



Ethiopian TVET-System

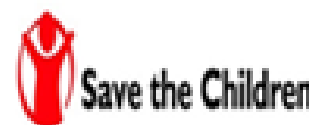


Irrigation and Drainage Design and Construction Supervision Level IV

Based on, March 2017 G.C. Occupational Standard

**Module Title: Coordinate and Monitor the Operation
of Irrigation Delivery Systems**

TTLM Code: EIS IDS4 TTLM 0920V2



This module includes the following Learning Guides

**LG53: Confirming performance measures in
Irrigation systems management plan**

LG Code: EIS IDS4 M11 0920 LO1-53

**LG54: Monitor and coordinate processes and
resource targets**

LG Code: EIS IDS4 M11 0920 LO2-54

**LG55: Report outcomes of coordination and
monitoring**

LG Code: EIS IDS4 M11 0920 LO3-55



This TTLM is totaling incomplete and except the title the inside content and TTLM organization might be for other unknown X - UC .It is better to develop again from zero level

- **Occupation** :IDS4
- **Module Title:** Coordinate and Monitor the Operation of Irrigation Delivery Systems
- **Level:**4
- **Done by:** Tujuba Assela PTC
- **Round:** First
- **The Trainer needs TM training**

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Instruction sheet	Learning Guide 53: Confirming performance measures in irrigation systems management plan
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This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics:

- Identifying customer requirements for irrigated culture.
- identifying environmental factors that impact on the irrigation system
- Consulting historic system information and stakeholders.
- Confirming performance requirements for an irrigation system management plan

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, **upon completion of this Learning Guide, you will be able to:**

- Identify customer requirements for irrigated culture.
- identify environmental factors that impact on the irrigation system
- Consult historic system information and stakeholders.
- Confirm performance requirements for an irrigation system management plan.

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below
3. Read the information written in the “Information Sheets 1- 4”. Try to understand what are being discussed.
4. Accomplish the “Self-checks 1,2, 3 and 4 ” in each information sheets on pages 11,18,28 and 38.
5. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering the Self-checks).
6. If you earned a satisfactory evaluation proceed to “Operation sheets 1, and 2 on pages 36 and 37 and do the LAP Test on page 38”.
7. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Learning Activity.

Information Sheet-1	Identifying customer requirement for irrigated culture
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1.1. Introduction

Irrigation is the process of applying controlled amounts of water to plants at needed intervals. Irrigation helps to grow agricultural crops, maintain landscapes, and revegetate disturbed soils in dry areas and during periods of less than average rainfall.

The assessment of the irrigation potential, based on soil and water resources, can only be done by simultaneously assessing the irrigation water requirements (IWR) Net irrigation water requirement (NIWR) is the quantity of water necessary for crop growth. It is expressed in millimeters per year or in m³/ha per year (1 mm = 10 m³/ha). It depends on the cropping pattern and the climate. Information on irrigation efficiency is necessary to be able to transform NIWR into gross irrigation water requirement (GIWR), which is the quantity of water to be applied in reality, taking into account water losses. Multiplying GIWR by the area that is suitable for irrigation gives the total water requirement for that area. In this study water requirements are expressed in km³/year.

1.2. Calculations of irrigation water requirements

Calculations of irrigation water requirements are done while preparing national water master plans or irrigation projects. Useful information was obtained from a number of country studies available from AQUASTAT [21a], but the information was based on many different approaches. For the purpose of this study the need was felt to develop a method of computing irrigation water requirements for the whole continent in a systematic way. In order to be able to do this at the scale of the continent, assumptions have to be made on the definition of areas to be considered homogeneous in terms of rainfall, potential evapotranspiration, cropping pattern, cropping intensity and irrigation efficiency.

1.3. Steps to be followed in calculating water requirement

For the calculation of irrigation water requirements the following steps have been followed:

- ✓ Delineation of major irrigation cropping pattern zones. These zones are considered homogeneous in terms of types of irrigated crops grown, crop calendar, cropping intensity and gross irrigation efficiency.
- ✓ Represented on the map of Africa, they should be viewed as regions where some homogeneity can be found in terms of irrigated crops. The cropping pattern proposed for

the zone should be viewed as representative of an 'average' rather than a 'typical' irrigation scheme.

- ✓ Definition of the area of influence of the climate stations (in GIS) and quality check on the climate data.
- ✓ Combination of the irrigation cropping pattern zones with the climate stations' zones (in GIS) to obtain basic mapping units.
- ✓ Calculation of net and gross irrigation water requirements for different scenarios.
- ✓ Comparison with existing data and final adjustment.

1.4. Surface irrigation

Surface irrigation consists of a broad class of irrigation methods in which water is distributed over the soil surface by gravity flow. The irrigation water is introduced into level or graded furrows or basins, using siphons, gated pipe, or turnout structures, and is allowed to advance across the field. Surface irrigation is best suited to flat land slopes, and medium to fine textured soil types which promote the lateral spread of water down the furrow row or across the basin



Figure 1 Surface irrigation

Sprinkler irrigation is a method of irrigation in which water is sprayed, or sprinkled through the air in rain like drops. The spray and sprinkling devices can be permanently set in place (solid set), temporarily set and then moved after a given amount of water has been applied (portable

set or intermittent mechanical move), or they can be mounted on booms and pipelines that continuously travel across the land surface (wheel roll, linear move, center pivot).



Figure 2 Sprinkler irrigation

Drip/trickle irrigation systems are methods of micro irrigation wherein water is applied through emitters to the soil surface as drops or small streams. The discharge rate of the emitters is low so this irrigation method can be used on all soil types.



Figure 3: Drip/trickle irrigation

Subsurface irrigation consists of methods whereby irrigation water is applied below the soil surface. The specific type of irrigation method varies depending on the depth of the water table. When the water table is well below the surface, drip or trickle irrigation emission devices can be buried below the soil surface (usually within the plant root zone).



Figure 4 Subsurface irrigation

1.5. An example of irrigation

To irrigate is to water crops by bringing in water from pipes, canals, sprinklers, or other man-made means, rather than relying on rainfall alone. This water was used for drinking, washing, and irrigation. Modern irrigation systems use reservoirs, tanks, and wells to supply water for crops

The purpose of irrigation is to supply adequate amount of water when rainfall is not sufficient or timely to meet the crops' water needs

Irrigation helps to grow agricultural crops, maintain landscapes, and revegetate disturbed soils in dry areas and during periods of less than average rainfall. Irrigation also has other uses in crop production, including frost protection, suppressing weed growth in grain fields and preventing soil consolidation

Identifying customer requirement for irrigated culture

- irrigated culture
- Customer expectations and requirements
- Customers requirement for irrigated culture
- steps and procedure in identifying customers requirement

Self checking -1	Written Test
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Directions: Write the best answer for the following questions. Use the Answer sheet

Provided in the next page: Each question worth two point

1. Write the four methods of irrigation? (2points)
2. What are the purposes of irrigation? (2points)
3. What is irrigation? (2points)
4. Write the Purposes of Drip/trickle irrigation? (2points)
5. Write the deference between Drip/trickle irrigation? And surface irrigation? (2points)

Note: Satisfactory rating – 10 and above pts Unsatisfactory - below 10 pts

Name: _____

Date: _____

Score = _____

Rating: _____

Answer Sheet-1

1. _____

2. _____

3. _____

4. _____

5. _____

This are key variables and range to be covered in Lo1

<p>Environmental factors</p>	<p>May include, but not limited to:</p> <ul style="list-style-type: none"> • Environmental flows • Chemicals • Nutrients • Salinity • Downstream requirements
<p>Historic system information</p>	<p>May include, but not limited to:</p> <ul style="list-style-type: none"> • Previous studies • Impact of weather • Relevant hydrometric information • Previous system deliveries • Previous flow rates • Operational procedures
<p>Stakeholders</p>	<p>May include, but not limited to:</p> <ul style="list-style-type: none"> • Customers • Government • Farmer and grower associations • Downstream land holders • Other water authorities • Employees • Customer representative committees • Land care or similar active groups • Local communities
<p>Irrigation system management plan</p>	<p>May include, but not limited to:</p> <ul style="list-style-type: none"> • Service levels • Capital investment • Maintenance levels
<p>Equipment</p>	<p>May include, but not limited to:</p> <ul style="list-style-type: none"> • Electronic monitoring and metering systems • Manual chart recording systems • On- and off-road vehicles

	<ul style="list-style-type: none"> • Communication equipment • Personal protective equipment
Monitoring and testing programs	<p>May include, but not limited to:</p> <ul style="list-style-type: none"> • Timeliness of deliveries • Flow • Input and output quality • Testing procedures • Frequency • Sampling locations • Budgets • Physical achievement targets • Operational procedures • Number of complaints

Information Sheet-2	identifying environmental factors that impact on the irrigation system
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2.1. Introduction

To Identify Environmental factors that impact on the irrigation system are Identified Factors Influencing Irrigation Technology Adoption and its Impact . The traditional system of irrigation identify the factors that influence the adoption of TP location; and external factors (civil strife, climate) (Benin and Mugarura, 1999) This means that the error terms of the adoption and poverty models are not

The expansion and intensification of agriculture made possible by irrigation has the potential for causing: increased erosion; pollution of surface water and groundwater from agricultural biocides; deterioration of water quality; increased nutrient levels in the irrigation and drainage water resulting in algal blooms

Physical factors that affect the choice of irrigation technologies are the terrain (slope), soil type, and the type of crops planted. Farmers adopt an irrigation technology if a given irrigation technology needs little maintenance and provides the necessary water for crop growth and maximum yield efficiency

Excessive and irregular irrigation has the following effects: 1. Increase in Saline and Alkaline Elements in Soil or Increase in Salinity: When irrigation is done regularly with excessive water, groundwater level comes up and quantity of solvent salts increases

The following factors affect any selected method of irrigation:

- Topography: Topography is the slope of the ground and how much uneven or leveled it is
- Climate: Ground level irrigation methods are directly affected by climate
- Crops
- Water Conservation
- Economic Factors and Labour
- General

2.2 Environmental flows

Water that is left in river system or released into it for the specific purpose of managing the condition of eco system (king et al.2003).

Environmental flows describe the quantity, timing, and quality of water flows required to sustain freshwater and estuarine ecosystems and the human livelihoods and well being that depend on these ecosystems

“Environmental flows can be described as ‘the quality, quantity, and timing of water flows required to maintain the components, functions, processes, and resilience of aquatic ecosystems which provide goods and services to people” (The World Bank)

Environmental flows” is a system for managing the quantity, timing, and quality of water flows below a dam, with the goal of sustaining freshwater and estuarine ecosystems and the human livelihoods that depend on them” (International Rivers)

2.3. Purposes of environmental flows

- Fishing
- Farming
- Drinking/water supply
- Grazing land
- Pollution control
- Navigation
- En dangered species
- Cultural and spiritual values

2.4. Chemicals

Chemical means involving or resulting from a reaction between two or more substances, or relating to the substances that something consists of. As a noun, the common definition of chemical is a substance that is produced or used in a process (reaction) involving changes to atoms or molecules. The term is Sometimes defined more broadly as "a substance". As an adjective, "chemical" means "of or pertaining to chemistry. Examples of chemicals include the chemical elements, such as zinc, helium, and oxygen; compounds made from elements including water, carbon dioxide, and salt; and more complex materials like your computer, air, rain, a chicken, a car, etc

The Most Dangerous Chemicals Known to Man

- Ethylene Glycol. It's highly likely that you have a bottle of this first chemical lying around somewhere in your garage
- 2, 3, 7, 8-Tetrachlorodibenzo-p-Dioxin
- Batrachotoxin
- Potassium Cyanide
- Thioacetone
- Dimethylmercury
- Fluoroantimonic Acid
- Azidoazide Azide

2.4 Nutrients

A nutrient is a substance used by an organism to survive, grow, and reproduce. The requirement for dietary nutrient intake applies to animals, plants, fungi, and protists

The six essential nutrients are vitamins, minerals, protein, fats, water, and carbohydrates.

Water is the Most Important Nutrient. Nutritionists spend a lot of time discussing total digestible nutrients, minerals, crude protein and even various fractions of protein. However, we often take for granted the most important nutrient, the one required in the greatest amount by any class of livestock water

Why do we need nutrients?

Our bodies derive energy from the foods and liquids we consume. The main nutrients our body uses for energy are carbohydrates, fats and protein. Water is necessary for transport of nutrients, and dehydration can cause a lack of energy.

Fat soluble vitamins are:

- Vitamin A
- Vitamin D
- Vitamin E
- Vitamin K

2.5 Salinity

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Salinity is the saltiness or amount of salt dissolved in a body of water, called saline water. Definition and units. Ocean salinity is generally defined as the salt concentration (e.g. Sodium and Chloride) in sea water. It is measured in unit of PSU (Practical Salinity Unit) which is a unit based on the properties of sea water conductivity. It is equivalent to per thousand or (o/00) or to g/kg.

Since 86% of global evaporation and 78% of global precipitation occur over the ocean, ocean surface salinity is the key variable for understanding how fresh water input and output affects ocean dynamics.

In fresh water the concentration of salts, or salinity, is nearly zero. The salinity of water in the ocean averages about 35 parts per thousand (ppt). The mixture of seawater and fresh water in estuaries is called brackish water and its salinity can range from 0.5 to 35 ppt less than 600 mg/L is regarded as good quality drinking water. 600 to 900 mg/L is regarded as fair quality. 900 to 1200 mg/L is regarded as poor quality. greater than 1200 mg/L is regarded as unacceptable.

Evaporation of ocean water and formation of sea ice both increase the salinity of the ocean. However these "salinity raising" factors are continually counterbalanced by processes that decrease salinity such as the continuous input of fresh water from rivers, precipitation of rain and snow, and melting of ice

Salinity affects: farms salinity can decrease plant growth and water quality resulting in lower crop yields and degraded stock water supplies. Excess salt affects overall soil health, reducing productivity. It kills plants, leaving bare soil that is prone to erosion.

2.6 Downstream requirements

Situated or moving in the direction in which a stream or river flows. "The bridge spanned the river just downstream of the rail line"

Situated in or towards the part of a sequence of genetic material where transcription takes place later than at a given point. "A termination signal was found downstream from the coding region" At a stage in the process of gas or oil extraction and production after the raw material is ready for refining.

Something that is moving downstream is moving toward the mouth of a river, from a point further up the river. Something that is downstream is further toward the mouth of a river than where you are. Downstream operations are the processes involved in converting oil and gas into the finished product. These include refining crude oil into gasoline, natural gas liquids,

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diesel, and a variety of other energy sources. The closer an oil and gas company is to the process of providing consumers with petroleum products, the further downstream the company is said to be

- Relevant legislation
- Relevant enterprise policies
- Range of appropriate measuring and testing procedures
- Investigation procedures
- Operations and maintenance policies and procedures
- Occupational health and safety and environmental legislation, acts and procedures
- Impact of the principles of hydraulics on the operation of flows
- Coordination processes
- Principles of scheduling
- System layout
- System operations
- Policies and standard operating procedures
- Communication systems
- Lock out procedures for mechanical and electrical



Self checking -2	Written Test
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Directions: Write the best answer for the following questions. Use the Answer sheet

Provided in the next page: Each question worth two point

1. Write at least five Purposes of environmental flows?(2points)
2. Why we need Nutrients? (2points)
3. Write the most dangerous chemicals known to man? (2points)
4. What is Chemicals? (2points)
5. Write downstream requirements? (2points)

Note: Satisfactory rating – 10 and above pts Unsatisfactory - below 10 pts

Name: _____

Date: _____

Score = _____

Rating: _____

Answer Sheet-1

1. _____

2. _____

3. _____

4. _____

5. _____



Information Sheet-3	Consulting historic system information and stakeholders
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3.1. Introduction

3.1.1 Historic system information

An information system (IS) is a formal, socio technical, organizational system designed to collect Information systems also can be defined as a collection of hardware, software, data, people and procedures that work .Systems Engineering; Sage, S.M. "Information Systems a computer system or set of components for collecting, creating, storing, processing, and distributing information, typically including hardware and software, system users, and the data itself: the use of information systems to solve business problems.

Types of Information System: TPS, DSS & Pyramid Diagram

- Pyramid Diagram of Organizational levels and information requirements.
- Transaction Processing System (TPS)
- Management Information System (MIS)
- Decision Support System (DSS)
- Artificial intelligence techniques in business.
- Online Analytical Processing (OLAP)

The purpose of an information system is to turn raw data into useful information that can be used for decision making in an organization. Many information systems are designed to support a particular process within an organization or to carry out very specific analysis

3.2 Impact of weather

3.2.1. Weather

Weather and weather forecasts affect people's health and lifestyles, the economy, society, and the environment. The degree of impact varies depending upon many factors including weather event type, event timing, event severity, event duration, event location, "unusualness Scientists warn that when global warming happens quickly, these weather events could happen more often, be more severe, and last longer. Wherever it happens, extreme weather can cause illness and death as well as damage to crops, property, animal habitats, and economies.

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3.2.2. Impact of Weather and climate

How important is weather and climate?

Perhaps the most obvious and the most important benefit of weather and climate is that they bring rain, snow and other forms of precipitation. Humans and all other organisms need to consume a regular supply of water to survive.

Weather affects us in a huge number of ways. Climate influences the growth of crops, thus affecting the availability and kind of food we eat. Fluctuations in weather (e.g. dry spells, wet spells) also affect crops. Weather affects what clothes we wear, and soon

3.2.3 Relevant hydrometric information

Hydrometric information is fundamental to the planning, operation and management of water resources and flood defence. Hydrometeorology is defined as the aspects of meteorology which are applied to the solution of hydrological problems.

As such, therefore, it includes the analysis of the hydrological cycle to assist in the effective control and management of surface water and groundwater and the management and control of flood flows. The data used include, for example, rainfall, snowmelt, soil moisture deficit and other climate data, river flows and groundwater levels. The Environment Agency (the Agency) generally uses rainfall information to generate river level or river flow estimates or forecasts.

3.2.4 Previous system deliveries

Delivery system A term used to describe how a national, regional, or local health care system is organized administered, provided, and paid for sometimes to a circumscribed system such as that under the auspices of a specific medical and hospital insurance carrier or health maintenance organization

noun. A means or procedure for providing a product or service to the public. The health care delivery system An acceptable health care delivery system should have two primary objectives (1) it must enable all citizens to access health care services, and (2) the services must be cost effective and meet certain established standards of quality. In many ways, the US health care delivery system falls short of these ideals.

3.2.5 Previous flow rates

To review flowing fluids are characterized by a quantity called the flow rate which is defined as the volume of fluid flowing through an area each second. In a pipe or other enclosed region,

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the flow rate can be expressed in terms of the fluid speed and the cross-sectional area of the pipe. One of the most useful examples where flow rate can be calculated easily is a moving fluid in an enclosed volume (like a pipe), so we will discuss this specific example at length. Some examples are blood flow in your circulatory system and air flow in a building's ventilation system.

The flow rate formula, in general, is $Q = A \times v$, where Q is the flow rate, A is the cross-sectional area at a point in the path of the flow and v is the velocity of the liquid at that point.

The equation of continuity states that for an incompressible fluid flowing in a tube of varying cross-section, the mass flow rate is the same everywhere in the tube. Generally, the density stays constant and then it's simply the flow rate (Av) that is constant.

3.2.6. Operational procedures

Operating procedure: a procedure for operating something or for dealing with a given situation. Procedure, process: a particular course of action intended to achieve a result. "the procedure of obtaining a driver's license"; "it was a process of trial and error".

The purpose of a SOP is to provide detailed instructions on how to carry out a task so that any team member can carry out the task correctly every time. The purpose or objective of a SOP should restate and expand a well-written title. A well-written SOP will facilitate training.

3.3. Stakeholder is

Different organizations will define stakeholders in different ways. A stakeholder provides information to the program, or is otherwise affected by the program. Providing expert advice and consultation as appropriate, defining benefits and a classification system such as high, medium, or low active versus passive. Stakeholder needs and requirements: Stakeholder needs and requirements represent the views of those at the business or enterprise operations level that is, of users, acquirers, customers, and other stakeholders as they relate to the problem (or opportunity) as a set of requirements for a solution that can provide the solution. Stakeholder consultation involves the development of constructive, productive relationships over the long term. Consultation enables us to identify and monitor trends, challenges and perceptions over time with specific groups of stakeholders. It therefore helps us to: Identify and track needs and expectations.

What are the different types of stakeholders?

3.3.1. Types of Stakeholders

- Customers. Stake: Product/service quality and value

- Employees. Stake: Employment income and safety
- Investors. Stake: Financial returns
- Suppliers and Vendors. Stake: Revenues and safety
- Communities. Stake: Health, safety, economic development
- Governments. Stake: Taxes and GDP

3.3.2. role of stakeholders in a project

The stakeholder is anyone who can positively or negatively influence the project, including the customers or users, the project manager and team, the project's sponsor, program and portfolio managers, the PMO functional managers within the organization, and external sellers that provide services or materials for the .Shareholders/owners are the most important stakeholders as they control the business. If they are unhappy than they can sack its directors or managers, or even sell the business to someone else. No business can ignore its customers.

Stakeholders have legal decision-making rights and may control project scheduling and budgetary issues. Most project stakeholders have responsibilities to businesses that include educating developers, financing projects, creating scheduling parameters and setting milestone dates.

3.4 Customers

A customer is an individual or business that purchases another company's goods or services. Customers are important because they drive revenues; without them, businesses have nothing to offer. Customer is a person who buys products or services from a store, restaurant or other retail seller. An example of a customer is someone who goes to an electronics store and buys a TV.

3.8 Government

The political direction and control exercised over the actions of the members, citizens, or inhabitants of communities, societies, and states; direction of the affairs of a state community, etc. political administration: Government is necessary to the existence of civilized society

A government is a group of people that have the power to rule in a territory, according to the law. This territory may be a country, a state or province within a country, or a region. Governments have a police force to make sure people follow the laws.

3.9 Farmer and grower associations

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Farmer organization is a group of farmers with special interests and concerns with developed structure, formal membership, status and functions for its members and with a set of byelaws and rules.

Grower Out grower schemes, also known as contract farming, are broadly defined as binding arrangements through which a firm ensures its supply of agricultural products by individual or groups of farmers.

Agriculture is the process of producing food, feed, fiber and many other desired products by the cultivation of certain plants and the raising of domesticated animals (livestock) Subsistence farming, who farms a small area with limited resource inputs, and produces only enough food to meet the needs of his/her family

3.10 Downstream land holders

Water rights pertain to the legal rights of property owners to access and use bodies of water adjacent to lands they hold. Different types of waters rights exist based on various forms of water that border or exist on a property

Landowners typically have the right to use the water as long as such use does not harm upstream or downstream neighbors. In the event the water is a non navigable waterway the landowner generally owns the land beneath the water to the exact center of the waterway

3.11 Other water authorities

What does water authority mean? Water authority is defined by the lexicographers at Oxford Dictionaries as A municipal body administering a system of water

An official body which is responsible for providing water. If you are concerned about the aluminums levels in your area write to your local water authority for details.

A water board is a regional or national organization that has very different functions from one country to another

3.12 Employees

What does employee mean? An employee is someone who gets paid to work for a person or company. Workers don't need to work full time to be considered employees they simply need to be paid to work by an employer (the person or business that pays them

An employee is an individual who was hired by an employer to do a specific job. The employee is hired by the employer after an application and interview process results in his or her selection as an employee.

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3.13 Customer representative committees

Customer Service Committee. Means the customer service committee to which the Appointee is allocated under section 6; (section 28 of the 1991 Act)

- ✓ A Consumer Representative must be able to analyze scientific data, understand research design, discuss benefits and risks, and evaluate the safety and efficacy of products.
- ✓ A consumer representative is a member of a government, professional body, industry or non-governmental organization committee who voices consumer.
- ✓ A consumer or career representative can give you the opportunity to be part of a health care team and help to improve the services we provide.
- ✓ To support you in this role we will provide you with regular updates such as:
- ✓ Opportunities to be involved as a consumer representative
- ✓ Training and education relevant to your role
- ✓ Opportunities to meet with other consumer representatives for networking and support

3.14 Land care or similar active groups

Land care groups in towns have a strong focus on environmental protection and body's headquarters are well supported, new groups are forming and they are active. Other groups admit 'There is not a lot of long term planning no strategic some groups undertook action planning to define goals and discuss a vision;

3.15 Local communities

Local community: A group of individuals that interact within their immediate surroundings. A typical local community consists of business operators,

A local community is a group of interacting people sharing an environment. In human communities, intent, belief, resources, preferences, needs, risks, and a number of other conditions may be present and common, affecting the identity of the participants and their degree of cohesiveness.

A community is a social unit (a group of living things) with commonality such as norms, religion, values, customs, or identity. Communities may share a sense of place situated in a given



geographical area (e.g. a country, village, town, or neighborhood) or in virtual space through communication platforms.

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Self checking -3	Written Test
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Directions: Write the best answer for the following questions. Use the Answer sheet

Provided in the next page: Each question worth two point

1. Write about Land care or similar active groups? (2points)
2. Write types of stakeholders? (2points)
3. What does employee mean? (2points)
- 4 what is the deference between community and a local community? (2points)
5. What mean Delivery System? (2points)
5. Write the deference between land owners delivery system? (2points)

Note: Satisfactory rating – 10 and above pts

Unsatisfactory - below 10 pts

Name: _____

Date: _____

Score = _____

Rating: _____

Answer Sheet-1

1. _____

2 _____

3 _____

4 _____

5. _____

Information Sheet-4	Confirming performance requirements for an irrigation system management plan.
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4.1. Introduction

Irrigation water management is the act of timing and regulating irrigation water applications in a way that will satisfy the water requirement of the crop without the waste of water, soil, plant nutrients, or energy

Irrigation Management Importance. Irrigation Management is important since it helps determine future Irrigation expectations. Increases in fuel prices means that pumping extra irrigation water increases irrigation expenses without increasing income. High nitrate levels have been found in many areas of the state.

Water resources come in many forms, but the three main categories are saltwater, groundwater and surface water

The important methods of water management

Conservation or water conservation helps to recharge ground water by reducing consumption and using alternative source of water. This method includes rainwater harvesting, groundwater recharge, reuse of Grey water and recycling wastewater

- Ground Water. Groundwater is water that is found underground within rocks
- Well Water. Well water as a source of water can be described by their depth, or by the way they are constructed
- Rain Water. Rain Water
- Surface Water
- Snow melt
- Lake And River Water
- Salt water from oceans

The following are the main factors which must be determined accurately during the planning stage of an irrigation project.

- Type of project and general plan of irrigation works.
- Location, extent and type of irrigable lands,



- Irrigation requirements for profitable crop production
- Available water supplies for the project,

4.2 Service levels

Service level measures the performance of a system. Certain goals are defined and the service level gives the percentage to which those goals should be achieved.

Service level describes usually immeasurable terms, the services a network service

Furnishes a customer within a given time period. When used as a

Service level includes all elements of the particular service provided and the conditions of service availability. The exact measurement related to service levels .

A good SLA is important because it sets boundaries and expectations for the following aspects of data center service provisioning. Customer commitments. Clearly defined promises reduce the chances of disappointing a customer. An SLA drives internal processes by setting a clear, measurable standard of performance

4.3 Capital investment

Capital investment is a sum of money provided to a company to further its business objectives. The term also can refer to a company's acquisition of long-term assets such as real estate, manufacturing plants, and machinery. Here are main investment types, or asset classes, that you can choose from, each with distinct characteristics, risks and benefits.

- Growth investments
- Shares
- Property
- Defensive investments
- Cash
- Fixed interest

4.4 Maintenance levels

The work carried out on equipment in order to avoid its breakdown or malfunction. It is a regular and routine action taken on equipment in order to prevent its breakdown. Maintenance, including tests, measurements, adjustments, parts replacement, and cleaning, performed specifically to prevent faults from occurring.

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Maintenance level. Sophistication and extent of the required equipment, facilities, funding, personnel, technical data, etc., determine the scope of maintenance activity at each maintenance level.

Maintenance. Activities required or undertaken to conserve as nearly, and as long, as possible the original condition of an asset or resource while compensating for normal wear and tear. Maintenance is an expense that, unlike capital improvement (which extends an asset's life), is not capitalized. Field-level maintenance is an on-system or near-system repair process that returns equipment to the user. Sustainment-level maintenance is an off-system repair process that returns equipment to the supply system.

4.5.Types of maintenance

- Preventive maintenance. Preventive maintenance is the most popular type of proactive maintenance
- Predictive maintenance is what savvy maintenance teams aspire to have or are already implementing
- Condition-based maintenance is at the core of predictive maintenance but, on its own, does not rely on technology to determine the condition of an asset
- Scheduled maintenance includes work that is scheduled on a calendar for completion
- Planned maintenance is work that's prepared for in advance of it taking place
- Routine maintenance is a form of time based maintenance and preventive maintenance, though some organizations differentiate between routine maintenance and preventive maintenance
- Emergency maintenance occurs when an asset requires immediate attention in order to keep a facility operational or safe.
- Corrective maintenance. is inherently part of emergency maintenance because, when there is an emergency, something needs corrected or fixed



This information sheet is about **confirming performance requirements for an irrigation system management plan.**

1. Write at least six (6) types of maintenance? (2points)
3. What mean by Service levels? (2points)
4. Write the definition of ground water? (2points)
5. What is Routine Maintenance? (2points)

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Operation Sheet -1	
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Procedures of planning and completing own work schedule

- 1 For Know Your Team
- 2 .Build Shifts around Your Best Employees
3. Establish a Team-Wide Communication Method
4. Get the Schedule Out Quickly
5. Honor Work Preferences and Time-Off Requests As Much As Possible
6. Get Employees to Do Some of the Work Scheduling
7. Let Employees Find Their Own Substitutes

Operation sheet 2	
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Procedures of Techniques of prioritizing work

1. The to-do list
2. Review your workload regularly.
3. Remember the 80:20 rules of workloads
4. ET realistic deadlines for your tasks
5. Allow time for interruptions.
6. Structure your workload
7. Don't let your inbox drive your workload
8. Un, fun, fun.
9. Keep multitasking to a minimum
10. Keep a log of your workload.

Operation sheet 3	
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Techniques of solving problem to develop contingency plans

1. Develop the contingency planning policy statement
2. Conduct the business impact analysis (BIA)
3. Identify preventive controls
4. Create contingency strategies
5. Develop an information system contingency plan
6. Ensure plan testing, training, and exercises
7. Ensure plan maintenance.

LAP Test 1	Practical Demonstration
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Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions: Given necessary reagents, tools and materials you are required to perform the following tasks within 1 hour.

Task 1: select materials and tools Establish team member

Task 2: prepare quick scheduling Build quality control team

Task 3: set the time of working schedule

Task 4: complete plan and working schedule Get Employees to Do Some of the Work Scheduling