



# Technologies for Small-Scale Irrigation for Horticulture

*Irrigation technology summaries from the Innovations in Dry Season Horticulture Project in Uganda*

## Micro Furrows

Micro-furrows are very short furrows with flat, level bottoms that run along the contour of a slope, filled one at a time to allow water to infiltrate. Unlike traditional furrow irrigation, micro-furrows can be set across a moderate slope. They can be filled using various methods, such as pipes or canals.

The short length (<10 meters) ensures the entire furrow receives approximately the same amount of water, and the flat bottom allows water to infiltrate at an even depth along the entire length of the furrow. This results in a high water use efficiency.

Benefits include:

- Very little loss of water below the root zone or running off the field
- Good uniformity of water applied along the furrow
- Requires little equipment to move water through the field
- Can be used to drain water in times of excess rain



## Conditions for using micro furrows

### Crops

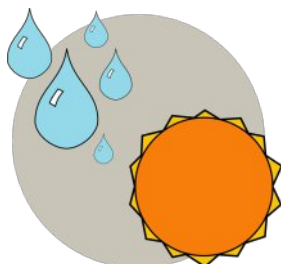
*Vegetables, Watermelon*



*Most vegetable crops perform well*

### Seasons

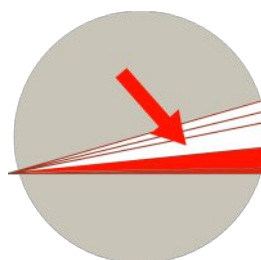
*Rainy and dry*



*Appropriate for year-round cultivation; furrow ends must be opened during rain to prevent flooding*

### Slope

*Mild to moderate*



*Can be used on mild cross-slopes, and on mild to moderate main slopes*

### Water Supply

*Various*



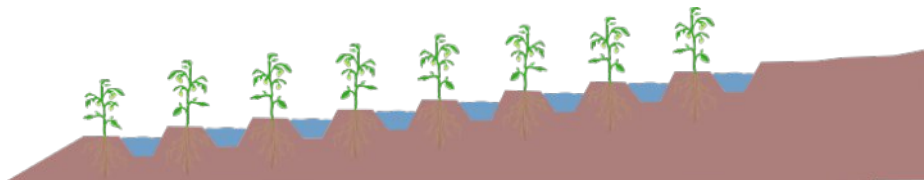
*A variety of water supply conditions are possible, including pumped water, piped gravity water, and canal-fed*

## Innovations in Dry Season Horticulture Project

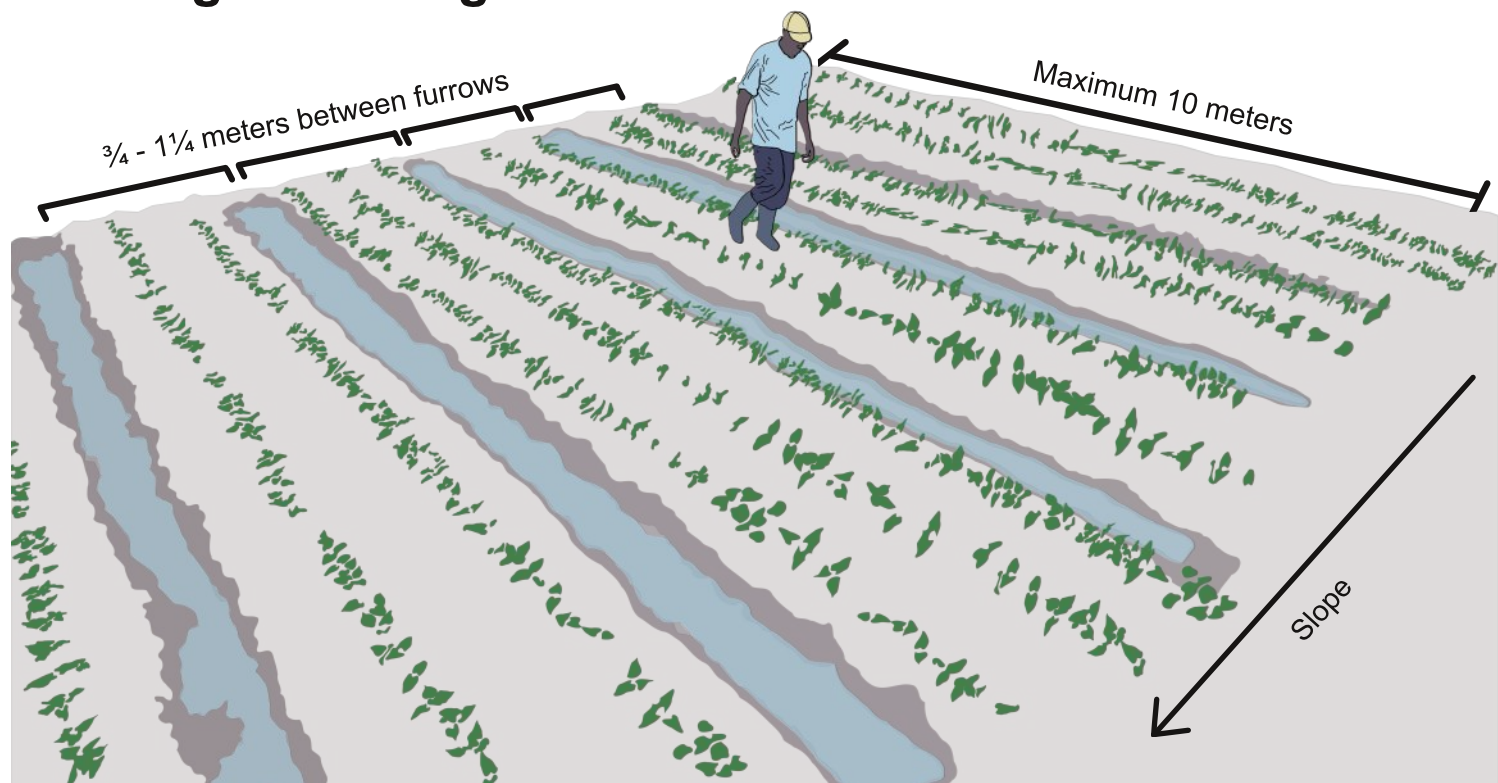
The Innovations in Dry Season Horticulture Project engages in participatory research and development with women and smallholder farmers in Uganda to improve irrigation systems, working within the local context and with a focus on gender issues. Find out more at [www.hortirrigation.org](http://www.hortirrigation.org).

*The Innovations in Dry Season Horticulture Project is supported by the Horticulture Innovation Lab and the Global Center for Food Systems Innovation with funding from the U.S. Agency for International Development, as part of the U.S. government's global hunger and food security initiative Feed the Future.*

Cross-section view of micro furrow construction on a moderate to steep main slope: build terraces prior to digging furrows



## Building and using micro furrows



**1. Identify the main slope of the field.** Use a tight rope of 10m or less and a spirit level to identify a flat cross slope. If the main slope is very steep, first make terraces to make the slope more manageable.

**2. Dig furrows** 10 to 15 centimeters deep, spaced every  $\frac{3}{4}$  -  $1\frac{1}{4}$  meters (closer for sandy soils, farther for heavier clays). The maximum length should be 10 meters, and closed on both ends.

**3. Level the furrow bottoms** and the tops of beds by eye, then add water to expose raised parts of the furrow.

**4. If using canals as the water source, dig a feeder canal** perpendicular to the furrows. If using piped water, **fill furrows directly** with the pipe.

**5. Fill the first furrow** up to the top, then switch water to the next furrow in the line, up to the last.

Then return to the first furrow. By this time all or most of the first furrow's water should have infiltrated.

**6. Continue irrigating** each furrow in a rotation until water has entered into the soil at least halfway under the width of the bed.

**7. In case of rain, open ends of furrows** to drain excess water and avoid waterlogging.

## Limitations and challenges

- This method requires a high amount of up-front labor in digging and carefully leveling the furrows; the system performs poorly if the furrows are not level
- Micro furrows are not appropriate for steep land
- Field can be waterlogged during rain if the furrow ends are not opened
- Filling each furrow requires some labor in closing the ends and moving the inflow

