Lecture #7
25 January 2011

I. Introduction
II. Discuss final paper and how people are doing on it
III. Science and responsibility?
  A. Things we have learned from scientists (Vitousek et al's points -- cited from Lubchenco)
    1. "between one-third and one-half of the land surface has been transformed by human action"
    2. "the carbon dioxide concentration in the atmosphere has increased by nearly 30% since the beginning of the Industrial Revolution"
    3. "more atmospheric nitrogen is fixed by humanity than by all natural terrestrial sources combined"
    4. "more than half of all accessible surface fresh water is put to use by humanity"
    5. "about one-quarter of the bird species on Earth have been driven to extinction"
    6. "approximately two-thirds of major marine fisheries are fully exploited, overexploited, or depleted"
  B. Lubchenco's questions
    1. How is our world changing?
    2. What are the implications of these changes for society?
    3. What is the role of science in meeting the challenges created by the changing world?
    4. How should scientists respond to these challenges?
  C. Lubchenco's reasons for scientists to be concerned:
    1. Human health
    2. Economy
    3. Social justice
    4. National security
  D. Lubchenco's New Contract "predicated upon the assumptions that scientists will"
    1. address society's most urgent needs
    2. communicate knowledge to decision makers
    3. "exercise good judgment, wisdom, and humility."
    4. "recognize the extent of human domination of the planet."
  E. Why should scientists have more responsibilities to society than business people, academics generally, novelists, artists, or garbagemen?
    1. Do scientists have responsibilities to society?
    2. If so, what do they consist of and who determines what they are?
    3. Lubchenco argues that there was a substantial societal investment in science and this is where the obligation flows from. Do you agree? Is there some other source of this obligation?
IV. Sustainability Science
  A. Kates et al and "sustainability science" questions:
    1. How can the dynamic interactions between nature and society--including lags and inertia--be better incorporated into emerging models and conceptualizations that integrate the Earth system, human development, and sustainability?
    2. How are long-term trends in environment and development, including consumption and population, reshaping nature-society interactions in ways relevant to sustainability?
    3. What determines the vulnerability or resilience of the nature-society system in particular kinds of places and for particular types of ecosystems and human livelihoods?
    4. Can scientifically meaningful "limits" or "boundaries" be defined that would provide effective warning of conditions beyond which the nature-society systems incur a significantly increased risk of serious degradation?
    5. What systems of incentive structures--including markets, rules, norms, and scientific information--can most effectively improve social capacity to guide interactions between nature and society toward more sustainable trajectories?
    6. How can today's operational systems for monitoring and reporting on environmental and social conditions be integrated or extended to provide more useful guidance for efforts to navigate a transition toward sustainability?
    7. How can today's relatively independent activities of research planning, monitoring, assessment, and decision support be better integrated into systems for adaptive management and societal learning?
  B. Sustainability science must:

1. "span the range of spatial scales between such diverse phenomena as economic globalization and local farming practices,"
2. "account for both the temporal inertia and urgency of processes like ozone depletion,"
3. "deal with functional complexity such as is evident in recent analyses of environmental degradation resulting from multiple stresses; and"
4. "recognize the wide range of outlooks regarding what makes knowledge usable within both science and society." --- this is related to discussion of how to do science so it makes a social impact.

C. Three tasks for sustainability science to move forward
1. "Wide discussion within the scientific community .. regarding key questions, appropriate methodologies, and institutional needs."
2. "Science must be connected to the political agenda for sustainable development"
3. "Research itself must be focused on the character of nature-society interactions, on our ability to guide those interactions along sustainable trajectories, and on ways of promoting the social learning that will be necessary to navigate the transition to sustainability.

V. What role should science and scientists have in helping us cope with environmental risks? Which of the following questions should we allow scientists to decide or participate (as scientists rather than as "mere" citizens") in deciding?

A. What is and what should be the relationship between natural science and social science?
1. Do we want politics involved in science? If so, how?
2. What about science involved in politics? If so, how?
3. How can we do science (both natural and social) so it has an impact?

B. Jasanoff sets out the following criteria (69) for what scientists should do in “Skinning Scientific Cats:”
1. Define meaningful goals for research
2. Establish discursive and analytic conventions
3. Draw boundaries between what counts and does not count as reliable knowledge
4. Incorporate change
5. Provide morally acceptable principles for bridging uncertainty (compare no regrets v. precautionary principle as possible policy responses to uncertainty)
6. Is Jasanoff correct in notion that need to combine views of "how the world is (scientifically) as well as how they [we] would like it to be (socially and politically)" (70). Science affects both our knowledge and our norms (70).

C. What are the risks of relying on science and scientists? What are the benefits of relying on science and scientists?
1. Scientists can tell us what environmental impacts of a particular behavior will be, but not how to value those impacts. Sell's case of differing values placed on ozone depletion's benefits and costs.
2. Jasanoff: "We expect scientists to see the world the same way whether they live in Japan, India, Brazil, or the United States. This is a comfort in an unstable world. As our uncertainties increase in scope and variety, we turn for answers, not surprisingly, to the authoritative voice of science" (64).
3. Science implies notion that there is one truth, even if multi-causal and even if not yet known and evolving, but nonetheless one. E.g., light as wave or particle.
4. Essentially, science implies that only one voice is valid.
5. In contrast, democracy implies that all voices are valid.