



Food and Agriculture
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Zimbabwe Review of FAW Management Options

By

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Background information

- Country level assessments indicate wide spread infestations mainly for the maize crop.
- Effective control is recommended at early instar stage & early crop development stage (vegetative period).
- There have been mixed messages in terms of options for control of fall armyworm and the small holder farmer has been on the receiving end.
- Objective is to stratify and provide key messages for farmers in Zimbabwe.





Use of non-chemical Integrated Pest Management options by small holder

Experience has shown that farmers have been using options that are at their disposal e.g.

- use of botanicals, detergents, ash, soil, sugar etc.;
- hand picking and crushing of eggs and larvae;
- Use of fish soup to attract natural enemies like ants;
- Mixed cropping practices;
- Conservation agricultural practices;
- Planting early in the season to escape higher populations of the pest;
- Use of bio-pesticides, diseased worms;





Use of non-chemical Integrated Pest Management options by small holder

- The objective of IPPM is to reduce the use of and reliance on pesticides to control pests in crops.
- IPPM is a further development of IPM expressing a stronger integration into the entire crop management with the objective of reducing and where possible eliminating the use of pesticides by application of suitable crop management.





Recent developments in key principles for FAW management

- **Good Agricultural Practices**
- **Agro-ecological approaches**
- **IPM interventions using the PAMS terminology**
 - **Prevention**
 - **Avoidance**
 - **Monitoring**
 - **Suppression**





Conservation agriculture, cultural control and FAW damage mitigation

- Overall enhancement of biological activity and diversity of the cropping environment is an important element for natural pest management under IPPM and IPM (breaking of pest cycles through variation of crops)



Cultural Control of Pests

- Cultural controls are the oldest methods that have been used to manage pest populations.
- **Cultural control** is a **method of crop protection** using careful **timing and a combination of agronomic practices** to make the environment **less favorable for the increase of pests**.
- The objective is to achieve reduction in pest numbers, either below economic injury levels, or sufficiently to allow natural or biological controls to take effect.



Strategies of cultural control

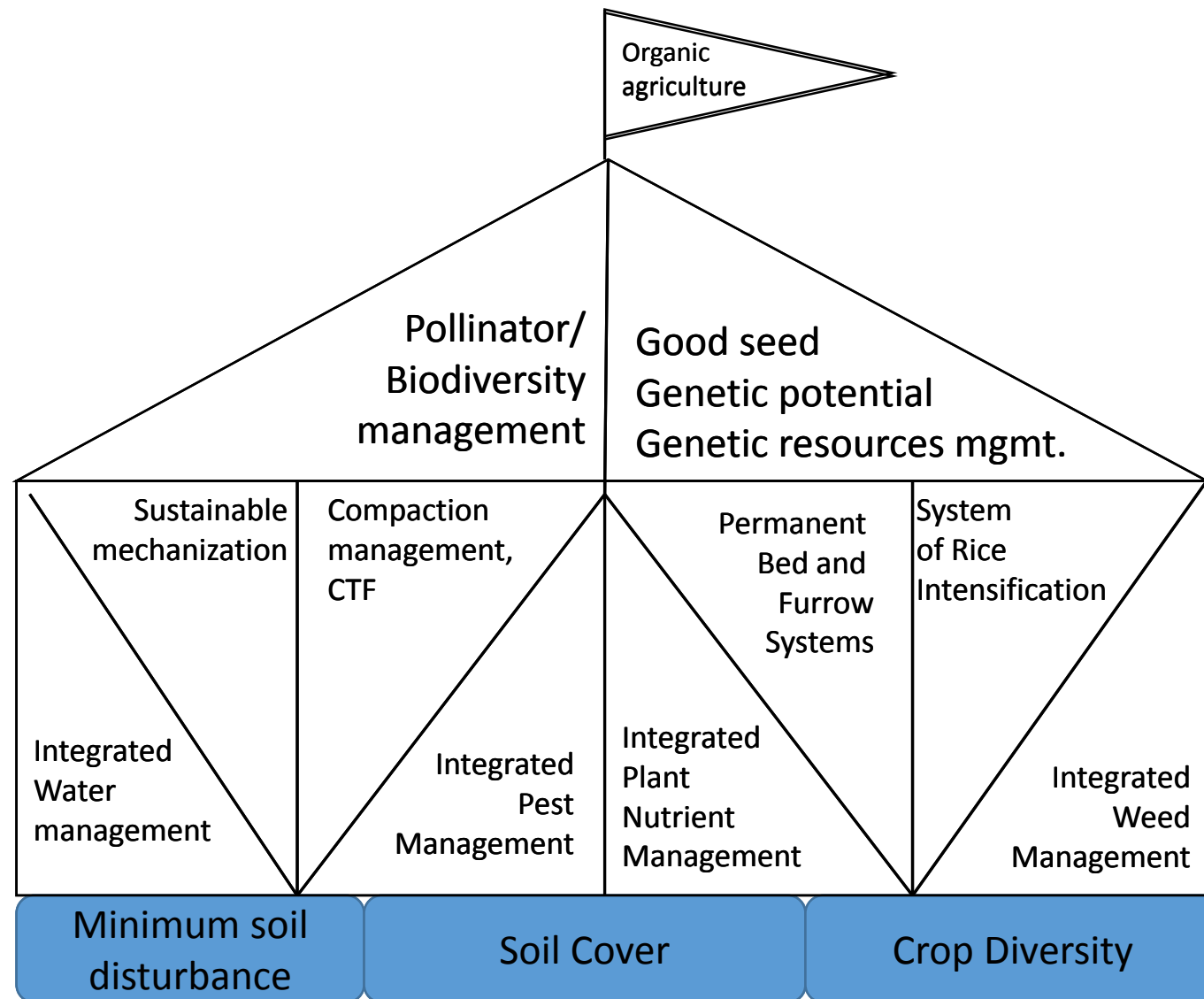
- i) Make the crop or habitat **unacceptable** to pests by interfering with their oviposition preferences, host plant discrimination or location by both adults and immatures.
- ii) Make the crop **unavailable** to the pest in space and time by utilizing knowledge of the pest's life history, especially its dispersal and overwintering habits.
- iii) Reduce pest survival on the crop by **enhancing** its natural enemies, or by **altering** the crop's susceptibility to the pest.



Conservation Agriculture and FAW Mitigation

The Concept and SCPI:

CA does not solve ALL problems (NO Panacea) but complemented with other best practices CA base allows for high production intensity and sustainable agriculture in all systems.





Conservation agriculture and FAW mitigation

Observations by CIMMYT in Zimbabwe

- Comparing infestation levels in CA and conventional plots, in combination with different varieties and plant densities.
- Increases the **biological activity** –macro-(spiders, beetles); meso-(fungi); micro-fauna (bacteria).
- Effective suppression observed both in farmers' fields and trials.





Use of Pesticides

- Initial response to FAW and impacts of heavy reliance on pesticides
- However a lot of challenges associated with pesticides
- Highly Hazardous Pesticides with focus on some HHPs reported to have been used for FAW control (only 6-10 out of 61 considered low risk and efficacious)
- Low Risk pesticides e.g. Biopesticides and botanicals
- SAPReF and the SAPReF FAW Roadmap with regards to FAW management



Use of Pesticides

- Brazil has warned Africa not to ‘go the pesticide route for FAW’
- Small holder family maize farmers in Mesoamerica have been managing FAW in maize for centuries without heavy reliance on synthetic pesticides
- Illegal trade; decanting; poor labelling,
- High incidences of human, livestock; wildlife poisoning + other environmental risks although reporting is poor and inconsistent
- Pesticide external costs/hidden costs grossly overlooked



Decanting
and No
PPE



Wrong maize
growth stage to
apply. Ineffective
and risk of high
residues in the
grain No PPE



No PPE

Pesticide Risks in Smallholder production systems

- Most S/H farmers in Africa do not use pesticides in their maize production and that includes Zimbabwe
- Sustained use of pesticides is not economically viable for most of the maize production systems and introduces risks to human health and the environment and also suppresses natural enemy populations.
- Heightened risks are to vulnerable members of the society e.g. women who perform most of the farm tasks.
- Heightened risks to consumers – pesticide residues in the staple food as well as the intercropped vegetables/legumes.
- NB: Some Highly Hazardous Pesticides (HHPs) have been used across the African continent to control FAW



Why flag HHPs that have been used for FAW?

HHPs need special attention. They can present:

- High acute human toxicity –up to 2 million; 200, 000 deaths
- Chronic human toxicity
- Severe environmental hazards

→ Concerns about occupational and food safety as well as long term health...more so when used on staple food and vegetables



Why do HHPs need special attention?

- Over 95% of pesticide poisonings occur in Lower and Middle Income Countries (LMICs)
- A small group of HHPs is responsible for a high proportion of poisoning incidences
- Most farmers are not able to meet safety requirements for HHPs
- Less hazardous alternatives are available in many cases





Farmer profiling for FAW management

Farmers in the Southern African sub-region can be generally classified into three broad categories

Small-scale farmers:

- These in general use few, if any, external inputs. They are subsistent and tend to recycle seeds or use traditional cultivars of crops and rely on rainfall to produce crops. They largely rely on family labour and hardly use mechanical implements using the hand hoe for cultivation.

Medium – scale (Emergent) farmers;

- This category constitutes farmers who are relatively better resourced and hence are better able to afford and adopt technologies such as improved seed, small scale irrigation initiatives, agro-chemicals for pest control and mechanized tillage practices.

Commercial farmers

- They use heavy equipment to cultivate the land as well as other machinery to spray pesticides, and irrigate their fields when rainfall fails. They are able to hire labor and technical services, and have access to information and new technologies.





Farmer profiling for FAW management

- Clearly not all farmers can adopt or afford all types or ways to effectively control the FAW. The following factors seem to determine what options of control a particular farmer chooses
 - **Available resources**
 - **Type of farming**
 - **Farmer knowledge and skills**
 - **Availability of options**
 - **Access and Influence from service providers**
- In this case there is no one fits all concept, rather factors above define farmer profile and, in the end, determine what control methods a farmer can adopt/afford to control the FAW;
- Critical to make considerations of farmer profiles and provide options most suited to their profile for their choice





Farmer profiling for FAW management

The following questions will become applicable

- Which options are available for the different categories of farmers?
- Would farmers adopt these methods and how best can they be persuaded to adopt?
- What are they currently employing for FAW management?
- How does it relate to the options recommended and how can these be integrated in their farming practices?





Farmer profiling for FAW management

Small-scale farmers;

- **Regular Scouting:** early warning, preparedness;
- **No Synthetic pesticides;** resource constrained;
- **Natural Pesticides;** Botanical plants such as Neem and tephrosia extracts, pawpaw, chilli;
- **Physical control methods;** crush eggs, pick and destroy larvae;
- **Early planting; no staggered planting**
- **GAPs**
- **CA, crop rotation, intercropping with legumes and other cultural practices; push and pull and its derivatives / agroforestry;**





Farmer profiling for FAW management

Medium Scale farmers/ Emergent Farmers:

- **Regular Scouting**
- **IPM with synthetic pesticides combination**
- **Low-risk pesticides**
- **Non-Chemical alternatives:** e.g. crop rotation, fallow;
- **Cultivation techniques;** early sowing dates and high plant densities, or conservation tillage practices and the modified “push and pull” technique.
- **Tolerant cultivars**
- **Improve crop vigor;** Use of balanced fertilization, liming and irrigation to ensure plant vigor.





Farmer profiling for FAW management

Commercial Farmers:

Regular Scouting: early prep and appropriate application of control method

Complex Cultural Practices; CA, crop rotations

Tillage Practices; CA practices such as ripping in combination with weed control methods

Pesticide application; low risk and bio pesticides

Complex pesticide regimes; rotation of modes of action to delay resistance development





FAW Research in Zimbabwe

- There is active research being conducted on FAW management in the country including
- screening of screening of host plants and testing varieties;
- push and pull technique ;
- mixed crops and conservation agriculture.
- The researchers are UZ, CIMMYT, DR&SS



Identified general gaps for research

- Agro-ecological approaches
- Cropping systems related research
- Local practices e.g. botanicals
- Leaf damage and relationship with yield losses





Specific recommendations for the FAW management agenda in SADC region

- More research on distribution of FAW and their strains
- More screening trials of botanical, bio-pesticides and indigenous substances to control FAW to confirm dosage rate and application methods.
- Increase public awareness about the fall armyworm and management options
- Strengthening national crop pest early warning system including the strengthening early warning system at farmer level
- Need for funding for these research activities and addressing gaps identified





FAW R4D priorities: Addis resolutions:

- FAW IPM – biology, monitoring, surveillance and early warning (including ICT tools), and scouting;
- Host plant resistance;
- Biological control;
- Cultural control and agro-ecological management;
- Environmentally safer pesticides (including Bio-pesticides), and pesticide risk management; and
- Socioeconomics and impact assessment.





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THANK YOU

