

ECON 275 – 70: ENVIRONMENTAL ECONOMICS – Take Home Exam 1
(30 points total)

The following are the rules relating to the take-home exam.

1. The take-home exam must be returned by 11:59 pm on **Sunday, June 15, 2022**. Please upload your file in Canvas. A Microsoft Word file is preferred.
2. NO late exams will be accepted.
3. You may not discuss the exam in any way with anyone until the exam period is over.
4. It is preferable that the exam be typed in a font size of 12 point. Single or 1.5 spacing is fine. Please make it easily readable.
5. If you need to draw diagrams and prefer to do by hand, kindly scan the diagram and copy and paste it into the submitted exam.
6. Any violation of the rules regarding consultation with others will be considered honor code violations. In addition, violation of rules regarding consultation or lateness will lead to assessment of penalties in grading (regardless of whether honor code action is taken). Please sign the Honor Statement and submit it along with your exam.

YOU MUST DO ALL PROBLEMS. PLEASE SHOW ALL WORK AND MAKE SURE TO READ EACH QUESTION CAREFULLY AND ANSWER EACH QUESTION FULLY.

1. **(6 points total)** Recycling or reuse of resources, is an important part of sustainability because it reduces the negative human impact on the environment and helps reduce the pressure on natural resources. Nevertheless, it is not a panacea, and as with everything, there are benefits and costs. As an example, the following article articles “[10 Reasons Why Recycling Alone Won’t Save Us](#),” and “[Plastic Recycling Doesn’t Work and Will Never Work](#)” discuss this issue. Recognizing there is no clear solution, the country of DCM is, nevertheless, planning on making a significant investment in setting up recycling facilities throughout the country. DCM has embraced the new economic model of a “circular economy” as discussed in “[Towards a Circular Economy: Business Rationale for an Accelerated Transition](#)” and “[The Circular Economy In Detail](#).” Links are also available on course website.

Based on your “expertise” in environmental economics, you have been hired as a consultant to the country of DCM to assist them in their investment planning. **In a minimum of 1000 words**, provide the country of DCM with your recommendations on how to best achieve their goal. In your analysis, be sure to distinguish between biological and technical materials.

2. **(5 points total)** The claim has been made that increasing the share of vegetables in people’s diet (a plant-based diet) will not only result in healthier people, but will also be good for the environment. Referring to the article ***Environmental Impacts of Food Production*** found on the link below and on the website, answer the following questions.

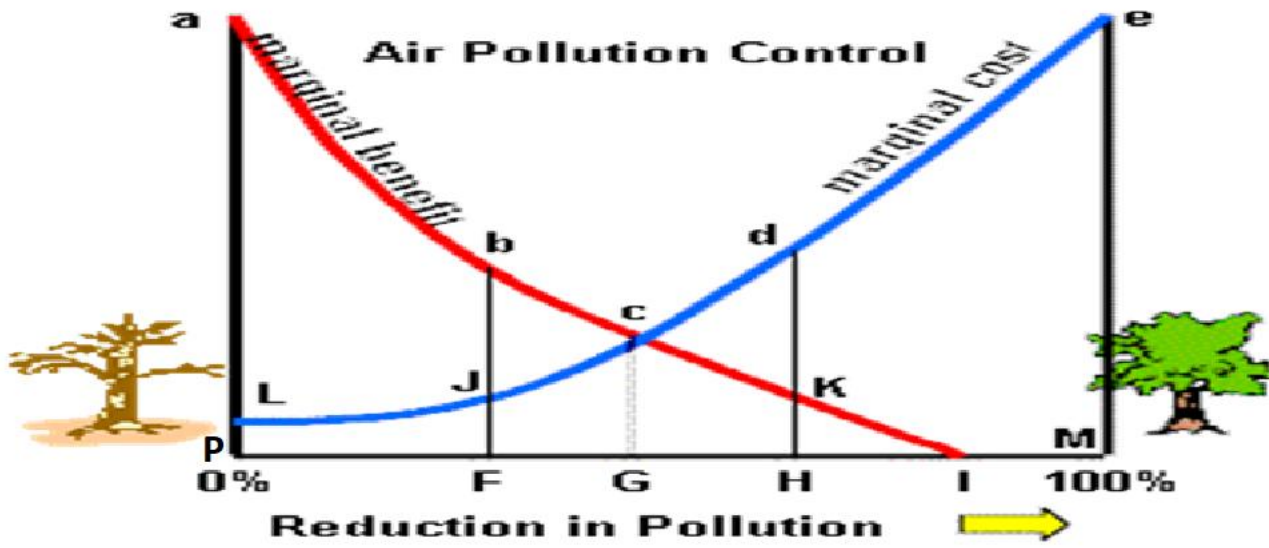
Environmental Impacts of Food

- a. (1 point) What factors contribute most to the negative environmental impacts of food production? Be specific and explain.
- b. (4 points) Based on what you know about the dietary habits of people in your country, write a letter of about **750 words** to the relevant authorities providing recommendations and policies the country could implement to reduce the environmental impact of food production. Be specific and explain in detail.

3. **(5 points total)** The country of **DCM** is considering implementing a project that will install a **Solar Farm** on a large piece of land close to a rapidly growing urban area. You have been requested to undertake a cost-benefit analysis to evaluate the feasibility of the project. Researching recent developments on solar farms, list what you perceive to be the:
- (1 point) Private Costs of the project.
 - (1 point) Social Costs of the project.
 - (1 point) Private Benefits of the project.
 - (1 point) Social Benefits of the project.
 - (1 point) What type of uncertainty could exist for such a project? Explain.
4. **(3 points total)** Assume a constant marginal-extraction-cost model of the allocation of a depletable resource with a renewable substitute (refer to text and/or notes for graph). Showing diagrammatically, what happens if:
- (1.5 points) Due to political pressure from fossil fuel companies, a per-unit subsidy is imposed by the government on each unit of the depletable resource used. Be sure to show the new effect on (i) marginal user cost; (ii) quantity extracted; and (iii) switching point.
 - (1.5 points) Now on a new graph, show diagrammatically what happens to the (i) quantity extracted; and (ii) switching point, if a technological development in resource extraction reduces the extraction cost for each unit.
5. **(3 points total)** The country of **DCM** is also considering buying up a 3 kilometer stretch of beach that will only allow swimming (that is, no boats, jet skis etc.). This area is a 20-minute drive from an urban area. You are assigned the task of developing a survey to estimate the values of a project using the **travel-cost method**. Develop eight (8) questions to be used in the survey to find out information that will help you estimate the benefits and costs of this project and list them below. For each question, also specify what economics cost of benefit you are trying to ascertain.
6. **(3 points total)** For each of the examples below, please answer the following:
- Does an externality exist? If so, classify the externality as positive/negative (or both).
 - If an externality exists, determine whether the Coase Theorem applies (i.e. is it possible to assign property rights and solve the problem?)
 - If it is possible for the Coase Theorem to solve this problem explain how.
- Example 1** (1.5 points) – A new factory that emits noxious odors into the air is built in a low-income area of the city.
- Example 2** (1.5 points) – Your roommates' favorite music is oldies from the 60s and 70s which you just hate. However, he (or she) insists on playing the music on a high volume at all times.
7. **(3 points)** Read the article **[Hit Hard by High Energy Costs, Hawaii Looks to the Sun \(PDF\)](#)** You should find a few examples of things we talked about in class. In **at least 300 words**, explain how one or more of the concepts learned are relevant to this article.

8. (2 points total) Refer to the diagram on the next page and fill in the blanks with letters with the correct answer to the questions in the given paragraphs.

On the left side of the diagram, there are no controls on pollution emissions and there is a 0% reduction in pollution. As we move toward the right along the horizontal axis, pollution is reduced through the application of environmental controls. Industrial emissions are entirely eliminated at 100%.



Fill-in the blanks using the letters (0.20 points each).

If there were no pollution controls, marginal benefit would be equal to **1.** _____ and marginal benefit exceeds marginal cost by an amount equal to **2.** _____. The optimal level of pollution control is indicated by the letter **3.** _____. At **F** the marginal benefit from a percentile reduction in pollution is equal to **4.** _____ and the marginal cost of a percentile reduction in pollution is equal to **5.** _____. At this level of pollution the **net marginal benefit** would be equal to **6.** _____ .

Assume that currently environmental regulations require firms to reduce pollutants to the amount **F**. Suppose stringent new laws are now implemented and require that firms now cut back pollution from **F** to **G**. Were pollution to decrease from **F** to **G**, the **total benefit** from this reduction in pollution would be equal to area **7.** _____ and the **total cost** of this reduction in pollution would be equal to area **8.** _____.

Now assume that the government enacts even more stringent pollution controls that require firms to reduce pollution to **H**. Were pollution to decrease from **G** to **H**, the **total benefit** from this reduction in pollution would be equal to area **9.** _____ and the **total cost** of this reduction in pollution would be equal to area **10.** _____.