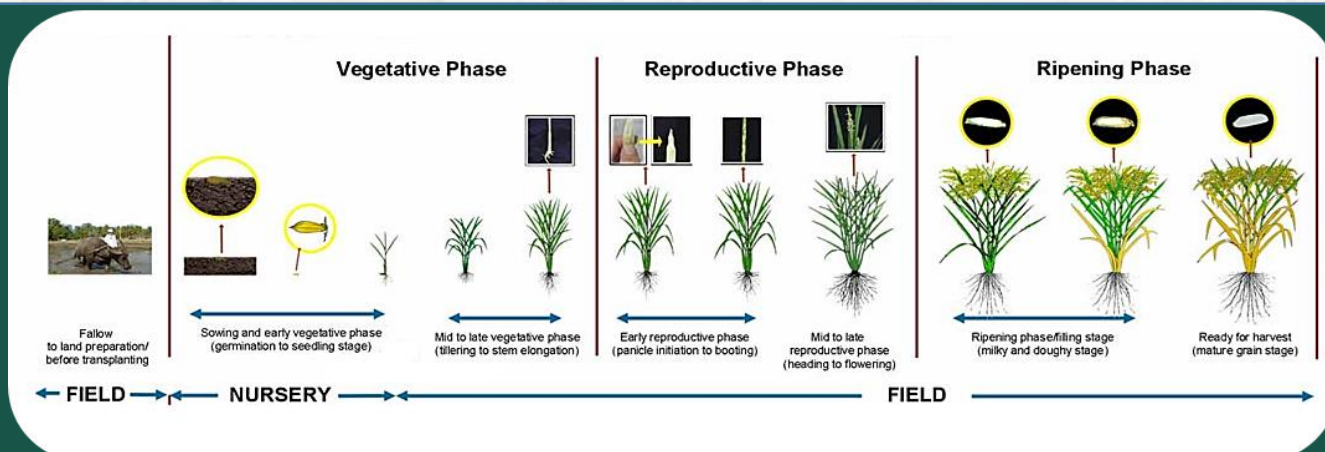


## Integrated Pest Management in Rice

IPM is a sustainable approach for management of insect pests and diseases that combines cultural, mechanical, biological and chemical management methods to minimize economic, health and environmental risks.

IPM practices in rice production include regular pest monitoring, optimal use of pesticides, complementary weed control practices, and alternate cultural and biological controls. Specific interventions of IPM in nursery and crop fields are detailed below.



### Nursery

- Select resistant varieties that are adapted to grow in local conditions
- Select disease free seed
- Treat the seeds with Trichoderma formulation @5-10g/kg seed
- In gall midge endemic areas, spray Thiamethoxam 25% WG @0.2g/L of water, 5 days before pulling seedlings from nursery for transplantation

### Crop field

- Transplant seedlings with a spacing of 20 x 15 cm
- Leave alleyways of 30 cm after every 2 m or 10 rows
- Plant a bund crop to enhance natural enemies of insect pests and other beneficial insects
- Use recommendation for site specific nutrient management and weed management. You can use Rice Crop Manager (RCM) for this (<http://webapps.irri.org/in/od/rcm/>)
- Examine the field thoroughly for pest incidence and level of damage at weekly intervals starting from 15 Days After Transplanting (DAT). If Bacterial Leaf Blight symptoms are seen between 20 to 30 DAT, delay the application of nitrogenous fertilizers
- At 15 DAT, install pheromone traps with 5 mg lure @ 8 traps/ ha for stem borer monitoring. While installing make sure that the trap remains above the crop canopy
- Use Trichocards 21 DAT and repeat every 15 days till flowering @ 5 cards/ ha
- Observe bund area and if sheath blight is observed on weeds, spray triazole fungicides
- If there is stem borer / leaf folder incidence, use one spray of Cartap hydrochloride 50 WP @ 600 g / ha at 60 DAT
- Mid-season drainage should be followed in case of Brown Plant Hopper incidence
- If false smut and grain discoloration are prevalent in the region, use a prophylactic spray of Propiconazole 25% EC @1ml./L of water at flowering



Seed treatment with trichoderma formulation increases plant growth and yield



Installation of pheromone traps to monitor insect pests



Use of Trichocards against stem borer



## Ecological engineering for pest management in rice

Ecological engineering is a part of IPM and focuses on manipulating farm habitats to make them less favorable for pests and, more attractive to beneficial insects.

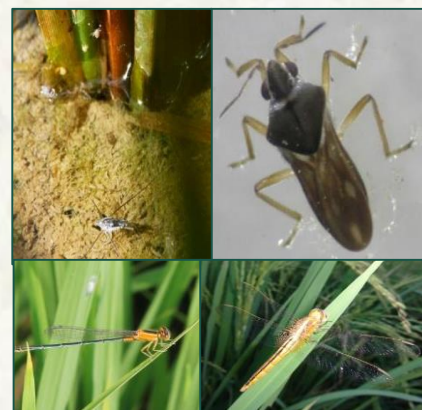
- Application of vermi compost in the nursery and main field helps in the early colonization of spiders and enhances aquatic predator population
- Avoiding insecticides or judiciously using safe insecticides early in the season will help conserve natural enemies
- Wider Spacing and Alleyways of 30 cm after every 2m exposes plant hoppers to predators
- Increasing floral diversity through locally available flowering plants as bund crops helps enhance natural enemy levels and action



Making of alleyways after every 2m or 10 rows

## Benefits of flowering plants on bunds

- These plants provide nectar and pollen, alternate prey and shelter for natural enemies and attract beneficial insects. This increases longevity and fitness of natural enemies.
- They can help reduce the number of harmful insects (e.g., Stem borer, leaf folder, plant hoppers)
- The farmers can get additional income if the produce from bund crops like pulses or vegetables or flowers can be sold. They could also add to dietary diversity within the farming household, if consumed.
- Bund crops like pulses or sunhemp can be incorporated in rice fields during land preparation thereby increasing soil fertility.
- Bund crops suppress weeds on bunds reducing the inoculum load of major rice diseases like blast, sheath blight and, brown spot.



Beneficial insects

## How to establish bund crops?

- Bunds are usually prepared by cutting the sides at initial land preparation and plastering the top and sides with mud before transplanting.
- Dibble seeds of bund crops (e.g., pulses, vegetables) or transplant seedlings (e.g., flower crops) immediately after transplanting rice. Use some dry soil/compost to avoid excess moisture.
- Wet the bund intermittently by splashing water from the transplanted field to allow germination/crop establishment.
- Pinch the top to induce branching at early vegetative stage and spray nitrophos @ 3g/lit to induce flowering in marigold.



Ecological engineering - Bund cropping with marigold

## Crops recommended for growing on rice bunds



Marigold  
*Tagetes erecta*



Bhendi  
*Abelmoschus esculentus*



Cowpea  
*Vigna unguiculata*



Pilipesara  
*Vigna trilobata*



Red gram  
*Cajanus cajan*



Black gram  
*Vigna mungo*



Coriander  
*Coriandrum sativum*



Green gram  
*Vigna radiata*



Flower crops grown on bunds of rice



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(Photo credit: IIRR & IRRI)