POLICY
Brief

TIMELINESS:

AN ECONOMICAL AND SUSTAINABLE MANAGEMENT STRATEGY OF FALL ARMY WARMS(Spodoptera frugiperda) IN MAIZE

July 2019

1. Maize

Maize is a staple food crop for **96 percent** of the Kenyan population with 125kg per capita consumption. As the Kenyan population projected to hit **43.1 million by 2020**, the demand for maize is estimated to reach five million metric tonnes [1]. In terms of production, approximately **80 percent** of the total grain output is produced by small scale farmers who rely on rein-fed agriculture under varying agro-ecological conditions.

Maize is an important source of carbohydrate, protein, iron, vitamin B and minerals consumed by Kenyans in varying forms including ugali, porridge, green maize mixed with legumes (Figure 1) and beer among other directly consumed products. Industrially, grains are used for starch and oil extractions while leaves, stalk, tassel and cobs are used to produce a wide range of non-food products.

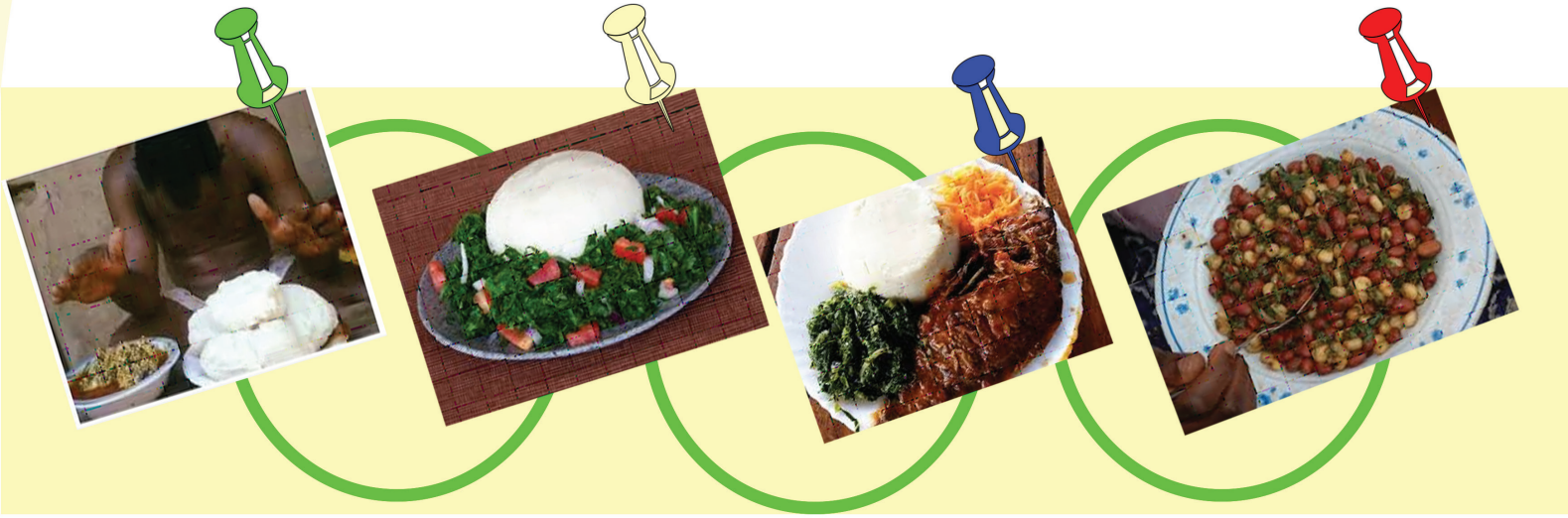


Figure 1: Selected uses of maize grains

What is the issue?

Fall armyworm (FAW) is one of the most damaging migratory pests native to North and South America and its caterpillars can infest over 80 plant species including cereals, fodder grasses and vegetable crops but with maize as the most preferred host plant. The pest was first reported in West Africa in September, 2016 and later in Central, South and Eastern African regions [2]. In Kenya, FAW was first detected in Trans-Nzoia County in March, 2017 on off-season irrigated maize where over 90% of the crop has been lost due to pest infestation. Currently, the pest has been reported in most parts of the country especially in Western region where maize is grown (Figure 2).

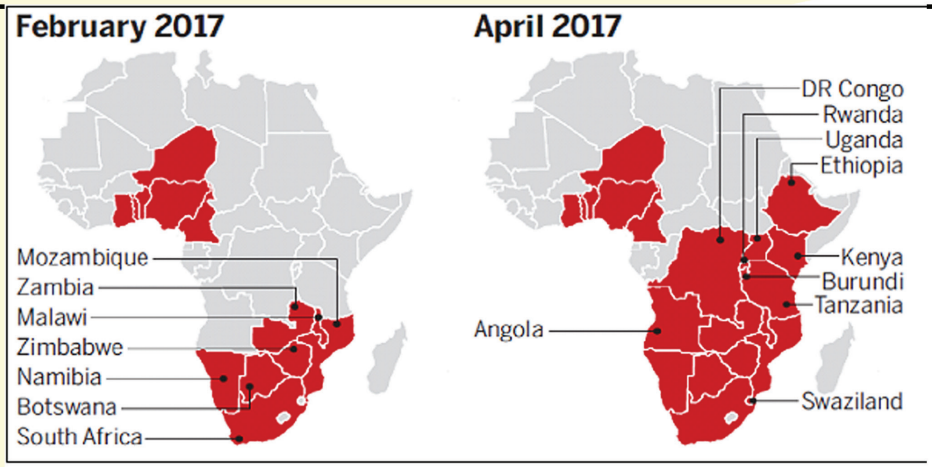


Figure 2: Spread of FAW between February and April, 2017; **Source:** FAO, 2017

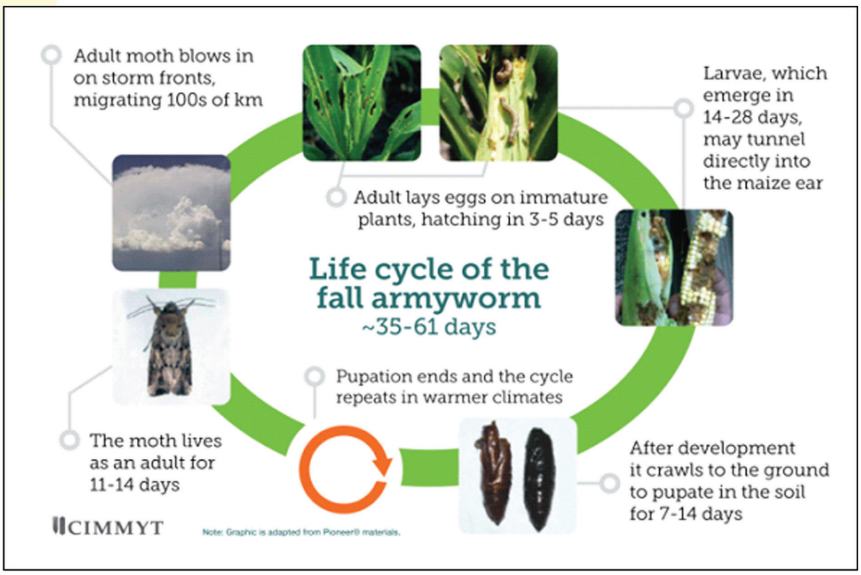


Figure 3: Life cycle of fall armyworm; **Source:** CIMMYT 2018

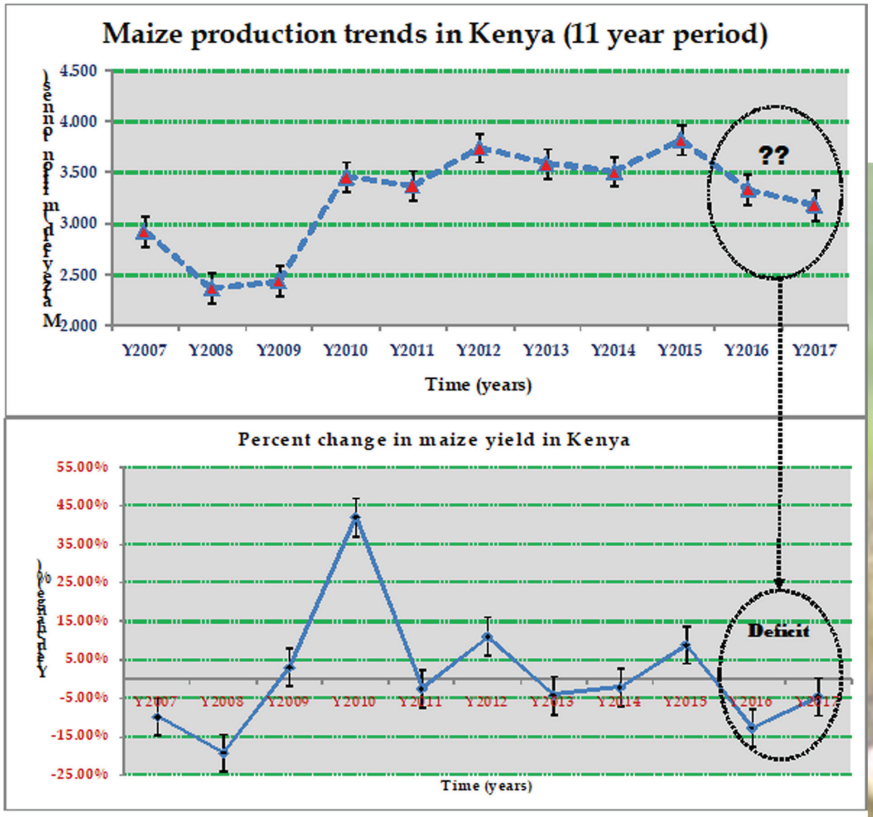
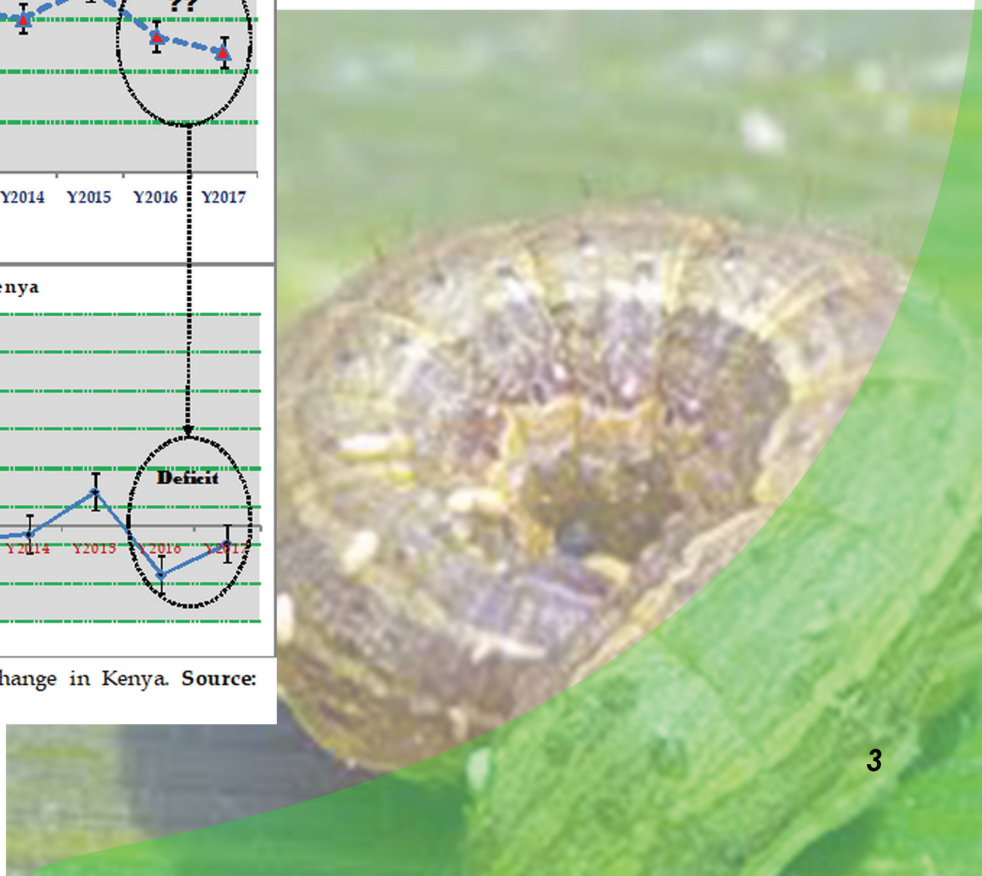


Figure 4: Maize production trend and percent yield change in Kenya. **Source:** KNOEMA, 2018

By the year 2017, the total area under FAW infestation was approximately 200,000 ha while 800,000 ha were under threat, translating to **10%** and **40%** of land under maize production respectively. In terms of number of bags (90kg) and monetary value, Kenya lost approximately 4.2 million bags of maize valued at **Ksh 12.6 billion** (200,000 Ha X 21Bags/Ha X Ksh. 3,000/bag) due to FAW infestation alone [3-4]. Additionally, worse infestation alarm has been raised due to ability of the adult moth to fly long distances, 100 km per night and 2000 km per lifetime [2, 5]. The migratory traits, shorter reproductive cycle especially under warmer temperatures and the ability to fly long distance enable this pest to spread and infest a wider area within a short period of time

As a result of the inadequate supply of maize, the demand is usually met through importation from neighboring countries (Figure 3). For instance, in 2018 alone, Kenyan government spent over KShs. 3.2 billion on maize imports, with FAW as one of the major contributing factors for low harvest [6]. This call for urgent action in ensuring that farmers use not only sustainable but also economical and environmental friendly approaches in the management of FAW.

In terms of management of FAW, application of insecticides has been widely used in post parts of the world. However, reliable studies have indicated that development of resistance to chemicals is a major limitation for effective control [7-8]. Chemicals also posses major threat to atmospheric, aquatic and soil environments with short and long-term impacts on human and animal health. This leaves non-chemical approaches such as timing to be the most reliable and sustainable methods of managing FAW.



3.Key gaps in FAW management in maize field

1. Unsynchronized farm operations
2. Ability of FAW to develop antibiosis resistance mechanism to insecticides
3. Poor timing of planting in relation to the rainfall pattern and pest population dynamics
4. Availability of numerous alternate host plants during off-season

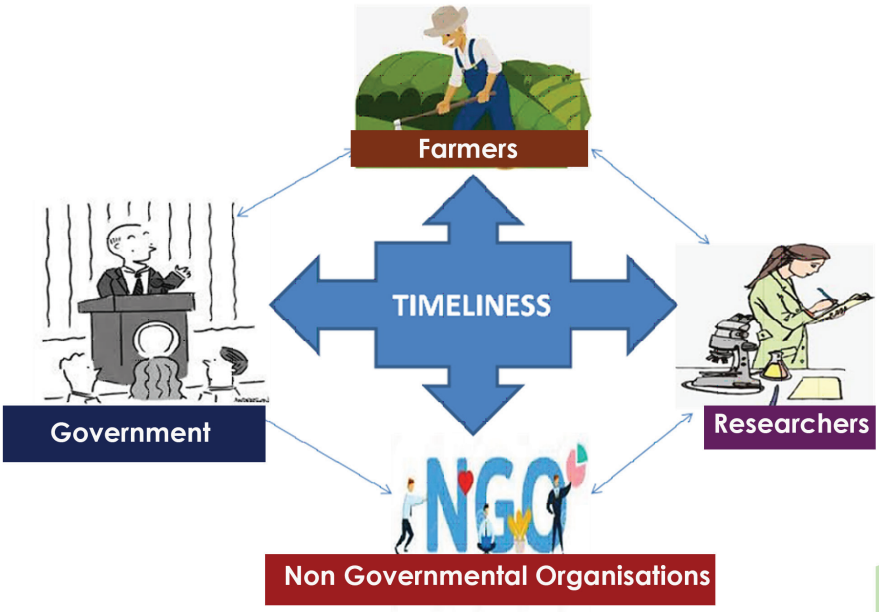
4.Why timely planting?

1. i. Under warm temperatures (about 28 oC and above), the FAW takes 30 days to complete its life cycle hence more damage in maze plantation. In contrast, in cooler temperatures, it takes 60 – 90 days. This provides adequate time for early maturing maize crop to escape serious damage by FAW through avoidance.

2. ii. When majority of farmers plant at the same time especially at the onset of rainfall, the risk of FAW damage is spread thus r educing the significant yield loss compared to when farmers do staggered planting.

3. iii. Timely planted maize utilizes adequate moisture and this promotes vigorous growth and development hence high vigour. Vigorously growing maize would express host plant resistance through antixenosis (non preference) hence reducing the use of synthetic and biopesticides.

POLICY RECOMMENDATIONS



Policy recommendations

a. Government

i. Timely implementation of surveillance and monitoring program for FAW within the country as well at the borders of the neighboring countries like Tanzania, Somali, Uganda, Sudan and Ethiopia.

ii. Designate, hire experts and equip regional extension laboratories for timely response to infestation by FAW.

iii. Sensitize small scale farmers, farmer groups and lead farmers on the importance of one-time timely operations to spread the risks and damage by FAW in maize plantations

b. Researchers, scientists and Non-governmental organizations

i. Increase farmer training through workshops, seminars and field-days on FAW management through timely planting, monitoring, scouting for incidences and sustainable management

6. Acknowledgements

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7. References

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