the systems may not sound familiar to you, because they are provided by the Constitutional Law, Civil Law, Economic Law and Criminal Law. For example, the exclusive economic zone of the territorial sea is provided by the declaration law or the constitutional law of the State; the Law on the Administration on the Use of Sea Areas and the scope of the right to use Sea Islands belong to the property law and involve the basic provisions of the civil law. The Maritime Law belongs to economic law. These laws regulate the major areas of mankind's activities at sea and are general laws.

In terms of marine management, several principles are provided by these laws, for example, the principle regarding the resource ownership, the principle for conservation and utilization of marine resources, the principle regarding the rights and obligations of the economic development, scientific research and users, the principle regarding the obligation of environmental protection, and the principle regarding the schemes and mechanisms advocated by the meeting for linking the unified management with sectoral management. These principles are to be improved. As for the specific systems, these systems are about the marine space, zoning, planning, licensing, argumentation for the environmental impact assessment, and marine nature reserves. What I mentioned just now are regulations on the administration of marine environment, and they do not involve international laws and economic or civil laws. It can be inferred that both fishery and environmental protection regulations have such provisions. There are also provisions on the paid use of resources, investigation, monitoring, forbidden behaviors, and supervision activities. Some of the laws even involve the rank of marine supervision teams and their functions, including maritime surveillance departments, fishery administration departments, maritime departments, and environmental supervision and inspection departments.

Of course, there are problems regarding these laws and regulations. First, is the theme we are discussing identified in accordance with the



idea of integrated and balanced marine management? Second, some important systems and management mechanisms are not in place, such as those regarding the management of coastal belts, the Bohai Sea, eco-compensation, and environmental emergencies. We are aware of this key problem, so the 12th Five-Year Plan mentioned this morning proposed to further improve laws, regulations and policies relevant to marine issues, intensify the enforcement and safeguard the orders for marine enforcement.

As for the management system, a policy is proposed after relevant ideas are discussed, and then it is identified by legislation, implemented by an institution, and amended and improved during the implementation. By this the policy can be improved and then the law. This is a law-making period. We've proposed the Basic Marine Law at the meeting, to incorporate the concept of the management of the ecological system into law-making. We also need to improve the management of coastal belts, the Bohai Sea and environmental emergencies.



Strategies, Law and Regulation System in the EU: River Impacts on Oceans and Coasts

Carl Gustaf Lundin
Member of CCICED TF on Ocean
Head, Global Marine Programme, IUCN

As we all know there are a number of activities that have been taken place now on the continent-wide base. Basically the idea is to integrate aspects of what has been the sovereign national right in the past into a structure which permit some of those shared problems to be resolved. The way EU has thought about those things through working through the framework of directives. These directives I think are of various quality and success. I try to outline, but I think they are key lessons we have learned here. I also talk about how river basin decisions are made having a couple of the examples different in China. I talk about the modification. Then, finally I also will talk about the problem. There are quite a few things I want to cover here.

As you all know, EU has many disadvantages to China. Of course we have many different languages; we have very different legal tradition. We have many different ways of solving problems. We have long history of war as well to cement these types of problems.

Consequently I think what we deal with EU in some degree at least common denominator. We are trying to solve problems through basic principles and driving them through what are in many ways very heterogeneous system. I think when we look at China we have a lot more commonality in terms of thinking about the problem, framing these issues so on which makes it easier to deal with these issues.

If we look at different directives, I think the first one is an example of how one can go with common type of solution. The Common Fishery Policy I think is one of the worst pieces of legislation out there. It has



been a failure and there is no way you can say it is a model for anyone.

Fortunately, Europe is not alone in poor fishery management. I think there are some examples here. In this part of the world we are the loser. In any event, my point here is that there is not automatic solution. I think we are trying to do in EU through the Common Fishery Policy is to see the responsibility for management from the local level from what in Chinese term of provinces and move it upwards through political decision making process at the central level. This I think is proven does not work so well, by and large making the decision as close to the people as possible is a preferred option. I think the other Directive is much more setting broader goals and working through them have been much more successful in terms of the presentation.

Here is the list, I will not go into detail about all of them. Some of them are particularly interesting things like the Habitat Directive which really looks into what are particularly sensitive areas that we need to protect. We make sure that the representatives are kept in intact over a period of time and have been restored the ones that are under represented. Biodiversity strategy helps EU implement some of the broader global commitments done under the work of GBD. The strategic assessment which has forces larger thinking across the impacts, how can we deal with those types of the impacts and then the Water Framework Directives I think I will go into some more in detail.

We also have integrated marine-time policy which again comes out with large number of action plans over 60 of them. Many of them actually try to push in a way much of our report is working for the broader context where the Europe wants to go in terms of its marine time industries in the coming years.

Marine Time Strategy Framework Directive is much more directed to how we deal with environmental consequences of marine industry and how we cope with those.

One good example perhaps I think in the same type of relevance would be looking at the Rhine River in Europe which goes through a number of countries traditionally was very heavily impacted earlier in the last century and now has seen a revival. In fact the Rhine River has significantly improved. I think that shows some of the Directives work



very well. We also have had a lot of common work in terms of the use of water, sedimentation issue, eutrophication issue, pollution issue, hazardous materials and so on.

So there is a lot of literature available on the Rhine River. But I would say it could be a good way to see large river system with many different challenges I think there are something that we can learn from there.

What framework objective is really setting some aspiration goals? One of them is to improve ecological status by 2015. Now as many of EU Directives, they often negotiated through quite difficult political processes and they also provide the baseline quality. It permits countries actually to have higher standards in some cases. There is quicker development in some countries that is way ahead and in some countries even reduced the quality as a function of the directive.

By and large, they have been quite effective to push thing forward. It also looks how to integrate various aspects of the work we are doing. In term of relevance for China, the whole idea is a long-term perspective as much as Five-Year Plan. The Work Framework Directives also deals with the longest scale. One example would be looking at the different goals, the bottom line is the river basin management plan that has been agreed and will be revised with some regularity, which permits also that if we are not moving in the right direction, we need to modify the plan.

For many of us who perhaps are not so clear that rivers are one of the main impacts on marine environment. In fact, if we look at China, much of the coastal line now is severely affected by things that are high up in the country. I think it very important for us to see that everything ends up in the ocean one way or another over time. At the same time, we also have the direct modification that we do into the oceans — things like land reclamation and so on, that of course we have heard quite a lot here.

Just to bring things back to home, one of the problems we have a lot today is the question of eutrophication that leads to outbreak of blooms. Clearly, this is a manageable issue. We have in Europe a number of successful improvements. I am from Sweden, our capital Stockholm has big river system coming straight out of the mouth of very extensive set of lakes. 100 years ago, if I drank a glass of the water, I would surely be seriously sick possibly even died. Today, I could actually do that without



any hesitation. You can even pull out a salmon in the middle of the city and eat it and it wouldn't be a problem. There are some good examples of how much bigger population we can change things around. But it does require a lot of investment. That requires long-term planning and dedication to accomplish it.

I think we have numerous examples across Europe which are quite encouraging. I think they are good examples for China as well.

Of course this is not one thing that needs to happen. We need to deal with both point source pollution, the diffuse sources of pollution, particularly agriculture and urban users. Also, looking at how we manage natural resources in a way that we do not degrade the system. This is a true challenge for any one.

Looking at things like hazardous substances. Here clearly we have a lot of significant problems, within Europe we have lots of Directives that try to deal with these. I think there is some significance progress made over the last years, but we still have a long way to go. I did not mention any of the Directives there. But a lot of work has been done on that.

Here in China I think there is still significant amount of work needs to be done. Of course, the actual fact of these things do end up in the oceans have very negative impacts.

I just talk about the fact that systems are connected and good environmental status of ocean depends on good river basin management.

Here I think is an interesting case of trying to look at the trade-offs. The green areas are the positive aspects of what we are doing right now, things like using land, improving our communications and so on. While the red ones I think are the problems we are facing. As you can see there are a number of red areas in terms of the environment. I think I would focus on two of them. One is the great economic loss associated with natural and man-made hazards. Here I perhaps go to the more downstream and look at what was happening in coastal zone, I think we do have very serious challenge here in China. The way I see it a lot of industrial parks China has actually been put now within perhaps a meter of sea level in many cases. There are some understandable reasons why this is happening. I think the overall risk associated with that not just to China but for every one across the world that depends on the products





produced in China are very significant. We know that China is prone to natural disasters. This is a high risk strategy. Beyond that what we have seen we are destroying lot of productivity in the system. As Professor Su mentioned, a lot of breeding areas actually are associated with coastal areas, if we destroy them, you will not have same type of natural productivity.

There are very compelling reasons to look at green belts in coastal areas that are restoring natural habitats instead. Also looking at what these habitats are doing in terms of carbon, they actually turn out to be the most effective carbon sequesters out there. So that another important factor just hammering home the point of coastal vulnerability, unfortunately this of course occurred very recently.

I think the other thing to say is the idea of having long-term strategic plan in China. We are not going to see dramatic shift at one time. But if we set up realistic goals and work towards them I think that we stand a good change making this work.

I think these are a few reasons why I think the Water Framework Directive could be an interesting model for China to look into. In terms of the history of how China deals with water, there are a lot of parallelisms also and I think the difference we have at provincial level near some of the differences we see in Europe. I think the clear governance structure is a very strong advantage in the work of the framework Good management through using clear objectives and ecologically sensitive way thinking about it, I think is another possible thing.

In terms of implementation, I think having a long-term implementation is good. The principle is that how we pay for this I think is similar in China these days. I think the way of thinking from mountain top to the oceans is another important parallel way of looking at it also in terms of how we structure the management and so on.

So I want to finish on another case. We have done a lot of work in terms of how can we help reduce the carbon footprint of humans. Here in China we have a very interesting situation right now. We have massively increasing use of hydrocarbons. At the same time, we actually are reducing some of the best natural ecosystems that are sequestering carbon. We have done good calculations recently on what different types



of ecosystems contribute to. Healthy salt marshes turn out to be one of the best ways of sequestering carbon. Basically you build up the organic matter in the sediments with water. Whereas if you have poor ecosystem, the worst case scenario you have massive emissions of carbons from these systems both in terms of methane and also release of CO₂. So this actually turns them into to be the massive source. We now look at the number of trees, this is a large common problem. This is something China should deal with. Professor Tang has been working very hard on this issue. We had seminar coming up in June where I think some of the issues will be discussed.

What are the solutions for these? Well I think we need to calculate the blue carbon cost as well and put that into the framework of how we do it. We need to think of new financial mechanism actually take credit for what have been done in terms of carbon management. I think there are some good ways looking at that. We have heard the thought of using economic incentives earlier in the discussions this morning I think. These can be applied in this case as well. The new interesting study by Duke University we just publish something with World Bank last week on this topic. Also, I think there other policy mechanisms available.

So I think I would end saying that this is what China's rivers and coasts look like today, but there are good examples here in China as well that we can look at. I think we would all like to see bright future in China. We would be happy to help with that as well.



Ocean Ecosystem Protection and Blue Economy Development in Qingdao

Mr. Song Chunkang
DG of Qingdao Environmental Protection Bureau

It is my great pressure that the 2011 CCICED Roundtable Meeting finds its venue in Qingdao, Shandong Province. It provides a good opportunity for us to learn the domestic and international experience. Now I'm going to brief you on the efforts of Qingdao to strengthen environmental protection and advance the development of blue economy. I wholeheartedly hope that you give precious comments on the city's environmental protection including marine environmental protection efforts.

1) The environmental conditions of Qingdao

Being a coastal city by the Yellow Sea, Qingdao is one of the key economic centers and coastal open-up cities. It is among the top ten cities in terms of economic size in mainland China. Being at the foot of mountains and by the sea, Qingdao has beautiful landscapes and amicable weather and is China's renowned scenic spot, tourism resort, and famous historical cultural city. It has 13,800 km² of sea areas, 69 sea islands, 49 natural bays, and 711 km of coastline. For years, the basic national policy of protecting marine environment has been adhered to, and the sustainable development strategy has been implemented; the outlook on scientific development has been carried out, and the development of eco-city has been sped up; the blue sky and clean water project has been carried out, and the environmental quality has seen constant improvement. Qingdao has been granted the honorary titles including "national eco-friendly garden city", "model city for greening efforts", and "China Environment Award". The city proper and all of its five county-level cities have become



national environmental protection model cities. In 2010, 90.7% of the city proper saw excellent or good environmental quality, and the air quality was good for the tenth consecutive year, the water quality of major rivers was improved year on year, 77.4% of the function zones met with environmental standards, the water quality in coastal sea areas was good, all of the water quality function zones in sea areas around Jiaozhou Bay met with relevant standards, and 71.4% of the waters in Jiaozhou Bay managed to do so.

2) Principal measures on strengthening marine eco-environmental management and the achievements

Qingdao has adhered to the principle of giving considerations to both the terrestrial and marine ecosystems, taken the marine eco-environmental protection as a key task for improving the city's environment carrying capacity and implementing the sustainable development strategy, and done five tasks as follows: first, the environmental infrastructure construction has been strengthened, the capacity for collecting and treating municipal wastewater has been enhanced, the improvement of drainage pipes has been included in the key infrastructure construction projects, and 689 km of new drainage pipes have been laid out, which makes the total length of drainage pipes up to 4,500 km, of which 2,200km is sewage pipes. The capacity to collect wastewater has been significantly improved. Four new wastewater treatment plants including Loushan River Wastewater Treatment Plant have been built up, and nine such plants including Tuandao Treatment Plant and Licun River Treatment Plant have been rebuilt or upgraded, adding the treatment capacity by 570,000 m³/d, so it has reached 1.4 million m³/d. Among them, 700,000 m³/d of wastewater was treated to meet with domestic standards. And 85% of the wastewater in the city is treated before discharging into the environment.

Second, considerations have been given to both the land and sea, overall plans have been developed for rivers and sea, and the integrated pollution treatment has been highlighted in key river basins. Efforts have been made to treat pollution sources in the three river basins including the Haibo River, Licun River and Loushan River in the city proper, and





over 500 pollution sources have been removed or treated. Over 3 billion yuan has been spent in the integrated treatment of 70 km watercourses of the Licun River and Moshui River. The treatment efforts have increased by 60% than that of the 11th Five-Year Plan period. The natural and ecological functions of the watercourses have been restored gradually, and projects on eco-friendly water supplement of the watercourses have been conducted. The industrial wastewater from beer industry has been well treated and then discharged into watercourses as supplement, which increase the ecological runoff of watercourses.

Third, efforts have been made to advance the development of eco-cities and strengthen marine ecological conservation. By now three districts and five county-level cities have been built into national eco-model districts, and 49 out of the 79 townships across the city have been entitled national environmentally beautiful townships. Nature reserves covering the Dagong Island, Lingshan Island, and Wenchang Islet as well Jiaozhou Bay special marine nature reserve have been established. There are 13 nature reserves at all levels, and scenic spots and forest parks at or above provincial level. The nature reserves cover a total area of 1,500-odd km², accounting for 14.4% of the land area. The control lines for reclamation in Jiaozhou Bay and for wetland conservation have been defined, and the around-Jiaozhou Bay eco-conservation planning and controlling system has been established.

Fourth, efforts have been made to intensify the environmental supervision on chemical companies and advance the pollution prevention and control in old industrial parks. One hundred and ten polluting companies in the old city proper are planned to relocate, and the relocation and upgrading are already under way for over 50 companies. The environmental impact assessment for plans and construction projects are intensified, and all of the 16 development parks and six industrial function zones have gone through the EIA for their plans. The environmental supervision has been enhanced, and companies discharging effluents directly into Jiaozhou Bay and other sea waters are ordered to correct within a specific period of time. Industrial companies that fail to meet



emission standards have upgraded their pollution treatment facilities, 280 companies have received mandatory cleaner production audit, the online monitoring system for key pollution sources has been set up, and the on-line monitoring facilities for key companies under monitoring program at or above provincial level have been supervised by provincial and municipal monitoring platforms.

Fifth, a relatively sound system for the monitoring and evaluation of marine environment has been established. The monitoring sites in the Jiaozhou Bay have increased from 14 to 39 ones, and in accordance with the principle of networking these sites, the monitoring items have increased to 33, up from 29 before. And the monitoring frequency has increased from three times to four times. Remote sense monitoring has been introduced around Jiaozhou Bay, and a more scientific evaluation method has been used to follow up the evaluation on the marine environmental quality and pollution treatment effectiveness. In the context of the average annual GDP growth rate at 13.8% during the 11th Five-Year Plan period, the SO₂ emission and COD discharge have gone down by 27.4% and 14.5% respectively, the up-to-standard rate of water quality in the function zones of rivers has gone up by 5.5 percentage points, the COD and ammonia nitrogen levels have dropped by 19.4% and 39.7% respectively, and the up-to-standard rate of water quality in coastal function zones has been up by 14.5 percentage points.

3) Plans for developing blue economy and model areas for marine eco-environmental conservation

The development of blue economic zone in Shandong Peninsula has become a national development strategy since the start of the year. As a core zone and a major city, Qingdao plans to increase the GDP to one trillion yuan in 2015, up from 566.6 billion yuan in 2010, with average annual growth rate of 11%. The added-value of marine industry will have gone up to 115 billion yuan then from 55 billion yuan in 2010, with average annual growth rate of 16%. In the course of facilitating blue economic zone, more attention will be given to marine eco-environmental protection and developing model area in this regard, and the emphasis





is to be placed on the following five measures: first, tremendous efforts will be made to cut down the land-based pollutants and to exercise total amount control on water pollutants, COD and ammonia nitrogen. The COD and ammonia nitrogen discharges will have been brought down by 12% and 15% respectively from the 2010 levels by the end of the 12th Five-Year Plan period. On the basis of controlling industrial sources and domestic sources, agricultural non-point pollution sources are to be incorporated into the reduction scheme, and the scheme of total amount control of pollutants based on the capacity of the marine environment will be gradually set up, so that the Jiaozhou Bay is to have excellent or good water quality, up to 90% of the function zones will meet with water quality standards, and all of the function zones around Jiaozhou Bay will meet with relevant standards constantly.

Second, the urban environmental infrastructure is to be further improved. The city plans to lay out 1,300 km of sewage pipes and build 17 wastewater treatment plants, so that the treatment capacity will reach 2.2 million t. More efforts will be made to build wastewater recycling facilities and develop policies to encourage the use of reclaimed water. There are going to be 24 new or upgraded recycling projects, so that the wastewater recycling rate will reach above 20%.

Third, comprehensive measures will be introduced to advance the treatment of pollution in river basins. An eco-compensation scheme in basins around Jiaozhou Bay will be introduced, with the conservation of Jiaozhou Bay as the core. Based on intensifying the pollution treatment in river basins, the pollution interception, and the treatment of point pollution sources, eco-friendly treatment projects will be carried out regarding wastewater treatment, dredging, water diversion for supplementing water sources, greening and landscaping, and ecological restoration, so that 90% of the environmental function zones of rivers will meet with water quality standards.

Fourth, continuous efforts will be made to advance the ecological conservation of the sea and speed up the development of marine nature



reserves and special marine conservation zones. Ecological treatment projects of key bays including Jiaozhou Bay and estuaries are to be carried out, 115,000 mu of coastal shelter forests will be planted, and five ecological wetlands in Jiaozhou Bay including the Taoyuan River wetland, Shaohai Wetland, Yanghekou Wetland, and Nvgukou Wetland will be developed for the purpose of conservation.

Fifth, the supervision on marine ecological conditions will be strengthened, and joint supervision will be organized by environmental protection and marine departments. Environmental violations will be investigated and punished, the rational development and use of marine resources will be facilitated, and pre-warning and emergency response capacities for marine disasters including red tides will be upgraded.



Management Countermeasures on Coastal Ecosystem and Adaptation

Tang Qisheng

Academician of Chinese Academy of Engineering
Member of CCICED Task Force on Ocean

My main topic is to promote the development of blue economy through ecosystem management. I'd like to talk about two issues: one is the multiple pressures straining coastal ecosystems and the other is countermeasures for adaptive management.

This map profiles the main component of marine ecosystem, which is an interactive complex consisting of organisms and environments with different nutritional layers. It is a function unit. I want stress coastal ecosystem, for it is more prone to the influence of human activities. As defined by Intergovernmental Oceanographic Commission, coastal waters refer to sea areas of no more than 200 meters deep. Based on this definition, of the 3 million sq. km. economic zone that China possesses, about 2.5 million sq. km. belongs to coastal waters. This means management of coastal waters plays a key role for China's development. Taking the Yellow Sea as an example, the whole sea area belongs to coastal waters and it can be called a coastal ecosystem.

The first part I want to talk about is the coastal ecosystem threatened by multiple pressures. Years of research showed the following characteristics of coastal ecosystem:

First is overexploitation of coastal waters, such as overfishing, excessive development of coastal zones, climate change including natural



change and global warming. Eutrophication and land-based pollution including pollution from industrial, agricultural and domestic sources are the major problem of marine pollution.

After the 1970s, overfishing was a foregone conclusion. It led to deteriorating quality of fishing resources and damage of the functional service of ecosystem.

We found in the 1970s that periodic changes of the climate had an evident impact on the bio population of the Yellow Sea. We also predicted correctly the changes of early this century. According to the periodic fluctuation of the climate, it will be dry spell early this century. And the situation in these years is just the case.

A new research provides evidence to another finding, i.e., ecosystems have periodic transition and the phenomenon exists across the whole north Pacific region. For instance, this trend was observed in the early studies in Bering Sea and Alaska. The phenomenon was subject to periodic changes of the climate quite obviously. The effect of global warming can be seen from the map in the upper right corner. Red area indicates regions with temperature rising by more than 1°C. Sea areas in the northern hemisphere, those in Europe and Canada as well as the Yellow Sea, the East China Sea and the South China Sea in our country all experienced much temperature rise. Among the 64 ecological oceans in the world, 59 went through rising temperature. Temperature in the Yellow Sea and South China Sea has climbed by 1°C approximately and the East China Sea recorded 1.5°C increase.

Several slides have shown the problem of eutrophication. Booming of red tide, green tide and jelly fish as well as dead zone are all displayed in a direct way. We have a document on the growing amount of nitrogen and phosphor of the Bohai Sea. Since 2000, we have seen big increase in nitrogen in the area and this phenomenon has also been observed at the Yangtze River estuary and the Pearl River estuary.



Under the influence of so many factors, frequent changes of ecosystem have become its basic characteristics. The characteristics may vary with different factors functioning at different time period. That determines the complication and uncertainty of the changing mechanism of ecosystem. It's very hard to predict and manage. We did a study on the Bohai Sea in 2003. We can't manage down-up control, top-down control and wasp-waist control with traditional theory. Only in a very short time period, we may find the seemingly down-up control and if overfishing continues for some time, it may seem to be top-down control. But over a longer period, it's very hard to predict and manage.

Now we come to the topic of adaptive management. This is the second part of my presentation. I personally think human society has gone through the stages of management, mitigation and adaptation in about 100 years to achieve the perception of marine sustainability. You may think the time span is bit longer. As we know, the International Council for the Exploration of the Sea (ICES) was founded in 1902 as the earliest marine organization in the world. It has a clear purpose which is to manage the fish stock of the North Sea in Europe. However, in 2002 the World Summit on Sustainable Development in Johannesburg raised the topic of ecosystem-based management (EMB) and the phrase ecosystem methodology, and then followed by the idea of adaptation. I would like to clarify two points by showing the slides and talking about this part of history. First, it is not an easy task to deal with ecosystem management. Second, there is not an exact definition on adaptive management. That is to say, we are still exploring the issue. In spite of the first consensus statement on EMB announced by then UN Secretary General Kofi Annan in 2002, we still haven't found out a precise method with nearly ten years passing by. Therefore, I quote the traditional Chinese saying "the benevolent see benevolence and the wise see wisdom" to comment on this issue.

What have we done in the past few years in the field of fishery? I summarized four points. One is summer closed fishing, which began in 1995. At first, the system was not well received and China also did



this out of expediency. But now it has been widely accepted, a method especially praised by international experts of our task force. Our neighboring countries and regions are also learning from us. The second is enhancement and release. Release of *Penacus orientalis* in Bohai Sea started on a small scale in the 1980s. In 2006, the Chinese government issued Action Plan for Cultivation and Conservation of Aquatic Biological Species Resources of China which strengthened enhancement and release. In May and June every year, public release and enhancement will take place in inland seas. From 2007 to 2009, about 40 billion fries of various aquatic fingerlings were introduced to coastal ecosystem. The third one is about integrated multi-trophic aquaculture. The term was brought forward only in the recent years. But actually the practice started in the middle 1990s within estimated carrying capacity. Now integrated multi-trophic aquaculture is being promoted and is well recognized. Though the term integrated multi-trophic aquaculture sounds genteel, the idea is well received by management and industrial department. Last year we formally proposed to develop carbon sink fishery and to my surprise, it was applauded by the authority of fishery and industrial department. The popularity is even greater than that of the academic circle. China Fisheries, a publication run by Bureau of Fisheries of the Ministry of Agriculture, interviewed me for exclusive report. This year I received many invitation letters from different provinces, asking me to join them in the promotion of carbon sink fishery. This May Jiangxi and Shanghai invited us to their discussions and WWF also took part in it. I think the idea is welcomed for its win-win nature, one the one side, it generates benefits and on the other side it helps to reduce carbon emissions.

A thorough study of related scientific and technological issues is needed to promote sound and fast development of carbon sink fishery. In November 2010, the 109th forum on engineering technology was held with the support of Chinese Academy of Engineering. Focusing on the theme of carbon sink fishery and low-carbon technologies, the spectacular event drew on a large group of participants. On the last day of the three-day meeting, there were still over 100 participants, which is a rare phenomenon at current academic gatherings. A basic discussion as it was,



the topic appealed to many people. This year we established a laboratory on carbon sink fishery. In the course of its establishment, some companies were very enthusiastic about it. therefore we set up two company-based laboratories as affiliates, one being carbon sink laboratory for scallop in Zhangzidao, Liaoning Province and the other being shellfish-algae carbon sink laboratory in Sanggouwan, Shandong. We have combined the effort of both scholars and companies. Xiangshan Science Conference will be held this June. This is a high-level academic meeting in China. It will discuss basic issues in a scientific perspective from carbon sink features of coastal ecosystem, to the formation of biological carbon sink and its mechanism. The meeting will set a direction and target for China to carry out biological carbon sink study and carbon sink expansion of coastal ecosystem. All our effort aims to make our management sustainable. It may not produce satisfactory result in the short term, but we believe with science-based foundation and continuous effort, it will deliver a good prospect.





Debate and Discussion

Integration the idea of environmental protection into the development of blue economy development

Xu Lihua

The municipal government of Yantai City, Shandong Province, China

The roundtable has provided us an important opportunity to share the policy research findings of the Council on China's marine eco-environmental issues. Yantai City shall, availing of this opportunity, further strengthen the exchanges and cooperation with all parties concerned and try to facilitate the sustainable development of the ocean.

Yantai boasts 909 km of coastline in coastal areas and around sea islands. The sea waters cover 26,000 km², there are 72 rock islands each with an area of above 500 m², the shallow sea reaches 6,560 km², and the shoal is up to 284 km². There are eight rivers entering the sea, whose annual runoff amount to 200 million tons. There are also 14 municipal wastewater treatment plants discharging effluents into the sea, and the annual discharge reaches around 100 million tons. In the context of rapid economic development and sprawling urbanization in recent years, marine environmental pollution has been effectively controlled, the overall marine environmental quality has kept stable, and all of the function zones in coastal waters have met with relevant standards. The coastal sea waters has met with mainly Grade I or Grade II standards (taking up 93%), and there has been no water with quality worse than Grade IV. The indicators for coastal sediments have all met with Grade I standard, and the indicators for shellfish in coastal waters have met with Grade II standard.



These achievements can be attributed to the following efforts:

1) Efforts have been made to set strict standards for access to projects and strengthen the environmental management of marine-related projects. The Action Plan for Blue Sea, the Master Plan for Environmental Protection for Bohai Sea, and the Plan for Marine Environmental Protection have been introduced, and the environmental impact assessment system and the “three simultaneities” system for marine-related projects have been strictly enforced, in order to ensure sustainable development of the sea. Highly polluting industries including small paper mills, small brewing industries and small electroplating industries have been rigorously controlled, while pollution-free and slightly polluting industries which have higher starting-points and sound benefits have been embraced, in accordance with the principle of “banning water-and energy-intensive and highly polluting construction projects” and the working thought of “forbidding new polluting projects, shutting down small-scale polluting companies and treating large-scale polluting companies”. The environmental management has been strengthened in coastal industrial complexes, EIA statements have been prepared for the planning on industrial complexes in 16 development zones at or above provincial level, and higher environmental standards has been set for projects accepted by such complexes as well as environmental management standards. The EIA statements of 40 plus highly polluting construction projects including chemical, leather-making, paper-making and smelting projects have been rejected in recent years, effectively controlling the marine pollution and ecological damages caused by new marine-related projects.

2) Efforts have been made to intensify the treatment of land-based pollution and exercise total pollutant load control. Focusing on enhanced treatment of wastewater in key regions and river basins, over 4 billion yuan has been spent shutting down, merging or shifting the business of 50-odd wastewater dischargers, treating over 200 industrial wastewater sources, and building or rebuilding 14 municipal wastewater treatment facilities including Taoziwan municipal wastewater treatment plant and Xin'anhe municipal wastewater treatment plant. There are now eight wastewater treatment plants under construction, and domestic garbage



landfill sites have been built and operated in urban districts and coastal county-level cities of Yantai. A total of 9,344 t of COD has been cut down since 2005, and the COD discharge went down by 17.94% from the 2005 level, effectively improving the quality of coastal waters.

3) Efforts have been made to implement the ecological conservation strategy and facilitate the virtuous ecological cycle of the ocean. The development of nature reserves has been intensified to strictly protect typical and unique marine biological resources and ecology, and relevant scientific research has been conducted. Also, the development of ecological function zones has been enhanced, and eco-function zones in key fishery waters such as Laizhou Bay, Miaodao Bay, Sishili Bay, Dingzi Bay and Taozi Bay have been set up. Environmental management has been enhanced for the development and utilization of coastal resources, and the sand excavation has been forbidden to prevent erosion on the shore and protect the wetlands. The plans for division of coastal environmental function zones and marine function zones have been strictly implemented, marine aquaculture has been managed scientifically, and efforts have been made to vigorously promote cleaner production in marine aquaculture, eco-friendly aquaculture, and the comprehensive use of wastes from shellfish culture and processing industries. Nearly 100,000 mu of raft culture farms has been removed since the start of the 11th Five-Year Plan period, helping maintain the ecological balance of the ocean. The plantation of shelter forests to protect sea coasts has been facilitated, nature reserves for such shelter forests have been established, and 52,000 mu of coastal shelter forests have been extended and rebuilt, forming unique landscape in the coastal regions.

4) Efforts have been made to prevent and control seawater intrusion and conserve underground water. In the long-term efforts to treat sea water intrusion, Yantai has found out an effective way by “building dams to block seawater, building man-made rivers, diverting and reserving freshwater, and using freshwater to block seawater”. As a result, more than 50 km of underground dam has been built along the coast, so have three underground reservoirs including Wanghe Reservoir, Huangshui



Reservoir, and Gongjiadao Reservoir, blocking the seawater intrusion effectively. In light of the reality of shortage in water resources and serious loss of freshwater, Yantai has conducted integrated treatment of rivers entering the sea, removed industrial companies' effluent outlets into the rivers, and built and improved rainwater and sewage separation pipes. For the moment, 95% of the city's rivers entering the sea have dams for water storage, which helps reserve water, prevent water and soil erosion, and cut down the pollutant load entering the sea.

5) Efforts have been made to improve the accountability mechanism and strengthen the supervision on marine environment. First, the technical center for emergency response to oil spills has been established, the oil spill emergency response information system, satellite image processing system, monitoring system, oil spill control and clear-up system have been improved, and oil spill containment and clear-up equipment and apparatus such as containment boom and oil recovery equipment have been prepared; all these have played an essential role in the emergency response to several oil spill incidents. Second, the port and shipping companies have been urged to perform their duties. They have been urged to prepare oil spill emergency response equipment and to perform pollution control duties, through instruments such as EIA statements, environmental check upon completion of projects, opening of ports, and inspection on the safety and pollution control capacity of hazardous goods wharfs. Third, the public has been encouraged to participate in the emergency response to oil spills. Surveys have been conducted on the resources available for emergency response to oil spills, a variety of emergency response apparatus have been pooled, and entities with capacity to respond to oil spills are all included in the emergency response system. Fourth, the mechanism for emergency response to oil spill from vessels has been established and improved. The Contingency Plan for Emergency Response to Oil Pollution to Seas has been printed, distributed, and enforced, the job descriptions and guidelines for all departments have been identified, and the mechanism for emergency response to oil spills have been set up and improved. Fifth, the marine environmental monitoring system has been established and improved. Regular monitoring has been conducted on



land-based outlets, coastal waters, bathing beaches, ecological monitoring areas, and red tide monitoring areas. Also, the supervision on marine environment and resources has been tightened, in order to crack down on illegal activities such as illegal use of marine resources and damage to the marine environment.

Although the city has made remarkable achievements in facilitating marine environmental protection, the situation in this respect is still very serious. There are prominent problems as follows. There are many short rivers in this region entering the sea, so the pressure for preventing and controlling land-based pollutants are huge. Oil ships in Bohai Bay come and go frequently, so the risks for marine pollution incidents are high. Part of the sea waters is overexploited, and the coastline is not used intensively, so certain damages have been caused to the ecological environment of the seas. Many administrative departments are involved in the marine issues, and the joint supervision efforts are to be enhanced. The marine environmental protection work has a poor basis, the emergency response capacity is relatively backward, and there are devoid of effective monitoring instruments. These problems will be addressed in the future.

Yantai lies to the sea and flourishes because of the sea. It is the core area in the plan of national blue economic zone and an integral part of the effective eco-economic zone of the Yellow River Delta. To strengthen marine environmental protection and facilitate the sustainable development of the ocean have become the collective responsibility and central task of the entire city. So, the following tasks are to be highlighted from now on.

First, a comprehensive mechanism is to be set up. Efforts will be made to work out a unified leading agency and working agency for marine environmental protection. The horizontal coordination among departments will be intensified by integrating the resources of the environmental protection, maritime and fishery departments and by developing a unified supervision network for marine environmental protection. These departments will assume their own duties and work together in terms of coastal and oceanic construction projects, disposal of oil spills, and



settlement of pollution disputes. Close attention will be paid to setting up the expert decision making, argumentation and review mechanism, and a joint meeting scheme involving the leading agency, working agency, and expert panel for marine environmental protection will be introduced, in order to consider on a regular basis the integrated treatment of marine pollution and advance the continuous improvement of marine environment.

Second, efforts will be continued to carry out marine ecological conservation projects. The projects on integrated treatment of the ecological environment in major bays will be advanced, overexploitation will be controlled, and total pollutant load system will be introduced. The administration on existing nature reserves will be enhanced, and a new batch of marine nature serves are being planned, so as to develop the scheme of marine nature reserves with reasonable structure and layout, integration of ecological conservation with sightseeing, and unique characteristics. Also, efforts will be made to advance the construction of municipal wastewater treatment facilities, incorporate the marine ecological restoration and treatment work into the integrated Bohai Sea treatment projects and eco-province development projects, and list the dredging projects of coastal waters such as major bays, estuaries and ports as well as marine resource restoration projects into the national key projects.

Third, more efforts are to be made to treat land-based industrial pollution. The industrial wastewater recycling projects will be accelerated, and the reclamation rate of water for industrial purposes will be raised. Strict standards will be set for market access, and the scheme for evaluation of the energy-and water-consumption as well as the pollution discharge intensity per unit of GDP will be established and improved. Cleaner production will be introduced, backward processes and equipment that are water-intensive and highly polluting will be phased out, and vigorous efforts will be made to address structural pollution problems. Automatic online monitoring system will be introduced for key pollution sources that discharge a large amount of wastewater in order to facilitate



the discharge to meet with relevant standards. Companies that fail to meet with emission standards will be shut down in accordance with law.

Fourth, the projects on integrated treatment of small river basins will be sped up. Attention will be paid to improving the surface water quality and environmental quality of coastal waters, and projects on integrated treatment of small river basins will be carried out, which combine the measures of pollution control, the wastewater-to-resource conversion, and the ecological restoration and conservation of river basins. In terms of water pollution treatment, strategic change will be made from treating source pollution to comprehensive prevention and control of pollution to river basins. The quality of rivers entering the sea will be improved, so as to ensure that the water quality of major economic bays including Zhifu Bay, Taozi Bay and Laizhou Bay meet with standards for the environmental function zones of coastal waters.

Fifth, the projects on monitoring, prevention and control of marine pollution will be strengthened, and the capacity for environmental pre-warning and emergency response will be upgraded. Efforts will be made to improve the marine pollution prevention system, gradually perfect the registration system for land-based companies that have impact on the marine ecological environment, set up eight to ten oil pollution treatment stations in major ports, mitigate and prevent the damage by pollutants from ships to the ecological environment. Efforts will also be made to develop the marine pollution pre-warning and forecast system, enhance the capacity building for environmental emergency response, further improve the contingency plan for major marine environmental pollution incidents and contingency plan for oil spill incidents, strengthen the rank of professionals for environmental supervision and monitoring as well as relevant equipment and facilities, enhance the capacity for responding to emergencies, and minimize the impact of major marine incidents.



Planning first and then action

Mr. Liu Zuli

Vice Mayor of Weihai municipality government

I'm very glad to be here and I've come to learn useful information. I also attended the roundtable meeting last year in Shanghai, and phrases like green, circular economy, low-carbon, and sustainable development are still fresh in my memories. Each of the meetings has impact on my thoughts and concepts. I've learned a lot from these meetings, which have enriched my knowledge and helped share experience.

The wonderful presentations of the experts make me realize that we used to talk about the one earth, and now we talk about the one ocean, the one that is integral and inseparable. It happened that yesterday was the 25th anniversary of the Chernobyl incident. The nuclear trouble triggered by the natural disaster in our neighbor country Japan is still lingering. So, all of us here are well aware of this.

The meeting also told me that the current marine system is quite fragile and faces serious problems, problems much more serious than what I've imagined. Also, I feel that the development trend is not satisfactory and that it is imperative to protect and treat the ocean.

Moreover, I've learned through your presentations that the protection of the ocean resorts to more than one region or one method and needs the whole world instead of one country or region. All-dimensional protection is needed, in terms of space, it ranges from the high mountains to the oceans; in terms of instruments, it may include economic instruments including compensation mechanism, carbon sink, and taxation, as I was told by the environmental economist this morning, as well as technical



instruments, administrative instruments and legal instruments. Citing the Chinese officials, “comprehensive treatment” is needed, and a single method will not work.

Now I’d like to extend sincere gratitude to the organizer of the meeting and the experts especially experts from other countries. I’m doing this as a local Chinese official and as a citizen of the People’s Republic of China. Indeed, you have come here all the way from other countries and regions to share your precious experience, for our ecological conservation undertaking. It is the spirit of what Chairman Mao once called internationalism. It reveals sincere feelings and it is real knowledge and deep insight instead of armchair strategy.

I’m arranged to give comments according to the meeting notice. However, with no written materials available before the meeting, I’m not able to give any well-prepared comments. Being not a professional in this field, I’m not capable of giving professional comments. Instead, I’d like to take this opportunity to brief you experts and colleague on information about the city I come from.

I come from Weihai, a city in the east end of Shandong Province in East China. It is a typical coastal city, and marine industry takes up a considerable proportion in the industrial mix. It boasts 1,000 km of coastline and sea area of 10,000 km² while its land area is only 5,600 plus km². There are 200,000 ha of shoals, and the marine output value amounts up to 123 billion yuan, with value-added of 60.3 billion yuan. The marine output value takes up 31% of local GDP. One has to make use of whatever resources available. What we have is marine industry. So, to protect the marine environment and develop marine resources is especially important to us. It is a relatively independent ecological system here, so we gain the most from doing well in ecological conservation and lose the most otherwise. We have attached great importance to it in these years and have been doing fairly well so far. By saying fairly well I mean there is still a gap from the European and American developed countries. However, in a shorter vision, we have made some progress, because



Weihai has gained the following titles including “national sanitary city”, “environmental protection model city clusters”, “eco-development model area”, “top tourist destination”, and the most livable city in the world. Needless to say, these titles are not bought with money, like paid fake licenses. Considerable efforts have been made to gain these honors.

Looking back, these achievements can be attributed to the following efforts.

To begin with, close attention has been paid to developing plans. There was a plan back in 1999, which identified the guiding principle of “giving considerations to both the land and sea and paying equal attention to development and conservation”. The plan and principle have always been respected. The industrial layout has also been identified in accordance with this plan.

Second, in terms of specific tasks, there have been two controlling passes on land, that is, the access to projects and the pollution outlet. The access may be shown by the industrial layout. Now I will recall how we have invited business and attracted investment. Since the reform and opening-up over the past three decades, Weihai has invited business and attracted investment from other regions, in order to protect local natural environment including the marine environment. While other local areas compete for projects and businesses for economic development, Weihai has always highly valued the natural environment and turned down 2.2 billion U.S. dollars of overseas investment and over 20 billion yuan of domestic investment, which means saying no to highly polluting and energy-and resource-intensive companies. According to statistics, the local GDP last year was about 30 billion U.S. dollars, which consumed 7 billion kWh of electricity. The data indicated that light industry takes up a large portion. All local areas cannot afford to say no to highly polluting and energy-and resource-intensive companies. Second, the estuaries and the pollution outlet. As for the pollution outlet of companies, one environmental supervisor is assigned for each of the pollution outlet. 24-hour monitoring is conducted in companies with such conditions.



Otherwise, there are inspections and secret investigations. Investigations will be conducted once any problems are identified, and no companies are allowed to discharge excessive pollutants. As for the estuaries, the treatment of estuaries is to be integrated with that of the whole rivers. Not long ago, a large-scale campaign was organized to treat non-point pollution in rural areas, dredge watercourses, and treat pollution by husbandry and poultry farms. We will do better in treatment of estuaries in the foreseeable future.

We do well in math in marine issues. The first is addition. As one of the experts said just now, we've released over 4 billion fish fries. Also, a sea-bed pasture has been built up, and more than one million m³ of stone has been thrown into the sea to build the pasture. Also, 13 national and provincial nature reserves have been set up. The second is subtraction. The area with overexploitation has been reduced by over 200,000 mu. More than 7,000 net-cages in 2,000-odd ha of culture farms have been removed and recovered by the government. According to the experts, it would not work if there are too many fries in an aquaculture farm, so some of the cages were removed, and the government paid for the loss of the aqua-farm owners. Also, 1,100 fishing boats have been torn apart, and 5,500 fishermen shift to other businesses. So, the environmental access and outlet is managed on land and the addition and subtraction measures are taken at sea. There are also some other measures, such as fishing moratorium which comes between June and September every year, controlling the intensity of cages, strengthening supervision and monitoring by supervisors and instruments, as well as publicity and education. We think that the conservation is effective only if each of us in a coastal city is aware of the importance to do it.

So, we owe our achievements to the above-said efforts.

There are also some shortcomings in our work. To begin with, the capacity to defend against external pollution is poor. A country or a region has its boundaries but not the pollution, which needs no passport. We can treat local pollution fairly well but fail to defend against external pollution





brought by currents. We still suffer from the threat from blue algae and *Enteromorpha prolifera* very frequently, as mentioned this morning. Second, we also face great pressure from both the development and the conservation. The average GDP growth rate for the 12th Five-Year Plan period is set at 7%, and the growth rate for this year is 8%. We will not lag behind in meeting this target, for it is of direct interest to the people's well-being and the political officials' promotion. But we feel increasing pressure from it. This target is above exception for development. Taking Libya for example, Libya is not a poor country, and the average income level in China is one quarter of that of Libya. We Chinese also pursue a good life, because all people, regardless of nationality or ethnic group, are entitled to the right to do so. I was told by a lecturer from Hong Kong University last year that Hong Kong has only 500,000-odd vehicles. Qingdao has 700,000 to 800,000, but a small city like Weihai has over 500,000. The public transportation has made good progress. There are over four million buses in Beijing, over 300 new buses put into operation in Qingdao every day, and over 200 new buses put into use in Weihai every day. So Weihai also faces great pressure in this regard. Third, the inputs are not sufficient. The supervision and anti-disaster capacities are still poor. Even with corresponding equipment and manpower, we are still unable to do as much as we would like to, and the supervision and anti-disaster tools are backward, especially in terms of the response to disasters. We are incapable of responding to oil spills once an oil tanker sinks. I'm certainly convinced that Ministry of Environmental Protection and State Oceanic Administration will consider such issue. There are four sea waters in China, the Bohai Sea, Yellow Sea, East China Sea and South China Sea. Weihai is adjacent to Yellow Sea. I suggest capacity building for each of the four sea waters, because it is not neither possible nor necessary to count on the capacities of one of them, and the capacities of the four can be shared through convenient communications nowadays.

We are well aware of these shortages and shall make or revise our plans in light of our realities, in accordance with the 12th Five-Year Plan for national economic and social development, and the plans being or already developed by State Oceanic Administration and Ministry of



Environmental Protection. We shall also honestly implement the plans. I will not elaborate now on our work for the next step.

Now, I'd like to make the following suggestions. First, the findings of this meeting especially the wonderful speeches (I didn't get it thoroughly because of poor English) of the experts should be documented and distributed in a wider scope, in particular through the internet. There are local officials from four prefectural level cities present here. Not all of the prefectural level cities have the opportunity to come here to listen to the experts' instructions, so the speeches can be documented and distributed to a wider scope to renew local officials' ideas. Ideas are very important, especially in China and especially the ideas of leading officials. In China, things will work out if the leading officials pay great attention. The higher the ranking of the official and the more importance he gives to it, the better the things will work out. If the leading officials highly value the issue and incorporate it into the government official performance evaluation system, then there will be a good cure to the problem. Second, these are hard-earned good ideas, instruments and experience, which will affect decision-making, policies, and laws in a long run. So, we should try to incorporate the findings of this meeting into the policies and laws. Now, to exercise administration in accordance with law and build a law-ruled government is also important in local areas. It is also one of the purposes of this meeting and we expect it to become a policy or law. Third, we should depend on science and technology. The primary way to solve these problems and settle the prominent conflict between development and conservation is science and technology. Mankind is indeed greedy. The productive force used to mean the capacity of mankind to conquer and change the nature. Now, keeping abreast with the times, it means the capacity to live in harmony with the nature. The damage to the Earth is tremendous due to scientific and technological progress. The damages in one year nowadays amount to those in several centuries before the industrial revolution, so something needs to be done to address this problem. It is hard to control the increasing desires of mankind because mankind is greedy. In my opinion, the following several industries should be highlighted. First, transportation, which connects China with anywhere



in the world within one day; second, communications, to make a phone call in the U.S. to China is as convenient as neighbors upstairs and downstairs; third, medicine, the development of which may give us longer life expectancy. As to other aspects, for example, the food, one third of our food is wasted; the clothes, is it possible to cut down our demand for clothes by two-thirds and wear the same clothes for a lifetime? It is impossible. So, we shall resort to science and technology to address such conflict between development and pursuit of happiness.

It is the primary instrument to do so and we are looking forward to it. Now I'd like to invite you to Weihai to see if I've talked about the city as it is. Weihai citizens will open their doors to welcome domestic and overseas friends.





The transformation of Hong Kong's Ocean economy

Sarah Liao Sau Tung

CCICED Member, Senior Advisor to the Vice-
Chancellor of the University of Hong Kong on
Environmental and Sustainability Matters

When I was asked to make a leading comment, I was not sure what to do. So I have prepared a series of slides that help to wake you up at this late hour of afternoon. And I can freely express what I have heard.

Certainly, the ocean is very important to Hong Kong because we are surrounded by the sea. For the past 100 years, we have gone through some exponential changes in our society, so along with it our relationship with the ocean. I have found an old picture of Hong Kong of 1850, it is a sleeping little fishing village with 3,000 fishermen. The major economic activity would be fishing. And it was an important occupation for Hong Kong at that time. You can see from the picture that the Victoria Harbor was a busy place for fishing boat. Through out the past 100 years, it has transformed from a fishing village to what we called the “Pearl of the Orient” port, a trading city and metropolis that is thriving on financial services and other things and not fishing.

So have we done something right or wrong? What have we done to the ocean? As I going through the meeting this morning and afternoon, I have heard very informative presentations from our international partners, telling us what is happening in the developed world. They come out with indicators, approach to legislation, control and management skills, how they actually present some forms of benchmark for China who is heading towards developed world.

But are we all doing the right thing. I must say Hong Kong has done



something right and something wrong. Let's have a look.

For blue economy, we want to have an ecosystem-based approach. Have we done anything to preserve the ocean? Do we have development strategy for marine time resources, is the commercial development of ocean in a sustainable way? Well, my answers to these are very simple. We never have these policies.

Our policy is first of all reclamation of land to make more space. Because of exponential growth of population, we grew from about 7000 people in the 1850 picture to 7 million. So reclamation takes precedence over all other policies.

To the extend our Victoria have been reclaimed to such an extent that you can almost walk across from Kawloon to Hong Kong. It was only in 1997 that somebody woke up and proposed a legislation called "Protection of the Victoria Harbour".

Now we prohibit any further reclamation of the Harbour unless it is for public interests and unless there is no alternative ways of doing it or whether the cost is prohibitively expensive. So basically we will not have any more reclamation of the harbour. So land to be provided by reclamation is an easy method. But it is not a sustainable method. It certainly does a lot of harm to our ecosystem in the process and as well we are moving to coastal habitat.

It also has a policy of developing into a port. It is a thriving port and perhaps the busiest port in the world. Because of the two things, the reclamation helped the development and Victoria harbour has actually been reduced to a navigation channel. We could hardly find any reasonable fish in the harbour. These two items caused land requirement, most people find it justifiable because we need it in our stage of development.

But the third item came in my mind and somebody talking about is the sewage system. Even until the late 1960s and early 1970s, engineers from our government who are responsible for infrastructure development still believes that the ocean is very resilient, it is the best drainage system. We can discharge population sewage into the harbour with no problem. The nature will take care of it. So unfortunately our Victoria Harbour has also become a sewage storage place. Even up to this moment I am talking we still have our sewage from the waterfront discharging into the harbour,



and the process of building a sewage treatment plant is still in progress. It is not finished.

So as you can imagine the sludge that is collected in the bottom of the sea is horrendous. Under this thin line, I have put down some information on fishing, so the fishing industry is certainly not a concern as far as the economic impact on the territory is concerned, because even from the 3000 you saw in the last picture, it has grown to 7600 fisherman, a very small percent of our GDP. We are also aware that it has supported employment of 10,000 people in related trade.

We have pollution control in coastal waters. But even fishery is not a major activity; we have nonetheless the protection of fishery. We have Fishery Ordinance because we would like to protect the ocean environment as far as we can. Recently, we have agreed to go for prohibition of trawling activities. You see this boat, I do not know how often you see it in mainland waters. This is a trawler, that means it scrip through the bottom of sea. It collects the big or small every life form regardless of its size and development stage. It does real damage to our marine life forms.

We have protection of nursery and spawning grounds, and implementation of close season and fishing license. Here, in the last two regulations, we have problem of enforcing them because we share waters with our neighbors from the cities of China.

Whenever we have a close season, we have illegal fishing boats coming into our waters. We are not going to start a war just because of fishing.

So in short, the implementation of such measures, we need collaboration of your neighbors. Because fishing has become so difficult, the overfishing scenario in Hong Kong waters is very much a problem. Mariculture has become a popular alternative. This is a picture of mariculture, and the problem of mariculture is coming to all maricultures, pollution from the waste and also the application of drugs like antibiotics, hormones also constitute serious pollution to the waters nearby.

We have another kind of farming which is very popular is the oyster farming. It produces 100 tons, it is a small amount. In the 1980s and 1990s, the oyster farms provided a very good indicator of heavy metal



poisoning, because oyster has very special mechanism of accumulating cadmium in its muscles. So we find very high level of cadmium over a period of time until we clean up our industrial effluent which used to be discharged in the same sea where these oyster were put in.

For years now, because of reform and opening up in mainland China, all the factories have been moved north so the pollution followed to the north. So we do not have the problem now, but upstream we see some of the problem now and then.

We are trying to upgrade our marine environment by prevention of trawling, but we also want to provide more spawning grounds for fish. As you know, fish are like tourists. They swim in schools coming around. When they find a good spot, they will actually stay. We are building artificial reefs, we are finding more diverse city in our fish combination. And more fish like to stay in our hotels here. We actually put structures. They serve two purposes. Because once you have a structure at the bottom of sea, you stop trawling as well. And we have a big fight with fisherman, because they said we are already short of fishing grounds. By putting more artificial reefs, you are affecting our trawling ground. So it has proven to be very effective. We are seeing more fishes.

So we have not been doing too much to help our marine environment except I am proud to say that at least we are doing something right. This is not the right picture, but it is a similar picture with wetland in the foreground and sea in the back. We have actually designated one of the largest sites in the Shenzhen Bay for conservation under the Ramsar Convention. This is the wetland that is well-known in the world and has rich diversity because it has been under very careful management. The birds flew from the South Pole and Australia to Hong Kong to take a rest and then fly all the way to Canada.

We have a program to sample these birds. We also have an activity every year to count and identify the number of species to make sure that they are happy over the flight to Canada. We have biologists and ecologists doing a program of measuring the fat that these birds can accumulate during their stay in Hong Kong so that they have enough food to fly all the way to north. At one time, this amount of fat was getting alarmingly low, because across the border in Shenzhen because all



industrial development there, there wetlands have completely depleted. So the birds have less number of hotels to live in and the food becoming very short.

In our discussions with them, again this is working with our neighbors, the design of putting artificial plants. On the other side, using plastic containers to hold them down, and it seems to work. The birds would settle with a man-made habitat for the time being. Over the years, as Shenzhen develops, they also realize the value of this wetland park. Instead of developing it further into an industry estate, they found that this is the most expensive residential site of the whole of Shenzhen because of the view, the good quality of air and tranquility in the area.

So conservation does not always have to be in conflict with economic gains. This is a very good example. We have more marine parks. I do not know if they were qualified to be called marine time spatial management. We designate marine parks and we are very serious about it. Within a marine park, you have active conservation, species identification and monitoring, and we do not allow any artificial activities to be carried out in those areas. We have been very successful in creating a biodiversity database with GIS so we know where everything is. One of the marine parks is in the east side for the Chinese white dolphins. They are protected under the scheme. Although the area we designated is very limited, but nonetheless, they thrive. We have been following 200 ~ 300 dolphins very closely. They are identified by photographs and because of their scars on their skin, we can actually tell one from another. So the database expands.

Finally, we all know we need vision, we need high-level policy to preserve and manage ocean, resources and habitats. For the Chinese, we always love good food. And we think that is the quality of life. I think the ocean officers know much than that. We need to have very well-thought policy and the policy overarching the entire China geographical layout. Also, it ought to be applicable to each individual local situation because it differs from place to place. And we need to make things work and not something in place that may become a joke because it is simply not implementable.

I have heard in this afternoon and morning very stimulating discussions and presentations. But what I would like to see is more focus



on priority list. Where do we begin, how do we start doing something positive instead of waiting for the situation to get worse, then to revert it will take even longer period of time.

One of the things we learned in the air pollution monitoring and management is setting up of matrix—a monitoring network. So maybe the same thing could be done with water quality. I already see one of the speakers showing monitoring in their own place, the mayor just speaking before me. Maybe we could have a standardized format of database designed by MEP and every local bureau would start collecting the data. We would like to see CMS continuous monitoring stations play their role. So you have a system with direct reading and people can exchange data easily just on the internet, at least we know where the baseline is. Where are we now at the moment, where do we want to go. Then we can set targets.

The Second thing that needs time to do is biodiversity database. For every locality of marine ecological interest in coastal areas, we ought to set up a biodiversity database. Biodiversity database is not easy to set up. There are lots of tools that can help you. But we do need time and expertise to go around, and over years of hard work to set up the database.

Once you have knowledge of what it is, then we can plan what to do next, whether we need compensation when there is an impact on such ecosystem. Compensation is always a hard thing to do if you do not have the baseline. In Hong Kong, every time we do any dredging, we lay pipes in sea bed, our fisherman would know how to ask compensation. We have a system of testing ecotoxicity to see whether their fry actually die under certain turbidity concentration. But there is always a huge argument.

Also, whether we can identify ecologically sensitive sites in our own location and start protecting them from now on without having full justification, because these things are irreversible. If you start ignoring it, or building on it or allowing industrial pollution to get to it, you may never be able to retrieve it.

I have seen how the wetland conservation development of Chongming Island in Shanghai. It was a transformation that took place in two years time. It not only provided protection that is needed, but also provided very good site for education, public education, education for students, so



that the next generation will have a sense for ecological protection and its importance that should go up with such ideas.

Back to the Mapple site we have in Hong Kong, if we did not do anything, it educates our students. Every school would be given an opportunity to go on site every other year so that students learn about why do we have to protect birds and why are ecosystems so sensitive.

So I think we might be able to identify a few items and get on with them, because our marine environment sometimes is too remote for people to appreciate that it has impacts on our life and impacts on how our development progress would take place.



Session 3 Closing

Closing Remarks

Fang Li

Assistant Secretary General of CCICED

CCICED 2011 Roundtable Meeting is going to end after one-day hard work. This meeting has heated discussions focusing on the theme of “promoting blue economy through ecosystem-based management—from mountains to seas”. The contents of the meeting today are very rich. We have the following three components in our meeting: Component 1, which is very important, is that we have shared the findings of the eco-environment issues and policy on sustained marine development in China and relevant policy recommendations to the Chinese Government made by CCICED. Component 2 is that our meeting listened the speeches of officials from the Chinese Government and environmental protection and marine administrative department of some provinces and cities, Chinese and international experts & scholars and partners of CCICED as well as comments and suggestions. Component 3 is that with discussions, we have further identified the challenges confronting us in achieving blue economy.

Participants have deepen understanding about the significance of strengthening ecosystem-based management in facilitating sustainable marine development and achieving national strategy of building China into a strong marine country. Although the time is quite short and most of us felt that we have not fully finished our constructive discussions, the meeting still obtains fruitful outcomes after heated discussions with many important recommendations.

Here, on behalf of CCICED I would express our thanks to your



participation and hard work!Based on the presentations and discussions, I would like to present the summary of some common understandings of the meeting:

First, in understanding, all participants agree that China requires ecosystem-based management, which is a must for achievement of sustainable marine development in China. China is a big marine country. Oceans and coastal zones are important space and precious wealth for sustainable development of China. However, rapid development of coastal regions and marine economy over the past years has brought huge pressure and impacts on marine environment. Our Task Force has analyzed the causes of this type of pressure and impacts. There are natural, social and management reasons. At present, the problems of continual degradation of eco environment and unbalanced, uncoordinated and non-sustained development become pre-eminent. The “12th Five-Year Plan” of China clearly requires that we should adhere to the policy of ecosystem-based management and planning the development of blue economy in a scientific way. Participants agree that ecosystem-based management is necessary; it is the distillation of both practice and understanding of the Chinese nation about the physical foundation and development orientation and the only way for China to achieve fast and sound development.

Second, many experts mentioned how we should turn the knowledge into action and put forward some comments and suggestions:

1) Enhancement of inter-department coordination. Inter-department coordination is the preconditions and foundation for achievement of the ecosystem-based management strategy. We are happy to see that apart from officials from environmental protection department and marine department, we also have officials from comprehensive administrative department from local government actively taking part in the meeting. During the development of the past years, marine management in China at present is divided administrative regime and lacks joint management mechanism for overall planning and comprehensive coordination. As a result, marine ecosystems are artificially divided with fragmented administration. It is quite difficult to solve marine eco-environment protection problems that involve different administrative regions and departments. The first issue under discussion is establishment the idea



and methods of overall planning covering both mountains and seas and development of the new pattern of comprehensive management based on ecosystems.

2) Turning knowledge into action. Participants agree that a comprehensive plan is an important measure for achieving ecosystem-based management. In the beginning of the presentation, the Task Force told us that ecosystem in fact has many functions such as regulation, support, supply and culture. In the past, we focused on more on its supply function, that is, how much fish can we catch, which is the economic aspect. Our comprehensive plan may pay attention to all functions of ecosystem. This kind of unified plan will be the basic insurance for achievement of ecosystem-based management. The experience of many cities also demonstrates the importance of such plan being in place.

3) Suggestion about serious consideration of the long-term mechanism. For the long-term mechanism, participants focus their discussions on the application of economic instruments, that is, the application of economic means including compensation that we have discussed a lot. In fact, the discussion on compensation mechanism has been conducted in China for many years. It has close relationship with environment property right system. How to identify the boundary of compensation may need further research. We are very happy to hear the presentations of not only the officials from coastal cities, but also the officials from western province with mountains. In the second part of long-term mechanism, participants suggestion that we should establish complete laws and regulations and strengthen supervision capacity, which are fundamental guarantee for achievement of sustainable development of oceans. We have mentioned and discussed such contents as the idea of ecosystem-based management, legal system for protection and development of marine environment, enhancement of the capacity in monitoring and management of marine ecology and environment, effective legal instruments, pollution prevention and control in particular in upstream provinces, shift from end-of-the-pipe treatment to source control, which will ensure sustainable development of marine resources. In the third part of long-term mechanism, participants also mentioned how to increase the investment in science and technology in order to develop



marine science and technology for conservation of marine ecosystems, which would be important support to sustainable ocean development. In addition, speakers also mentioned education and public participation as well as the database mentioned by Ms. Liao from Hong Kong University.

Third, participants put forward some suggestions on the work of CCICED. For example, some hoped that CCICED would carry out some pilot work to implement our policy recommendations. Demonstration activities will be conducted in suitable regions to identify and share the experience and lessons. Some representatives suggested to share information of CCICED. We will show you our website on the screen, you are welcome to lodge on our website. Our study reports and meeting information are released in the website in both Chinese and English. Some information of this meeting will be released in our website.

I know that my summary is neither complete nor professional. Many representatives put forward very good suggestions. I believe that our Chinese and International Chief Advisors will complement if I miss something in the summary.

Under the efforts of all participants, this roundtable meeting finishes each task with a complete success. First, I would like to thank all members of CCICED Task Forces. They show great passion and initiative in preparing this meeting and are willing to share their research findings. So here I would like express our thanks to all Chinese and international members of the Task Force. Second, I will thank the two CCICED Members, they come to our meeting and shared their experience in achieving sustainable marine development. Third, I will thank the representatives who made commentary speech, in particular the representatives from the four cities and those from western province with high mountains. From your presentations, I see the hope of achieving sustainable marine development in China. In particular, you come from comprehensive administrative department, environmental protection department and marine department. With your presentations, we see that our local governments are considering relevant issues and engaged in achieving blue economy through ecosystem-based management. Fourth, I express my thanks to the donors and partners of CCICED. They sit down in the back of the meeting room but did not speak due to time limit. But I



would say just because of the strong support of these partners, CCICED has developed into its 20th year in 2011. I think that today's meeting shows that your support has indeed helped and facilitated sustainable development of China. Fifth, my heartfelt thanks go to Qingdao Government and Qingdao Environmental Protection Bureau that provide strong support and help to the success of this meeting. Last but not the least, I express my thanks to all friends and staff who have contributed to the success of this meeting.

Based on the agenda of this meeting, we will have field study tour tomorrow. I believe that you can understand vividly the experience of Qingdao Government in ecosystem-based management. I hope you actively take part in the field trip.





Appendix

Policy Recommendation of CCICED 2011 Roundtable Meeting

China Council for International Cooperation on Environment and Development (CCICED) held Roundtable Meeting in Qingdao during April 27-28, 2011 in order to disseminate CCICED policy research findings of 2010 AGM on sustainable development of marine eco-environment of China and its policy recommendations to the Chinese Government, publicize new ideas of the Chinese Government on strengthening ecosystem-based management, and explore new strategy for sustainable development of blue economy.

Mr. Li Ganjie, MEP Vice Minister and CCICED Secretary General attended the meeting and gave a speech. Mr. Hau Sing Tse, CCICED Member and Senior Vice President of CIDA, Chen Lianzeng, Vice Director of State Oceanic Administration and Vice Mayor Wang Jianxiang of Qingdao were specially invited to the meeting and gave a speech. Mr. Xu Qinghua, CCICED Vice Secretary General and DG of MEP Department of International Cooperation chaired the meeting. Ms. Fang Li, Assistant Secretary General of CCICED and Vice DG of MEP Foreign Economic Cooperation Office summarized the meeting. A total of 120 people including 6 Council Members, 4 vice mayors of coastal cities, 18 leaders of local environmental protection departments, representatives of relevant departments of the State Council, research institutes and universities, representatives of relevant countries and Beijing office of international organizations as well as representatives from Chinese and international enterprises attended the meeting.

Centering on the theme “Promoting a Blue Economy Through Ecosystem-Based Management”, this meeting has the following two





topics: “Ecosystem Service and Marine Environment Protection” and “Promoting Blue Economy through Ecosystem-Based Management”. The meeting listened to the introduction about the policy recommendations of CCICED 2010 AGM, laws and regulations of China on ocean administration; marine environmental protection in China and national plan for prevention and control of marine pollution during the “12th Five-Year Plan” period; countermeasures for protection and adaptability of coastal ecosystems of China under multiple pressure; EU’s strategy, laws and regulations on the impacts of rivers on seas; international experience in management of oceans and ecosystems as well as development of blue economy in some coastal cities of China. With in-depth discussion and exchanges, the meeting has reached common understanding, further identified the challenges for developing blue economy, and understood the significance of ecosystem-based management in promoting sustainable development of blue economy and achieving national strategy of building China into a strong marine country.

The preparation of the meeting gets high attention of CCICED donors and partners and strong support of Qingdao City Government. Representatives of the meeting spoke highly of the organization and achievements of the meeting. CCICED 2011 AGM will listen to the report on this roundtable meeting.

The roundtable meeting is briefly summarized as the followings:

I. Development of blue economy is a must for economic development of China

The Chinese Government takes the ocean development strategy as one of the important components of the “12th Five-Year Plan” and requires vigorously developing blue economy and marine resources in a scientific way, and cultivating industries with marine advantages. The meeting believes that this is an important measure for achieving the development goal of the “12th Five-Year Plan”. With over 30-years reform and development, China has gained the success that attracts worldwide attention in its national economy and social development with its GDP ranking No.2 in the world. However, China has paid too high cost of its resources and the environment with increasing pressure on its land resources, energy and space, which becomes a bottleneck that constrains



sustainable development of China. Therefore, scientific, rational and orderly development and utilization of rich marine resources; raising the level of development and utilization of marine resources and promotion of development of blue economy are important conditions for ensuring comprehensive, balanced and sustainable development of Chinese economy.

II. Development of blue economy must make an overall plan for development and utilization of land and marine resources

The meeting pays high attention to marine eco-environment problems such as significant reduction of beach wetlands due to coastal land-source activities, loss of biodiversity, damage and serious waste of ocean biological resources, serious degradation of marine fishery ecosystems, expansion of the polluted marine waters in some bays and marine waters in vicinity of cities as well frequent marine disasters in China. To protect ocean ecological environment and facilitate development of blue economy, we must make overall consideration of land and oceans.

China has bright prospects in developing blue economy. But the basic prerequisite is the overall consideration of development of land and marine resources and taking it as a long-term strategic task for implementation. First, China should facilitate the policy arrangements combining marine and land economy and attach importance to the sustainability of blue economy and service functions of marine ecosystems. Second, China should strictly control land-based activities, appropriately develop and utilize marine resources and achieve sustainable development of blue economy. Third, China should vigorously develop marine science & technology conducive to the protection of ecosystems.

III. The exploration and practice of coastal regions of China on ecosystem-based management has important significance

As representatives of coastal cities and areas of China, Qingdao, Xiamen, Weihai, and Yantai have obtained remarkable achievements in development of blue economy and have rich experience in the exploration of ecosystem-based management and enhancement of protection of marine ecology.

First, making overall arrangement for marine and land resources





and pay equal attention to protection and development. Focusing on ecosystem-based management, they have facilitated synchronized development of marine industry, port industry and ocean-related industry as a systematic project and developed the ocean-land integrated pattern that makes overall plan for ocean-land industries, resource elements, construction of infrastructure and control of eco-environment, facilitates interaction between land and oceans with complementary and coordinated development.

Second, scientifically identifying function areas and optimizing regional development based on regeneration capacity of marine resources and environment carrying capacity. Taking marine function area zoning as the basis for guidance and decision making of marine development activities, we will scientifically identify marine functions in accordance with regenerating capacity of marine resources and carrying capacity of marine environment, to maximize the overall benefits of marine resources. Based on zoning of marine function areas, relevant coastal cities have further identified in a scientific way the marine eco-environment sensitive areas and various kinds of areas prohibited from developing marine resources. They have put more efforts in supervision on development and protection of major resources.

Third, adhering to the strategy on prioritizing protection of marine eco-environment with strict environment access to construction projects. Relevant coastal cities have carried out the responsibility system, firmly rejected the high consumption of resources and pollution or resource oriented projects, and strengthen environmental management of marine related projects in an all round way. They have strengthened the control of land-based pollution and conducted control of total discharge of pollutants. Meanwhile, they have improved the monitoring system and carried out regular monitoring. They have made more efforts in enhancing law enforcement and management of marine environment and resources and cracked down any illegal conducts.

IV. Common understanding and recommendations of the meeting

After careful discussions and exchanges, the meeting has reached the following common understanding and policy recommendations:





First, ecosystem-based management is an inevitable choice for sustainable development of blue economy of China.

China is a big marine country. Seas and coastal zones are important space and wealth for sustainable development of China. However, rapid economic development of coastal zones and blue economy of the past years has brought mounting pressure and impacts on marine environment with preeminent problem of imbalanced, uncoordinated and unsustainable development. The “12th Five-Year Plan” of China clearly requires that we should adhere to “ecosystem-based management and scientific planning of development of blue economy”, this is the distillation of the understanding and practice of national physical foundation and development direction. It is also the only way to the achievement of fast and sound development of blue economy in China.

Second, inter-department coordination and cooperation is the prerequisite and foundation for the implementation of ecosystem-based management strategy; comprehensive plan is an important measure for achievement of ecosystem-based management.

Marine management in China has been under separated management by different departments and sectors with overlapping functions and absence of government function. It lacks overall plan and the joint management mechanism with comprehensive coordination and artificially divides the entire marine ecosystem for separate administration. Therefore, it is difficult to address some marine ecology and environmental protection problems that go beyond one region or department. Achieving ecosystem-based management requires overall planning and the management idea with full consideration from high mountains to the seas; new pattern based on comprehensive management of ecosystems; development of government regime with equal consideration of land and seas as well as management system based on zoning of marine eco functions. First, we should establish an inter-department and trans-regional coordination mechanism at national level. Second, we should study and carry out national master plan for marine development as soon as possible and develop unified marine development policy and comprehensive marine development plan. Third, we should conduct zoning of marine waters of our country based on self-operational pattern of marine ecosystems and



the characteristics of different marine areas of our country and carry out different management policies such as marine nature reserves, marine resource development zones, marine fishery farming areas and marine tourist development zones, etc.

Third, the establishment of ecosystem-based long-term mechanism is the fundamental guarantee for sustainable marine development. Making more investment in science & technology is important support to sustainable marine development.

Land and ocean are an indivisible whole. Land and marine ecosystems jointly support land and marine economic activities. Land economic development in particular export-oriented economic development depends on the development of blue economy. The advantages of marine resources can play its role in full only in combination of land economy with marine economy. To achieve ecosystem-based management, we must facilitate the establishment of long-term guarantee mechanism: 1) explore and set up the eco-compensation mechanism between upstream and downstream and among different river basins as soon as possible; 2) establish and improve legal system on ecosystem-based management and strengthen the capacity building in supervision, set up an integrated, coordinated and highly-efficient system and mechanism with strong law enforcement; 3) strengthen input in science & technology and develop marine science & technology conducive to protection of ecosystems; 4) expand and develop a channel and mechanism where the public can take part in ecosystem-based management.

Fourth, local authorities urgently need the establishment of national marine emergency response system by the central government to address increasing major pollution accidents and crisis in seas

The expansion of the scale of coastal economy (port economy) and increasing marine transportation increases the risk of pollution in marine waters. Although the economic development level of coastal areas varies, local governments have established different emergency response management mechanisms and systems with relevant emergency response resources. However, their strength is scattered and difficult to address trans-region or trans-marine-waters large scale environmental pollution accidents, natural disasters and public crisis. To this end, we



urgently need an overall plan of the central government that integrates the resource advantages of each region; sets up an inter-department and trans-regional emergency response coordination mechanism equipped with relevant equipment and human resources to address potential major trans-regional crisis. Meanwhile, local governments should actively explore comprehensive coordination mechanism suitable to local conditions, integrates the efforts of departments such as environmental protection, marine time and marine fishery, set up unified marine environment monitoring network, law enforcement team and mechanism for joint response to accidents etc..

Fifth, strengthen international communications and cooperation and jointly safeguard marine eco environment.

We have only one ocean. Enhancing protection of ecological environment of seas depends upon concerted efforts of all countries in the world. China shares the ocean with 8 neighboring countries, we must carry out wide international cooperation. First, we should introduce new theories, technologies and thinking of foreign countries in particular of developed countries on protection of marine ecology and protect marine eco-environment of China. Second, we should actively work with neighboring countries and regions to jointly conduct scientific research on protection of marine ecology and environment, protect ocean eco environment and facilitate sustainable development of marine economy.



Meeting Program
CCICED Roundtable Meeting
April 27-28, 2011
Qingdao Shangri-la Hotel, Qingdao, China

Promoting a Blue Economy Through
 Ecosystem-Based Management

April 27, Wednesday	
Opening session	
Chaired by Mr. Xu Qinghua, Deputy Secretary General of CCICED DG, Department of International Cooperation, MEP	
Opening remarks	
1. Mr. Li Ganjie, CCICED Secretary General Vice Minister, Ministry of Environmental Protection	
2. Mr. Hau Sing Tse, CCICED Member Senior Vice President, Canadian International Development Agency	
3. Mr. Chen Lianzeng Deputy Administrator, State Oceanic Administration of China	
4. Mr. Wang Jianxiang, Vice Mayor of Qingdao Municipal Government	
Keynote speeches	
1. Prof. Shen Guofang CCICED Member and Chinese Chief Advisor	CCICED Policy Recommendations of the 2010 AGM to the GOC
2. Dr. Arthur Hanson CCICED Member and International Chief Advisor	Ecosystems and Green Development: Linking Land and Sea
Session 1 (10:30 – 12:30)	
<i>Protecting Ecosystem Services: Rivers and the Sea</i>	
Chaired by Ms. Fang Li, Assistant Secretary General of CCICED DDG, Foreign Economic Cooperation Office, MEP Prof. Su Jilan, Chinese Co-chair of CCICED TF on Ocean	



Session speakers (subject to revision)	
1. Mr. Zhao Hualin, DG, Department of Pollution Prevention and Control, MEP	<i>Ocean Environmental Protection and Coastal Pollution Control Plan in the Period of 12th Five Yyer Plan</i>
2. Prof. Su Jilan, Honorary Director of the Second Institute of Oceanography – SOA, and Academician of Chinese Academy of Science.	<i>Policy Recommendations of CCICED Task Force on Ocean</i>
3. Prof. Peter Harrison Stauffer-Dunning Chair and Director, School of Policy Studies, Queens University, Canada.	<i>International Trends in Marine and Coastal Ecosystem Management</i>
Debate and Discussion	Improving Land Based Sources of Marine Ecosystem Problems
Leading Comments	
1. Mr. Daniel J. Dudek CCICED Member Chief Economist, Environmental Defense Fund, USA	
2. Mr. Lin Guoyao Vice Mayor of Xiamen municipality government	
3. Mr. Young-Woo Park Regional Director and Representative for Asia and the Pacific, UNEP	
Session summary	
Session 2 (14:30 – 17:30)	
<i>Marine and Coastal Ecosystem Management</i>	
Chaired by Prof. Su Jilan, Chinese Co-chair of CCICED TF on Ocean Prof. Peter Harrison, International Co-chair of CCICED TF on Ocean	
1. Mr. Wang Bin DDG, Department of Environmental Protection on Ocean, State Oceanic Administration of China	Laws, Regulations of Management on Oceans and Coasts in China
2. Mr. Carl Gustaf Lundin Member of CCICED TF on Ocean Head, Global Marine Programme, IUCN	Strategies, Law and Regulation System in the EU: River Impacts on Oceans and Coasts



3. Mr. Song Chunkang DG of Qingdao Environmental Protection Bureau	Ocean Ecosystem Protection and Blue Economy Development in Qingdao
4. Prof. Tang Qisheng Core Expert of CCICED TF on Ocean Academician of Chinese Academy of Engineering	Management Countermeasures on Coastal Ecosystem and Adaptation
Debate and Discussion	Safeguarding China's Blue Economy
Leading Comments	
1. Ms. Xu Lihua Vice Mayor of Yantai municipality government	
2. Mr. Liu Zuli Vice Mayor of Weihai municipality government	
3. Ms. Sarah Liao Sau Tung CCICED Member Senior Advisor to the Vice-Chancellor of the University of Hong Kong on Environmental and Sustainability Matters	
Meeting Summary by Ms. Fang Li	
April 28, Thursday	
Field visit	



Participants List

CCICED Members

1. Li Ganjie
CCICED Secretary General, Vice Minister,
Ministry of Protection, China
2. ShenGuofang
CCICED Chief Advisor, Academician of CAE
3. Arthur Hanson
CCICED Chief Advisor,
4. Daniel J. Dudek
CCICED Member, Chief Economist,
Environmental Defense Fund,
USA
5. Sarah Liao Sau Tung
CCICED Member, Senior Advisor to the
Vice-Chancellor of the University of Hong
Kong on Environmental and Sustainability
Matters; Former Secretary to the Environment,
Transport and Works of the Hong Kong Special
Administrative Region Government

Special Invited speaker and Guests

6. Hau Sing Tse
CCICED Member, Senior Vice President,
Canadian International Development
Agency (CIDA)
7. Chen Lianzeng
Vice Minister of State Administration of
Ocean
8. Zhao Hualin
DG of Department of Environmental
Pollution Control, MEP
9. Xu Qinghua
Deputy of Secretary General of CCICED,
DG of Department of Environmental
Protection Cooperation
10. Wang Bin
DDG of Department of Ocean
Environmental Protection, State
Administration of Ocean
11. Wang Jianxiang
Vice Mayor of Tsingdao Municipal
Government



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| 12. Fang Li | Assistant Secretary General, CCICED, DDG of Foreign Economic Cooperation Office, MEP |
| 13. Su Jilan | Former President of , Acadmician of Chinese Academy of Engineering |
| 14. Peter Harrison | Dean of School of Public Policy, Queens University, Canada |
| 15. Lin Guoyao | Vice Mayor, Xiamen Municipal Government |
| 16. Young-Woo Park | Regional Director and Representative for Asia and the Pacific, UNEP |
| 17. Carl Gustaf Lundin Head | Global Marine Programme, IUCN |
| 18. Song Chunkang | DG of Qingdao Environmental Protection Bureau |
| 19. Tang Qisheng | Academician of Chinese Academy of Engineering |
| 20. Xu Lihua | Vice Mayor of Yantai municipality government |
| 21. Liu Zuli | Vice Mayor of Weihai municipality government |

Delegates

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|-------------------|-------------------------------------------------------------------------------------------|
| 22. Kang Binjiang | Director, Ministry of Commercial |
| 23. Liu Fuqiang | Director, State Administration of Ocean |
| 24. Huang Yu | Deputy Director, MEP |
| 25. Li Wei | Director, Environmental Development Center, MEP |
| 26. Lu Yan | Project Officer, Environmental Development Center, MEP |
| 27. Li Bo | Engineer, China-East Asian Environmental Cooperation Center, MEP |
| 28. Zhang Jianyu | Director of Environmental Defense Fund (China Program) |
| 29. Qin Hu | Program Manager of Environmental Defense Fund (China Program) |
| 30. Shi Ping | President, Yantai Institute of Coastal Zone Reasearch, Chinese Academy of Science |
| 31. Hong Huasheng | Professor of Xiamen University |
| 32. Fang Qinhua | Associate Professor of Xiamen University |
| 33. Liu Yan | Senior Researcher, Strategy Development Research Institute, State Administration of Ocean |
| 34. Yu Rencheng | Senior Researcher, Institute of Oceanology, Chinese Academy of Science |



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| 35.Zhou Mingjiang | Senior Researcher, Institute of Oceanology,
Chinese Academy of Science |
| 36.Liu Hui | Yellow Sea Fishery Research, Chinese
Academy of Fishery Sciences |
| 37.Ding Pingxing | Professor, East China Normal University |
| 38.Yu Zhigang | Professor of Ocean University of China |
| 39.LiYongqi | Professor of Ocean University of China |
| 40.Wang Houjie | Professor of Ocean University of China |
| 41.Wang Wei | Professor of Ocean University of China |
| 42.Wu Jun | Professor of Ocean University of China |
| 43.Jiang Yushan | Yantai Municipal Government |
| 44.Wang Xiaoyan | Yantai Municipal Government |
| 45.Lin Taihong | Yantai Municipal Government |
| 46.Yu Bo | Yantai Municipal Government |
| 47.Li Fenfa | Xiamen Municipal Government |
| 48.Xie Haisheng | Xiamen Environmental Protection Bureau |
| 49.Peng Jun | Xiamen Environmental Protection Bureau |
| 50.Xu Hui | Beijing Environmental Protection Bureau |
| 51.Bao Jingling | Tianjin Environmental Protection Bureau |
| 52.Zhao Ximei | Tianjin Environmental Protection Bureau |
| 53.Ju Ronghui | Qingdao Environmental Protection Bureau |
| 54.Ge Fuhong | Qingdao Environmental Protection Bureau |
| 55.Wu Yanqiu | Qingdao Environmental Protection Bureau |
| 56.Wang Dazhuang | Qingdao Environmental Protection Bureau |
| 57.He Xu | Qingdao Environmental Protection Bureau |
| 58.Ge Jingjing | Qingdao Environmental Protection Bureau |
| 59.Liu Weilong | Qingdao Environmental Protection Bureau |
| 60.Huang Yusong | DG of Qingdao Ocean and Fishery Bureau |
| 61.Zhang Lanqing | DG of Qinghai Environmental Protection
Bureau |
| 62.Xuan Shuilin | DG of Hebei Environmental Protection
Bureau |
| 63.Fan Guohua | DG of Liaoning Environmental Protection
Bureau |
| 64.Chen Xingui | DG of Henan Environmental Protection
Bureau |
| 65.Li Zhiguang | Director of Guangdong Environmental
Protection Bureau |



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| 66.Zhou Bihe | Director of Zhejiang Environmental Protection Bureau |
| 67.Zhang Bo | DG of Shandong Environmental Protection Bureau |
| 68.Zhuang Jiacheng | Director of Shandong Environmental Protection Bureau |
| 69.Sun Shanfang | Director, Hainan Land Resource and Environmental Bureau |
| 70.Wen Hongqiang | Deputy Director, Fujian Environmental Protection Bureau |
| 71.MA Jian | UNIDO Programme Coordinator |
| 72.Hau Sing Tse | Canadian International Development Agency Senior Vice President |
| 73.Thora Broughton | Canadian International Development Agency Program Manager |
| 74.Louise Vallieres | Canadian International Development Agency Senior Environment Specialist |
| 75.Francois Lafreniere | Embassy of Canada Counsellor, Head of Development |
| 76.Betty Ann Chung | Embassy of Canada First Secretary |
| 77.Nicolas St-Pierr | Embassy of Canada Second Secretary (Political) |
| 78.Wang Bei | Embassy of Canada Project Officer |
| 79.Yong-Woo Park | UNEP Regional Director |
| 80.Zhang Wenjuan | UNEP Project Officer |
| 81.Gunnvor Berge | Royal Norwegian Embassy in China Development Counsellor |
| 82.Kirsten Jacobsen | Royal Norwegian Embassy in China Environment Counsellor |
| 83.Stefan Bundscherer | GIZ Programme Director |
| 84.Ursula Becker | GIZ Programme Manager |
| 85.Elize de Kock | Embassy of the Netherlands Counsellor Environment |
| 86.Xueju Huang | EU delegation |
| 87.Daniel J. Dudek | Environmental Defense Funds Vice President |
| 88.Sarah Liao | University of Hong Kong Advisor to the Vice Chancellor |



89.Songlin Wang

WWF Beijing Office Senior Marine
Programme Officer

90.Yujing Zhou

WWF Beijing Office Marine
Programme Coordinator

91.Art Hanson

CCICED Secretariat Chief Advisor

92.Peter Harrison

Queen's University Director

93.Carl Gustaf Lundin

International Union for Conservation
of Nature Director

94.Per W. Schive

Norwegian Ministry of the
Environment Deputy Director
General

95.Duncan Knowler

Simon Fraser University
Associate Dean

96.Chris Dagg

CCICED SISO Project Director

97.Yichun Dai

CCICED SISO Project Officer

98.Sam Baird

Ocean Task Force of CCICED
International Coordinator



