

Daily Lesson Plan (DLP)

Topic. Plot your Plants.		Day :1
Grade: 4-5	Lesson Name: How will you install irrigation methods to best suit each crop?	Time :(60 Mins.)

Topic	How will you install irrigation methods to best suit each crop?		
Weekly key words	Natural conditions, technology, paddy rice, burrow, furrow, etc.		
Seating plan	<input type="checkbox"/> Individual	<input type="checkbox"/> Pairs	Group of 4
Skill development	<input checked="" type="checkbox"/> Reading <input type="checkbox"/> Reflection <input type="checkbox"/> Other (Specify)	<input checked="" type="checkbox"/> Writing <input type="checkbox"/> Illustration	<input checked="" type="checkbox"/> Discussion <input type="checkbox"/> Presentation <input type="checkbox"/> Collaboration <input type="checkbox"/> Observation <input type="checkbox"/> Research

Objectives: ➤ The students will be able to:	Learn about how to install irrigation methods to best suit each crop
Teaching Resources:	Laptop/multimedia, pictures, writing board, notebook, piece of paper, pen/pencil, plants, worksheet
Teaching Learning Strategies	
Introduction: 5 mins. Start the lesson by asking the students to tell if they know different methods of irrigation. Listen to their responses and give feedback. Methodology: (20 mins.) To choose an irrigation method, the farmer must know the advantages and disadvantages of the various methods. He or she must know which method suits the local conditions best. Unfortunately, in many cases there is no single best solution: all methods have their advantages and disadvantages. Testing of the various methods - under the prevailing local conditions - provides the	

best basis for a sound choice of irrigation method. This chapter gives some very broad guidance and indicates several important criteria in the selection of a suitable irrigation method.

Surface, Sprinkler or Drip Irrigation

The suitability of the various irrigation methods, i.e. surface, sprinkler or drip irrigation, depends mainly on the following factors:

- natural conditions
- type of crop
- type of technology
- previous experience with irrigation
- required labour inputs
- costs and benefits.

NATURAL CONDITIONS

The natural conditions such as soil type, slope, climate, water quality and availability, have the following impact on the choice of an irrigation method:

Soil type: Sandy soils have a low water storage capacity and a high infiltration rate. They therefore need frequent but small irrigation applications, in particular when the sandy soil is also shallow. Under these circumstances, sprinkler or drip irrigation are more suitable than surface irrigation. On loam or clay soils all three irrigation methods can be used, but surface irrigation is more commonly found. Clay soils with low infiltration rates are ideally suited to surface irrigation.

When a variety of different soil types is found within one irrigation scheme, sprinkler or drip irrigation are recommended as they will ensure a more even water distribution.

Slope: Sprinkler or drip irrigation are preferred above surface irrigation on steeper or unevenly sloping lands as they require little or no land levelling. An exception is rice grown on terraces on sloping lands.

Climate: Strong wind can disturb the spraying of water from sprinklers. Under very windy conditions, drip or surface irrigation methods are preferred. In areas of supplementary irrigation, sprinkler or drip irrigation may be more suitable than surface irrigation because of their flexibility and adaptability to varying irrigation demands on the farm.

Water availability: Water application efficiency (see Annex 4, step 8) is generally higher with sprinkler and drip irrigation than surface irrigation and so these methods are preferred when water is in short supply. However, it must be remembered that efficiency is just as much a function of the irrigator as the method used.

Water quality: Surface irrigation is preferred if the irrigation water contains much sediment. The sediments may clog the drip or sprinkler irrigation systems.

If the irrigation water contains dissolved salts, drip irrigation is particularly suitable, as less water is applied to the soil than with surface methods.

Sprinkler systems are more efficient than surface irrigation methods in leaching out salts.

TYPE OF CROP

Surface irrigation can be used for all types of crops. Sprinkler and drip irrigation, because of their high capital investment per hectare, are mostly used for high value cash crops, such as vegetables and fruit trees. They are seldom used for the lower value staple crops.

Drip irrigation is suited to irrigating individual plants or trees or row crops such as vegetables and sugarcane. It is not suitable for close growing crops (e.g. rice).

TYPE OF TECHNOLOGY

The type of technology affects the choice of irrigation method. In general, drip and sprinkler irrigation are technically more complicated methods. The purchase of equipment requires high capital investment per hectare. To maintain the equipment a high level of 'know-how' has to be available. Also, a regular supply of fuel and spare parts must be maintained which - together with the purchase of equipment - may require foreign currency.

Surface irrigation systems - in particular small-scale schemes - usually require less sophisticated equipment for both construction and maintenance (unless pumps are used). The equipment needed is often easier to maintain and less dependent on the availability of foreign currency.

PREVIOUS EXPERIENCE WITH IRRIGATION

The choice of an irrigation method also depends on the irrigation tradition within the region or country. Introducing a previously unknown method may lead to unexpected complications. It is not certain that the farmers will accept the new method. The servicing of the equipment may be problematic and the costs may be high compared to the benefits.

Surface irrigation requires a high labour input

Often it will be easier to improve the traditional irrigation method than to introduce a totally new method.

REQUIRED LABOUR INPUTS

Surface irrigation often requires a much higher labour input - for construction, operation and maintenance - than sprinkler or drip irrigation. Surface irrigation requires accurate land levelling, regular maintenance and a high level of farmers' organization to operate the system. Sprinkler and drip irrigation require little land levelling; system operation and maintenance are less labour-intensive.

COSTS AND BENEFITS

Before choosing an irrigation method, an estimate must be made of the costs and benefits of the available options. On the cost side not only the construction and installation, but also the operation and maintenance (per hectare) should be taken into account. These costs should then be compared with the expected benefits (yields). It is obvious that farmers will only be interested in implementing a certain method if they consider this economically attractive. Cost/benefit analysis is, however, beyond the scope of this manual.

In conclusion: surface irrigation is by far the most widespread irrigation method. It is normally used when conditions are favourable: mild and regular slopes, soil type with medium to low infiltration rate, and a sufficient supply of surface or groundwater. In the case of steep or irregular slopes, soils with a very high infiltration rate or scarcity of water, sprinkler and drip irrigation may be more appropriate. When introducing sprinkler and drip irrigation it must be ensured that the equipment can be maintained.

Activity: (30 mins.) (Group Work)

Basin, Furrow or Border Irrigation

This section discusses some of the important factors which should be taken into account when determining which surface irrigation method is most suitable: basin, furrow or border irrigation. Again, it is not possible to give specific guidelines leading to a single best solution; each option has its advantages and disadvantages.

Factors to be taken into account include:

- natural circumstances (slope, soil type)
- type of crop
- required depth of irrigation application
- level of technology
- previous experience with irrigation
- required labour inputs

NATURAL CIRCUMSTANCES

Flat lands, with a slope of 0.1% or less, are best suited for basin irrigation: little land levelling will be required. If the slope is more than 1%, terraces can be constructed. However, the amount of land levelling can be considerable.

Furrow irrigation can be used on flat land (short, near horizontal furrows), and on mildly sloping land with a slope of maximum 0.5%. On steeper sloping land, contour furrows can be used up to a maximum land slope of 3%. A minimum slope of 0.05% is recommended to assist drainage.

Border irrigation can be used on sloping land up to 2% on sandy soil and 5% on clay soil. A minimum slope of 0.05% is recommended to ensure adequate drainage.

Surface irrigation may be difficult to use on irregular slopes as considerable land levelling may be required to achieve the required land gradients.

All soil types, except coarse sand with an infiltration rate of more than 30 mm/hour, can be used for surface irrigation. If the infiltration rate is higher than 30 mm/hour, sprinkler or drip irrigation should be used.

Wrap up (5mins.): Wind up the lesson by asking the students randomly to share their findings.

Home Assessment:

The students will do the worksheet as homework.

Worksheet

Lesson Evaluation:

- Teacher was able to accomplish all aspects of the lesson well ☐
- Teacher was not able to do warm up activity ☐,
- develop lesson plan well ☐,
- do the learning activity ☐,
- do wrap up ☐,
- accomplish lesson objective ☐,
- manage time well ☐,
- manage class well ☐

Worksheet Day

Name: _____

Class: _____

Topic: Plot the Plants

Subject: Science

1. Write about any three natural factors which have impact on choosing an irrigation method:
