Sub-theme:

Capacity building

Knowledge Gap Assessment and Coping Strategies by Farmers Against Fall Armyworm (*Spodoptera frugiperda* J.E. Smith) Infesting Maize in South Eastern and Coastal Kenya

Presented by:

BONIFACE MWIRIGI

Co Authors:

Muo Kasina (KALRO), Mary Guantai, (KEPHIS), Susan Njeri

INTRODUCTION

- Maize (*Zea mays L.*) is a major cereal crop in Africa
- It is Kenya's main staple crop whose per capita consumption is 100 kg per annum (Yami *et al*., 2020) and it is consumed by over 85 % of the population
- It is used as human food; 32 % and 35 % of protein & dietary energy consumption respectively (Groote *et al*., 2011) & animal feed; stovers and also as a source of income
- Production of maize has been threatened by invasion of fall armyworm (FAW) (*Spodoptera frugiperda*)
- This has resulted in increased production costs and low crop productivity leading to food insecurity

Problem Statement

- Production of maize has recently been constrained by invasion of fall armyworm
- Since the first report of invasion, the pest has been reported in 42 out of 47 counties of Kenya(Sisay *et al*., 2018).
- Losses caused by FAW on maize in Kenya are estimated at 4.1 to 17.7 million tonnes/year (US$ 1088 to US$ 4661 million) (Rwomushana *et al*., 2018)
- There is however, lack of information about farmers' knowledge, perceptions, and coping practices limiting design of effective FAW management programs for effective control
- This has also hindered implementation of effective FAW management programs
- The present study therefore aims at considering various knowledge gaps and practices undertaken by farmers to effectively design appropriate management strategies

Justification

- Maize is a key determinant of food security in Kenya as it is the main staple food
- South Eastern and Coastal Kenya experiences harsh climatic conditions ; low food productivity
- Maize suited in almost all agro-ecological zones; can be used as a principal crop to curb food insecurity in the areas
- High temperatures in South Eastern (14^0C -32^0C) & coastal Kenya (27 ^{0}C-30 ^{0}C) that favours pest multiplication; crop damage & yield losses
- Yield losses are incurred despite strategies recently developed to manage the pest
- A survey therefore is needed to establish existing knowledge levels and responses towards the pest important to enable researchers to understand problems faced by the farmers in managing the pest
- Will help researchers to develop sustainable pest management approaches based on farmers knowledge & needs

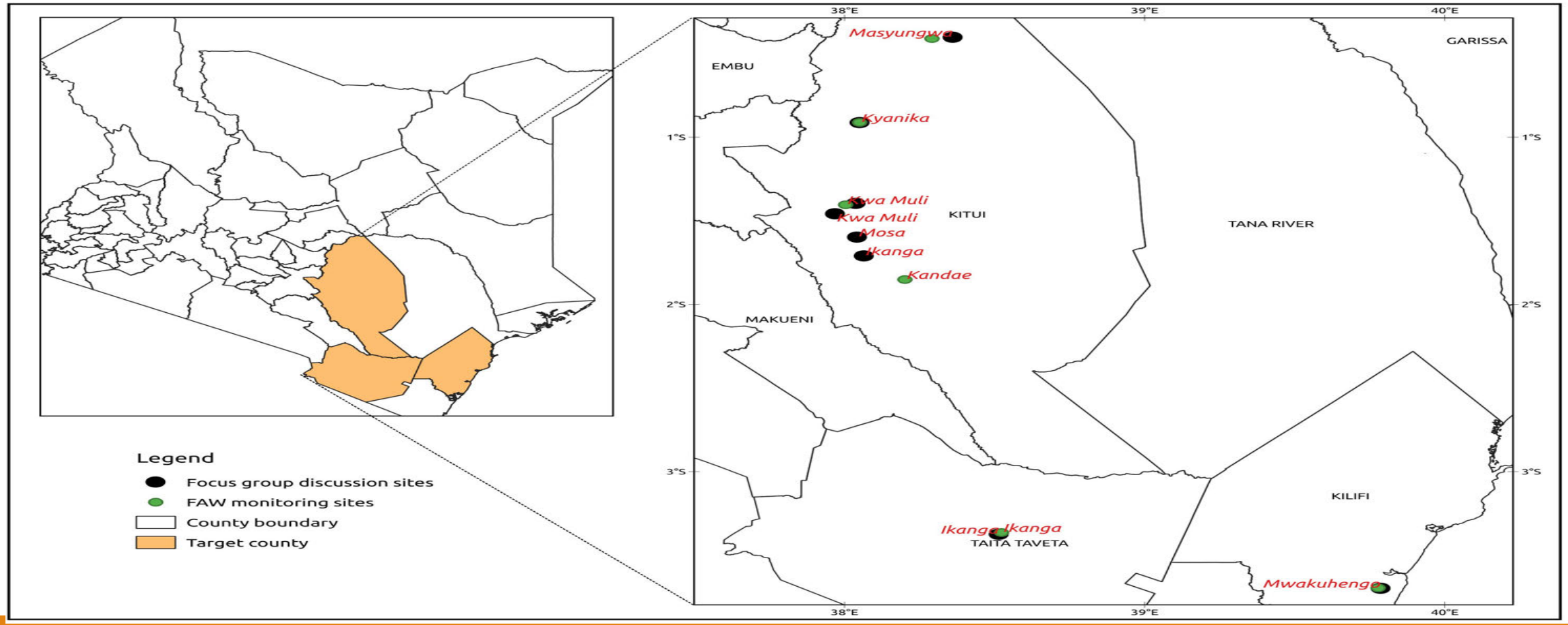
Objectives

General objective

To assess Knowledge gap and coping strategies by farmers against fall armyworm (*Spodoptera frugiperda* J.E. Smith) infesting maize in Southeastern and Coastal Kenya

Methodology

Study site description



Methodology cont'd

Data collection

- Respondents selection based on purposive sampling method
- Farmers actively growing maize
- 8 FGDs each comprising of between 10 - 20 members from their respective wards.
- Tool; An open-ended questionnaire

Data collected;

- Lifestyle characteristics ; Age, gender, education, marital status & main occupation
- Guiding questions; maize production, level of knowledge of FAW & its management, impact of FAW on maize yield & income.

Data analysis

- Excel spreadsheet; to determine means for responses across the different FGDs.
- The Statplus statistical software for Excel used for basic analysis ;means and frequencies.
- Standard deviation used to show differences at 95% confidence level.

Results

Demographic characteristics

Group	Total farmers	Percent female	Percent youth	Percent married
Mwakuhenga	16	62.5	6.3	93.8
Ikanga Voi	25	80	20	96
Masyungwa	11	64	9.1	100
Ikanga Kitui	15	66.7	0	100
Mosa	12	58.3	16.7	83.3
Kyanika	17	76.5	5.9	94.1
Kwa Muli	15	73.3	13.3	100
Kavalula & Ngengi	23	56.5	4.3	100
Mean	16.75	67.225	9.45	95.9
SD	4.920801	8.567505	6.731164	5.777543

Production details

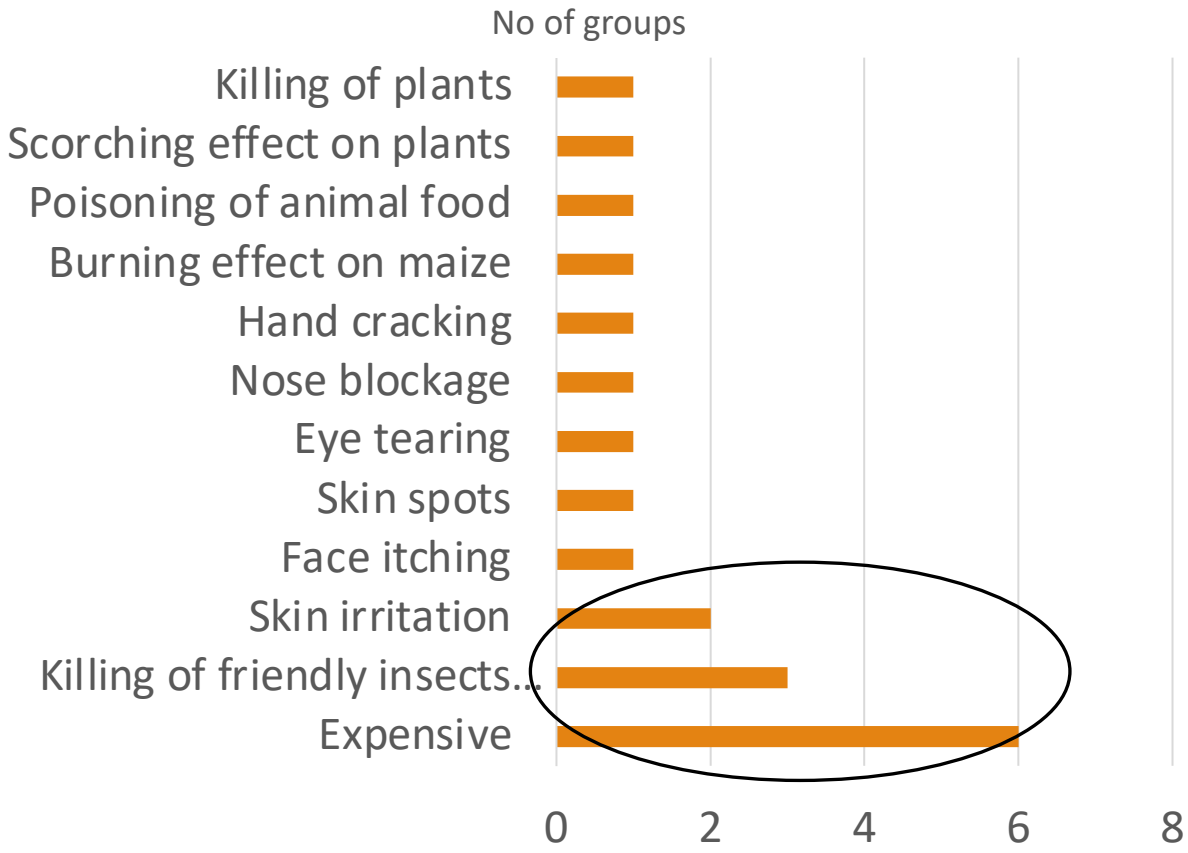
Group	Total No. maize varieties	% farmers certified seeds	% farmers maize for food and selling	Average 90-kg bags per farmer/acre
Mwakuhenga-	7	93.8	48	11
Ikanga Voi-	6	60	24	9
Masyungwa	4	27.3	9.1	8
Ikanga Kitui	8	100	53.3	10
Mosa	8	50	25	20
Kyanika	6	94.1	5.9	9
Kwa Muli	8	100	100	20
Kavalula & Ngengi	6	100	100	10
Mean	6.625	78.15	45.6625	12.125
SD	1.407886	28.38299	37.3841	4.94072

Results cont'

Knowledge of FAW and pesticide use

Group	% Farmers encountered FAW	Non-pesticide controls measures	Total pesticide molecules	Frequency of pesticide application
Mwakuhenga	100	5	8	2
Ikanga Voi	100	6	0	0
Masyungwa	54.5	2	7	1.5
Ikanga Kitui	100	0	4	2.5
Mosa	100	3	3	5
Kyanika	94.1	0	3	1.5
Kwa Muli	100	4	7	2
Ngengi	100	2	4	3.5
Mean	93.575	**2.75**	**4.5**	2.25
SD	15.9231	2.187628	2.672612	1.488048

Challenges of using pesticides.

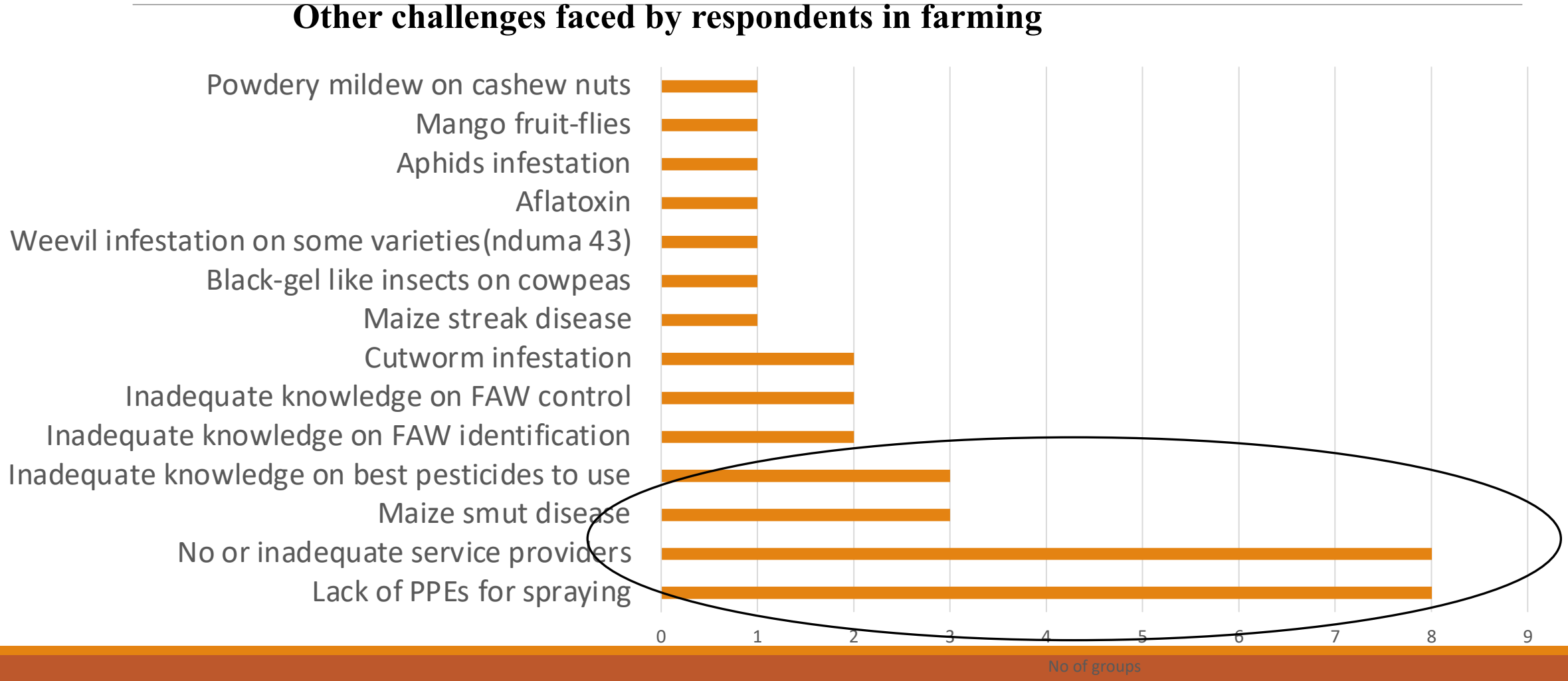


Results cont’

Other coping practices used by farmers in managing fall armyworm

- Handpicking and crushing
- Smoking using local herbs
- Botanical concoctions of local herbs
- Use of soil
- Use of ash
- Various domestic soaps for laundry

Results cont'



Results cont'

Fall armyworm invasion and yield loss at farm level

FGD	On set of FAW infestation (month) after germination	% Yield loss
Mwakuhenga	2	67.5
Ikanga Voi	3	55
Masyungwa	2	37.5
Ikanga Kitui	1	53.8
Mosa	1	57.5
Kyanika	2	32.5
Kwa Muli	1	80
Ngengi	1	50
Mean	**1.625**	**54.225**
SD	0.744024	15.22045

Recognition of FAW

Groups/ stage	Mwakuhenga	Ikanga Voi	Masyungwa	Ikanga Kitui	Mosa	Kyanika	Kwa Muli	Kavalula& Ngengi	Average
Egg	18.75	0.0	0.0	20.00	0.0	0.0	66.67	4.35	27.4
Larva	100.0	100.0	0.00	86.67	100.0	100.0	100.0	100.00	85.8
Pupa	75.00	100.0	0.00	0.00	0.00	0.00	100.0	17.39	36.5
Adult	0.00	0.00	0.00	0.00	0.00	0.00	53.33	43.48	12.1

Conclusion

- There is limited knowledge about the biology and ecology of fall armyworm
- Apart from the heavy pesticide used, farmers have other pest control practices that can be enhanced to improve fall armyworm management.

Recommendations

- The study recommends design of FAW control strategies based on farmers knowledge gaps and practices
- Farmers should be trained on identification of other FAW stages besides the larval stage for effective monitoring and timely application of control strategies

Acknowledgements

Theme: *"Enhancing Phytosanitary Systems for Healthy Plants, Safe & Sustainable Trade"*

www.africa-cope.org

For more information, please contact:

www.africa-cope.org
www.kephis.org
Facebook.com/3rd phytosanitary Conference 2020
Twitter: @3rdphytoconf

Theme: *Enhancing Phytosanitary Systems for Healthy Plants, Safe & Sustainable Trade"*
www.africa-cope.org