Republic of Rwanda
Ministry of Education

RTB | RWANDA TVET BOARD

PRELIMINARY PRESSURIZED IRRIGATION SYSTEM

WIRPR301

Apply preliminary pressurized irrigation system

Competence

RQF Level: 3

Learning Hours 80

Credits: 8

Sector: Agriculture and food processing

Trade: Water and Irrigation

Module Type: General

Curriculum: AFPWIR3001- TVET Certificate III in water and irrigation

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<table>
<tr><td>Purpose statement</td><td colspan="6">This module describes the skills, knowledge and attitude required to conduct preliminary pressurized irrigation activities. At the end of this module, learners will be able to collect preliminary information related to the irrigation schedule, carry out the proper safety and assembly of pressurized irrigation system and adjust the irrigation schedule. Qualified learners deemed competent to this competency may work alone or with others on routine tasks in marshland, hillside, small scale irrigation, garden, greenhouses, agricultural land, rain water harvesting, related activities under minimum supervision.</td></tr>
<tr><td rowspan="5">Delivery modality</td><td colspan="2">Training delivery</td><td>100%</td><td colspan="2">Assessment</td><td>Total 100%</td></tr>
<tr><td colspan="2">Theoretical content</td><td>30%</td><td rowspan="4">Formative assessment</td><td>30%</td><td rowspan="4">100%</td></tr>
<tr><td colspan="2">Practical work:</td><td rowspan="3">70%</td><td rowspan="3">70%</td></tr>
<tr><td>• Group project and presentation</td><td>20%</td></tr>
<tr><td>• Individual project /Work</td><td>50%</td></tr>
</table>

Elements of Competency and Performance Criteria

Elements of competency	Performance criteria
1. Collect preliminary information related to the irrigation schedule	1.1. The pressurized irrigation schedule is methodically consulted in terms of chronologic sequence of activities
	1.2. Information about the irrigation schedule is regularly disseminated to the beneficiaries to ensure their participation.
	1.3. Availability of water resources is appropriately checked in terms of discharge according to the pre-determined crop water requirements
	1.4. Meetings with water user associations are systematically planned and organized for preparation of regular water distribution

2. Carry out the proper safety and assembly of pressurized irrigation system	2.1 Laterals and fittings are properly checked to ensure the safety and hence proper water flow
	2.2 Pipes and their fittings are relevantly assembled in accordance with technical specifications before running the system
	2.3 The status of pipeline is regularly and properly checked to make sure whether it is free from leakages for its efficient use
	2.4 Pressurized irrigation fittings are appropriately adjusted for ensuring better flow network.
3. Adjust the irrigation schedule	3.1. Weather conditions are properly observed and predicted for adequate adjustment of irrigation schedule
	3.2. Irrigation schedule is carefully adjusted based on the observed and predicted weather conditions
	3.3 The preliminary pressurized activities are timely reported

Course content	
Learning outcomes	At the end of the module the learner will be able to: 1. Collect preliminary information related to the irrigation schedule 2. Carry out the proper safety and assembly of pressurized irrigation system 3. Adjust the irrigation schedule

Learning outcome 1: Collect preliminary information related to the irrigation schedule	**Learning hours: 20**
Indicative content	

- Consultation of the pressurized irrigation schedule in terms of chronologic sequence of activities
  - ✓ Read and interpret pressurized irrigation schedule
  - ✓ Basic Irrigation scheduling methods
    - Soil moisture measurement
    - Water balance
    - Plant Observation
  - ✓ Factors affecting irrigation schedule (rainfall, soil moisture, irrigated crops, evapotranspiration, water table)

- Dissemination of information to the beneficiaries about the irrigation schedule
  - ✓ Communication methods
- Checking the availability of water resources in terms of discharge according to the pre-determined crop water requirements
  - ✓ water sources
  - ✓ Factors affecting the quality of water source
  - ✓ Discharge measurements method
    - water volume, water velocity, water head

- Planning and organization of the meetings with water user organization
  - ✓ Elements of design and delivery of meeting
    - Need and opportunity assessment
    - Planning and management
    - Message development

- Delivery
- Evaluation

Resources required for the learning outcome	
Equipment	Phones, Computers, Flow meter, Printer, Rain gauge, Soil moisture sensor and meter, Tensiometer,
Materials	Soil, Technical manual, Markers, Measuring tape, Handbook, Water, Books, Flip chart, Pen, Pencils ,Notebooks
Tools	
Facilitation techniques	• Demonstration and simulation • Individual and • group work • Practical exercise • Individualized • Trainer guided • Group discussion
Formative assessment methods	• Written assessment • Oral presentation • Performance assessment • Project based assessment

Learning outcome 2: Carry out the proper safety and assembly of pressurized irrigation system	**Learning hours: 30**
Indicative content	
• Check-up laterals and fittings to ensure for the safety and proper water flow ✓ Different types of lateral fittings and their standards and specifications (DN: Nominal Diameter and PN: Nominal pressure) • Ensure the assembly of pipes and their fittings in accordance with technical specifications before running the system ✓ Pipes assembling techniques • Check pipeline status to make sure whether it is free from leakages for its efficient use	

✓ Causes of pipeline leakages Broken Seals connector, Clogged Lines, Corrosion, Damaged pipe Joints, Excess water pressure, Intruding tree roots, Loose Water Connectors, Rapid temperature changes • Adjust pressurized irrigation fittings for ensuring better flow network ✓ Pressurized irrigation network and pipe coupling techniques

Resources required for the indicative content	
Equipment	Pump, moto pump, engine/source of energy, drip irrigation kit, sprinkler irrigation kit
Materials	Books, Technical manual, Hoe, Pipes, Note books, Pen or pencil, Flip chart, Water, Markers, Lateral pipes (PVC, Steel, HDPE),Lateral fittings (Elbow, cross, tee, union, reducer, socket, end cap, pipe clip, valves, nipples.
Tools	Tool box
Facilitation techniques	• Demonstration and simulation • Individual and • Group work • Practical exercise • Individualized • Trainer guided • Group discussion
Formative assessment methods	• Written assessment • Oral presentation • Performance assessment • Project based assessment

Learning outcome 3:Adjust the irrigation schedule	**Learning hours: 30**
Indicative content	
• Observation and prediction of weather conditions ✓ Observation and Collection of data from meteorological equipment Rain gauge, earth thermometer, psychomotor, wind vane, anemometer, barometer, radiometer, pan evaporation ✓ Ways to predict weather without a forecast	

- Observing the wind and air, Detecting the direction of the wind, Watch smoke from a fire, Watch for calm conditions, Observing the shape of the cloud, Check the color of the cloud

✓ Meteorological factors which affect weather
✓ Factors affecting evaporation from a cropped land

- Air and water temperature, relative humidity, wind velocity, surface area (exposed), barometric pressure, salinity of the water

- Adjust the irrigation schedule based on the observed and predicted weather conditions
- Report the preliminary pressurized activities

✓ Report formats

Resources required for the indicative content	
Equipment	Computers, Flash discs, Meteo-station
Materials	Books, Pen, Marker, Water, Flip chart, Books, Technical manual, Water
Tools	Crop wat software
Facilitation techniques	• Demonstration and simulation • Individual and • group work • Practical exercise • Individualized • Trainer guided • Group discussion
Formative assessment methods	• Written assessment • Oral presentation • Performance assessment • Project based assessment

References

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Farm Electric Handbook. *Pumping and Irrigation: A guide to the design of simple pumping systems.* Warwichshire. 61p.
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