

**Science for Sustainable Development Working Group of the
U.S.-China Forum on Environment and Development
April 9, 1999
Washington, D.C.**

Neal Lane, Assistant to the President for Science and Technology and co-chair for the Science for Sustainable Development Working Group, opened the meeting noting that this year marked the 20th anniversary of U.S.-Chinese collaboration in science and technology. He expanded on the important role played by science and technology in U.S.-Chinese relations, and especially for this Forum. Because science and technology has the twin goals of promoting environmental production while improving economic growth, he said, they are the root of all future progress.

Dr. Lane then proceeded to outline the range of discussions to be held that afternoon. The working group would first hear a report on progress made since the last Forum meeting in Beijing in March 1997. Topics included areas of interest to both countries - natural disasters, agriculture, water, coastal management, climate science and environmental monitoring. The working group would then move to address new issues, including ideas on biocomplexity, sustainable development, and land use.

Dr. Lane concluded his opening remarks by stating that his goal for the meeting was to develop further ways in which the U.S. and China could cooperate on the new issues presented before the working group. He was eager to hear the ideas which his Chinese colleagues were ready to present.

Madam Zhu Lilan, Minister for Science and Technology and co-chair of the Working Group with Dr. Lane, next proceeded to make her opening remarks. She stressed the importance of following the United Nation's Agenda 21, which seeks to build coordination between a nation's economic and environmental activities. The role of science and technology, she said, is important in "eliminating contradictions" between these two activities. Science and technology will be important in finding solutions to the questions of population control, eliminating poverty, developing new energy sources, and maintaining sustainable development.

The question of how to raise the standard of living while having an eye to the environment, is now a big issue for Chinese society, she said. The Chinese government is looking to use international cooperation to solve some of the problems they face. Today the U.S. and China will look at the problems with water, land use, and the mitigation and remediation of natural disasters.

Madam Zhu noted that at the working lunch with Vice President Gore and Premier Zhu Rongji, the topic of improving development programs through market mechanisms was discussed. She believed however, that in order to be truly effective, the power of the markets had to be combined with the promise of science and technology. This way the

U.S and China could have sustainable development on one hand, and cooperation in science and technology on the other.

Natural Disasters

Dr. D. James Baker, Under Secretary of Commerce and Administrator of the National Oceanic and Atmospheric Administration (NOAA) in the Department of Commerce, spoke first in updating the Working Group on progress made since the last meeting. One of the Forum's big successes in the past year was the Natural Disaster Mitigation and Reduction Workshop held in November 1997. Dr. Baker co-chaired the workshop with Chinese Vice Minister of State for Science Deng Nan. Dr. Baker reported that in depth discussions were held at the workshop at the technical level, with many experts in the field in attendance. This workshop, he said, was a good example of the strength of the Environment and Development Forum. Currently, the Joint Report of the Natural Disaster Workshop is available, and the proceedings will be available shortly.

Kay Goss, Associate Director of the Federal Emergency Management Administration (FEMA), next described the increasing dialogues which have been taking place between the U.S. and China, in part as a result of the Forum's Natural Disaster workshop. She noted that since March 1997, there has been a growth in exchanges on emergency management between FEMA and the Chinese Ministry of Civil Affairs, the Chinese Academy of Sciences, Chinese firefighters, Chinese river basin managers, and the Chinese Peoples' Liberation Army. In total, FEMA has met with over 20 Chinese delegations, and the fields covered include flood planning, disaster relief, fire fighting, and earthquake mitigation.

Putting the work of FEMA into a larger context, Ms. Goss noted how disaster relief is vital to maintaining a nation's infrastructure, building sustainable development practices, strengthening the government, and social well being. The Memorandum of Understanding, which FEMA is preparing to sign with the Chinese, will be able to help both governments in all these capacities.

Ms. Goss also noted FEMA's work with the Vice President in planning to solve the Year 2000 (Y2K) computer problem. FEMA is preparing contingency plans for the Y2K problem, and will be prepared to respond in case of emergencies.

Finally, Ms. Goss introduced the issue of the Global Disaster Information Network (GDIN), which will hold its second meeting from May 11-14, 1999, in Mexico City. GDIN was established in an effort to integrate all sources of disaster management information. The theme of the upcoming meeting will be to work on preparedness into the new millenium.

In his response to the presentations by Dr. Baker and Ms. Goss, **Wu Jisong**, Director General of the Department of Water Resources and Hydrology in the Ministry of Water Resources, focused on four points: the current status of preparedness, government efforts

to mitigate natural disasters, successes of the U.S.-China cooperation in natural disasters, and possibilities for future cooperation.

Mr. Wu noted first that the number and frequency of natural disasters in China is very high. To quantify this in economic terms, Mr. Wu asserted that 3-6% of China's GNP is annually lost due to natural disasters. In 1997 the drought, intense storms, and coastal flooding caused the most damage, while in 1998 earthquakes and flooding were the major cause of damage. The economic loss from the 1998 flooding alone is estimated by the Chinese to stand at almost \$30 billion.

In an attempt to mitigate these damages and prevent future loss, Mr. Wu noted that the government has approached the problem on three fronts. First, the Chinese government has enacted six laws, which will bind future economic development planning with plans for mitigating natural disasters. Second, the Chinese government has advanced many new engineering projects, which will work to prevent and reduce the effects on natural disasters on the ground. Finally, the Chinese government took several steps to fight natural disasters on a more technical level. They have engaged in capacity building and have established three disaster-monitoring systems. One is an earthquake forecasting-center, another is a marine-disaster forecasting-center, and the third is medium-term climate forecasting-center.

While reviewing the current status of U.S.-Chinese cooperation, Mr. Wu noted the success of the Natural Disaster Workshop, noted earlier by Dr. Baker of NOAA, and mentioned the upcoming seismic disaster cooperative projects undertaken jointly by the National Science Foundation (NSF) and Chinese Seismic Bureau (CSB).

Finally, Mr. Wu turned to the prospect of future cooperation between the U.S. and China. Mr. Wu stated that the U.S. and China should work for more exchanges of data and information; that the two countries should cooperate on developing observational equipment and technology, and forecasting future natural disasters; and the two sides should further cooperate on developing emergency response planning. Lastly, he said, the two countries should work to exchange their respective technologies and experience. Mr. Wu placed special emphasis in learning from the experience of the U.S. government with the New Deal program during the Roosevelt Administration. He posed four questions regarding this program:

- What influence did the improvement of the water sector have on the development of the national economy?
- How did the New Deal program aid the development of water conservancy and hydropower? What types of projects were undertaken (e.g. the construction and improvement of reservoirs, the diverting of water projects, hydropower and irrigation projects, etc.)?
- What policies were adopted to assist the development of the water sector by the government?
- Who financed the New Deal projects (the Federal government, local government, private companies, etc.), and were certain funds directed only to

certain targets (e.g. were Federal funds used mainly on big and medium-sized projects)? Also, was there any insurance coverage on the projects?

In response to the Chinese presentation, Dr. Baker stated that he was pleased with the U.S.-China cooperation on disasters. He appreciated the opportunity to learn from the Chinese experiences, but more importantly, felt that this was an opportunity for the both U.S. and China to learn not only about natural disasters, but also how to study them in the future.

In response to a question from the U.S. delegation, Director Ni stated that although China already has a disaster management system similar to GDIN, it will consider cooperating with the other GDIN member nations if a patch or cross over between the two systems is possible.

Climate Science

The issue of climate variability, impacts and scientific understanding was next on the agenda and again introduced by Dr. D. James Baker of NOAA. Dr. Baker focused his comments on the socio-economic utility of improved climate forecasting capabilities. The ability to accurately forecast seasonal to interannual climate variability for such events as El Nino promises significant returns and savings for societies and economies. However, the ability to deliver specific forecasts useful to specific users in agricultural, water resource management and other industries requires further advances in understanding of the physical forces underpinning climate variability. Accurate, timely forecasts promise to improve the efficient allocation of resources and produce lowered stable prices of agricultural, energy, and other natural resources. As two key countries, the U.S. and China have great potential to make contributions to the understanding and predictability of climate variation. The relative expertise, resources, strengths and geographic position of the U.S. and China indicate cooperation should be strengthened in climate forecasting research, applications, observations and assessments. Stronger international cooperation promises efficiencies in conducting certain research and development projects in this area, especially as we look to begin a new century.

Dr. Baker announced the upcoming U.S.-China Climate Workshop and Symposium on seasonal to interannual climate variability that will be held in Beijing in September 21-24, 1999. NOAA and the Chinese Meteorological Administration and State Oceanic Administration, will co-host these events. Delegates from other Asian regional nations will be invited to attend to increase the utility and relevancy of the meetings to improved research and science initiatives. Items already on the draft agenda include: national climate program overviews of the U.S. and China, climate theory and processes, modeling and prediction, observations and data-set generation and assimilation, theoretical studies of El Nino and extreme events (monsoons, hurricanes, and other events), and prediction modeling and real time forecasting.

Concluding his remarks, Dr. Baker noted the good relationship NOAA shares with key science agencies in China, including the Chinese Oceanic Administration, the Chinese

Meteorological Administration, the Chinese Academy of Sciences and the Ministry of Science and Technology. These relationships have been built on the 20-year history of the US-China Science and Technology Agreement and through associated cooperative projects, such as TOGA, South China Sea Monsoon Experiments and others. It was his hope that the forthcoming U.S.-China Climate Workshop and Symposium will contribute to the science agenda and the sustainable development agenda for the next 20-year period.

Ding Yihui, Director General of the National Climate Center, China Meteorological Administration, responded to Dr. Baker's presentation. He stated that much of the China's research on climate variability has focused on studying the 1998 floods and studying short-term climate protection.

According to Ding Yihui and the research carried out by his office, the main factors behind the 1998 Yantze River floods were ENSO-El Nino, above normal snow fall on the Tibet Plateau, a weak monsoon season, and other factors. Understanding these factors has help China develop an accurate climate prediction and weather forecasting model, based on predicting where the rain belt would move.

Ding Yihui also noted China's recent progress in developing what he called the NCC Model System. The NCC Model System is a short-term climate prediction system, which combined several oceanic, atmospheric and regional models. Since the last meeting of the Forum, forecasting maps based on this system were distributed throughout China, and actual events were found to coincide with the models.

Ding next listed some of China's most recent and successful meteorological experiments. These include: South China SMEX, which studied monsoons; HUBEX, which studied river basins; TIPEX, which studied Tibet; and HUMEX, which also studied monsoons. Many of these experiments were successful, Ding stated, due to the cooperation between the U.S. and China with their respective doppler radar technologies.

Ding Yihui lastly raised some areas for potential future cooperation. He advocated jointly studying the causes and mechanisms behind meteorological events such as typhoons and monsoons, and arranging for an exchange of relevant data from both countries.

Integrated Coastal Management

Once again, Dr. Baker of NOAA began the discussion. Dr. Baker noted that at the previous U.S. China Environment and Development Forum (Beijing, 1997), coastal management was an important topic on the sustainable development agenda and one for which increased cooperation was called. In the U.S. the coastal regions contain over 50% of the population and produce approximately 33% of GDP. Coastal regions in China are similarly vital with 60% of GDP derived from coastal regions and 40% of the population inhabiting the area. Coastal areas of both countries continue to develop at a significantly

higher rate than interior areas. The coastlines of both countries are among the longest in the world and share many common problems.

Since the last Forum meeting, a joint integrated coastal management panel was established in September 1998. This panel is a tangible result of the Forum's ability to concentrate attention and results in shared national priorities.

Three partner reserve and marine sanctuaries were established in 1997 and 1998 between China and U.S. to promote improved management of marine protected areas, specifically addressing local management challenges for coral reefs (Florida-Hainan Province), mangroves (Florida-Guangxi) and wetland habitats (Maryland/Virginia-Tianjin). In June 1999, local Chinese marine-reserve managers will visit these sister sanctuaries in the United States to learn U.S. management approaches and begin drafting Chinese management plans for application in China's context. NOAA provided management training at an Integrated Coastal Management-Marine Protected Areas (ICM-MPA) Management Workshop, March 22-26, 1999, in Hainan Province to 35 Chinese coastal resource managers. Training topics included: introduction and application of ICM principles in coastal regions, promotion of ecotourism for MPA's, and education and outreach in MPA management.

The Second Meeting of the ICM Joint Coordination Panel (JCP) will be held in July 1999 to define the second phase of the US-China ICM work plan covering 1999 to 2001 period.

Ni Yuefeng, Director General of the Department of Science and Technology at the State Oceanic Administration, responded to Dr. Baker's comments by noting China's comprehensive management of its coasts. China has passed legislation regarding the use of territorial seas, continental shelves and exclusive economic zones, laying submersed cables, conducting oceanographic studies, protecting the marine environment, traffic safety, and the exploitation of mineral and oil resources. According to Director Ni, between 1989 and 1995, 3663 marine zones were divided and classified for their protection.

Director Ni also noted that comprehensive management experiments were also conducted on these marine zones and tideland resources.

To further improve its coastal management, Director Ni stated that China will continue to reform and strengthen its legal system and enforcement mechanisms. As an example, in 1998 custom authorities were empowered to enforce these coastal management regulations. Director Ni predicted that the Chinese government will soon empower even more agencies to enforce its coastal management regulations.

Director Ni completed his presentation with suggestions for future U.S.-Chinese cooperation on coastal management. He advocated the establishment of a demonstration area to set up models and train the next generation of coastal managers. He also

advocated the U.S. and China expand their cooperative research on the sustainable use of coastal resources.

Sustainable Development

The U.S. delegation opened the discussion on Sustainable Development Progress with a presentation by **Dr. Rosina Bierbaum**, Associate Director for Environment in the White House Office of Science and Technology Policy. Her presentation was focused on three central themes: Integrated Environmental Monitoring and Research; Integrated Science for Ecosystem Challenges (ISEC); and the Ecosystem Report Card.

With regard to Integrated Environmental Monitoring and Research, Dr. Bierbaum discussed that the latest thrust in U.S. policy is to link the thousands of National and Regional environmental survey centers. The project is based on combining highly detailed information from index sites, medium-level information from the national and regional surveys, and mass data from inventories and remote-sensing programs. This will give the U.S. the ability to monitor progress in sustainable development on a national scale.

Moving the discussion to the Integrated Science for Ecosystem Challenges (ISEC) project, Dr. Bierbaum informed the Working Group of the initial priorities of ISEC. They include (1) Biodiversity and Species Decline, (2) Harmful Algal Blooms and Hypoxia Eutrophication, (3) Habitat Conservation and Ecosystem Productivity, and (4) Information Management and Integrated Assessments.

Finally, Dr. Bierbaum reported on the development of the Ecosystem Report Card. Dr. Bierbaum stressed that it is not enough to merely monitor and research the status of ecosystems. It is just as important to assess any progress or further degradation in an ecosystem's health. The goal is to develop standardized indicators, similar to economic indicators, which could be openly used to measure ecosystem health. Dr. Bierbaum noted that the Vice President is firmly behind the Ecosystem Report Card concept, and has challenged OSTP to work with citizen groups to develop the Report Card by 2001. The first draft of the Report Card should be completed by May 1999.

Wang Weizhong, Director of the China Agenda 21 Administration Center, presented China's progress on sustainable development. Mr. Wang stated that his nation's progress on sustainable development has been focused around the United Nations Agenda 21. From China's perspective, the crux of Agenda 21 is that sustainable development is not limited to environmental concerns only. The economy too is an integral part of any sustainable development plan.

Mr. Wang reported that the co-dependence of environmental and economic concerns is appropriately reflected in the current 5-year plan, recently passed by the Chinese government. The next step, he said, is to strengthen the laws, which will enforce this 5-year plan. China has passed six new environmental laws, for a total of 395. China's next hurdle will be enforcement of these laws.

With the acceptance of the 5-year plan, the Chinese government is encouraging regional and local governments to adopt their own sustainable development plans. These plans should reflect the uniqueness of each area's income base, climate and risk to natural disasters.

Mr. Wang also expanded upon the importance of science and technology for the future. He discussed how the Ministry of Science and Technology (MOST) has prepared a plan to use science for social development. Currently 29 pilot programs in sustainable development have been sponsored by MOST. These programs seek to make more comprehensive use of the natural resources available.

Finally, Mr. Wang expressed his interest in promoting international cooperation. He outlined these nine areas where immediate action could be taken:

- 1) Capacity Building
- 2) Sustainable Agriculture
- 3) Cleaner Industry
- 4) Clean Energy and Transportation
- 5) Sustainable Utilization of Natural Resources
- 6) Pollution Control
- 7) Combating Poverty
- 8) Population Health and Human Settlement
- 9) Climate Change and Biodiversity

Mr. Wang closed by reviewing China's perspective on sustainable development and Agenda 21. He felt that the policies geared toward sustainable development required strengthening. The policies should be based regionally, and work towards capacity building. Reflecting what Dr. Bierbaum had said earlier, a standardized set of indicators also needs to be established, in order to make available a continuous standard of measurement. Second, China needs to promote Agenda 21 at the local levels. As he said earlier, sustainable development policies need to be found at the national, regional, and local levels. Third, sustainable development would be helped if both the U.S. and China worked together to promote the transfer of environmentally sound technologies. Finally, China will work to establish a national sustainable development network system. With this project, they hope to work closely with FEMA.

Responding to Mr. Wang's presentation, Dr. Baker of NOAA stated that he was very impressed with the Agenda 21 plan. He noted that in the U.S., sustainable development is approached from a broad, national perspective. As an example, he cited the President's Council on Sustainable Development. He also noted that in the U.S., stewardship, rather than exploitation of our natural resources, is used to guide our actions.

Ms. Goss of FEMA also responded to Mr. Wang's presentation. She expressed her enthusiasm for the community based projects proposed by Mr. Wang. Local projects, she said, help to institutionalize sustainable development policies. As an example, she cited FEMA's practice of having disaster management based locally, where they can bring

together public and private resources. Ms. Goss raised the possibility of having a "sister-cities" exchange with the Chinese to further learn from each other's best practices.

Ms. Goss also expressed interest in Mr. Wang's statement on technology transfer. She proposed that maybe the U.S. and Chinese could work together to look at data compiled by each government's scientists, and transfer it to the public sector.

Mr. Wang responded positively to Ms. Goss's "sister cities" idea, and to her ideas on technology transfer. Mr. Wang noted that a technology transfer agreement already exist between China, Japan and UNESCO, which is similar to the one between the U.S., India and Singapore.

Mr. Wang also noted that one problem China was facing with its sustainable development program was the large number of indicators, over 140, which were used to measure progress. This made it difficult for local officials to assess the success of their community-based projects.

On all these projects, Mr. Wang expressed an interest in working more with the United States.

Liu Yanhua, Director General in the Department of Rural and Social Development, in the Ministry of Science and Technology, was also enthused with the "sister city" proposal. He noted that mayors from 20 different Chinese cities participating in the Agenda 21 program will be the U.S. shortly. This visit could be the first step in developing the sister city idea into an actual program.

Biocomplexity

Dr. Rita Colwell, Director of the National Science Foundation (NSF), gave the final presentation regarding progress toward sustainable development. The focus of her presentation was biocomplexity, which she defined as looking at scientific phenomena at many scales, and realizing the interconnectedness of all things. She quoted John Muir, the American naturalist, who said, "When we try to pick out anything by itself, we find it hitched to everything else in the universe."

The biocomplexity paradigm requires that scientists from different countries, cultures, and disciplines work together, as global events such as pollution and infectious diseases do not respect national boundaries or human divisions.

As an example of the biocomplexity model, Dr. Colwell cited the recent work to understand the toxicity cycle of the Chesapeake Bay. Another example of biocomplexity theory in use is NSF's Integrated Science for Ecosystem Challenges program. In this program, the value of biodiversity is related in terms of economic gains, and is estimated at hundreds of billions of dollars to the U.S. economy each year.

Water Resource Management

Dr. Dennis Hjeresen, Program Manager at Los Alamos National Laboratory, began the discussion on the U.S.-China Water Resources Management Workshop, which was to be held in April 1999, in Tuscon, Arizona. Forty-six Chinese and over one hundred U.S. water management experts were expected to be in attendance.

Dr. Hjeresen began by outlining the objectives of the Workshop. He said the Workshop was designed to: 1) Identify and prioritize key areas for cooperation and follow-up activity; 2) Enhance commercial opportunities; 3) Provide the basis for a bilateral agreement; and 4) Publish its proceedings.

Dr. Hjeresen also outlined possible next steps for the Workshop. These include delivering its recommendations to the Vice President, the Premier, the Forum, and through them to participating Agencies and Ministries, and/or Congress; developing resources to create a sustainable program; and/or establishing a joint Project Office to plan, coordinate, and execute program activities.

In concluding his remarks, Dr. Hjeresen presented a plan for the Forum's consideration, which would build upon the Water Workshop. He outlined a plan for the U.S.-China Water Resources Management Program in which a coordinating body would work to develop bilateral, water resources agreements between the two nations. It could also maintain a database of all existing cooperative activities, and conduct follow-up workshops and conferences in order to maintain a dialogue.

Qin Dahe, Director General in the Department of Resources and Environment, within the Chinese Academy of Sciences, presented China's perspective on the Water Workshop. Noting the different problems faced by different regions in China, i.e. water conservation in the north, water quality control in the south, and while acknowledging the low efficiency of water usage over-all in China, Mr. Dahe stated that China's priority in water management was the sustainable use of new resources. New resources to be exploited include glaciers, underground desert water, and water gained from wetlands. Watershed management in the Yellow and Yangtze River basins is also important.

In order to address these concerns, the Chinese will focus their research in the areas of water conserving technology in farming, recycling water, technology for developing new water resources, and watershed management.

Mr. Dahe closed his presentation by proposing several areas for collaboration between the U.S. and China. The list of possibilities included:

- 1) Technology to increase water-use efficiency
- 2) Technology to prevent erosion, salinization, and desertification
- 3) Managing watersheds
- 4) Sustainable use of other water sources
- 5) Package technology for high-value crops for sustainable agriculture
- 6) Developing databases and support systems

7) Wetlands management.

Agriculture

Deputy Under Secretary in the Department of Agriculture, **James Schroeder**, opened the discussion on Agriculture. He stated that the U.S. has three objectives in its agricultural cooperation with China. First, the U.S. seeks to increase technological cooperation. Second, the U.S. seeks to have specific technologies exchanged. Third, the U.S. seeks a resolution to the trade dispute between the two countries.

Mr. Schroeder noted the work of the U.S. Trade Representative and MOFTEC, in negotiating an agreement on cooperation. The agreement included sections technology cooperation and scientific exchanges, cooperation in developing agricultural sectors, and resolving future trade disputes. This agreement will become a very important road map for the future, but it has not yet been signed.

Unfortunately, the agreement has been caught up in politics. Mr. Schroeder warned that if the agreement is not signed, China would encounter problems with the private sector. (NOTE: The Agricultural Trade Agreement was signed the next day, April 10.)

Miley Gonzalez, Under Secretary in the Department of Agriculture, further elaborated on the U.S. position on agriculture. He reiterated Mr. Schroeder's hopes for a quick signing of the U.S.-Chinese trade agreement, as it would encourage cooperation between the two countries.

He stated that it was important to the U.S. for research in agriculture to increase. Feeding the world's population will become one of the greatest threats to global stability in the next century. For this reason, sharing information is of mutual benefit.

As a positive example of sharing information, Mr. Gonzalez mentioned the Joint Research and Education Program carried out in the field of forestry. This program, he noted, has helped resolve some of the problems the U.S. and China have faced. It could be used as a model for future cooperation.

Mr. Gonzalez closed by noting that this century's global economy has had an industrial base. It has relied heavily on fossil fuels. In order to have sustainable development, the economy of the 21st century will need to be bio-based.

The Chinese report on agriculture was given by **Wang Xiwu**, Director General of Science and Technology in the Ministry of Agriculture. Mr. Wang stated that China continues to feed 22% of the world's population with only 7% of its arable land. This provides a powerful incentive for the Chinese to follow sustainable development practices.

According to Mr. Wang, currently China is facing five problems. First, their huge population is putting enormous pressure on the quality and quantity of food in China.

Second, there are enormous shortages in natural resources. This includes both land and water. Third, China is in a situation of runaway pollution. Fertilizer run-over into the rivers is particularly egregious. Fourth, China has a poor emergency response infrastructure. The Chinese will have to develop more and better tactics to stave off natural disasters. Fifth and finally, China must alleviate the level of poverty faced by most citizens.

To counter these problems, Mr. Wang laid out a course of action. First, China must protect its basic farmland. Over 70% of its farmland is dry, and in need of technological solutions. China must also work more with the international community, and learn from its neighbors. Third, the Chinese must implement a restoration plan, whereby they will improve the low-yield and degraded grasslands. Two thirds of China today falls into this category. China must at the same time harness new resources to ease its water shortage. Finally, China must follow the ecological agricultural practices as outlined in the Agenda 21.

Mr. Wang did offer up two specific areas for cooperation between the U.S. and China. First, Mr. Wang suggested that U.S. and Chinese scientists work together to examine and compare various models of agricultural development. Second, the Chinese are looking to develop a renewable energy source for rural areas, and U.S. cooperation would again benefit both sides.

Land Use

The final item on the Working Group's agenda was the issue of land use. Land Use is an issue which the Vice President had asked the Working Group to begin to address, and this was the first time the issue had been discussed. **Dr. Neal Lane** made a presentation on behalf of the U.S. to explore interest in a joint dialogue on land use management. Dr. Lane began by stressing the importance of proper land use management, and noting that both the U.S. and China suffer from land degradation – including deforestation, wetlands disturbance, and rangeland degradation. He explained that U.S. experts who came together to discuss this idea tried to answer three basic questions: 1) What are the most pressing land use challenges; 2) Where is there greatest benefit from bilateral cooperation; and 3) Where is the expertise and resources to address this issue? Dr. Lane presented four categories or possible discussion topics for a land use dialogue: land degradation, land use choices and their impacts, urban land use planning and livability issues, and tools available for land and other resource management. Dr. Baker introduced Margaret Davidson and Tony LaVoi, of NOAA's National Ocean Service, who made an abbreviated presentation which highlighted the benefits of using Geographic Information System (GIS) technology to assess land use and to aid land use management decisions.

Dr. Lane proposed that if both sides agreed that land use management was worthy of further discussion, a group could be constituted to consider a bilateral dialogue on the issue. Madame Zhu agreed.

The Chinese also noted that in the past, their land use policies had led to soil degradation, which in turn led to food shortages. Land use was inefficient, and much of the territory was not used at all. Development of land resources was also constrained by environmental factors.

Since the 1990s, however, China has begun to develop strict land use policies, which have encouraged good farming and forestry practices. Unfortunately, to date this process has been long, expensive, and mostly restricted to urban areas. The Chinese have been successful though in increasing the use of their urban land. They would also like to increase the amount of land under cultivation, and use urban land even more efficiently by increasing construction density.

The Chinese have also increased the amount of their cultivated land through better planning, and are proud that they have enhanced their intensive land use methods to maximize the exploitation of the resources available to them. They plan to further enhance reform of land use measures, including looking at realistic resource pricing.

In outlining areas where Chinese sustainable development practices could be aided through international cooperation, the Chinese gave five examples. First, the Chinese want to make sustainable use of their construction lands. Second, the Chinese want to further study sustainable use of agricultural lands. Third, the Chinese want to develop a strategy for sustainable use of currently unused lands. Fourth, the Chinese want to study market mechanisms, which help maximize land use. Finally, the Chinese wish to further investigate re-assessing land use policies with the help of new technologies, such as GIS and internet technologies.

Conclusion

Madam Zhu Lilan concluded the Chinese presentations at the Working Group by recognizing the success of the Forum, while acknowledging the effects of time limitations on the discussions.

The meeting ended with both Dr. Lane and Madam Zhu encouraging the delegations to continue to work together on these important issues, and toward the next affirmative step the Forum can take, rather than waiting for the next meeting of the Forum. If the U.S.-China Environment and Development Forum is to be a success in the future, emphasis needs to be placed on the actions which rise from these gatherings and the success of collaborative activities.