

Module 5: Irrigation In Coffee

Objective

To enable trainers/farmers understand when and how to irrigate coffee in order to produce high yields and quality.

Content

- i) Introduction.
- ii) Benefits of irrigation - production, bean size, flower induction, ground fertilizer application.
- iii) Coffee water stress testing.
- iv) Types of irrigation - bottle, overhead, basin, under tree and drip.
- v) Critical periods to irrigate - moisture content is inadequate, pinheads.
- vi) Breaking dormancy, when trees are under stress.
- vii) Important aspects of irrigation - weed, calibration, repair of leaks, well serviced system.

Methodology

- i) Lectures.
- ii) Discussions on irrigation methods and timings.
- iii) Demonstrations on various irrigation methods and use of cobalt chloride kits.
- iv) Group work practicals on setting up the moisture monitoring kit.
- v) Visits to farms under irrigation.

Teaching aids/materials

- i) Trainers Manual.
- ii) Flip chart/ white board and marker pens.
- iii) Cobalt Chloride kit.
- iv) Drip Irrigation pipes, small sprinklers for under tree irrigation.
- v) Illustrations on overhead sprinklers.

5.1 Introduction

Irrigation is the artificial application of controlled amounts of water to the soil at predetermined intervals. It may be done to make up for inadequate or break dormancy rainfall for the purpose of increasing the cropping level. It can also be done to supplement rainfall especially when the tree is carrying a heavy crop. Irrigation may be done through drip, overhead, basin, under tree or bottle.

5.2 Benefits of irrigation

- Increases production by up to 50% especially when rains are below normal.
- Increases the bean sizes hence the proportion of premium grades and thus enhances quality.
- It can be used to induce flowering.
- It protects the tree from damage arising from overbearing when there is drought.
- It allows ground fertilizer application in case of rain failure.

5.3 Coffee water stress testing

The moisture deficit testing kit (cobalt chloride disc method) is used to determine whether to irrigate or not. On average, if time taken by the disc to change from blue to pink is 5 minutes or more, there is need for irrigation. Other appropriate methods include use of electronic devices such as infra-red monitoring tool and farmers experience by visual observation.



Cobalt chloride kit



Moisture stress on young coffee plant

5.4 Types of irrigation

- **Drip irrigation** – this is the most preferred type of irrigation since it is economical in water usage. Water is delivered through laid out drip lines that have equally spaced openings.
- **Overhead irrigation** – the use of sprinklers to apply water above the coffee bushes. It is the most uneconomical in water usage and predisposes the coffee trees to disease attacks. It is also expensive to run.
- **Basin irrigation** – holes are dug between the coffee trees and water is applied into holes.
- **Under tree irrigation** – This is preferred where CBD is severe to avoid wetting the canopy. It involves use of small sprinklers to apply water under the trees.
- **Bottle irrigation** – This is ideal for small scale farmers and involves the use of bottles to apply water under the tree canopy.



Drip irrigation coffee



Over-head irrigation



Basin irrigation



Bottle irrigation

5.5 Critical periods to irrigate

Coffee needs to be irrigated when:

- Moisture content is inadequate for the young coffee
- Flower buds are fully formed but there are no rains to induce blossoming
- Pinheads are breaking dormancy (7th week from fruit set) but there is moisture deficit
- Rains fails during the ripening stage – This is a critical stage in the coffee production cycle and every effort to irrigate should be made if rain fails
- Coffee trees are under stress due to drought

5.6 Important aspects of irrigation

- Irrigate weed free coffee fields
- Determine the amount of water being applied - collect water from the discharge point for a given period of time. This will tell how long to irrigate
- Repair leaking pipes and joints – to minimise water wastage
- Ensure the pump and the whole irrigation system is working properly – check the foot valves, sluice valves and the return valves
- Sources of water may be – rivers, lakes, boreholes, shallow wells and reservoirs
- Ensure the water is tested on suitability for coffee farming
- For sustainability in water sources, harvest water from buildings and run off from farms into dams and reservoirs
- For sustainable water use, irrigate in the early morning and at night
- Bottle irrigation can be done for young seedlings