

Sharing experiences on implementation of IPM in rice and cotton in Asia

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Outline of Presentation

1. Integrated Pest Management (IPM)
2. Rice IPM implementation
3. Cotton IPM implementation

1 What is IPM?

WHAT IS IPM?

- Empowering farmers to become effective managers and decision-makers
- To be able to grow a healthy crop with the least disruption of the agro-ecosystem, thereby encouraging natural pest control mechanisms and minimizing pesticide usage and dependency
- **IPM BY FARMERS, NOT FOR FARMERS**



IPM IS KNOWLEDGE CAPITAL AND KNOWLEDGE MANAGEMENT

- BIOLOGICAL CONTROL AND ECOLOGICAL PRINCIPLES AS FOUNDATION
- FARMERS ANALYSIS AND DECISION-MAKING REVOLVE AROUND
 - Growing a healthy crop
 - Conserving natural enemies
 - Observing fields regularly



IPM IS HUMAN RESOURCE DEVELOPMENT : MAKING FARMERS EXPERT

- Develop critical and informed decision-making skills
- Develop new ways of thinking and problem-solving
- Help farmers organize themselves and their communities



KNOWLEDGE MANAGEMENT STRATEGY: NON-FORMAL EDUCATION IN FFS

- DISCOVERY-BASED LEARNING TECHNIQUES
- EXPERIENTIAL LEARNING METHODS
- COOPERATIVE APPROACHES



SUSTAINABILITY OF IPM

- STRONG TECHNICAL BASIS FOUNDED ON ECOLOGICAL PRINCIPLES
 - Farmers managing the ecosystem rather than controlling it
- PARTICIPATORY NON-FORMAL EDUCATION
 - Making farmers expert
- LOCAL COMMUNITIES OWNERSHIP OF IPM
 - Ensure communication, collaboration and continuous training



SOOO WHAT IS IPM?



- Integrated Pest Management (IPM) evolved in the last 50 years from a technical mix of components to a farmer led programme
- Successful IPM programmes are based on strong ecological principles

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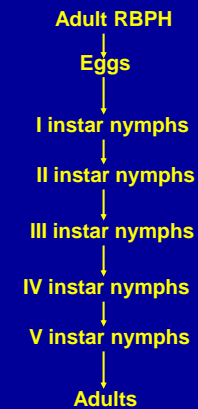
Rice IPM – an example of the rice brown plant-hopper

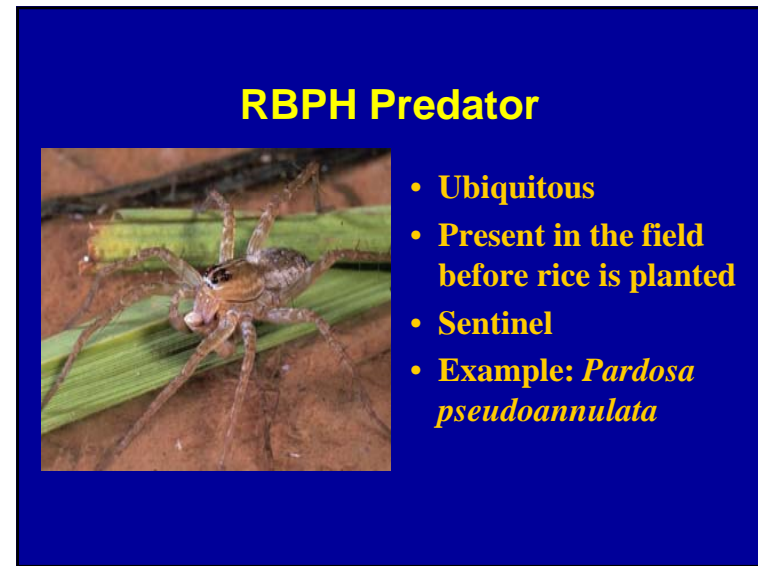
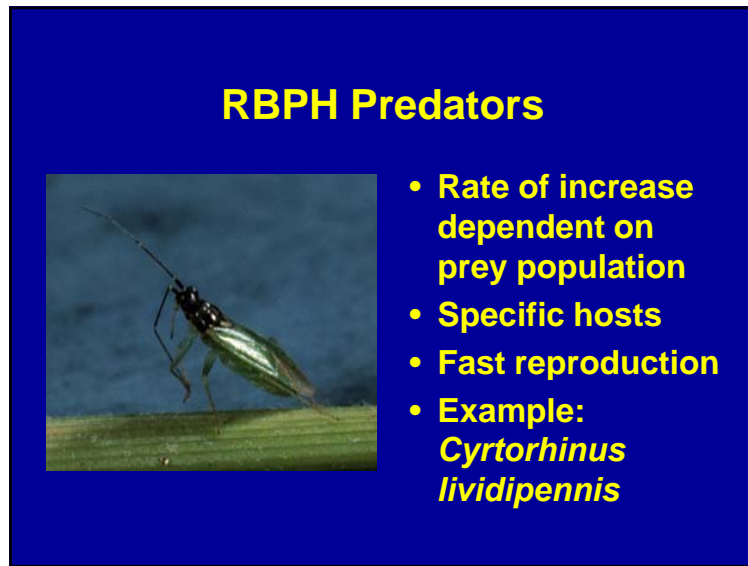
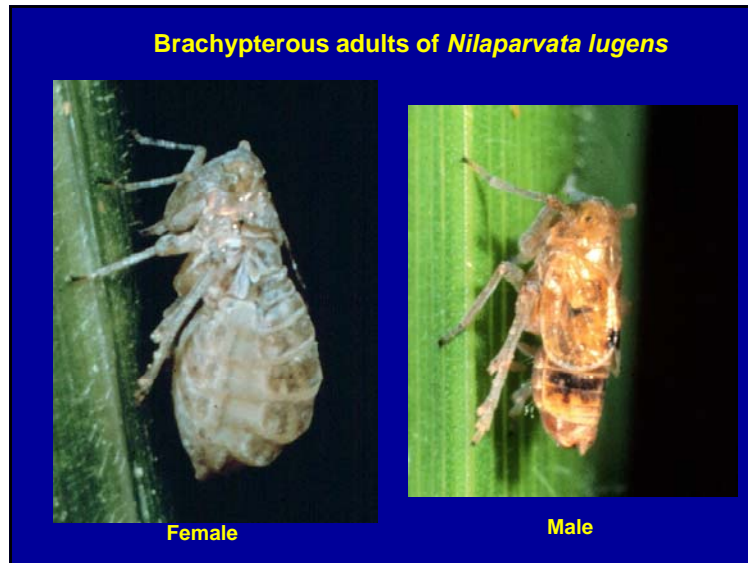
Rice Brown Plant Hopper



- The Rice Brown Planthopper (BPH)
- *Nilaparvata lugens* Stål
- (Hemiptera: Delphacidae)
- c. 5 mm long
- life cycle 23-25 days

Biology of RBPH and its contribution to the food chain






RBPH Parasitoids

Two common egg parasitoids of RBPH


Anagrus sp.
(Hymenoptera: Mymaridae)

Oligosita sp.
(Hymenoptera: Trichogrammatidae)




RBPH Predators

- General feeders
- Opportunistic
- Highly mobile
- Example: *Paederus fuscipes*





Category 3 - Predators

Pseudogonatopus sp.
Hymenoptera - Dryinidae




Elenchus sp. - Strepsiptera - Elenchidae


RBPH Predators

Dragonfly & Damselfly


Odonata - Coenagrionidae
Agriocnemis sp.




Odonata - Libellulidae
Diplacodes sp.



Entomogenous Fungi Moniliales




Hirsutella citriformis




Metarhizium anisopliae

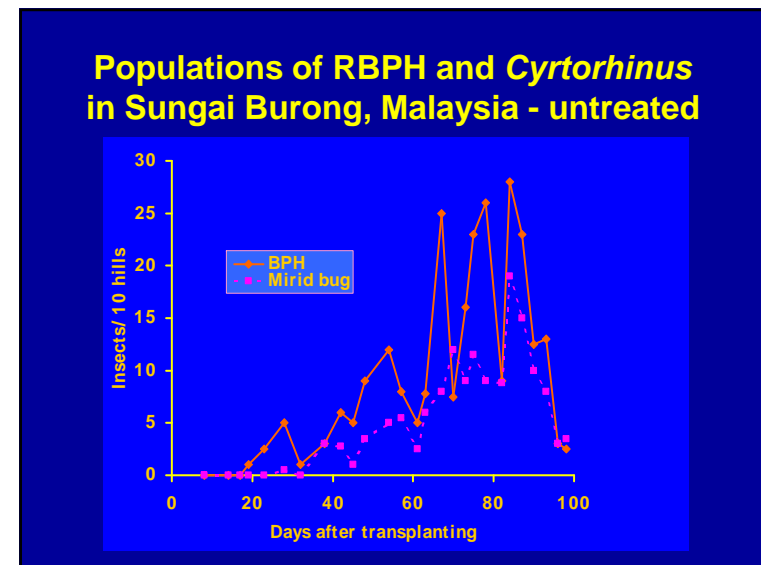
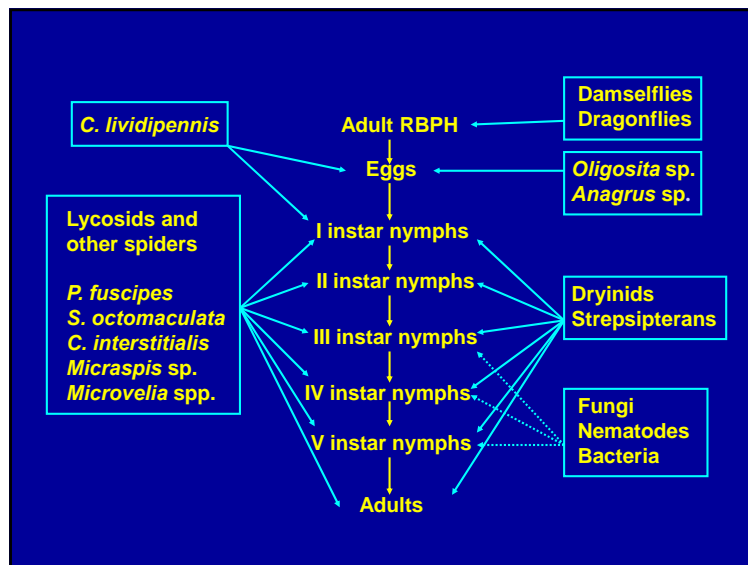
RBPH Predators

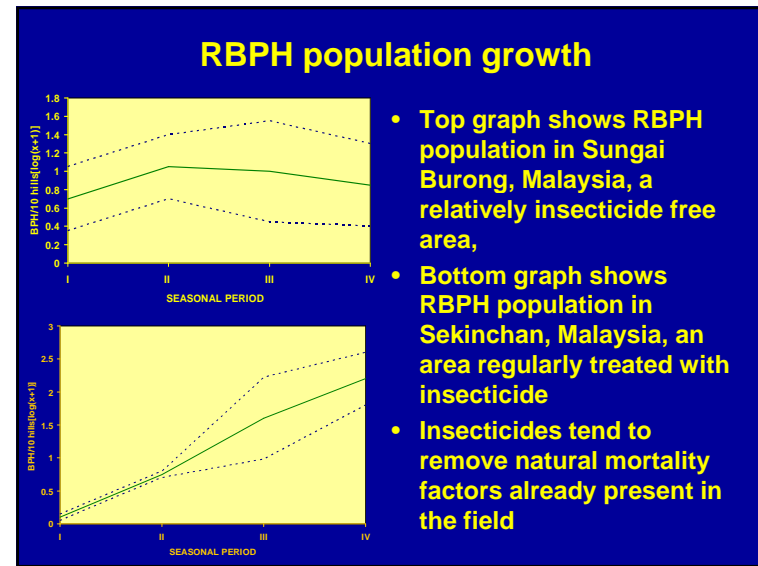
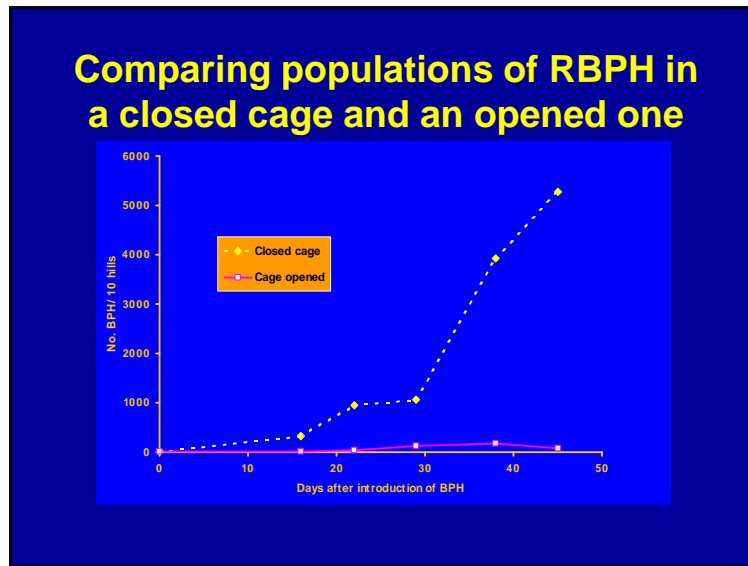
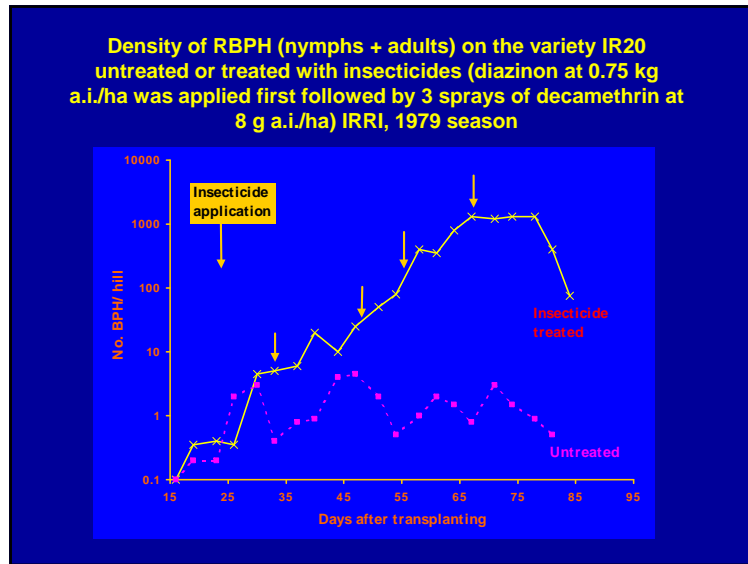


Hemiptera – Veliidae
Microvelia douglasi
atrolineata



Hemiptera – Gerridae
Limnogonus fossarum



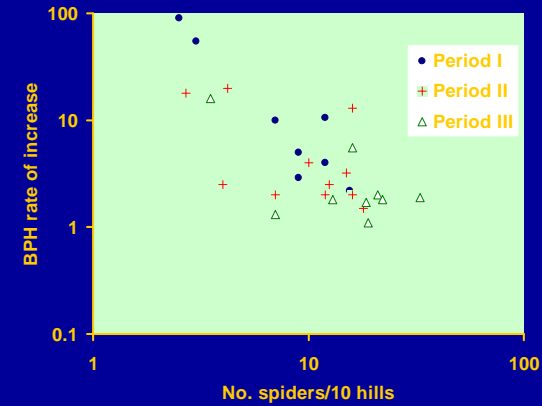


General Predators vs specific parasitoids

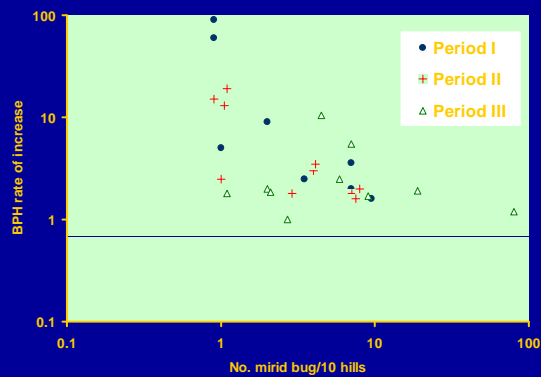


- General predators play an important role in keeping rice pests in check
- Their survival do not depend on pest species but on other non-pest species too

Relationship between RBPH population rate of increase and the density of spiders



Relationship between RBPH population rate of increase and the density of *Cyrtorhinus*



3 Cotton IPM – Advances made

Farmers Learn about Ecology and Natural Enemies

Farmers become excited about discovering the natural diversity in their fields and learn about natural enemies.

Farmers Learn New Management Skills

By improving farmers' observation skills and analytical capacities through self-discovery learning exercises (e.g. ecosystem analysis & insect zoos), farmers are better able to manage complex ecological field conditions and make their own informed management decisions.

These skills can be applied in many aspects of life.

Ecosystem Analysis

Working in small groups, FFS participants observe and measure field conditions, create an ecosystem drawing as a visual analytical tool, present and defend their results and management decision

Field observations → Ecosystem Drawing → Presentation and Discussion

Farmers Learn to Reduce Pesticides

When farmers understand the concept of biological control they tend to use less pesticides and only on a need basis, thus saving on production costs.

Many farmers discover for the first time, that a crop can be grown without pesticides.

Farmers Learn Social Skills

FFS graduates are able to work more effectively with fellow farmers.

FFS graduates plan, implement and monitor self-help activities, set-up their own local institutions or play a more important role in community groups.



Many farmers claim that FFS improved their family life. Some become effective trainers of new FFS in their communities.

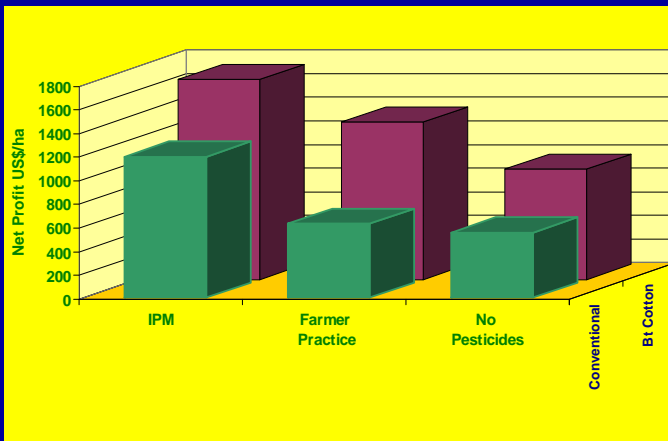
IPM Farmer Field School

- Season-long learning experience for 25-30 farmers
- Participatory learning process
- Develop ecological understanding that helps in ecosystem analysis



- Set up field studies to test hypothesis

Net profit data from Bt-Cotton study in Xiantao County, Hubei province, China 2002 season

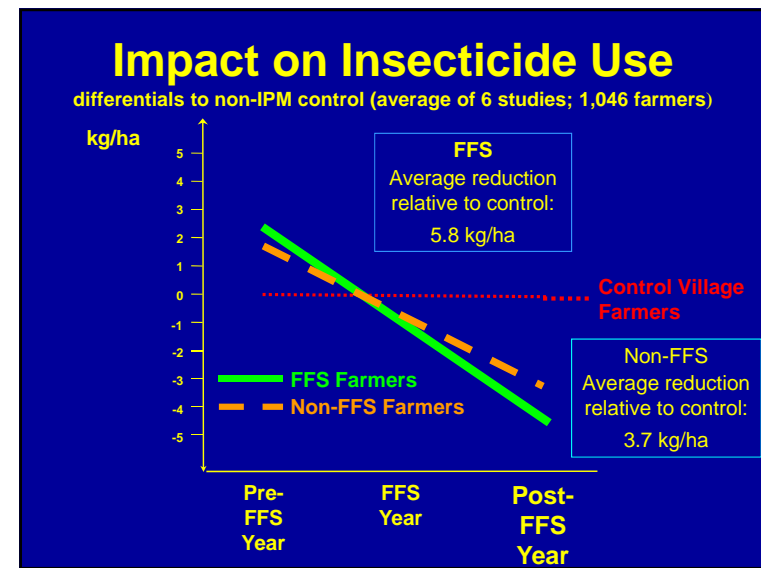
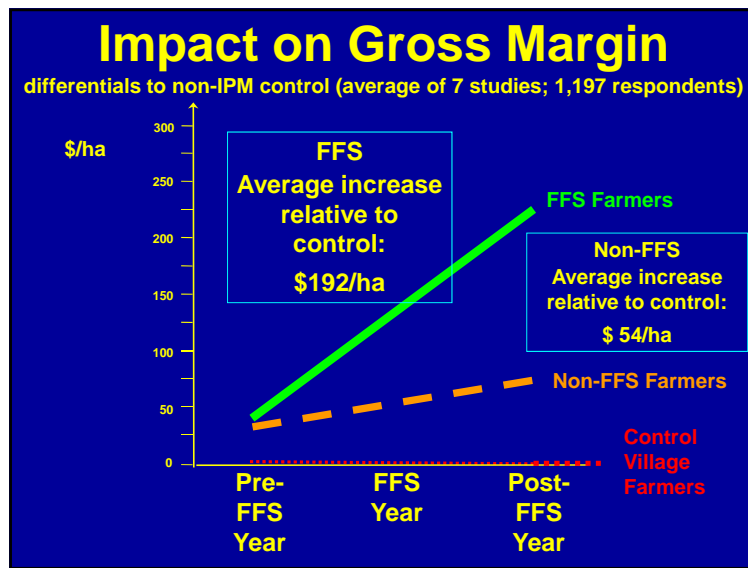
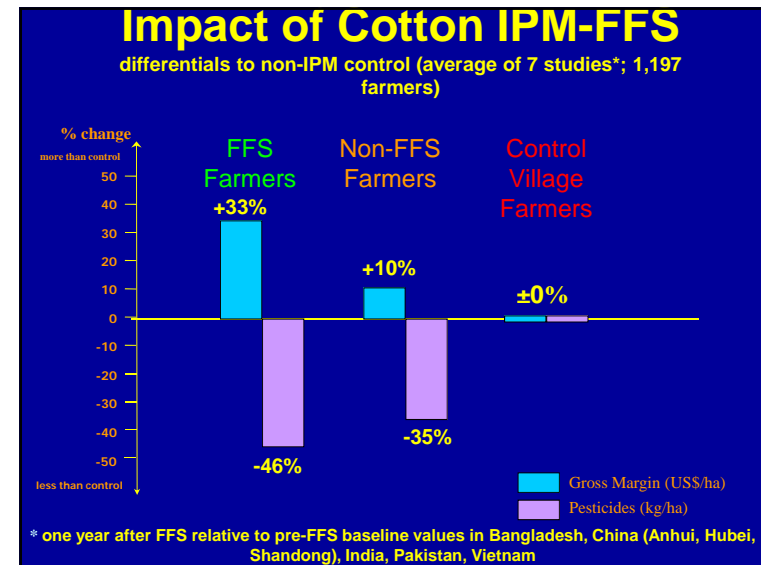
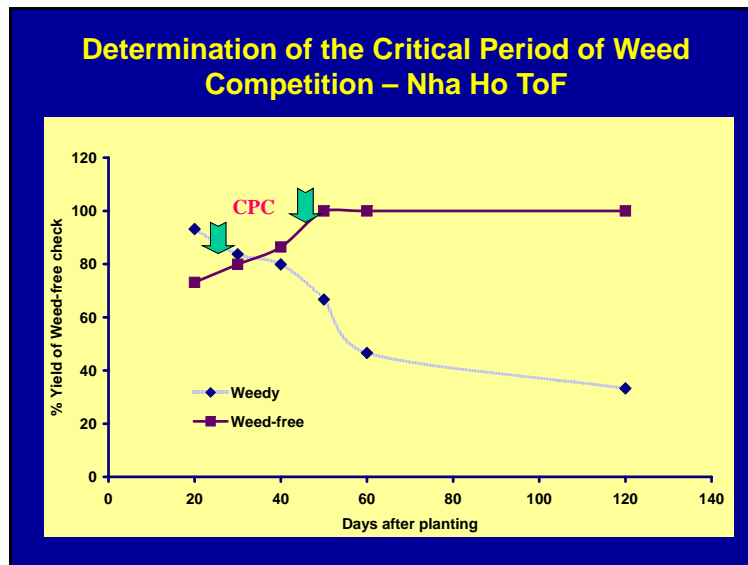


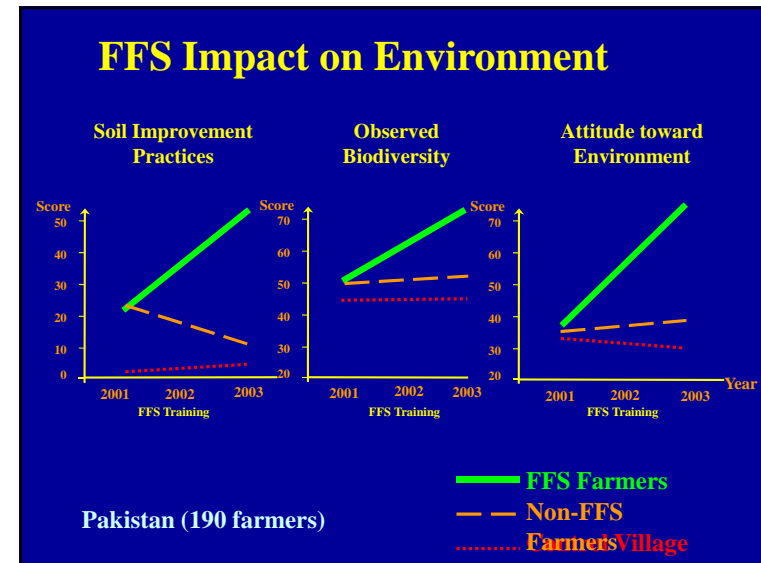
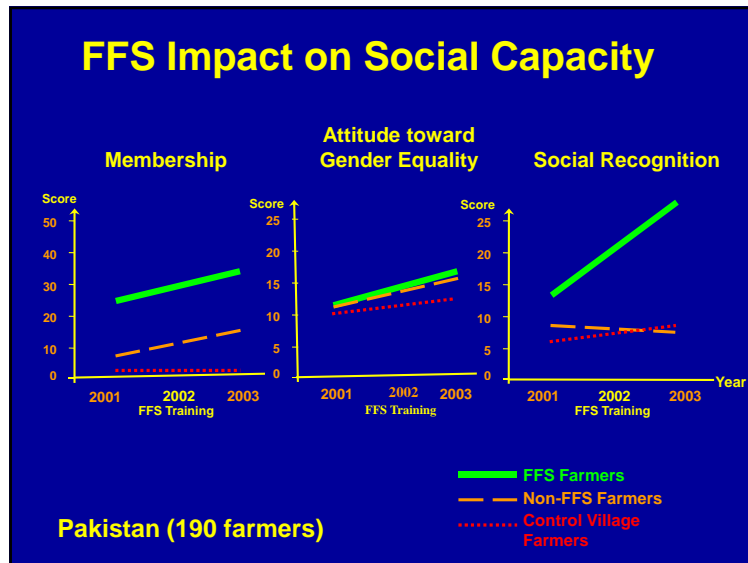
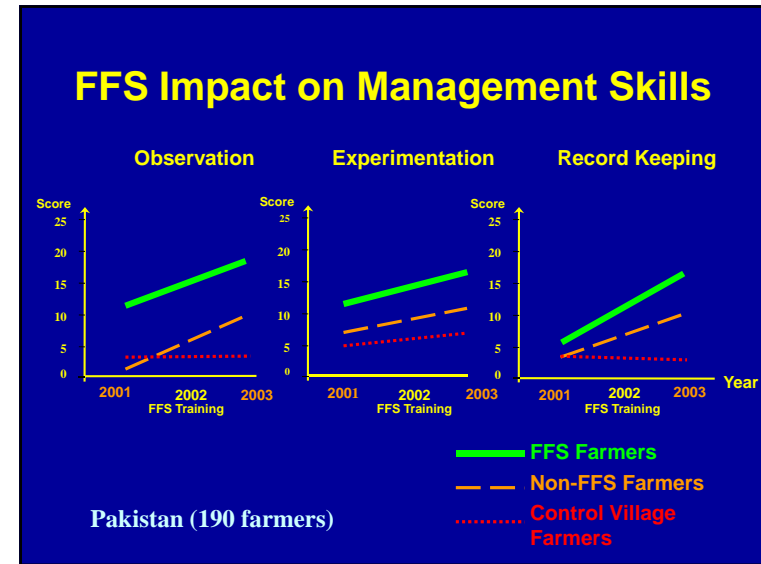
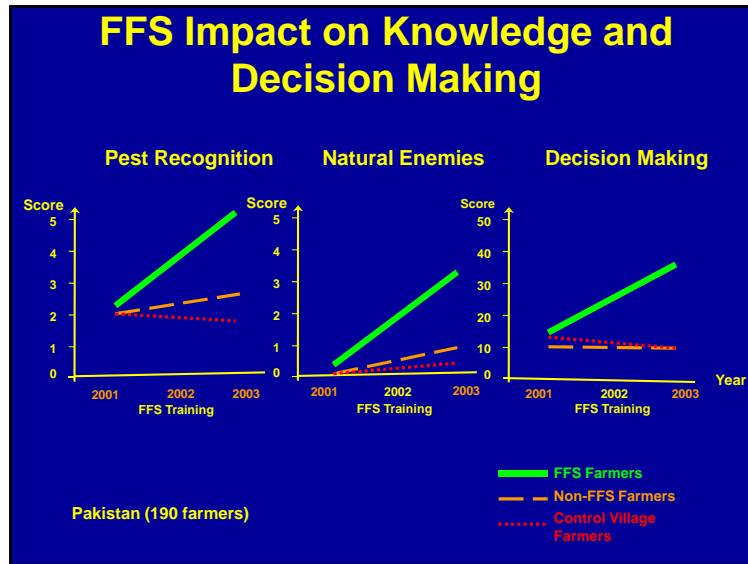
Weeds as medicine

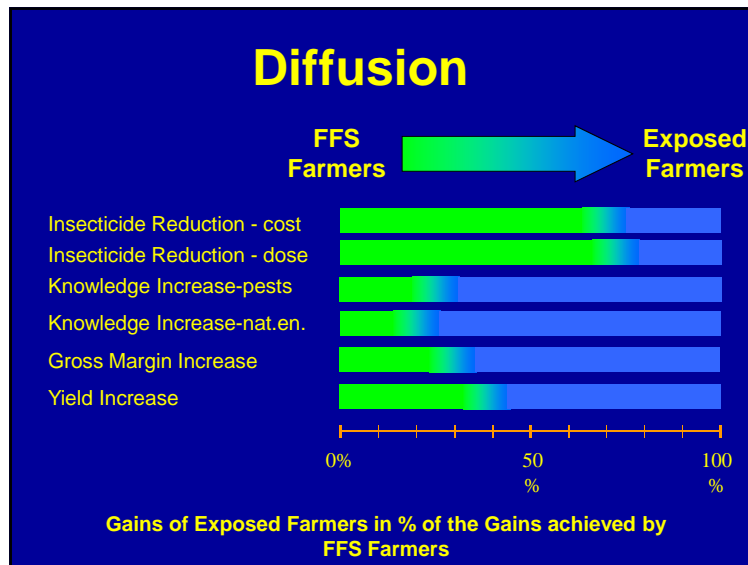
Makahiya	<i>Mimosa pudica</i>
Gatas2	<i>Euphorbia heterophylla</i>
Elepante	<i>H. indicum</i>
Sampalukan	<i>Phyllanthus niruri</i>
Hagonoy	<i>Chromolaena odorata</i>




Heliotropium indicum







Understanding biological control

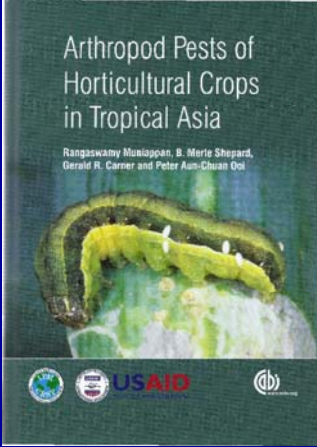


- In the past, few farmers knew about biological control in rice fields
- FFS encouraged farmers to discover biological control using insect zoos
- When farmers understand the concept of biological control they tend to use less poisons


IPM Objectives & Strategies

	Mass Media	Demonstration plots	Farmer Field School
Create awareness	✓		
Adoption of specific practices		✓	
Empowerment: understanding concepts & ability to make decisions			✓

Some references



Arthropod Pests of Horticultural Crops in Tropical Asia
Rangaswamy Muniappan, B. Merle Sheppard, Gerald R. Carner and Peter Ann-Chuan Goh



Farmer Field Research: An Analysis of Experiences in Indonesia
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Some references



Thank you **SEARCHA**