



# Development and Evaluation of IPM for Rainfed Upland Maize in a Farmers Participatory Approach

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# Site of Experiments

- ✱ Village – Kaladumaria, Bagjhopa, Amba
- ✱ Block – Jarmundi
- ✱ Dist.- Dumka (Santhal Pargana)
- ✱ State – Jharkhand (INDIA)

# Objectives

- ✦ Development of location specific IPM modules in Rainfed Upland Maize Production System.
- ✦ Evolution of IPM with motivation and involvement of farmers.
- ✦ To acquainted the farmers with key Pest of Maize & their natural enemy.
- ✦ Increase the sustainability and residue free yield of Maize.

# Constraints of Low Yield

✱ Abiotic – Rainfall

✱ Biotic – **Weeds** – Sawa (*Echinochloa colonum*)  
Banra (*Sataria glauca*)  
Narcul (*Phragmites karka*)  
Motha (*Cyprus rotundus*)  
Banchari (*Sorghum halepanse*)  
Kankoua (*Commelina benghalensis*)  
Hulhul (*Phylanthus niruri*)

## **Insects**

Major Pests – Termite - *Odontotermes Obesus* Ramb.  
- *Microtermes Obesi* Holm

Maize stalk borer (*Chilo partellus* Swinh)

Minor Pests – Grasshoppers (*Hieroglyphus nigrorepletus*)

– Army worm (*Mythimna separata* Wallkar)

Grey weevil (*Myllocerus undecimpustulatus*)

**Birds** – Parrot, Crow

# Other factors

- ✱ Not doing summer ploughing
- ✱ Close spacing
- ✱ High seed rate
- ✱ Sowing seed without seed treatment
- ✱ Poor fertilizer management
- ✱ Poor management of Insect Pest
- ✱ Poor management of weed

# Location Specific IPM modules

## Crop Stage

### ☀ Pre sowing

## Management practices

-Proper ploughing done to destroy stubbles, weeds and volunteers host.

Remove all residue from the field

Seed treatment with fungicide (Carbendazim @ 2gm/kg seed)

# Location Specific IPM modules

## Crop Stage

☀ sowing

## Management practices

Line sowing of Maize at distance of 75 X 25 cm

Planting density maintained by applying seed @ 18 kg/ha.

Fertilizer management (N100, P60 , K 40 kg) & application of fertilizer in line.

Application of Ethyle Parathion @ 25 Kg to control the soil insects

# Location Specific IPM modules

## Crop Stage

- ✦ Vegetative

## Management practices

Intercultural operation

Periodical weeding

Manually removal of borer infested plants

Conserve natural enemies by avoiding chemical spray.

# Location Specific IPM modules

## Crop Stage

## Management practices

### ✦ Flowering to Cob formation

Manual removal of infested plants

One need based application of Endosulfan @ 0.07 %

Manually protection from Birds

# Evolution of IPM modules over Traditional Farmers Practices (TFP)

## Treatments

- ☀ TFP with local variety BADMA
- ☀ TFP with composite variety SUWAN-1
- ☀ TFP with hybrid varieties K-25
- ☀ IPM with local variety BADMA
- ☀ IPM with composite variety SUWAN-1
- ☀ IPM with hybrid varieties K-25

# Results

## Termite Incidence (%)

| Variety | IPM  | TFP  | Mean |
|---------|------|------|------|
| BADMA   | 2.52 | 7.45 | 4.97 |
| SUWAN   | 1.59 | 8.28 | 4.93 |
| K-25    | 2.08 | 9.37 | 5.72 |
| Mean    | 2.06 | 8.36 |      |

# Results

## Maize Stalk Borer Incidence (%)

| Variety | IPM  | TFP   | Mean |
|---------|------|-------|------|
| BADMA   | 2.12 | 9.44  | 5.78 |
| SUWAN   | 1.97 | 11.25 | 6.61 |
| K-25    | 2.19 | 14.40 | 8.29 |
| Mean    | 2.09 | 11.70 |      |

# Yield & Cost Benefit ratio

| Variety      | YIELD (Q/ha) |       | Yield increase (Q/ha) | Yield increase (%) | Monetary gain (Rs.) | C:B ratio |
|--------------|--------------|-------|-----------------------|--------------------|---------------------|-----------|
|              | IPM          | TFP   |                       |                    |                     |           |
| <b>BADMA</b> | 25.24        | 15.34 | 9.90                  | 39.22              | 4950                | 1:5.89    |
| <b>SUWAN</b> | 47.36        | 35.21 | 12.15                 | 25.65              | 6075                | 1:7.23    |
| <b>K-25</b>  | 48.94        | 34.44 | 14.50                 | 29.26              | 7250                | 1:8.63    |

# Constraints faced

- ✱ Farmers not easily ready to take RISK
- ✱ Lack of knowledge about IPM
- ✱ Non availability of good quality seed
- ✱ Non availability of good quality Pesticides
- ✱ Lack of knowledge and skill to identify the Insect pests and natural enemies.
- ✱ Lack of knowledge in decision making
- ✱ Poor marketing linkage

# Conclusions

- ★ By adopting the IPM practices with improved varieties SUWAN-1 and K-25 farmers could get more benefit in rainfed upland maize production system.
- ★ These studies suggest that if IPM is implemented with proper motivation and involvement of farmers it may lead to the sustainability and residue free yield of maize under Agro-climate of Santhal Pargana.

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