

UNIT 4: SELECTING A SUITABLE AREA FOR RICE CULTIVATION

Grade Level: Form 4 or 5 (Year 9 or 10 - Biology Class)

Time : 60-90 Minutes

Introduction:

This exercise involves a study of the suitability of given areas (labelled A, B, C) for rice cultivation. Rice is a staple food for many people around the world, particularly in Asia. Cultivation of rice becomes one of the main agricultural activities in these countries. Currently, some of these countries have to import rice and ensuring economic self-sufficiency is important as it reduces dependency on imported rice.

Educational Objectives:

This script includes the following learning objectives:

1. Deciding on the suitability of an area for rice cultivation
2. Justifying the decision made on the suitability of each area for rice cultivation by considering various factors such as types of soil, environmental concerns and economic consideration
3. Analyzing data in tabular format
4. Comparing the physical properties of the three types of soil
5. Encouraging cooperative learning through groupwork
6. Communicating orally
7. Illustrating scientific knowledge/concepts in relating the properties of soil to plant growth

Scientific Concepts:

- There are various factors affecting rice yield.
- Rice is important to many societies.
- Yield of rice per hectare depends on standard fertilizer usage.

Previous knowledge assumed:

Conditions favoured by rice cultivation

Teaching/Learning Materials needed:

1. Information about rice growing (brochure published by the Department of Agriculture).
2. Textbook on the properties of soil.

Student's Guide

Scenario

The government would like to produce its own rice, since the rice sold in the country is imported from neighbouring countries. As an agricultural officer, you are asked to propose which of three available land areas (labelled A, B, and C) could best be used for rice cultivation based on various considerations, such as suitability of the soil, environmental concerns, economic considerations, etc.



Photo courtesy ... Mr. Ren Hua

The following information is available to help you make the decision:

	Area A	Area B	Area C
1. Type of Soil	Peat	Clay	Loam
2. Vegetation	Grass and shrubs	Grass and shrubs	Forest
3. Site	Near urban settlement	Rural area	Rural area
2. Location of River	500 metres away	5 kilometres away	3 kilometres away
5. Topography	Lowland and swampy	Slightly hilly	Partly lowland, swampy and partly hilly

Your Task

1. In groups of 3 to 4 members, discuss the following:
 - a) the importance of growing rice
 - b) physical properties of the three types of soils
 - c) conditions necessary for growing rice
 - d) use of land areas and its possible impact on people and environment
 - e) the cost to be incurred for irrigation of the land.
2. Write down your arguments for or against the suitability of each area.
3. Decide which area your group will choose to be the best possible site for rice cultivation.
4. Present your decision to the rest of the class.

Teacher's Guide

This activity relates to

- a) appreciating the importance of rice to many societies
- b) comparing properties of the different types of soil
- c) making decisions by weighing up various factors

Teaching Strategy

1. The suggestion is that the lesson begins by a class brainstorming session on the importance of growing rice, thus moving students away from canonical knowledge and into considerations of economics, social and environmental factors.
2. The brainstorming session is followed up by groupwork in which students are first asked to consider the suitable conditions for plant/rice growing and then use this knowledge to decide on the suitability of the site. This reinforces earlier work.
3. Once the suitability of each site has been discussed, the students are encouraged to choose one site as the most appropriate and present this choice to the rest of the class.
4. An expert/resource person may be called to give a talk on rice cultivation to give additional information.
5. The students utilize all the information obtained through group discussion and talk given by the expert to write a short report on their decision/conclusion.

Achieving the objectives

Objective	This is achieved by
1. Deciding on the suitability of the area for rice cultivation	group discussion analyzing the tabular data and using the background knowledge reinforced by the brainstorming session.
2. Justifying the decision made on the suitability of each area for rice cultivation	ensuring factors such as interference with the livelihood of other influence on the environment (for example, deforestation) and manpower needs for rice cultivation
3. Analyzing the given tabular data	students making their decision utilizing the data provided in the table. As the components of the data can be considered conflicting, it is a challenge to the students to analyze the data towards the decision they consider most appropriate in terms of economic self-sufficiency.
4. Comparing properties of different types of soils.	students undertaking class discussions
5. Encouraging cooperative learning through groupwork.	students working together in groups and arriving at a consensus common decision through discussion.
6. Communicating orally	taking an active part in the discussion within the groups.
7. Illustrating scientific knowledge/concepts in relating the properties of soils to plant growth.	students participating in group discussion.

Assessment

An assessment of achievement of the objectives of this instructional material can be attained by both formative and summative methods.

Formative Assessment Strategies

Able to give a Social Values grade (objectives 1 and 2)

- A. Not able to decide on the suitability of an area for growing rice, or if does so, it is a guess without justification.
- B. Able to justify any discussion on the suitability of an area for growing rice.
- C. Not only able to justify any decision, but is able to equate this with the social concern of the people and the need for sustainable development for the future.

Able to give a Science Method grade (objectives 3 and 4)

- A. Not able to effectively analyse the data given in tabular format and compare the properties of the different types of soil.
- B. Able to analyze the tabular data and compare the different types of soil so that decisions can be made on the area best suited to the growing of rice from a scientific point of view.
- C. Able to analyze and compare the data so that decisions can be made geared to the economic self sufficiency taking in to account environmental considerations.

Able to give a Personal Skills grade (objectives 5 and 6)

- A. Does not participate in the discussions and depends on others to analyze the data.
- B. Willing to participate in the discussions and to put forward opinions.
- C. Able to lead the discussions and guide others to formulate an opinion bearing in mind the various factors.

Able to give a Science Concept grade (objective 7)

- A. Has little understanding of plant growth and the part played in this by the soil.
- B. Able to explain the function of the soil in plant growth and the need for different soils for different types of plants. Able to explain soil needs for rice growing.
- C. Able to explain soil needs for plant growth and how the soil can be treated to maximize soil conditions for growing plants such as rice.

Summative Assessment Strategies

Able to give a Social Values grade (objectives 1 and 2)

- A. Report does not indicate a decision on the suitability of an area for growing rice, or if it does so, it is a guess with justification.
- B. Report justifies decisions on the suitability of an area for growing rice.
- C. Report not only justifies decisions, but equates this with the social concerns of the people and the need for sustainable development for the future.

Able to give a Science Concepts grade (objective 7)

- A. Report not written, or if produced, shows poor understanding of soil formation or the role of soil in growing plants.
- B. Report shows an understanding of different types of soil and their advantages and disadvantages.
- C. Report shows an understanding of soil and illustrates how soil can be treated to maximize soil conditions for growing plants such as rice.