



Photo: Jeffery M Walcott / IWMI



**UgIFT**  
**MICRO-SCALE**  
**IRRIGATION PROGRAM**  
Improving farmers' livelihood

**PART 3**

Brochure to be used  
during the farm visit

## **A GUIDE FOR SMALLHOLDER FARMERS:**

*What irrigation equipment should I select?*

SEPTEMBER 2020



Farmer's name: \_\_\_\_\_

Phone number: \_\_\_\_\_

Farmer Unique ID: \_\_\_\_\_

Date of the farm visit: \_\_\_\_\_



MINISTRY OF AGRICULTURE  
ANIMAL INDUSTRY &  
FISHERIES



**Ministry Mission:**

"To transform subsistence farming  
to commercial agriculture"

## Notes:

# THE MICRO-SCALE IRRIGATION PROGRAM

Welcome!

This brochure is Part 3 of a series of brochures that aim to guide you through the Micro-scale Irrigation Program. This brochure will help you during your farm visit by District and Sub-county Officers. This brochure will help you choose the irrigation equipment for your farm. This brochure will also show you how much irrigation equipment may cost. Once you make your choice of the irrigation equipment you prefer, you will sign an agreement that allows the District to ask for quotes from irrigation equipment suppliers on your behalf.

## What is a micro-scale irrigation system?

A micro-scale irrigation system includes the following parts:



**1. a pump**, which can be surface or submersible, and which can be powered by solar or petrol/diesel



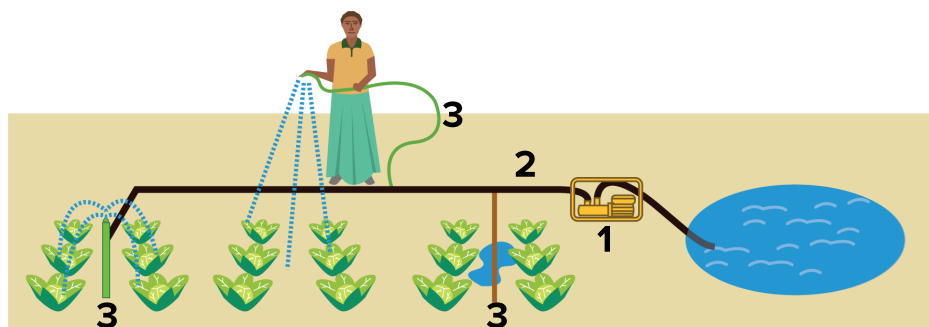
**2. a pipe** to transport water to the field



**3. an on-farm distribution system**, which can be either hosepipe, sprinkler or drip



**4. a tank**, but only if one is required



## This brochure will allow you to:

1 & 2

Choose the pump

3

Choose the on-farm distribution method

4

Decide if you need a water tank or not

5

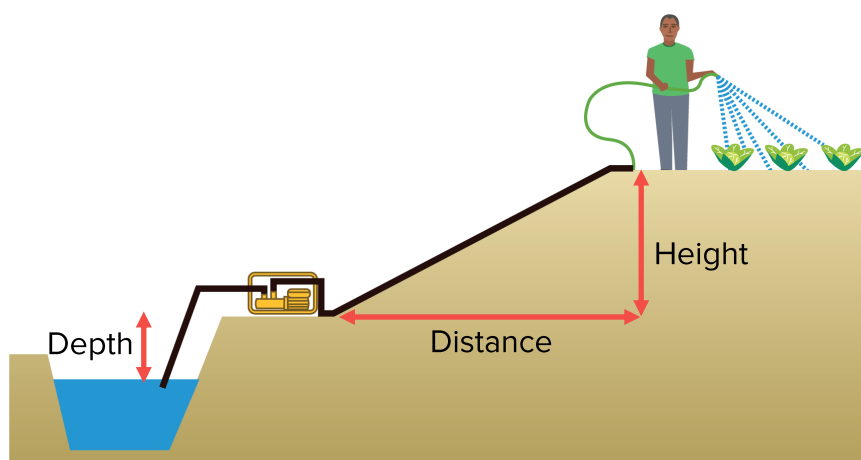
Estimate the costs of your irrigation equipment

## STEP 1. CHOOSE BETWEEN A SURFACE PUMP OR SUBMERSIBLE PUMP

You need to decide whether you will use a surface pump or a submersible pump. This depends on your water source.

### For my farm I need:

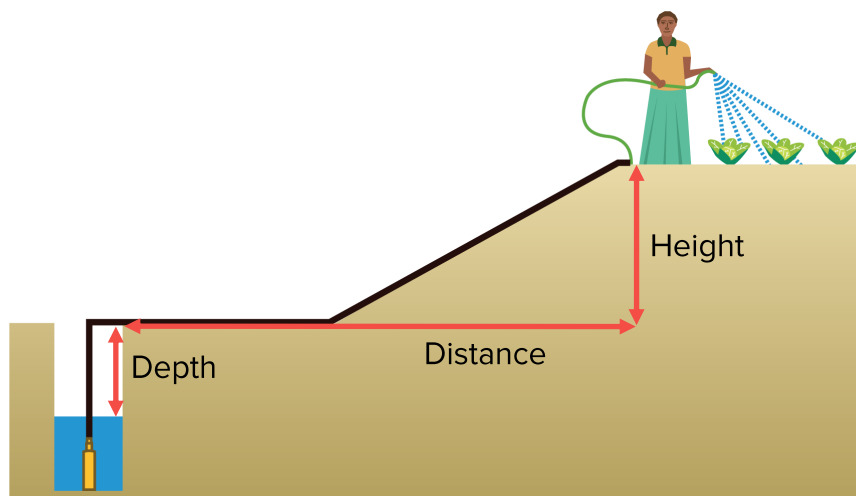
If you get water from a pond, stream, river, lake or groundwater, that is less than 6 metres below ground level, then you can use a **surface pump** that is located on the ground above the water.



#### ☐ Surface pump

In this case, you can choose between a solar powered or a petrol/diesel powered pump. Go to Step 2.

If you get water from a well with water more than 6 metres below ground level, or from a borehole, then you need a **submersible pump** located inside the well or the borehole.



#### ☐ Submersible pump

In this case, your only choice is to use a solar powered pump. Go to Step 3.

## STEP 2: CHOOSE THE POWER SOURCE FOR YOUR SURFACE PUMP

### How much pump pressure will you need to reach your farm?

<b>Distance</b> from the water to the farm	_____ metres x 2m per 100m = _____ metres	+
<b>Depth</b> of the water below the land surface	_____ metres	+
<b>Height</b> difference between the water location and farm	_____ metres	+
<b>Total</b>	_____ metres	+

		Suitable pump		
		Solar	Petrol/diesel	
<input type="checkbox"/>	Less than 30 m	X	X	In this case, you can choose between solar and petrol/diesel powered pump. Continue through Step 2.
<input type="checkbox"/>	More than 30 m		X	In this case, you can only choose a petrol/diesel powered pump. Go to Step 3.

### How to choose between surface solar and petrol/diesel pumps?

#### Solar pump



Example of a solar pump  
(Photo: Futurepump)

#### Petrol/Diesel pump



Example of a petrol/diesel pump  
(Photo: Just water pumps)

Solar and petrol/diesel pumps have different costs:

- **Purchase cost:** This is what you pay for the pump at the beginning. A solar pump costs more to buy than a petrol/diesel pump. However, the Government provides a higher co-payment for a solar pump than for a petrol/diesel pump through the Micro-scale Irrigation Program. This means that the purchase cost of the solar pump is only slightly higher than for the petrol/diesel pump.
- **Running cost:** This is what you pay for fuel, oil, and equipment maintenance. For a solar pump, you don't need to pay for fuel because energy is provided by the sun. For a petrol/diesel pump, you need to pay for fuel and oil.
- **Lifetime:** This is how many years the pump will last before you need to buy a new one. A solar pump lasts longer than a petrol/diesel pump. It will have to be replaced less often.

## STEP 2: ...CONTINUED

Cost factor	Solar	Petrol/Diesel
Purchase cost (farmer co-payment under the Micro-scale Irrigation Program)	Slightly higher	Slightly lower
Running cost	Zero	High
Lifetime	5 to 10 years	1 to 3 years

Solar and petrol/diesel pumps have different characteristics for use:

- **Time of use:** A solar pump can only be used when the sun shines (about 6 hours per day). A petrol/diesel pump can be used anytime.
- **Pollution and noise:** A solar pump produces no pollution or noise. Petrol/diesel pumps produce high amounts of noise and pollution.
- **Other uses:** You may want to use the pump to provide water for your house, power to your house, or simply recharge your phone. A solar pump can help with all three. A petrol/diesel pump can only provide water to your house.

Characteristic	Solar	Petrol/Diesel
Time of use	Daytime only	Anytime
Pollution and noise	None	High
Other uses	High	Some

So far, I prefer to use a: ☐ Solar \_\_\_\_\_ pump ☐ Petrol/diesel pump



## STEP 3. CHOOSE THE ON-FARM DISTRIBUTION METHOD

At this point, you have to choose the irrigation method. You have the following three options: hosepipe, sprinkler, or drip.



Photo: FarmBiz

### Hosepipe

It is a tube used to distribute the water to the field manually.

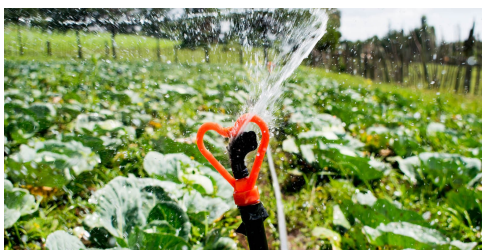


Photo: Futurepump

### Sprinkler

Sprinkler irrigation is a method of applying water that is similar to rainfall. Water is sprayed into the air through sprinklers. It breaks into small water drops that fall to the ground. Sprinklers wet the entire area of soil and the plants.



Photo: Stanford University

### Drip

Drip irrigation is when water comes slowly out of special holes in pipes called emitters. Drip irrigation only wets the ground where emitters are located. It does not wet the plants.

On-farm distribution methods have different costs:

- **Purchase cost:** A hosepipe costs less than a sprinkler system, which costs less than a drip system.
- **Running cost:** A hosepipe costs less than a sprinkler or drip system because hosepipes require less maintenance.
- **Lifetime:** A hosepipe lasts longer than a sprinkler system, which lasts longer than a drip system.

Cost factor	Hosepipe	Sprinkler	Drip
Purchase cost	Low	Medium (Two times more than hosepipe)	High (Five times more than hosepipe)
Running cost	Low	Medium	High
Lifetime	5 to 8 years	5 years	2 to 3 years

## STEP 3 ...CONTINUED

On-farm distribution methods have different characteristics for use:

- **Labour required:** You may irrigate your farm for many hours per day for many days. This will have an effect on your time available to do other things. Hosepipe irrigation takes the most time because you need to be present the entire time. Sprinkler require time because you need to be there to move the sprinkler. Drip requires the least labour because it can be automatized.
- **Water quality:** There can be a lot of dirt and algae in the water without any problem when irrigating with a hosepipe. There may be dirt and algae in the water when irrigating with a sprinkler. The water needs to be very clean with drip irrigation because the filter will quickly block up.
- **Crops:** It is better to keep the leaves dry for some crops like lettuce and tomatoes to avoid disease. Sprinkler irrigation wets the whole plant so it can result in fungal disease. It is easier to irrigate permanent crops like banana or coffee with a system that remains permanently in place.

Characteristic	Hosepipe	Sprinkler	Drip
Labour needed	High (Six times more than drip)	Medium (Two times more than drip)	Low
Technical skill required	Low	Medium	High
Water quality needed	Any	Medium	Good quality, little sediment and algae
Permanent crops	Suitable	More suitable	Very suitable
Vegetable crops	Suitable	Suitable	Very suitable

So far, I prefer: ☐ Hosepipe ☐ Sprinkler ☐ Drip



## STEP 4. DECIDE IF YOU NEED A WATER TANK



Photo: Global opportunity explorer

Water tanks increase the flexibility of an irrigation system. They are useful when:

1. The irrigation system can only supply small amounts of water. For example, small solar pump or small well or borehole water supply.
2. Using drip irrigation because it provides pressure control.
3. There are cloudy days and you have a solar pump.

The table below shows how much area different size tanks can serve:

Tank size	Daily irrigation requirement for
L	Acre
5,000	0.25
10,000	0.5
20,000	1

So far, do you want to have a tank? ☐ Yes ☐ No

What size tank would you like to have? ☐ 5,000 L ☐ 10,000 L ☐ 20,000 L

## STEP 5. ESTIMATE THE COST OF YOUR IRRIGATION EQUIPMENT

As a final step, you can calculate the approximate cost of the irrigation equipment. You can also calculate your co-payment. Costs are indicative. The actual cost for the irrigation equipment of your choice will be confirmed after irrigation equipment suppliers provide quotes and the District selects the lowest one on your behalf.

My farm is \_\_\_\_\_ acres

I choose:	Approximate costs
<b>Pump:</b> <input type="checkbox"/> surface <input type="checkbox"/> solar <input type="checkbox"/> submersible <input type="checkbox"/> petrol/diesel	<div>_____ million Shillings</div>
+	
<b>On-farm distribution method:</b> <input type="checkbox"/> hosepipe <input type="checkbox"/> sprinkler <input type="checkbox"/> drip	<div>_____ million Shillings</div>
+	
<b>Delivery pipe:</b> _____ metres long	<div>_____ million Shillings</div>
+	
<b>Tank:</b> <input type="checkbox"/> 5,000 litres <input type="checkbox"/> 10,000 litres <input type="checkbox"/> 20,000 litres	<div>_____ million Shillings</div>
=	
<b>Approximate total costs:</b>	<div>_____ million Shillings</div>

## STEP 5 ...CONTINUED

Approximate total cost:

\_\_\_\_\_ million Shillings

Lower range

\_\_\_\_\_ million Shillings

Government co-payment

\_\_\_\_\_ million Shillings

Your co-payment

\_\_\_\_\_ million Shillings

Upper Range

\_\_\_\_\_ million Shillings

Government co-payment

\_\_\_\_\_ million Shillings

Your co-payment

\_\_\_\_\_ million Shillings

### What to do if your co-payment is too high?

If your range of co-payment is too high for what you can afford, you can modify some of your choices to reduce cost. For example:

- **STEP 3:** If you have selected a sprinkler or drip on-farm distribution method, change to hosepipe.
- **STEP 4:** If you have selected a tank, change to a smaller tank or no tank.
- **STEP 5:** Reduce the farm area to be put under irrigation.
- **STEP 2:** If you have selected a solar pump, change to a petrol/diesel pump.



## Useful contacts

**Agricultural Engineer**

**Given Name** \_\_\_\_\_

**Surname** \_\_\_\_\_

**Telephone number** \_\_\_\_\_

**District or Sub-County Officer**

**Given Name** \_\_\_\_\_

**Surname** \_\_\_\_\_

**Telephone number** \_\_\_\_\_

✉ You can find out more information by writing an email to **UgIFTirrigation@agriculture.go.ug**

🌐 Website: **<https://www.agriculture.go.ug/micro-scale-irrigation-program/>**

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