Problem Set 5
(Due Tuesday, May 9th in class)

PLEASE WRITE YOUR NAME, SID, AND SECTION NUMBER ON EACH PAGE.

Question 1
Provision and management of environmental services has emerged as one of the most influential topics in environmental and resource economics.
   I. Briefly explain what we are referring to when we talk about environmental services?
   II. In this context, briefly define and describe the policy objective of the following programs:
      a) The Conservation Reserve Program (CRP)
      b) Environmental Quality Incentives Program (EQIP)
      c) Wetlands Reserve Program
      d) Conservation Security Program (CSP)

Question 2
The scientific community seems to have reached a consensus regarding the existence of global climate change. In class, we focused on the impact of climate change on Agriculture. The following questions are based on the lecture slides. Please be concise (no more than 1.5 pages) and type or write legible.
   I. How will climate change affect agricultural regions? What regions are likely to be winners or losers?
   II. How will farmers adopt to climate change? What factors will determine the success of adaptation?
   III. What types of economic policies can be used to slow climate change?

Question 3
Pesticide Economics
Suppose you have a small apple orchard that potentially producing 600 lb of apples per year. However, pests consume some of the apples, so the amount of apples you can actually use is below your potential. You are considering use of a pesticide that eliminates the pests completely, but you also are aware of the adverse environmental effects of pesticide use. As an economist, you estimated that the total cost (including application, environmental externalities, and possible resistance costs) of a one-time pesticide application at $600. Fixed application costs only make up half of these costs ($300). The current market price of apples is $2/lb.
   I. What is the economic threshold at which it is efficient from a social optimally perspective to apply the pesticide (i.e. what level of damage would justify pesticide application)?
   II. If pests destroy 40% of the apples \(d(M) = .4\), would you from a farmer’s perspective want to apply the pesticide? Why?
III. Now assume that per unit costs of pesticide application ($X$) are $3 (no fixed costs) and application of pesticide reduces the damage due to pests according to $d(X, M) = d(M) - 0.04\sqrt{X}$. What would be the optimal level of pesticide use in this case? What is the percentage of apples destroyed by pests after pesticide use? Compare your profits with and without pesticide use.

IV. Now assume that pests might destroy up to 60% percent of the apples in one year and only 20% of the apples in another year depending on weather conditions. Describe advantages and disadvantages of a preventive versus responsive application in this context.