

Bottle traps are an agricultural technology used to lure insects inside containers (bottles) containing bait of either food or chemical attractants. The objective is to lure pest insects to identify them for pest control, as part of overall pest monitoring, including field walks, observation and crop inspections. In larger fields they are used solely for pest identification. In smaller fields a number of traps can be used as a pest control method, trapping the insects, but this is not a common approach. Bottle traps must be installed in locations close to or amongst crops and across the farm in order to attract insects for identification and should be used throughout all cropping season to ensure that pests can be identified earlier. As a component of Integrated Pest Management, bottle traps with different lures or baits can be used to attract and identify most types of aphids and mites, fruit flies, stem borers, and fall army worm. While many of the lures and baits can be made at home or on the farm, pheromone-based baits need to be purchased from agricultural suppliers. While this introduces costs, bottle traps and lures can contribute significantly pest management, through early identification so appropriate action can be taken. This technology can contribute to climate smart agriculture objectives, as bottle traps and lures can reduce the amount of pesticides used, reducing greenhouse gas emissions; they can help with identifying new pests and insects as climates shift; and as pests are identified or reduced, productivity can increase. It is important for farmers and workers to keep records of pests identified to ensure that appropriate responses are enacted. There could be cases where infestation levels are low and the cost of taking action may be more than nominal crop losses. However, the opposite may be true, but decisions cannot be made without relevant information for extension workers to discuss with farmers.

MOST SUITABLE AGRO-ECOLOGICAL CONDITIONS

Value chain



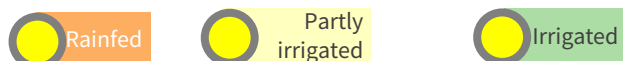
Soil texture



Climatic zone



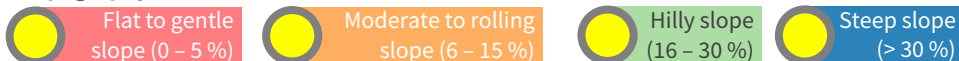
Water source



Annual average rainfall (mm)



Topography



MOST APPROPRIATE CONDITIONS AND REQUIRED INPUTS

Farming system

Does it require collective action



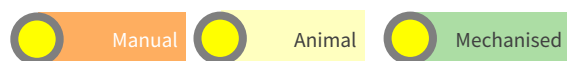
Characteristics



Farm size (ha)

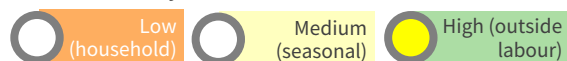


Mechanisation



Human resources

Labour intensity - level of effort

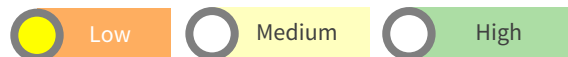


Gender/youth smart (low investment/low labour requirements)

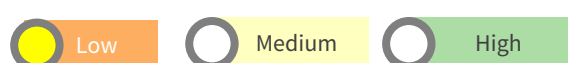


Financial resources

Initial investment



Maintenance Costs



Access to finance capital or credit required



Enabling Environment

Extension support



Access to inputs



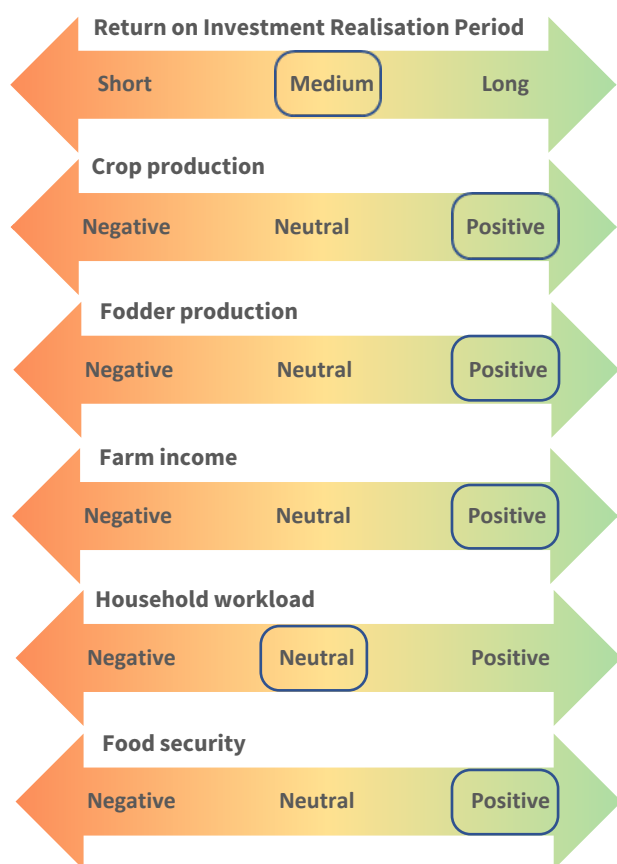
Market access



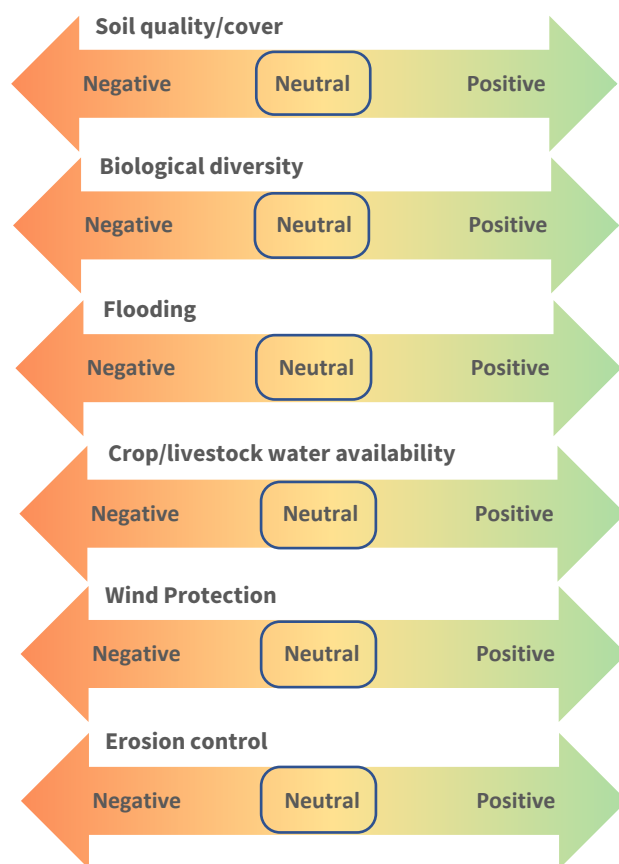
The purpose of this technical brief is to guide where this **practice, technology or strategy** could be applied. It may be applicable in other circumstances, but this brief focuses on where it is possibly **most suitable**. Content is general, and should be contextualised depending upon locality. The brief provides an overview, details of appropriate agroecological characteristics, appropriate conditions and inputs, possible outcomes and impacts, how the **practice, technology or strategy** should be applied, potential benefits and drawbacks, and provides suggestions for further reading in terms of CCARDESA materials and other sources, including those used to develop this technical brief.

POSSIBLE IMPACT/OUTCOMES

Socio-Economic Impacts Positive or Negative



Ecological Impacts Positive or Negative



These descriptors indicate whether the practice, technology or strategy has a positive, neutral, or negative impact or outcome. Those with no box are deemed not-applicable.

TECHNICAL APPLICATION

To effectively use mechanical bottle traps, the following should be carried out:

Bottle-trap

- **Step 1:** Obtain 2L plastic water or soft-drink bottles
- **Step 2:** Rinse bottles thoroughly to avoid contents affecting lure.
- **Step 3:** Cut bottle horizontally using sharp scissors or knife, ensure that the top-half is slightly shorter than lower-half.
- **Step 4:** Turn the shorter top-half upside down and insert into lower-half ensuring the top-half does not touch the lower surface of the bottom-half.
- **Step 5:** Poke holes in both sides, penetrating both layers (top and bottom halves) and insert string, cord, or wire to create a handle.
- **Step 6:** Hang on tree branches or on thick wire or wooden stands around field perimeter and in larger fields within fields.

Specially designed all army worm traps can be purchased at agricultural suppliers. Farmers may also need a magnifying glass to identify insects.

Lures or bait

- **Step 1:** Identify the types of insect or pest you wish to lure, to ensure the correct mix.
 - o For fall army worms, use a pheromone lure – which should be purchased from an agricultural supplier
 - o For maize stalk/stem-borers, again pheromone bait is the most effective.
 - o Flies are attracted by sugar-based solutions, or protein (meat) based for carrion flies
 - o Fruit flies are attracted by ripe-fruit, cider vinegar, beer and wine.
- **Step 2:** Place 2 to 4 cm of lure at the bottom of the lower half of the bottle, depending on size of the bottle – the larger the bottle, the more lure. Ensure that the lure smell must be strong, but not too intense so that it attracts insects rather than chasing them away.
- **Step 3:** Use only one lure per bottle trap as more than one might cause contamination leading to ineffective attractants.
- **Step 4:** Clearly mark bottles indicating the type of lure in use – permanent marker pen.

Use of disposable gloves is advisable when handling lures.

Unopened pheromone lure packets should be kept in a cool, dry places – preferably a refrigerator.

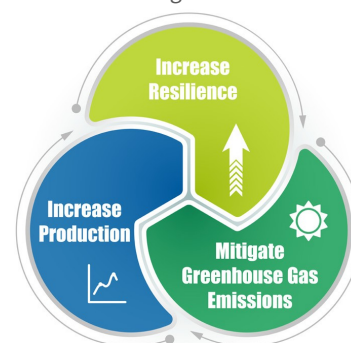
CLIMATE SMART AGRICULTURE OUTCOME(S)

Reflecting how this **practice, technology or strategy** contributes to Climate Smart Agriculture outcomes

Can lead to reduced usage of pesticides, hence reducing GHG emissions.

As climate changes, pests and insects will also change. Bottle traps will help.

The use of bottle traps can be used to identify pests for control, supporting productivity through appropriate pest control.



SUMMARY/KEY ISSUES

Benefits

- Bottle trapping is a cheap and effective method for monitoring insects on a farm and identifying those that may affect productivity and/or lead to significant losses.
- This technique can be used to identify the insect that are infesting the field and which areas they are more concentrated, providing information for targeted interventions.
- In smaller fields, or in times of intense infestation, bottle traps themselves can be used to lure and control pests

Drawbacks

- Precaution is required when handling chemical-based lures as they can be harmful to humans and animals, and can negatively impact crop yield if used incorrectly.
- Some lures can only be purchased at agricultural suppliers.
- Cannot be used operationally to control pests in larger fields.

REFERENCE MATERIAL

CCARDESA Related Content

- CCARDESA, 2019. KP19 Climate Smart Pest and Disease Control for Maize and Sorghum. CCARDESA, Gaborone, Botswana

Additional Information

- Arthurs, S. Hunsberger, A. [Do it Yourself Insect Pest Traps](#). University of Florida.
- The Food and Agriculture Organisation (FAO), 2016. [Establishment of pest free areas for fruit flies \(Tephritidae\)](#). Rome, Italy.
- The Food and Agriculture Organisation (FAO), 2018. [FAO Guidance Note 3 – Fall Armyworm Trapping](#). Rome, Italy.
- Dept of Agriculture and Rural Development, 2016. [Insect pests of maize in Kwazulu-Natal](#). Kwazulu-Natal Province.
- Reliefweb 2017. [Africa's most notorious insects – the bugs that hit agriculture the hardest](#). Reliefweb website.
- Livingseeds 2019. [Inset traps and lures](#). Living Seeds website.