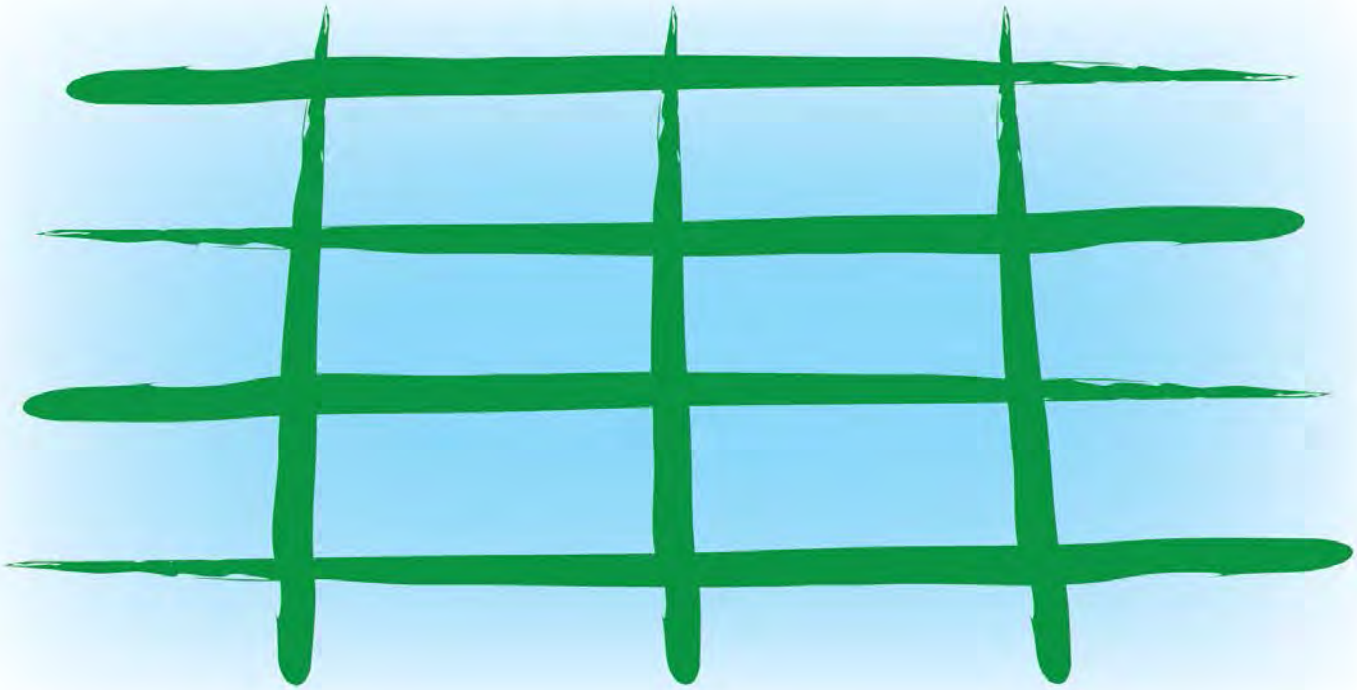
LEGATO

RICE ECOSYSTEM SERVICES



LEGATO

Land-use intensity and **E**cological En**G**ineering –

Assessment **T**ools for risks and **O**pportunities

in irrigated rice based production systems

Antragszeitraum / application period:

1. March 2011 – 29. Feb. 2016

Sustainable land management – a BMBF funding campaign

Module A:
„Interactions between land management, climate change and ecosystem services“

HELMHOLTZ
ZENTRUM FÜR
UMWELTFORSCHUNG
UFZ

Ecological Engineering

- design, monitoring and construction of ecosystems;
- development of strategies to maximise ecosystem services through
- exploiting natural regulation mechanisms (instead of suppressing them).

LEGATO
RICE ECOSYSTEM SERVICES

Ecosystem Services – the baseline of the LEGATO approach

- Ecosystem services dealt with in LEGATO:
  - ✓ Provisioning: biomass & nutrients (rice & other crops),
  - ✓ Regulating: biocontrol & pollinators,
  - ✓ Cultural: cultural identity, recreation & tourism

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RICE ECOSYSTEM SERVICES

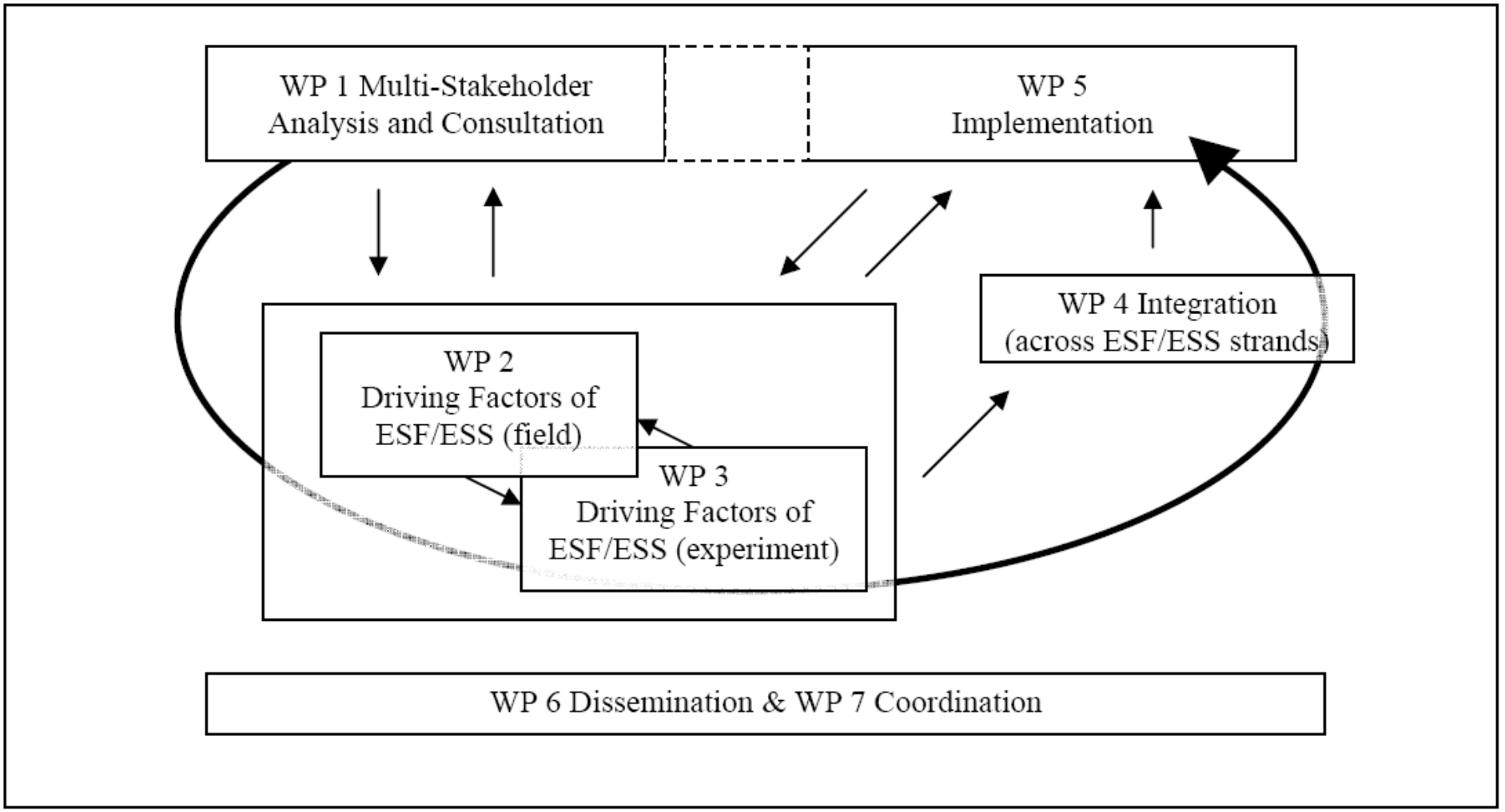
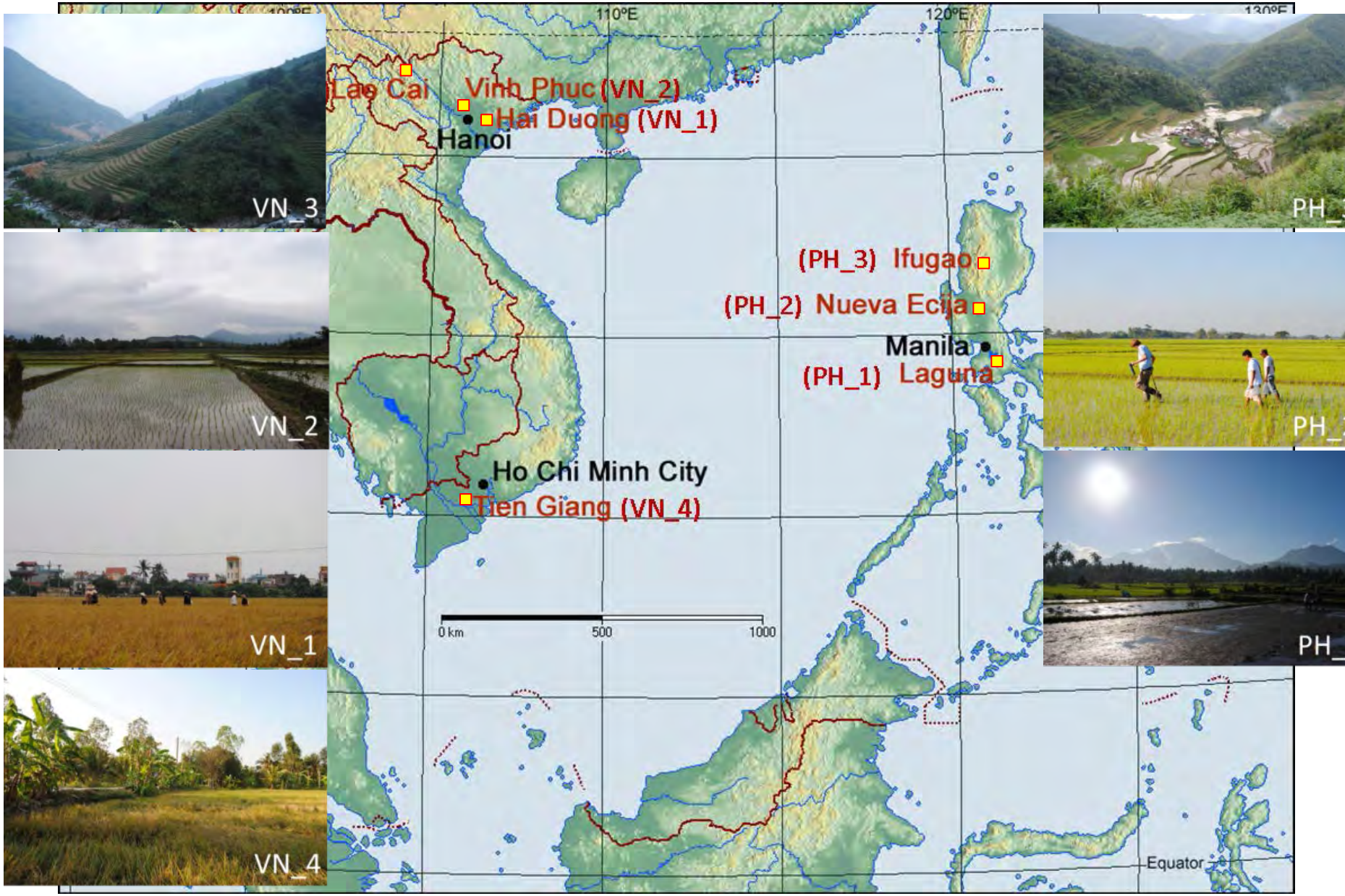


Figure 7.1: LEGATO overview structure and work flow

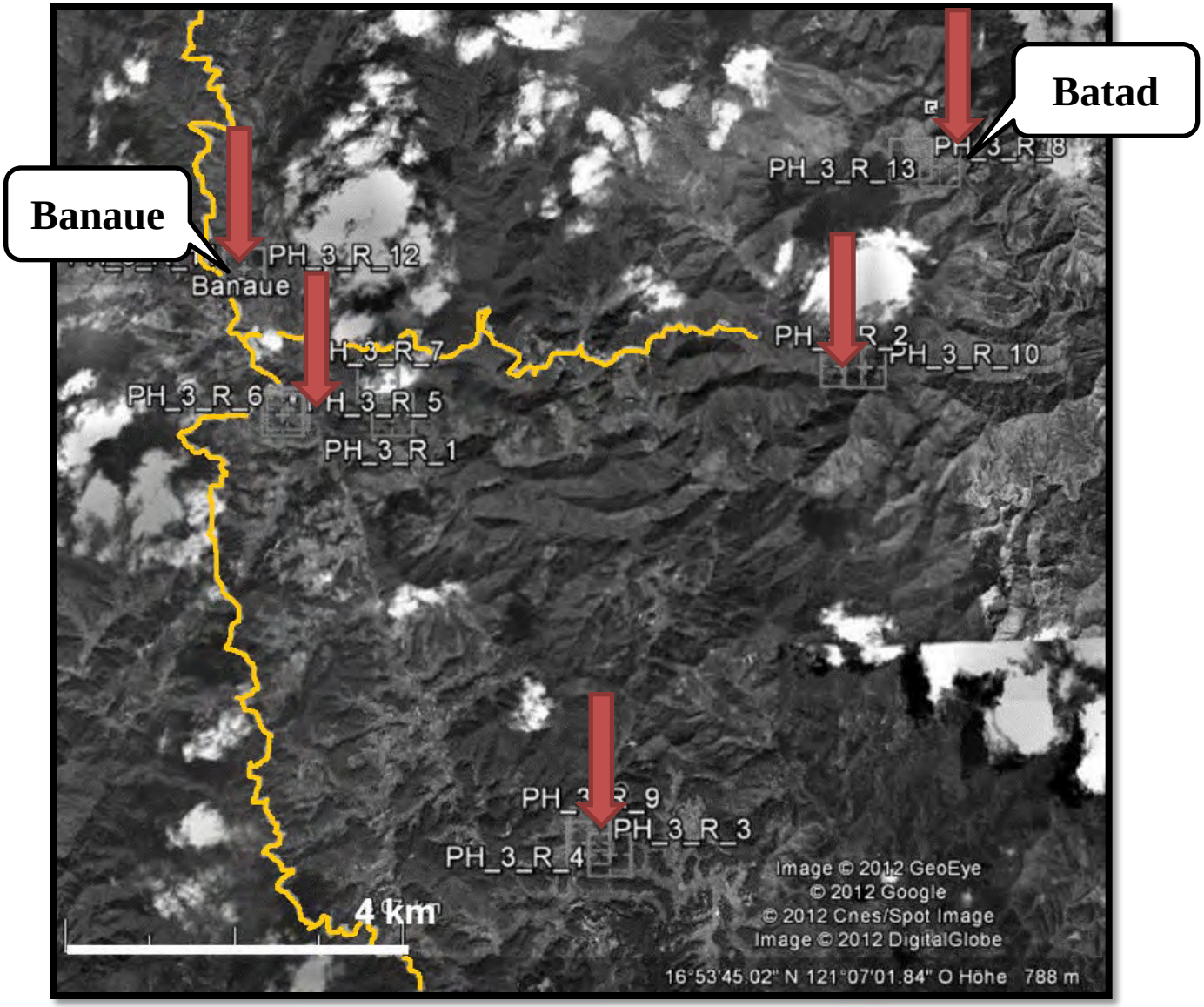

PLEASE
ORDER
DINNER
BEFORE
7:00 PM


Banaue HOTEL
WELCOME
LEGATO CONFERENCE
GUESTS AND PARTICIPANTS
LEGATO – UFZ
LEGATO
Ecological Engineering for Sustainable Management in Rice Landscapes
IRRI
Banaue Hotel and Youth Hostel • July 1-7, 2012

7 Regions (15x15 km²) with contrasting land use intensity and natural resources; 5 landscapes per region; in total more than 70 sites



LEGATO Ifugao (PH_3) research sites




Tappiya Falls Trail
Structurally rich
PH_3_R_8
Structurally poor
PH_3_R_13
149 m
149 m
© 2012 Mapabc.com
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Image © 2012 DigitalGlobe
© 2012 Google

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LEGATO
RICE ECOSYSTEM SERVICES


HYBRID RICE
VARIETIES FOR SALINE AREAS
IRRI-122
(PSB Rc80)
IRRI-118
(PSB Rc64)
IRRI-116
IRRI-115
(PSB Rc82)
IRRI-109
(PSB Rc30)
IRRI-108
(PSB Rc28)
IRRI-106
IRRI-105

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LEGATO
RICE ECOSYSTEM SERVICES

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LEGATO
RICE ECOSYSTEM SERVICES

Case study: regulating services

pest control – pollinators

implementation

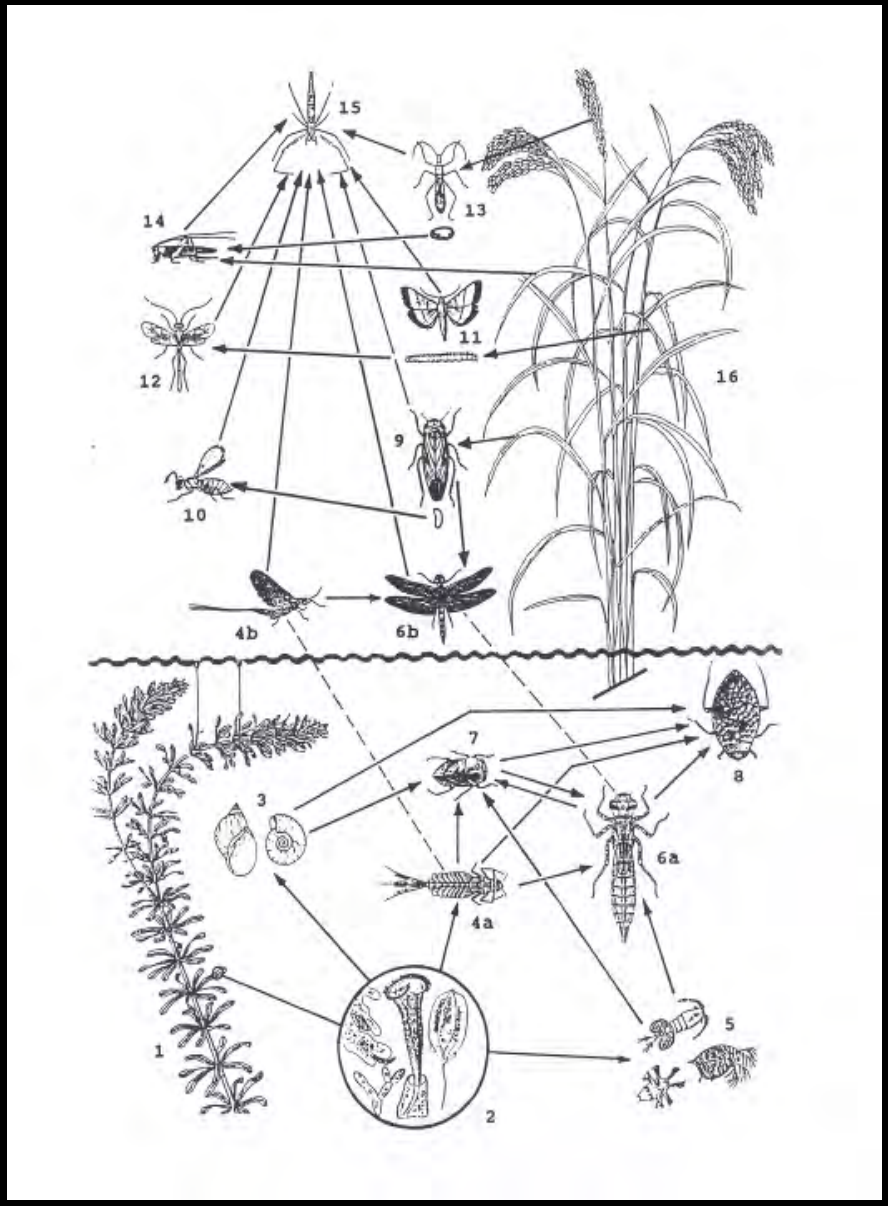


Figure 6: Simplified food web of “traditional” rice field (from Koch et al. 1990, modified); arrows indicate the trophic relationships (according to energy flow in the food chain)

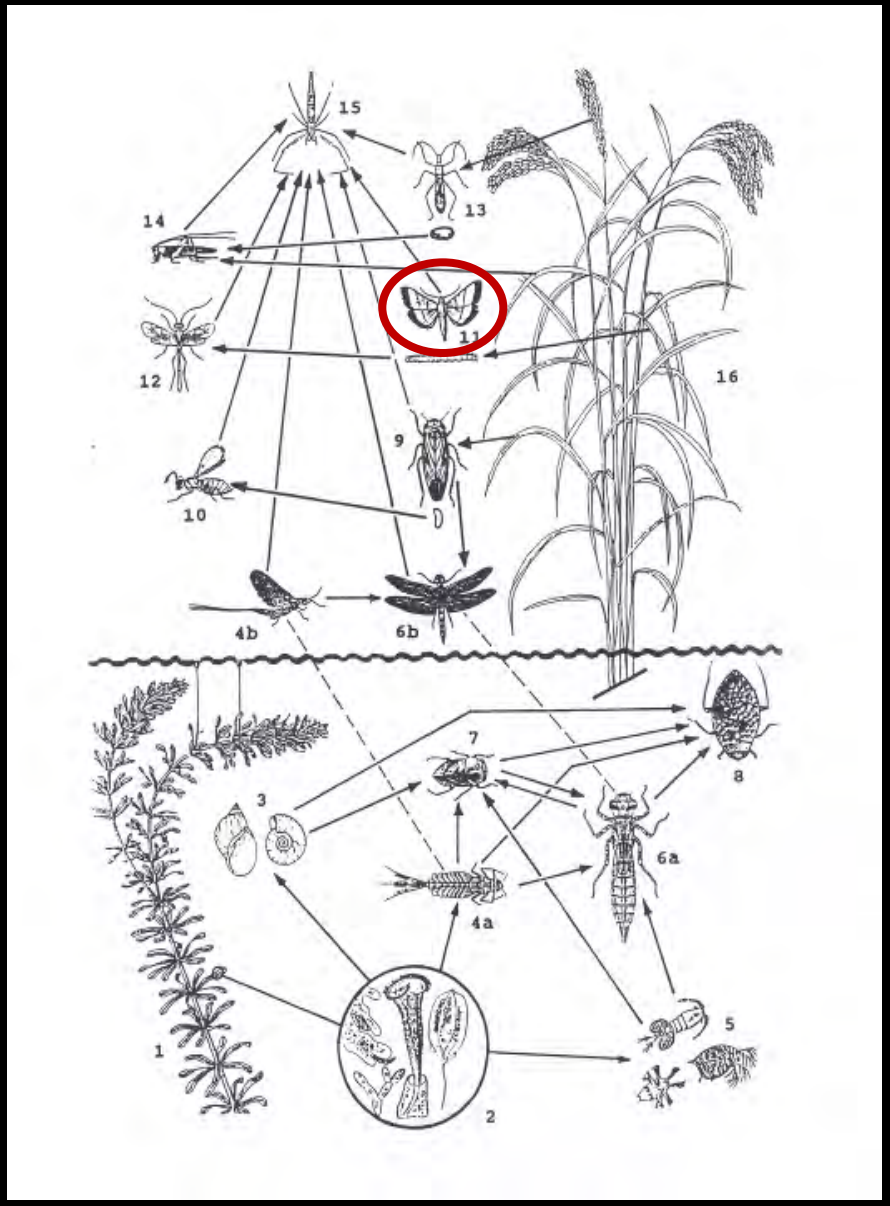
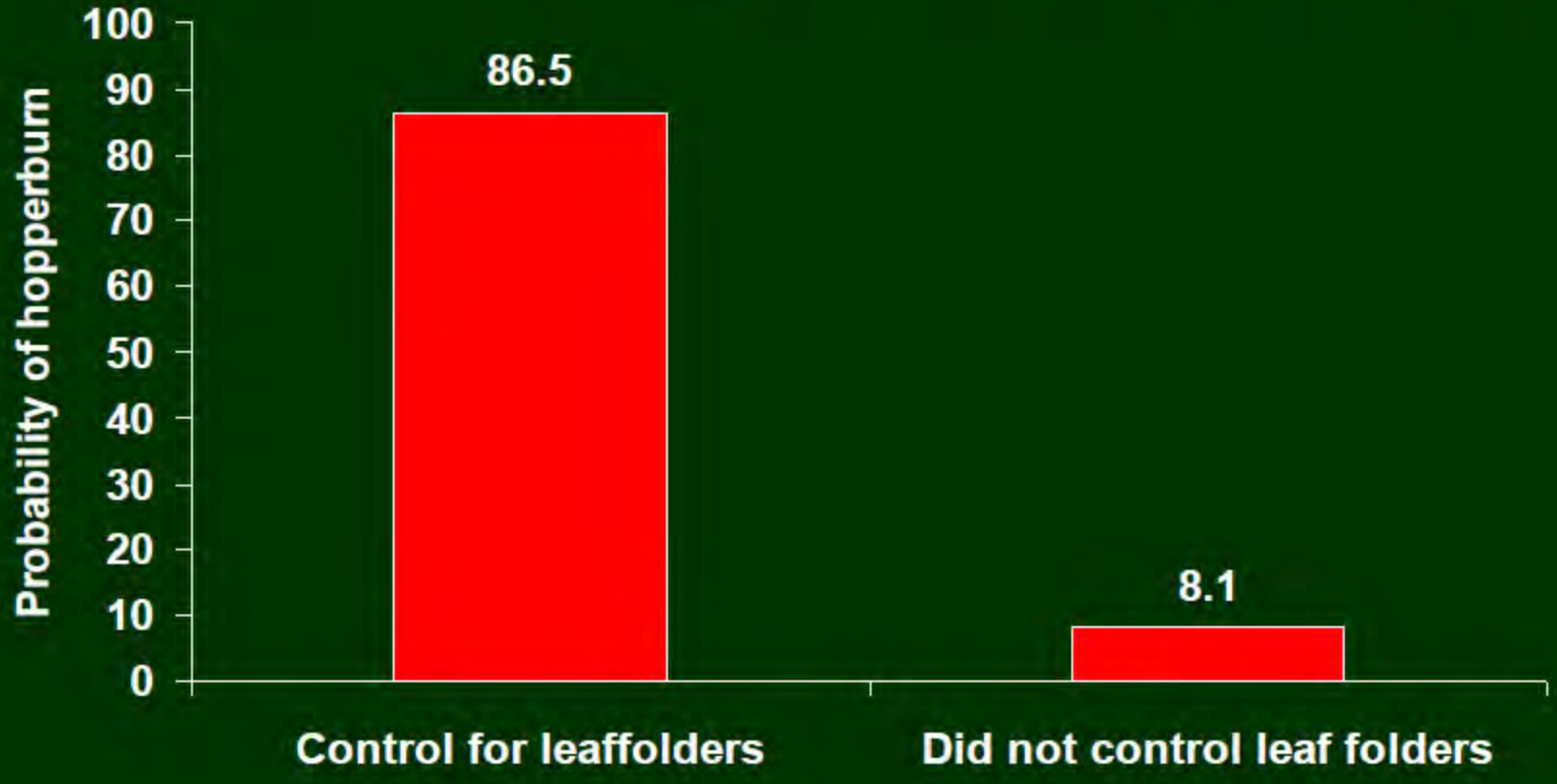
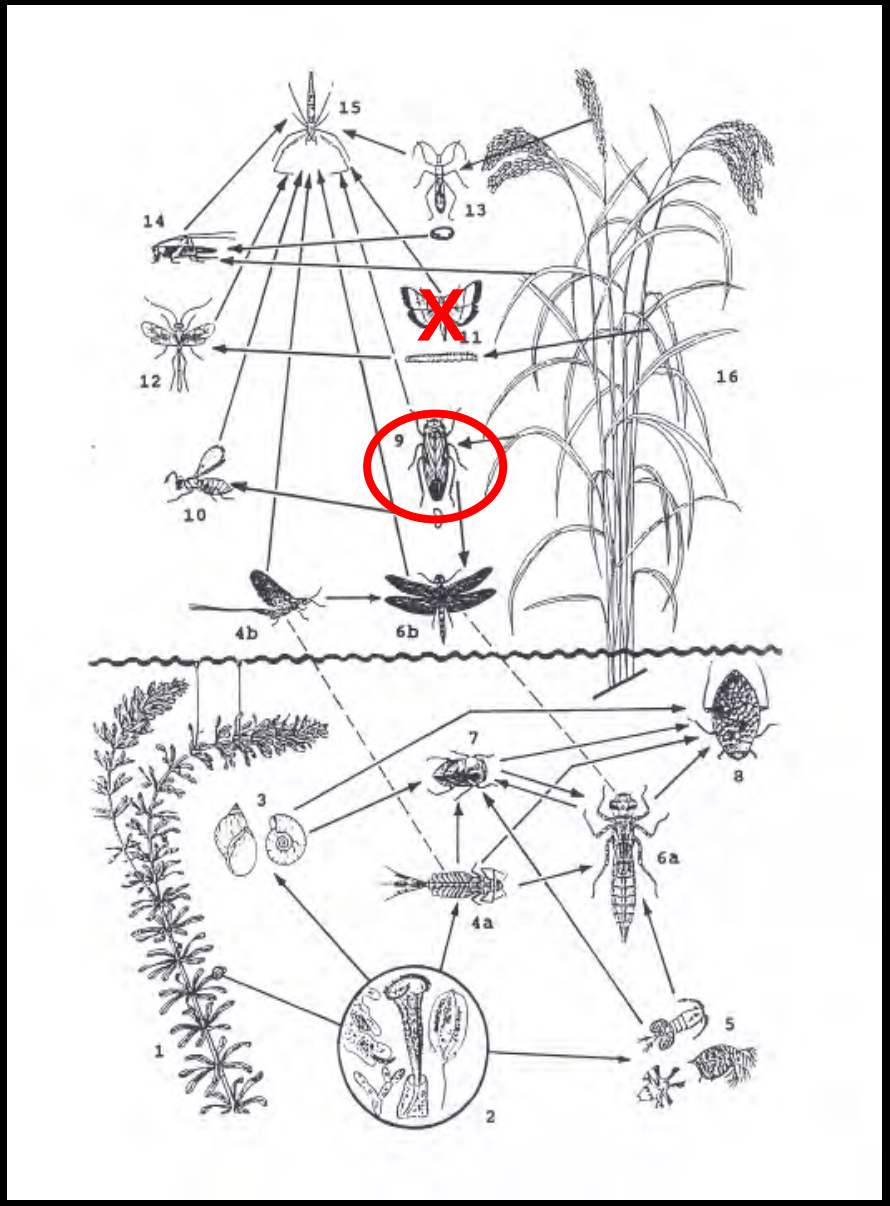


Figure 6: Simplified food web of “traditional” rice field (from Koch et al. 1990, modified); arrows indicate the trophic relationships (according to energy flow in the food chain)

IRRI

Leaf folder control in early crop stages increases vulnerability to hopperburn by 10 folds





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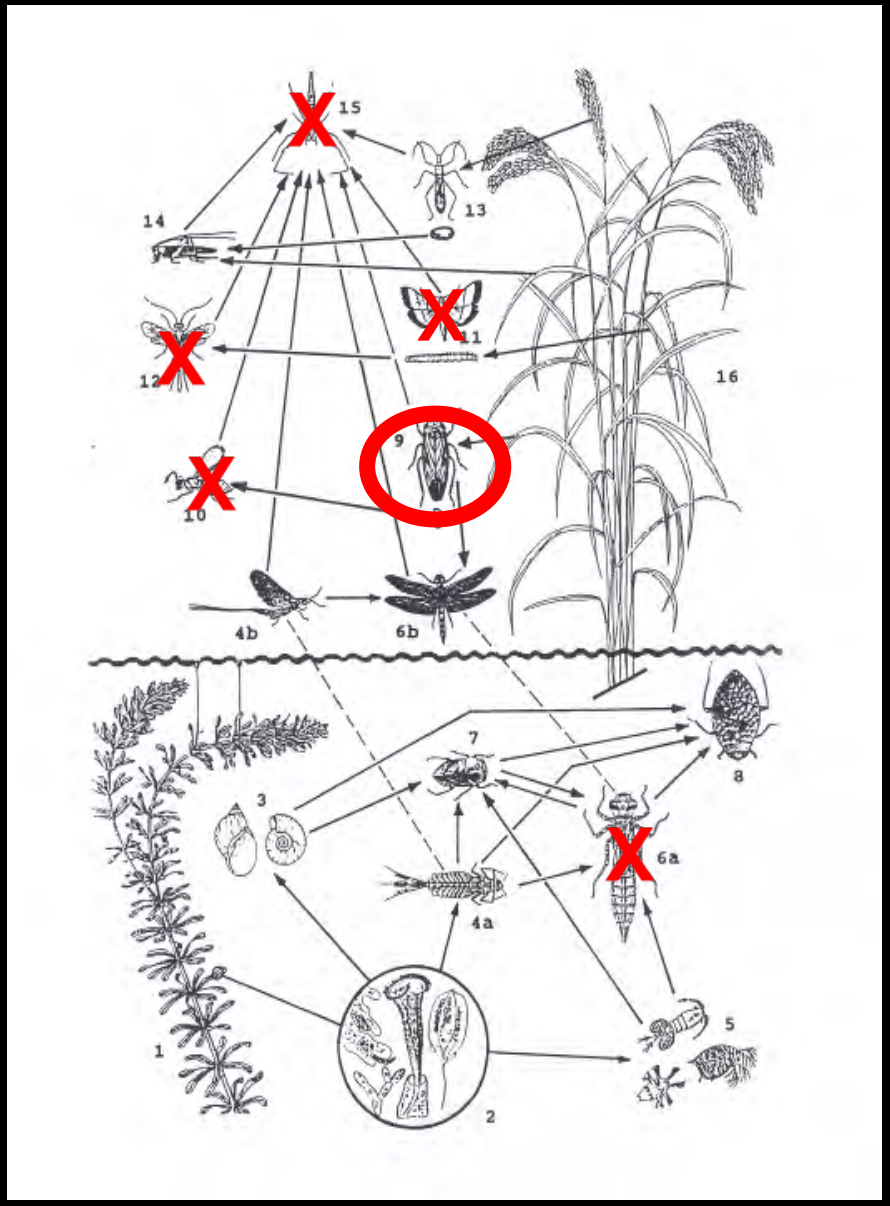

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IRRI

Insecticide sprays have no effect on hopper – Only few specialist species for egg mortality

Youtube

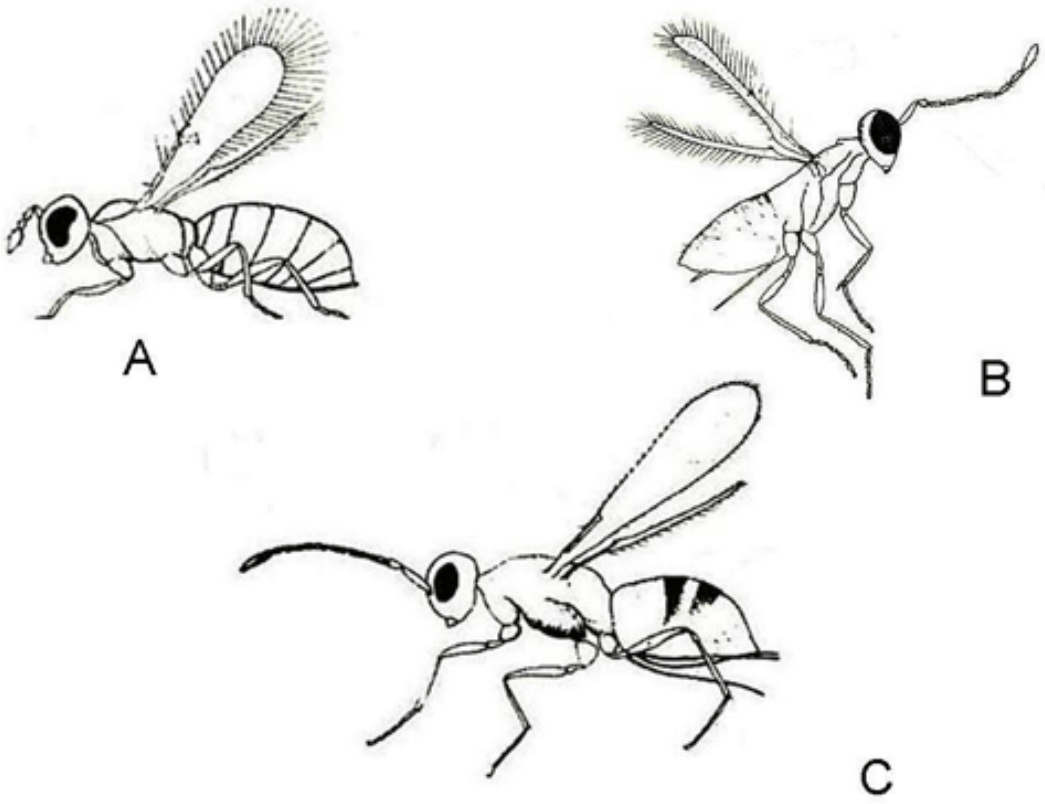
Increasing flora diversity in rice fields

Photo by: Ho Van Chien

Flowers are food sources for beneficials

- Provide food and shelter to natural enemies
- Facilitate regulatory ecosystem services – predation and parasitization

How to communicate egg parasitism



Three common planthopper parasitoids:
A = Oligosita B = Anagrus C= Gonatocerus

Why bees?

- Bees are bigger, easier to observe and also well known.
- Farmers are taught to observe the bee populations as indicators of parasitism.

Landscape transformation in many Vietnam districts

Entertainment-Education: New approach in communicating sustainable land management and biodiversity conservation

M. Escalada, K.L. Heong & H.V. Chien


CHƯƠNG TRÌNH TỌA ĐÀM: "NGÀY QUỐC TẾ ĐA D
GIỚI THIỆU CHƯƠNG TRÌNH "CÔNG NGHỆ
LA34

LEGATO TV episodes (I)

1	Structure of rice landscapes
2	Supporting and provisioning services of rice ecosystems
3	Role of ecological services
4	Nutrient and fertilizer requirements of rice
5	Eco-agriculture and forest trees
6	The rice field ecosystem
7	Structure of the traditional house

LEGATO TV episodes (II)

8	Benefit of dragonflies
9	Benefit of bees
10	Rural landscape
11	Socio-ecological systems
12	Organisms & micro-organisms in rice field
13	Decomposition of rice straw
14	Negative impact of rice straw burning
15	Role of minerals and silica in rice field soils

LEGATO TV episodes (II)

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LA34
Green Ecological Engineering
Dragonflies

Vietnam Turns Back A 'Tsunami of Pesticides'

Convincing Vietnamese rice farmers to use less pesticide came down to letting them see the benefits for themselves

For years, the entomologists at Vietnam's Southern Regional Plant Protection Center in Long Dinh had tried to sell rice farmers on the benefits of reducing pesticide use—to little effect. So in 2001, they took a different tack: They challenged 950 farmers to try for themselves.

In one plot, the farmers grew rice using their usual amounts of seed and fertilizer, spraying insecticide whenever they thought it was needed—which was often. In a nearby plot, they didn't spray at all for 40 days after planting and used less seed and fertilizer as well. To the farmers' surprise, the yield from the experimental fields was as good or better, while costs were lower, generating 8% to 10% more net income. From then on, they were convinced, recalls Chien Van Ho, who collaborated on the project.

out Asia—"but not in the Mekong Delta," says K. L. Heong, an IRRI insect ecologist. Thanks to the more judicious use of chemicals, natural predators helped keep planthoppers in Vietnam in check.

Clean as a swimming pool

The Green Revolution of the 1960s and '70s introduced sturdier plants that could support the heavier grain loads resulting from intensive fertilizer use. Rice production in Asia more than doubled. But it left farmers believing more is better—whether it's seed, fertilizer, or pesticides.

Rice farmers became accustomed to spraying soon after planting, when they first saw signs of the leaf folder, which appears

swimming pool," Heong says. What's more, tests have shown that killing planthoppers now takes pesticide doses 500 times greater than in the past. More and more planthoppers survive to suck sap from the young rice plants, causing them to wither.

As early as the 1980s, IRRI and the FAO convinced some Southeast Asian governments that with so-called integrated pest management (IPM), natural predators could control planthopppers. In 1986, Indonesia banned 57 pesticides and completely stopped subsidizing their use. But progress was reversed in the 2000s, when growing production capacity, particularly in China, unleashed a "tsunami of pesticides," says FAO entomologist Peter Kenmore. Even some in the agrochemical industry concur. "We all agree that in Vietnam, farmers have overapplied pesticides in some production environments," says Kee Fui Kon, who oversees rice-related R&D at the Swiss agrochemical giant Syngenta.

Radio soap opera

In Vietnam, the Mekong Delta trial helped change conventional wisdom among farmers and agricultural officials. The study led

Let 100 flowers bloom. Vietnamese rice farmers are encouraged to use less pesticide and to grow flowers and vegetables on the banks of their paddies.

www.legato-project.net