

Integrated Pest Management

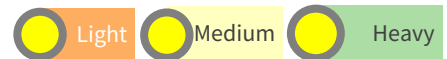
Integrated Pest Management (IPM) is the careful consideration of all available pest control techniques and subsequent integration of appropriate measures that discourage the development of pest populations and keep pesticides and other interventions to levels that are economically justified and reduce or minimise risks to human health and the environment, focusing on all practical options for reducing or eliminating pesticides. The practice of IPM for crop protection is widely encouraged, as the practice can enhance crop production and reduce risks associated with use, storage and management of pesticides. The integrated nature of this approach ensures that it is climate smart, as it utilises the best possible options to ensure sustainable productivity, which will in turn allow adaptation to climate change. However, as it may require the use of pesticides as one strategy, the climate-smartness may be affected.

MOST SUITABLE AGRO-ECOLOGICAL CONDITIONS

Value chain



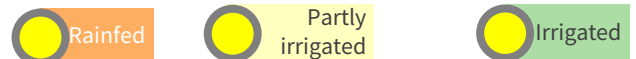
Soil texture



Climatic zone



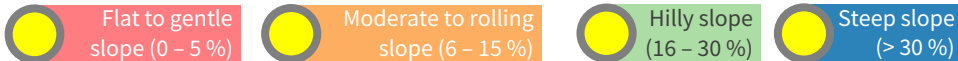
Water source



Annual average rainfall (mm)



Topography



MOST APPROPRIATE CONDITIONS AND REQUIRED INPUTS

Farming system

Does it require collective action



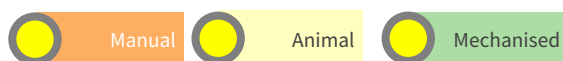
Characteristics



Farm size (ha)

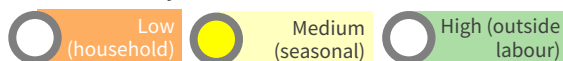


Mechanisation



Human resources

Labour intensity - level of effort

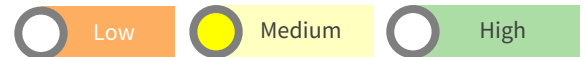


Gender/youth smart (low investment/low labour requirements)

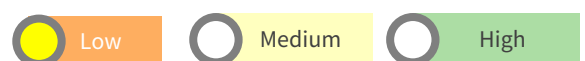


Financial resources

Initial investment



Maintenance Costs



Access to finance capital or credit required



Enabling Environment

Extension support



Access to inputs



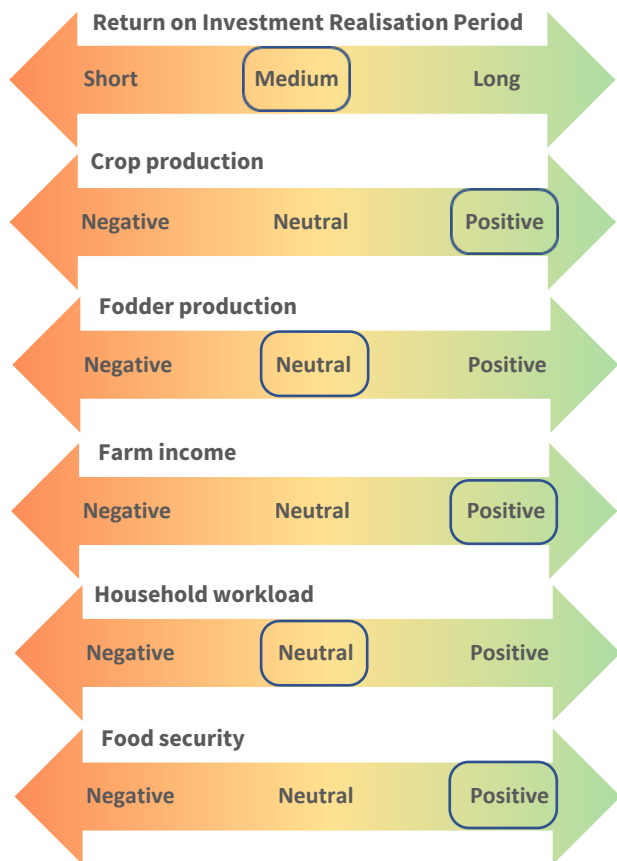
Market access



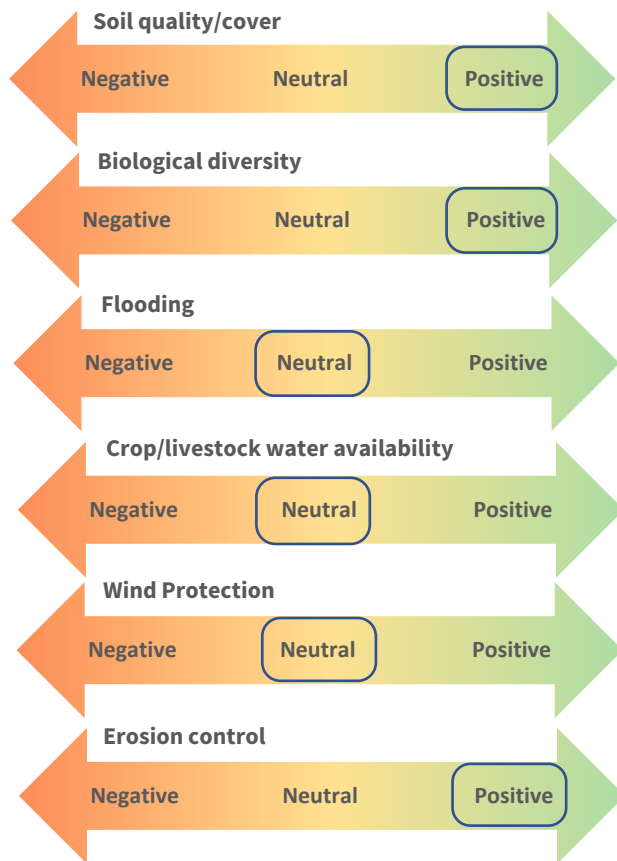
The purpose of this technical brief is to guide where this **practice, technology or strategy** could be applied. It may be applicable in other circumstances, but this brief focuses on where it is possibly **most suitable**. Content is general, and should be contextualised depending upon locality. The 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 leverage integrated pest management:

- **Step 1:** Identify damage and responsible pest. Regular crop monitoring is important, to ensure early identification. Bottle traps are useful for capturing samples to examine and identify a pest.
- **Step 2:** Learn about the pest and host life cycle and biology.
- **Step 3:** Monitor or sample environment for pest population.
- **Step 4:** Establish action threshold. If aiming to tackle weed infestation, intervention must occur before the weed matures and begins spreading seeds. Some thresholds are high. For example, if dealing with caterpillars, soya beans can tolerate a certain level of defoliation without it impacting crop yield.
- **Step 5:** Identify IPM response tactics.
 - o **Cultural methods** –planting crops that are adapted or suited to conditions and responding to their water, nutrient and shelter needs
 - o **Physical methods** – mechanical weeding, such as mechanical weeding or using organic or plastic mulch to cover the ground to reduce weed presence/success.
 - o **Genetic methods** – selecting modified or adapted pest-resistant varieties.
 - o **Biological methods** – using natural predators, push-pull approaches, intercropping, etc. and use of use of organic pesticides.
 - o **Chemical methods** – considering all levels of toxicity – from pheromone deterrents to conventional pesticides.
- **Step 6:** monitoring for ongoing efficacy, and adjustment of tactics where relevant/necessary. Aiming at all times to use chemical pesticides rationally and as a very last resort.

In the cases where chemical pesticides are used as part of an IPM strategy, the Agri-Intel website is an invaluable resource, which provides detailed chemical management advice: <https://www.agri-intel.com>

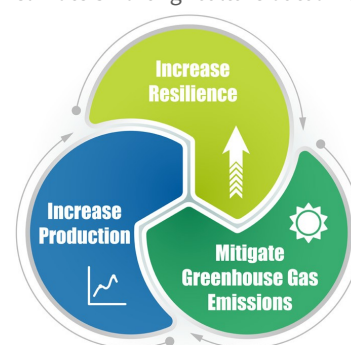
CLIMATE SMART AGRICULTURE OUTCOME(S)

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

Practical reduction or elimination of pesticide use reduces or removes the contribution to greenhouse gas emissions.

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IPM maximises opportunities for agricultural productivity while minimising or eliminating the use of pesticides.



SUMMARY/KEY ISSUES

Benefits

- IPM is the agricultural practice of combining several practices to maximise benefits.
- Pesticides are used following the safety information given on the packaging, when other approaches are not effective

Drawbacks

REFERENCE MATERIAL

CCARDESA Related Content

- CCARDESA, 2019. KP19 Climate Smart Pest and Disease Control for Maize and Sorghum. CCARDESA, Gaborone, Botswana
- CCARDESA, 2019. KP20 Climate Smart Pest and Disease Control for Rice. CCARDESA, Gaborone, Botswana
- CCARDESA, 2019. Technical Brief 07 Intercropping. CCARDESA, Gaborone, Botswana
- CCARDESA, 2019. Technical Brief 08 Relay cropping. CCARDESA, Gaborone, Botswana
- CCARDESA, 2019. Technical Brief 13 Mulching. CCARDESA, Gaborone, Botswana
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- CCARDESA, 2019. Technical Brief 19 Weed Control. CCARDESA, Gaborone, Botswana
- CCARDESA, 2019. Technical Brief 56 Cultural Control Continuous Long-Term Practices. CCARDESA, Gaborone, Botswana
- CCARDESA, 2019. Technical Brief 57 Resistant Varieties. CCARDESA, Gaborone, Botswana
- CCARDESA, 2019. Technical Brief 58 Push/Pull Systems. CCARDESA, Gaborone, Botswana
- CCARDESA, 2019. Technical Brief 60 Mechanical: Weeding. CCARDESA, Gaborone, Botswana
- CCARDESA, 2019. Technical Brief 61 Bottle-traps. CCARDESA, Gaborone, Botswana
- CCARDESA, 2019. Technical Brief 62 Biological: Encouraging Natural Predators. CCARDESA, Gaborone, Botswana
- CCARDESA, 2019. Technical Brief 63 Chemical: Organic pesticides. CCARDESA, Gaborone, Botswana

Additional Information

- CGIAR, 2017. Climate-Smart Pest Management: Implementation guidance for policymakers and investors.
- The Food and Agriculture Organisation (FAO), 2019. [AGP – Integrated Pest Management](#). Rome, Italy.
- The Food and Agriculture Organisation (FAO), 2014. [Environmental and Social Management Guideline, Pest and Pesticides Management](#). Rome, Italy.
- The Food and Agriculture Organisation (FAO), 2017. [Family Framing Knowledge Platform-How to make natural pesticide](#). Rome, Italy.
- The Food and Agriculture Organisation (FAO), 1992. [Towards integrated commodity and pest management in grain storage](#). Rome, Italy.
- Heeb, L, Jenner, E, Cock, MJW. 2018. [Climate-smart pest management: building resilience of farms and landscapes to changing pest threats](#). Journal of Pest Science (2019) 92:951–969.
- PennState Extension 2011. [Steps of Integrated Pest Management](#). Pennsylvania State University.