PLANTHOPPER THREAT TO SUSTAINABLE DEVELOPMENT OF ASIAN RICE FARMING: A WORM'S EYE VIEW



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[The views expressed herein are entirely those of the author and do not necessarily reflect the position of the agency he serves]

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Introduction:

- Purpose: Highlight the threat of Planthopper problems and insecticide misuse to the sustainable development of Asian rice farming and provide a Framework for developing sustainable interventions, structures and policies at the local, country and regional levels.
- Underlying theme: Crucial to recognize this threat and the need to develop a Framework using the Supply Chain Approach so as to enable insightful analyses and constructive policy engagement in developing innovative and sustainable interventions, structures and policies. A key challenge is in getting the 'basics and balance right'.

Background

Addressing the Preharvest Challenges of the Rice Supply Chain ADB - TA 7493

Subproject 1

Reducing vulnerability of crops to preharvest losses caused by planthopper pest outbreaks





January 17 to 19, 2011 **Mercure Fortune Hotel** Bangkok, Thailand

- Sustainable development of Asian rice farming is increasingly threatened by recurrent synchronized planthopper outbreaks
- •Arising from 2008 food crisis ADB 13th RETA (Regional Technical Assistance) – ADB-IRRI Rice **Planthopper Project**
- In 2009 & much of 2010 outbreaks in Thailand, Viet Nam, Malaysia, Indonesia, Cambodia, Philippines, Laos, China
- 2011 Outbreaks in Indonesia, Thailand and Viet Nam
- Major Finding: Pesticide overuse, unnecessary use, and misuse are important causes of these planthopper out breaks
- 2011 to 2012 Phase II of Project sustainable interventions, structures and Policy Engagement

Some Basics: Rice Supply Chain – The Big Picture



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INPUTS:

- Bio-fertilizers, bio-pesticides
- Reduce/optimize use of pesticides (both amount & timing)
- Reduction in water usage 'Wet and Dry' IRRI

PRODUCTION:

- Organization of production units
- Eco-system services/ Ecological engineering as public goods

PROCESSING:

- Co-gen (gasifyers using paddy husk)
- Hermetic storage
- Bio-pesticides

DISTRIBUTION:

- Packing material biodegradable
- Reducing carbon footprint convivialism

Generalised Rice Pesticide Supply Chain



Generalized Rice Pesticide Information Supply Chain



Planthopper outbreaks in Asia in 2009/10



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Brown Planthopper (BPH)

Virus Disease - Grassy Stunt







New virus
transmitted by WBPH
– Southern Rice Black
Streak Dwarf virus

Spreading in
 Southern provinces of
 China and North Viet
 Nam







Ragged Stunt



SRBSDV

Hopperburn occur in patches with high vulnerability



"Pest storms" in China and Thailand

江苏省南京市城区8月31日路灯下

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Pest storms @ gas station and restaurant in Ayutthaya province

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"Pesticide Tsunami"

We are using Resistant varieties, IPM, Biological control, Biodiversity, Ecological Engineering



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Why do planthopper outbreaks continue to threaten rice production in Asia?

Vulnerability factors

Low genetic biodiversity

- Many rice areas grown with few or closely related varieties.
- In Central Thailand 72% of farmers grew 2 varieties, Chainat1 and Pathumtani1.
- In the Muda area 2005, 2 varieties MR219 and MR220 covered 75% of the area.
- Season 2008/09 the same 2 varieties grown in 95% of rice areas in Malaysia.
- Hybrid rice narrow range of parental lines.

Low habitat biodiversity

- Large area rice monocrops with no other habitat.
- Double and triple cropping of rice.

Low biodiversity in parasitoids and predators

- High insecticide pressure farmers often apply 3 to 10 sprays.
- High use of insecticides toxic to parasitoids and predators.
- Poor equipment used low efficacy to pests, high efficacy to non targets.
- High use of cocktails that broaden the "kill" spectrum.

Why do planthopper outbreaks continue to threaten rice production in Asia?

Causal factors

Planthoppers have unique traits for adaptation

- It is a macro problem and can't be managed using micro tools.
- Planthopper outbreaks have ecological, sociological, economic and political dimensions

Need ecological tools at landscape level – eco agriculture

- Pest control tools rely in chemicals, plant resistance, GMOs.
- Tools do not tackle the "root causes" of outbreaks which have ecological and sociological dimensions.

Need changes in policies, institutional structures and concepts

- Lack ecological understanding particularly at the macro or landscape level.
- Plant protection policies and structures continue to favor pesticide use no change in > 50 years Need reform.
- Plant protection regulatory system have weakened and need reform.

Framing The Problem: Current System Favours YIN

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Negatives

Pesticide usage promotion by private and Public sectors Govt subsidies, free distribution during outbreaks Low costs of pesticides Pesticide misuse –especially scheduled spraying

YIN

Positives

Ecological research Resistant varieties Ecological engineering IPM training Insecticide reduction programs



Structural System favoring Negatives

Inadequate pesticides regulatory system Ecosystem services not factored into policies Incentives for short term profit gains Lack incentives for sustainable practices Access to subsidies & emergency pesticide allocations

Source: Adapted from Heong, 2011

"Escape strategy" in Vietnam

Farmers use light trap catches to synchronize sowing times to avoid heavy planthopper and virus infestations



Total insecticides used in IRRI farm Kg ai/ha/yr 1993 - 2008



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Negative Impact on Farmers' Health



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Pesticide 'Supermarket'



Advertisments – like Fast Moving Consumer Goods (FMCGs)





"Why are pesticides, which are poisons, allowed to be sold as FMCGs?"



"How did things ever come to this?"

Other Marketing/Sales Strategies



A: Spray calendars are distributed to farmers to promote prophylactic applications.

B: Sales promotion lottery ticket for a chance to win a motor cycle as an incentive to buy.

Thailand has 16 strategies, including the above and free gifts, dinners, lucky draws, and redemption vouchers. FMCG are products that have quick turnover, require less thinking by consumers and utilize advertising and promotional strategies to create emotional buying.

Insecticide use based on IPM	Insecticide use based on FMCG
Driven by rational decision making skills. Judicious use.	Driven by product packaging, brand names, attractiveness, promotions.
Need to use knowledge on pests, natural enemies, predation.	Less (or no) thinking needed. E.g. calendar/scheduled applications.
Maximize value of knowledge	Maximize value of sales
Economic rationale based	Emotional based, viz status, desire, fear, perceptions, attitudes, sense of power, price.

What are we up against?

SPKI **k**ache arsoi



Also 'FUD' – "Fear, Uncertainty, Doubt"

And '3Es' – 'Embrace, Extend, Extinguish'

Solution : Getting the Basics and Balance (Yin and Yang) Right

Positives

Ecological research Resistant varieties Ecological engineering IPM training Insecticide reduction programs



Pesticide promotion by private and Public sectors Govt subsidies & free distribution during outbreaks Low costs of pesticides Pesticide misuses





Facilitating Balance

Structural Adjustments

Regulations to prevent misuse Restrict emergency pesticide allocation Payment for ecosystem services (Public Good) Greening of Rice Supply Chain

Key Challenge:

How to 'Speak reason' to power/policy makers?

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Butter daisy (Melampodium divaricatium)

Okra (Abelmoschus esculentus)

Mung bean (*Vigna radiata)*



Farmer's Friend/Cobbler's pegs (*Bidens pilosa*) Institute of Strategic and International Studies (ISIS) Malaysia Chinese Wedelia (Wedelia chinensis)



(Sesamum indicum)

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Applications in Developed Countries



Increase in parasitoids in rice field with sesame and no insecticide use

Jin Hua, Zhejiang





Frog densities increase in eco eng fields



Recent Developments:

- ADB-IRRI-FAO Planning & Consultation Workshop on 'Rice Planthopper Problems and Insecticide Use- Developing Sustainable Interventions, Structures and Policies' – March 2011, Bangkok, Thailand – delegates from 8 ASEAN countries
- Thailand and Viet Nam Pilot Projects and various innovative efforts as already serious outbreaks, focus on ecological engineering plus other integrated efforts to restore balance
- Surprise package was Myanmar perceived 'weakness' (amongst lowest user of agri-chemicals) is now turned to their 'strength' emphasis is on building on their inherent eco-system services – flowers around fields, low level of chemical inputs →green and safe rice. Rice Specialization Company, Kitthayar Hinthar, with comprehensive greening rice supply chain, contract farming some 30,000 acres – Ayeyar Hinthar Group both exporting and supplying branded rice into local market.
- China also has pilot project in Jin Hua, Zhejiang and Hainan Island.

Requires A Multi-Disciplinary Approach



Towards Sustainable Interventions, Structures And Policies

POLICY ENGAGEMENT - SPEAKING REASON TO POWER – some pointers:

- Avoid sounding 'evangelical'
- Dove-tail prescribed changes to over-arching National goals or policies
- Be inclusive and holistic cover impact of prescribed change(s) to all stakeholders along supply chain – Governments need to balance interests of stakeholders with that of the nation
- Demonstrate clearly benefits and costs as well as budgetary demands on treasury
- Balance anecdotal evidence with empirically grounded (fact-based and structured) findings
- Strategise sequenced implementation 'touching stones to cross river'

Crucial points raised above should be mulled over and distilled for individual countries to address pesticide misuse and other contributory factors to planthopper outbreaks in Asia – especially what has worked and what has not.

✤ A crucial next step would be for Asian countries to work towards developing a common framework within the rubric of Supply Chain Approach to address pesticide misuse.

Towards this end, a proper understanding of the interplay of factors affecting different levels of the pesticide and pesticide information supply chains will provide invaluable insights for policy engagement.

✤ It will facilitate "getting the basics and balance right" at the local, national and regional levels.

Conclusion

• Optimistic of Asian countries' ability to recognize this threat to sustainable development and address planthopper problems and insecticide misuse in an urgent and focused manner. There are obvious opportunities to learn from each other's experience and cross-country comparisons, including from China Green Food Development Center – sharing and shoring.

• A multi-disciplinary approach which encourages new thinking will provide invaluable insights for policy engagement and ensuing oncourse correction of policy and other adjustments.

• The evolving innovative developments/ideas relating to supply chains and policy engagement should be harnessed towards developing sustainable interventions, structures, and policies to mitigate this threat to the sustainable development of Asian rice farming - step by step.

• Finally, some food for thought: 'We cannot solve our problems with the same thinking we used when we created them' – Albert Einstein.

