Resource & Environmental Economics Field Examination

January 10, 2008

Instructions:

- You have 4 hours to complete the exam. This time commences at the end of the 15-minute reading period during which no writing is allowed.
- Please use your assigned "alpha letter" on every page to identify your exam. Do not use your name or social security number. Write on only one side of the page leaving at least one inch margins. Also number each page and before turning in the exam make sure the pages are in order.
- You have four questions to answer.

Answer four of the five questions.

1. That U.S. has a potential oil field in the Anwar Wildlife Refuge (federally owned) that has not been developed. The reasons for nondevelopment are in good part political, but an economist would argue for postponing development as long as the costs of development exceed the benefits. Development would generate environmental damages and loss of habitat, but the field would contribute to the global supply of oil.

   a. Utilizing a simple model and assuming efficient markets, evaluate whether the exploitation of the Anwar Refuge would lead to a reduction in oil prices.

   b. Many of the benefits and costs involved in this project are uncertain. Explain how you would modify your model, if at all, to incorporate risks associated with future oil prices, and with potential effects of development on the environment and wildlife.

   c. Explain how the fundamental (deterministic) development question faced here is an issue of optimal scheduling, and describe completely how this perspective modifies the opportunity costs that are relevant to the question of whether development benefits exceed costs.

2. In parts of Indonesia the rate of rainforest destruction is high. There are a wide range of economic issues at play. The rainforest is at risk primarily because of the possible use of the land for agricultural and livestock production. The concern for the rainforest is global. Some tourists travel thousands of miles to view it, it sustains unique species and other environmental goods, and millions of others simply value its existence.

   Suppose you are asked to carry out an economic study of the value of a project to protect the rainforest.

   - What empirical methods will you use in the study?
   - Is there a potential conflict between economic efficiency and concerns for equity? If so, how would you suggest resolving that conflict?

3. There are indications that increasing greenhouse gas (GHG) atmospheric concentrations could produce significant future climate changes. Develop an economic framework for addressing issues related to GHG buildup and discuss economic aspects of the following questions:

   a. What is the rationale for government and/or multi-government intervention in this situation?

   b. Can the appropriate level of GHG buildup be addressed through markets? If so, how would you structure them?

   c. Should the solution only include participation from those regions or countries currently generating the most GHG's?

4. Today biofuel production is viewed as a potential source of greenhouse gas offsets and energy security. But biofuel strategies are becoming controversial because of the effects of widespread production on commodity prices and on the prospects for land transformation from grasslands and forest lands to cropland. There are environmental damages associated with this transformation, mainly due to ecosystem loss.

   Address the following economically

   a. Why would expansion in biofuels lead to increases in prices of traditional commodities?

   b. Why would expansion in biofuels lead to increases in land moving from other uses domestically and internationally?

   c. Would ethanol from existing crop residues that is complementary with current land use be a desirable replacement for traditional corn ethanol?

   d. How policy wise could one adjust the returns to biofuels to reflect the global change in greenhouse gasses.

   e. How could one direct policy toward imported renewable fuels to reflect the greenhouse gasses emitted in their production?

5. An agency has been addressing an agriculturally produced pollutant with regulatory practices that try to restrict on-farm activities. This program has not been successful in limiting emissions. Downstream surface water quality has been consequently degraded to levels which threaten water usability.

   The agency has begun to consider a shift from regulation of production practices to transferable pollution rights. Agency leaders have some questions for you. Based on your answers, they will formulate a preferred policy, go to work on refining a specific proposal, and seek approval for it in the Legislature.

   a. What are the best approaches for initially defining and distributing such rights? In considering what is "best", their initially stated concerns are fairness, ease of implementation, and economic costs and benefits borne by both the agency and polluters.

   b. They wish to know if a system of transferable pollution rights promises to be economically efficient in this setting or if there is a better policy.