Water Management: Technology, Economics and the Environment
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CLOSING COMMENTS

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This has been an excellent seminar with many fine presentations and much productive interaction between speakers and participants. As we close, it is appropriate to ask: "What have we learned?" There are many lessons that have flowed from our sessions and discussion and they can be summarized both in terms of the major themes and conclusions from each of the sessions and also a set of "Grand Conclusions" which emerge from the seminar has a whole.

Session 1: Technology and Scientific Developments for Improving Water Management.

1. The water problems of the world are serious and will likely become more serious.

2. There are many technical and scientific possibilities for addressing and managing the intensifying water scarcity.

a. need to embed science and technology in integrated watershed management plans.
b. need to focus on managing "green" water.
c. changes in diets, new technologies -particularly 'soft-path' technologies and understanding environmental uses of water can all help.

3. There are significant levels of uncertainty surrounding both the future water situation and the means of addressing it. What, for example, is likely to be the future relationship between water and energy?

4. Effective water management institutions will be crucially important.

Session 2: Water Resources, Economics and the Environment. Harmonizing Environmental Services and the Productive Uses.

1. Even in developed countries efforts to account for environmental values are messy and sequential. They are not routine.

2. The stakes are enormous in balancing the trade-offs between water for the environment and water for productive uses, even in developed countries. The stakes are so large that the parties at interest don't really want to know all of the economic and ecological facts. These parties are so risk averse that they would prefer to strike the balance in an atmosphere of uncertainty rather than one in which good information was widely available.

a. The stakes in the developing world are almost unimaginably higher. It is one thing to talk about the trade off between toads and hydro-electric power. It is something else altogether to deal with trade-offs that involve starvation on the one-hand and environmental destabilization on the other. The cases that were discussed were not cases that entail a choice between the imminent danger of widespread starvation on one side and significant environmental destabilization on the other.

3. There is an urgent need to make large investments in ecosystem science that will contribute to a better understanding of environmental uses of water. The high stakes-decisions that will be required should not be made in an information vacuum.

Session 3: Institutions for Good Water Governance

1. Water institutions of sorts evolve from the dynamic tension between existing habits and routine and the forces which seem to require change.

2. It will be especially urgent to develop overarching institutions that can coordinate the activities of local, regional and provincial institutions.

3. To some extent, institutional change can be planned and implemented.

4. The legal framework of Spain appears to be an example of an institution which is sufficiently flexible to be responsive to most foreseeable changes

a. It is not clear if this institution is adequate for managing the country's ground water.
b. Laws that assign water a scarcity value of zero send the wrong message to consumers since water is not freely available and remove one major tool - prices - for managing water scarcity.

GRAND LESSONS

1. Water is too important to leave issues of management and availability to chance.

2. Successful water management is place-specific and site-specific and the means of successful management evolve over time.

3. It will be critical to employ existing science and invest in the development of additional water science if global water challenges are to be addressed successfully.

4. Water management institutions and the evolution of those institutions will be very important. The development and operation of adaptive institutions will be especially important.

5. The growing gap between rich and poor is not sustainable. Nothing epitomizes that gap better than the fact that one billion people lack access to drinking water of appropriate quality and more than two billion lack access to effective wastewater and sanitation services. All of us have a responsibility to do everything that we can to ensure that all people have access to good quality drinking water and sanitation services.