

Human Activity and the Environment – Teacher’s Kit

Lesson # 3: How can the value of ecosystem goods and services be measured?



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- | | |
|----------------|--|
| . | not available for any reference period |
| .. | not available for a specific reference period |
| ... | not applicable |
| 0 | true zero or a value rounded to zero |
| 0 ^s | value rounded to 0 (zero) where there is a meaningful distinction between true zero and the value that was rounded |
| P | preliminary |
| r | revised |
| X | suppressed to meet the confidentiality requirements of the <i>Statistics Act</i> |
| E | use with caution |
| F | too unreliable to be published |
| * | significantly different from reference category ($p < 0.05$) |

Lesson #3

How can the value of ecosystem goods and services be measured?

Overview

This PowerPoint lesson describes use of the 7 slides in Set #3 and related learning activities to explore how the value of ecosystem goods and services (EGS) might be measured. Using the example of two transportation options, learners explore non-monetary methods to quantify and measure benefits. They compare monetary and non-monetary valuations for sample goods and services. Finally, they suggest possible non-monetary measures for determining the value of EGS portrayed in an image of an ecosystem.

Audience

- junior high school
- senior high school
- introductory post-secondary

Learning outcomes

- understand monetary and non-monetary valuation methods
- understand the importance of both valuation methods

Curriculum links

- grades 7 to 12 geography (ecosystems, geographic change), social studies (economics), biology (ecosystems and change), science, economics (accounting, valuation methods)
- post-secondary geography (ecosystems), environmental science (ecosystem accounting, ecosystem change)

Learning materials

- PowerPoint slide set #3: How can the value of ecosystem goods and services be measured?
- Statistics Canada publication, *Human Activity and the Environment 2013: Measuring ecosystem goods and services in Canada*
- Image collection: *Image # 8*
- Activity sheet #6: *Exploring non-monetary benefits*
- Activity sheet #7: *Exploring the non-monetary value of ecosystem goods and services*
- Activity sheet #8: *Exploring strengths and weaknesses*

Instructions

Think about the task

Think about the task

Today's task

What non-monetary measures can be used to value goods and services provided by this ecosystem?

What will I learn?
 the value of EGS can be quantified using monetary and non-monetary methods
 why it might be important to use non-monetary methods to quantify the value of EGS

Slide 1

Display or project Slide 1 or provide a provocative image to prompt learner reflection on the question “What non-monetary measures can be used to value goods and services provided by this ecosystem?”

Guide learners in a discussion of how the non-monetary value of EGS might be quantified and measured. Encourage learners to consider why it might be important to find alternatives to monetary measures of valuation when determining the value of EGS.

Explore the ideas

Explore the idea

The value of different transportation options can be compared using monetary measures such as cost. Are there other ways to quantify and measure their benefits?

\$500

\$1000 per school year

THINK of various ways of quantifying the benefits of each option

TALK to a partner

SHARE with the class

Slide 2

Organize learners into small groups and provide groups with a copy of Activity sheet #6: *Exploring non-monetary benefits*.

Display or project Slide 2 and inform learners that they must decide which transportation option provides the greatest benefits.

Explain that while they could use monetary measures to guide their decision (for example, comparing the cost of the bicycle with the cost of the transit pass), their challenge is to think of non-monetary ways to quantify and measure the benefits of each

transportation option. For example, they could compare the fitness benefits of each option by measuring the number of calories expended.

Guide learners in identifying other non-monetary ways of quantifying and measuring benefits. Instruct learners to record their ideas on Activity sheet #6 and then share with the class.

Learn about monetary valuation of ecosystem goods and services

Monetary measures can be used to determine the value of EGS.

LOOK at the images carefully

DESCRIBE what you see to your partner

IDENTIFY possible monetary measures to calculate the value of these EGS

Slide 3

Guide learners in reflecting on the images from Slide 3 and to think of what monetary measures might be used to determine the value of trees. Three examples of EGS associated with trees are pictured (from top to bottom):

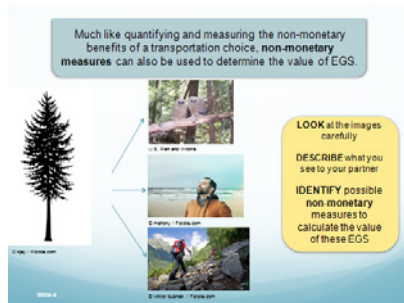
- timber and wood products
- clean air or air purification
- erosion control.

Consider prompting learners with a question such as: “What monetary measures could be used to determine the value of the goods and services provided by trees?” Remind learners that they are to think of how monetary value might be measured, and not calculate dollar amounts or actual values.

Possible examples include the market prices of timber and wood products, how much someone would be willing to pay to keep a tree, the value of lower health care costs associated with cleaner air, or money not spent on flood mitigation.

For more information on monetary valuation techniques refer to the Statistics Canada publication, *Human Activity and the Environment 2013: Measuring ecosystem goods and services in Canada*, page 21 and page 86 (Appendix B).

Learn about non-monetary valuation of ecosystem goods and services



Inform learners that similar to quantifying and measuring the benefits of a transportation choice, non-monetary measures can also be used to determine the value of EGS.

Display or project Slide 4 and ask learners to think of what non-monetary measures might be used to quantify and measure the value of the EGS provided by trees. Three examples of EGS associated with trees are pictured (from top to bottom):

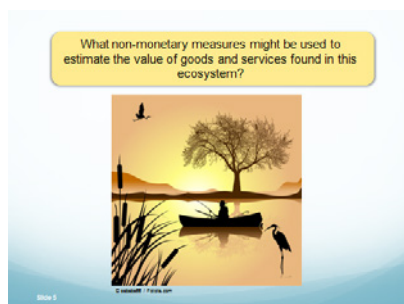
- habitat for endangered species (e.g., spotted owls)
- clean air or air purification
- recreation.

Consider prompting learners with a question such as “What non-monetary measures could be used to determine the value of the goods and services provided by trees?” Possible examples include the number of endangered species that inhabit the trees, a decrease in air pollution or the number of hikers that visit the ecosystem.

Encourage learners to share and record additional suggestions of non-monetary measures. Review these responses and guide learners in grouping the suggestions into categories. Possible suggestions include categories of social, cultural and physical measures. Record and display these grouping suggestions.

For more information on non-monetary valuation techniques refer to the Statistics Canada publication, *Human Activity and the Environment 2013: Measuring ecosystem goods and services in Canada*, page 9.

Apply non-monetary measures



Display or project Slide 5 and inform learners that their next task is to determine what non-monetary measures might be used to determine the value of EGS found in the pictured ecosystem.

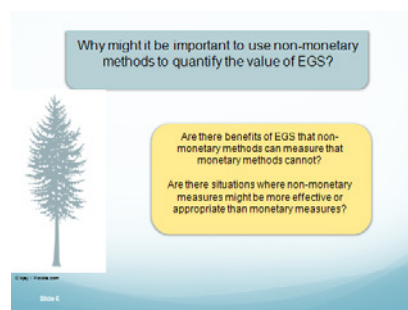
Provide each learner with a copy of Activity sheet #7: *Exploring the non-monetary value of ecosystem goods and services* and a copy of Image 8. Guide learners in identifying goods and services that might be found in this ecosystem. Remind learners that some EGS may be less obvious but are still valuable. For

example, clean air might be a good provided by an ecosystem, and cattails might provide a service by cleaning air and water. Prompt learners to record their observations about EGS on Activity sheet #7.

Next, guide learners in identifying non-monetary measures that could be used to estimate the value of each identified good and service. Remind learners that they are to think of the measures, and not calculate actual values. Prompt learners to reflect on the categories of non-monetary measures.

After learners have identified a number of non-monetary measures, inform them that their challenge is to determine the three most valuable EGS from the pictured ecosystem. Instruct learners to consider the measures carefully and to record their reasons. Invite learners to share their decisions with the class, guiding the discussion to explore the similarities and differences.

Explore strengths and weaknesses



Display or project Slide 6 and distribute Activity sheet #8: *Exploring strengths and weaknesses*. Organize learners into small groups to consider the strengths and weaknesses of both methods of determining the value of EGS.

Prompt learners with questions such as:

- Which measures are easier to develop and use?
- Are there particular groups or perspectives that might favour one form of measures over the other?
- Are there situations where monetary measures might be more effective or appropriate than non-monetary measures?
- Are there situations where non-monetary measures might be more effective or appropriate than monetary measures?
- Are there situations where using both types of measures might be effective and important?

Conclude by posing the question: “Why might it be important to use non-monetary methods to quantify the value of ecosystem goods and services?”

Activity sheet #6

Exploring non-monetary benefits

You are attempting to find the best way to commute to school and work. You can afford either a bike or a bus pass. Are there non-monetary ways to quantify and measure the benefits of each transportation option?



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How can the benefits of commuting by bike be quantified and measured?

How can the benefits of commuting by public transit be quantified and measured?

The transportation choice that appears to have the greatest non-monetary benefit is:

The top three reasons that support my decision are:

Activity sheet #7

Exploring the non-monetary value of ecosystem goods and services

An ecosystem good or service that I noticed in the image:	A non-monetary measure that could be used to estimate the value of the good or service

After reviewing the EGS found in this image and non-monetary ways to quantify and measure their value, I think that the three most valuable EGS are:

- 1.

- 2.

- 3.

Activity sheet #8

Exploring strengths and weaknesses

	Monetary measures and methods	Non-monetary measures and methods
Strengths		
Weaknesses		