

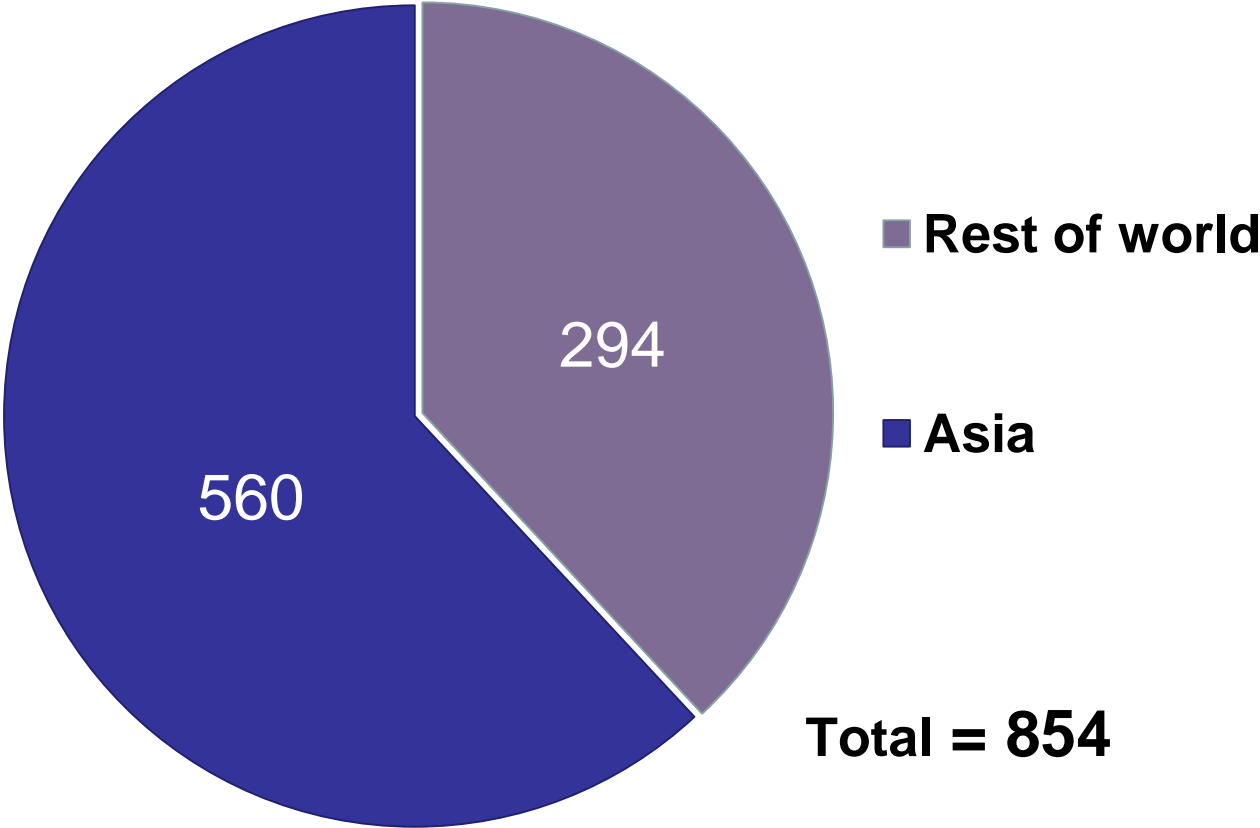
FAO's Policy Advice on Sustainable Rice Intensification: Closing the yield and nature gaps



Jan Willem Ketelaar, FAO Regional Office
for Asia and Pacific, SRI-Policy Workshop,
NASC, Delhi, 21 June 2014



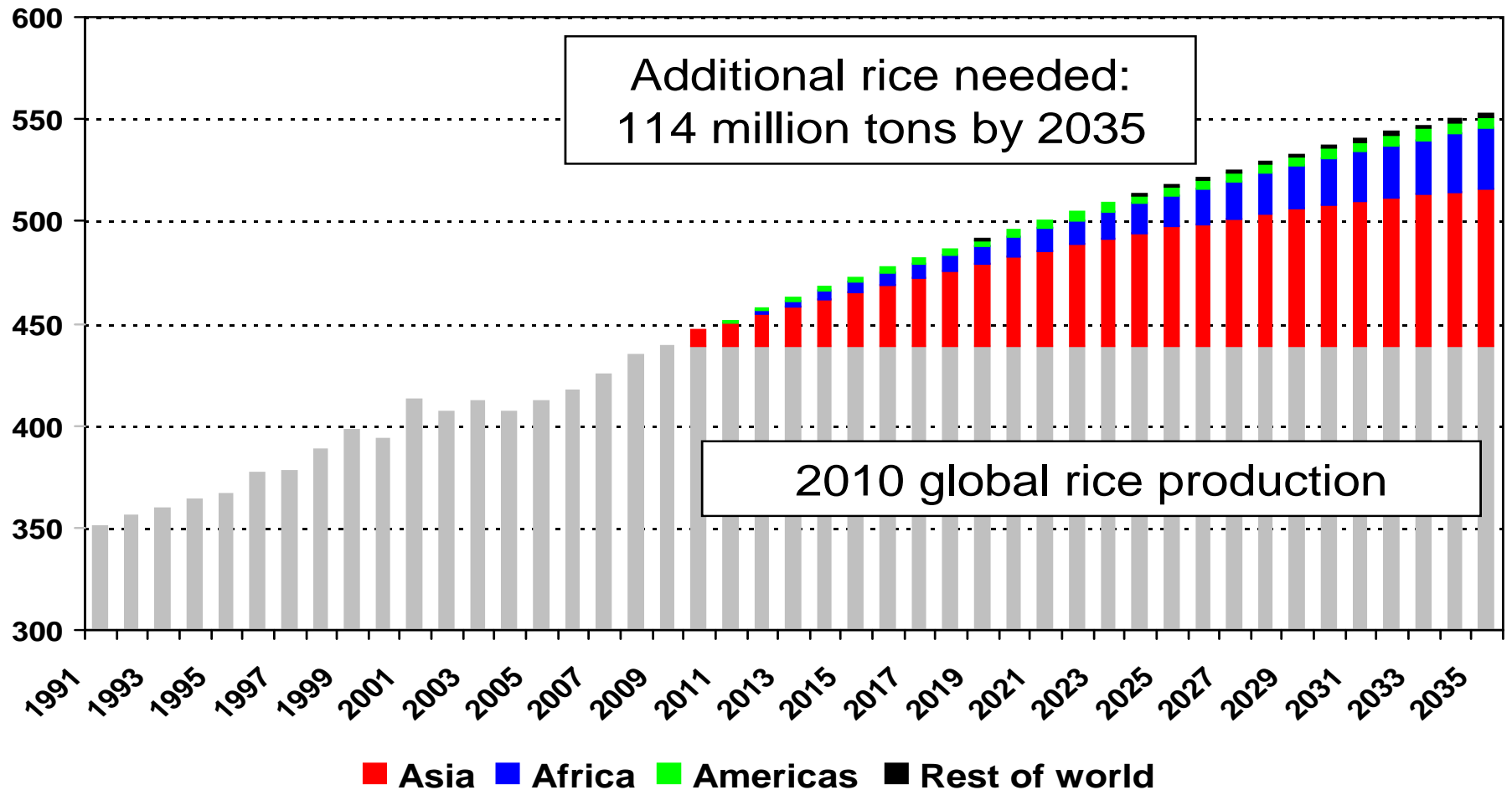
Number of undernourished people in the world, 2010-12, based on caloric intake per person (millions of people)



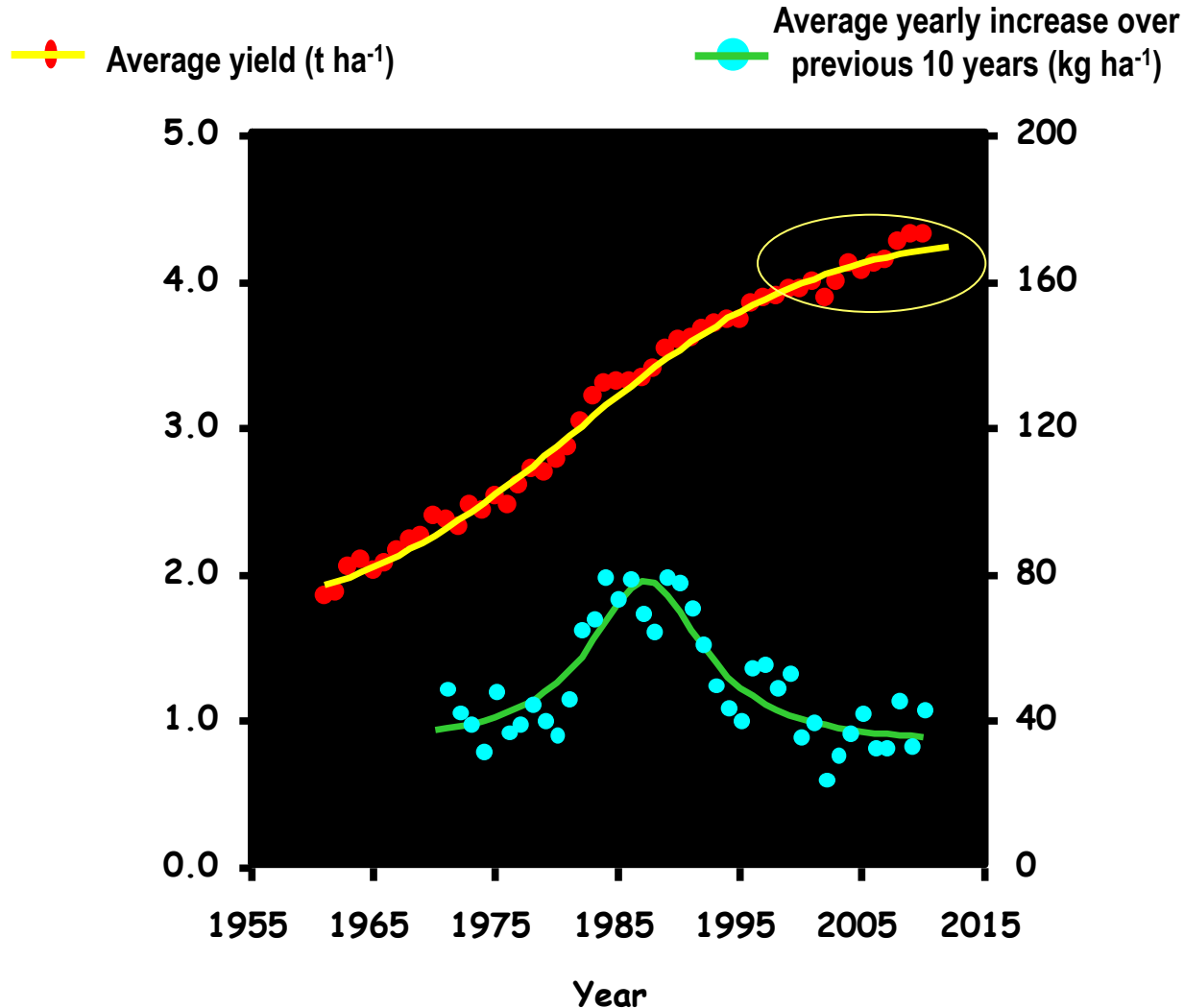
Source: Data from FAO Food Security Indicators, 2013.

Global rice production increases needed to meet demand by 2035 (Source: IRRI)

Million tons milled rice



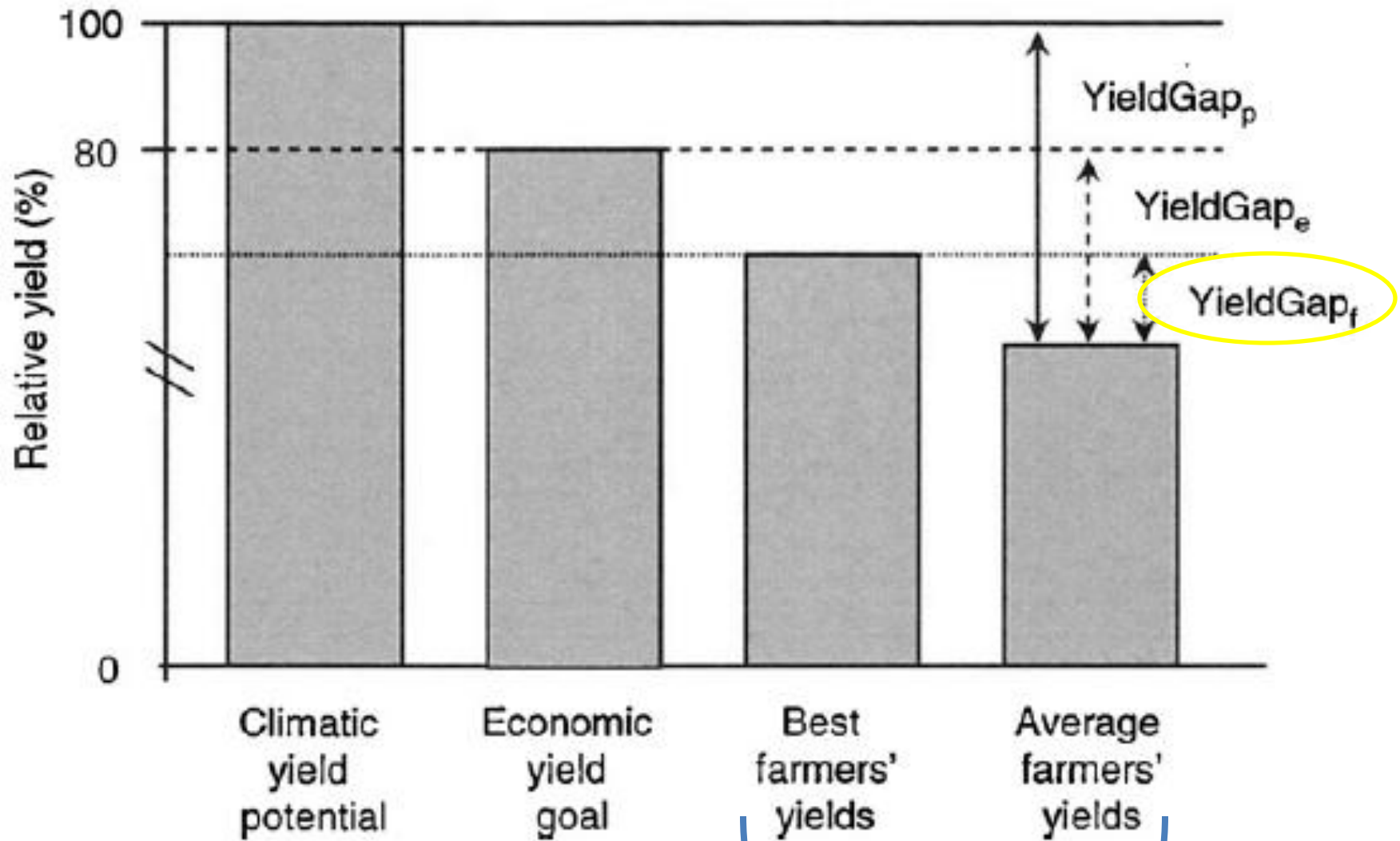
Green Revolution Slows (Source: IRRI) : Global Paddy Yield (1961-2010)



Closing the yield gap:

- Rice Intensification
- In Asian rice production:
 - Land is moving out
 - Labor is moving out
 - Water is moving out
- Major changes in crop production practices and increases in efficiency needed!
- > 40% of Indian rice area rainfed => scope for input efficiency gains and closing the yield gap!





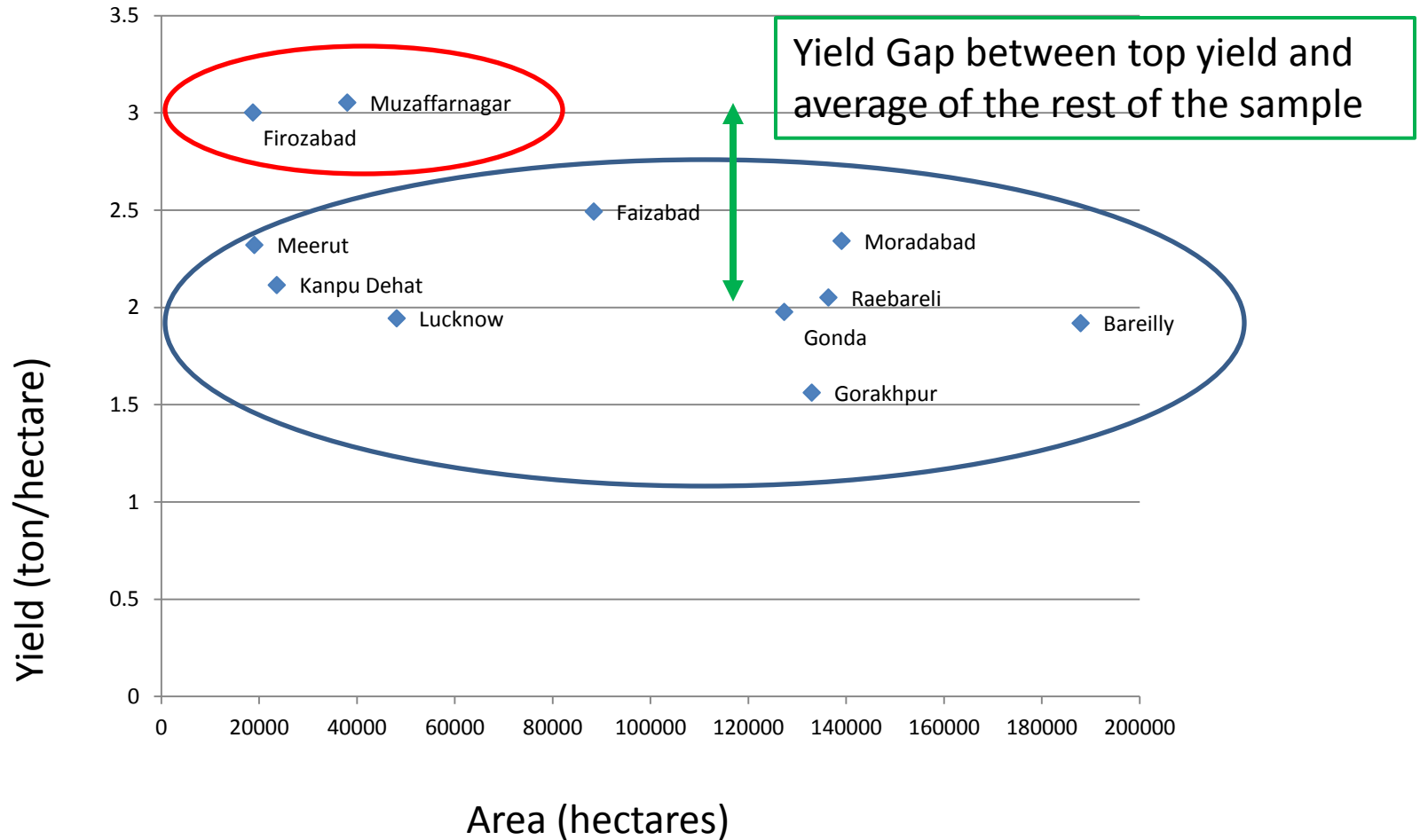
Simulated with model(s)

80% of Simulated: Experiment Station

Village, Block, District: Crop Cuts

Rice

Top 15% yield	3.03	31%
Rest of the sample yield	2.08	46%
Yield Gap	0.95	

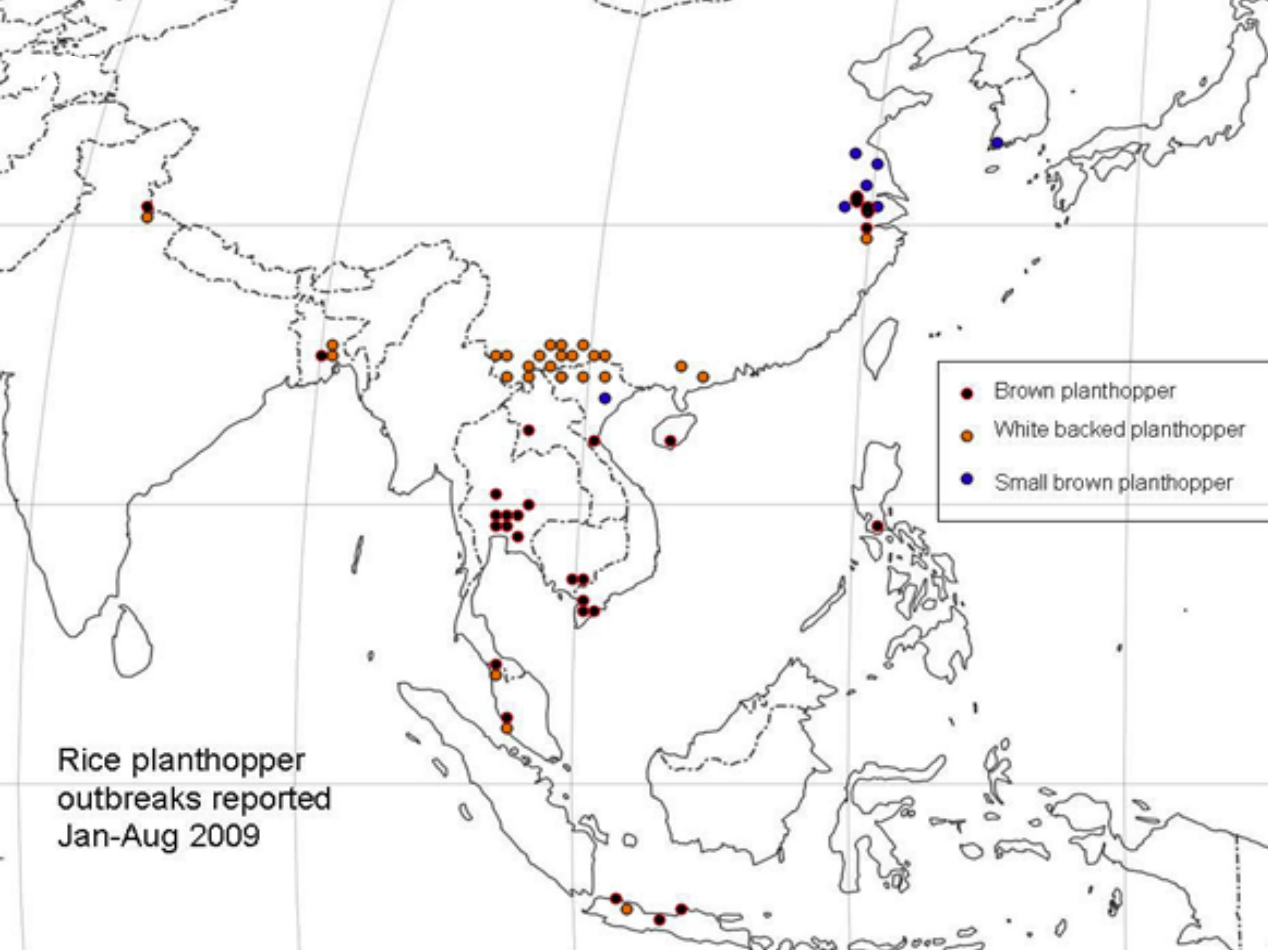


Yield data from 11 districts in Uttar Pradesh, India

Rice-based Farming Systems – more than just rice!







Crop Intensification Risks:

Rice planthopper outbreaks, linked to pesticide (and N-fertilizer) overuse, have occurred at an unprecedented frequency during last decade
 (Source: IRRI/Horgan)



Challenge: Sustainable Rice Intensification, optimizing ecosystem services



**A POLICYMAKER'S GUIDE
TO THE SUSTAINABLE
INTENSIFICATION
OF SMALLHOLDER CROP
PRODUCTION**

www.fao.org/ag/save-and-grow/

Relationships between 6 rice intensification/farming/crop management systems and 13 ecosystem services – *benefits that people obtain from ecosystems* – as key outcomes of multi-functional rice-based agricultural systems (FAO, 2014)

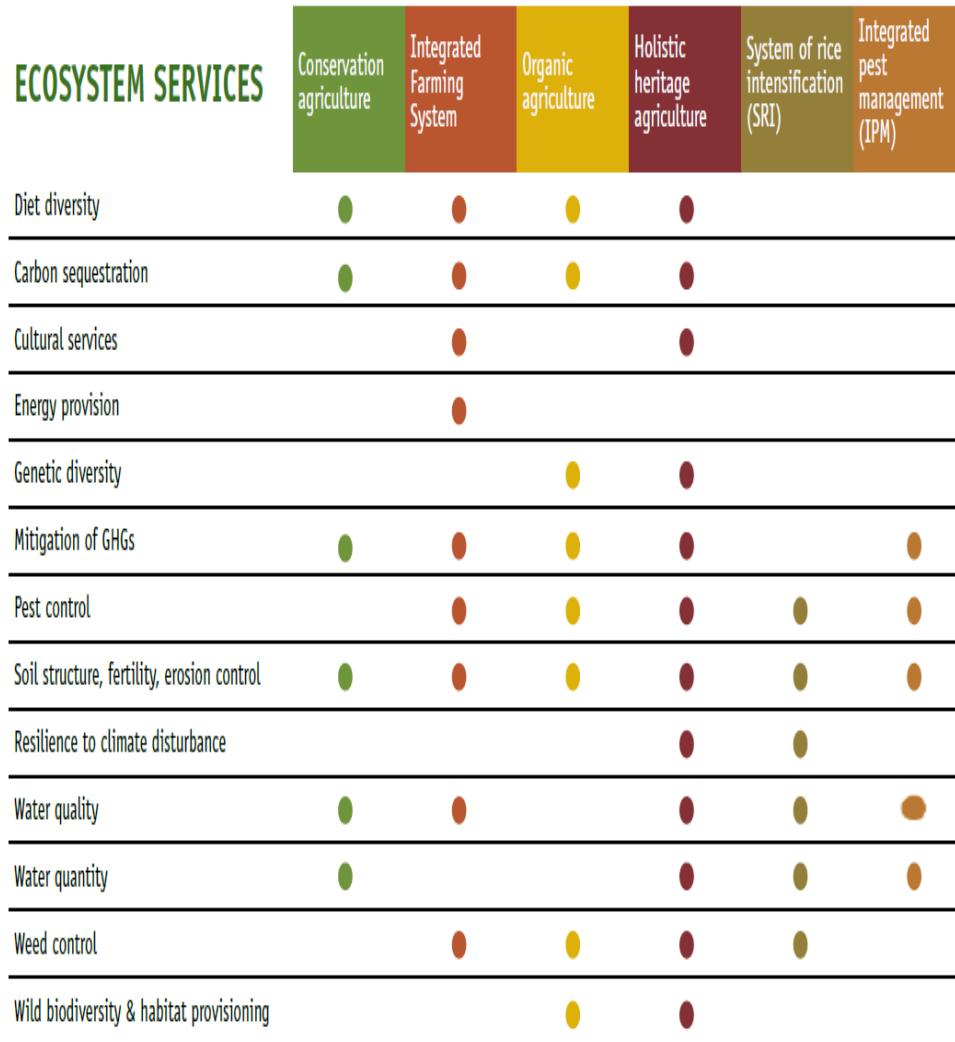


TABLE 1. SUMMARY OF ECOSYSTEM SERVICE OUTCOMES BY SYSTEM.

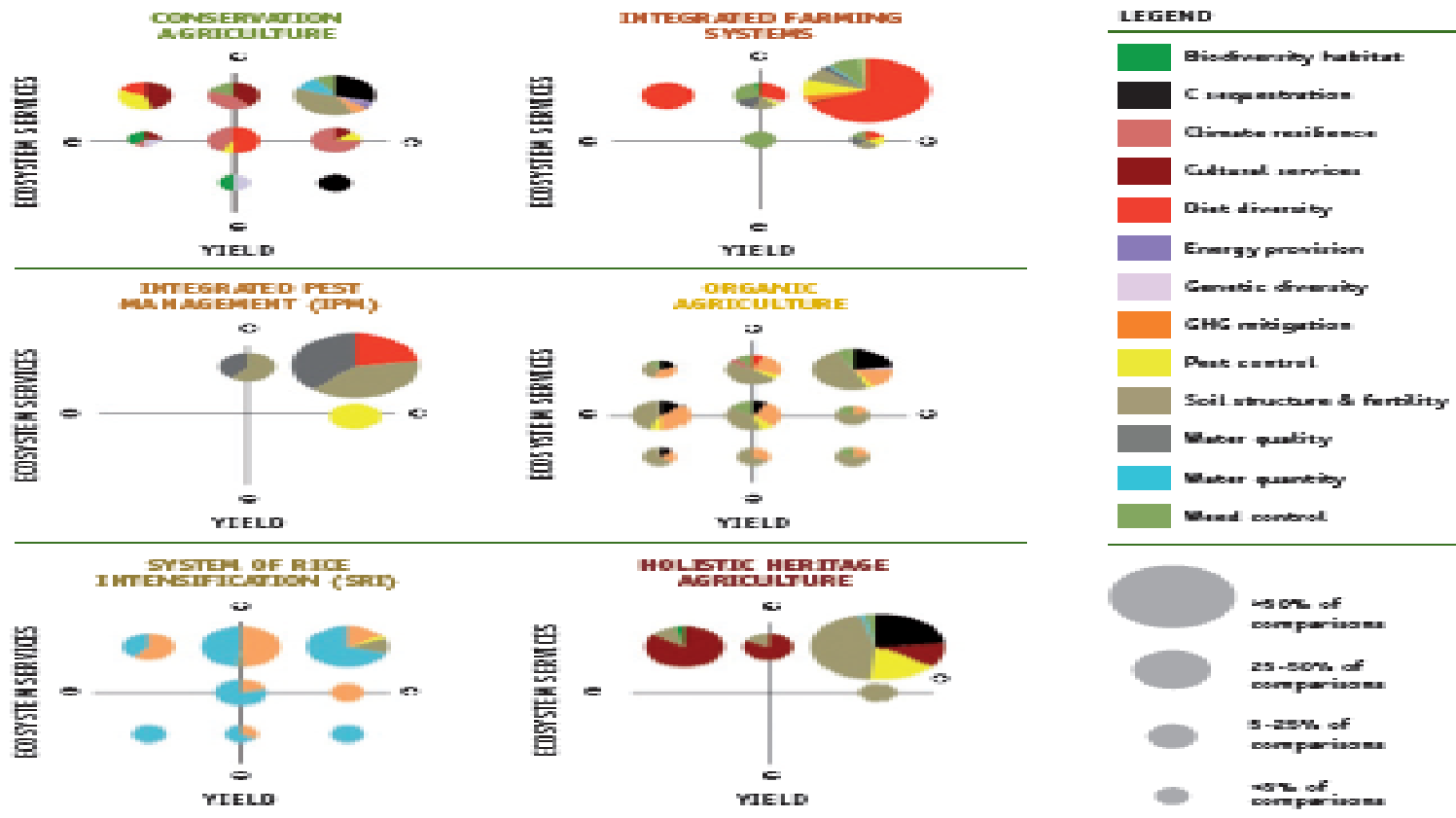
The tallies represent observations of ecosystem service outcomes reported in agroecological systems versus contrasting farming systems. Tallied observations indicate enhanced services (dark color shading), similar services (light color shading), and diminished services (no shading) relative to contrasting farming systems. The greatest number of observations is listed in boldface for each combination of agroecological system and ecosystem service.

ECOSYSTEM SERVICES	CONSERVATION AGRICULTURE			INTEGRATED FARMING SYSTEMS			INTEGRATED PEST MANAGEMENT			ORGANIC AGRICULTURE			SYSTEM OF RICE INTENSIFICATION			HOLISTIC HERITAGE SYSTEMS		
	+	↔	-	+	↔	-	+	↔	-	+	↔	-	+	↔	-	+	↔	-
Diet diversity	3	3	0	90	0	0				1	0	0				9	0	0
Carbon sequestration	35	11	0	8	0	0				48	0	2				22	0	0
Cultural services				1	0	0										42	0	0
Energy provision	3	3	0	7	0	1												
Genetic diversity										4	0	0				4	0	0
Mitigation of GHG	7	0	4	2	0	3	1	0	0	16	8	30	30	6	2	6	0	0
Pest control	2	0	0	8	2	0	4	1	0	9	2	0	12	0	0	16	1	2
Soil structure, fertility, erosion control	21	23	2	12	2	0	8	0	0	111	20	18	11	1	0	40	1	0
Resilience to climate disturbance										1	0	0	5	0	0	1	0	0
Water quality	1	0	0	2	4	2	17	0	0				1	0	0	2	0	0
Water quantity	8	0	0	1	0	0	1	0	0				94	8	5	1	2	2
Weed control	7	3	3	16	2	0				12	2	4	2	1	3	19	0	0
Wild biodiversity & habitat provisioning				1	2	0										2	0	0

Synergies and Tradeoffs between ecosystem services and rice yield (FAO, 2014)

FIGURE 1. SYNERGIES AND TRADEOFFS BETWEEN ECOSYSTEM SERVICES AND YIELD IN SIX FOCAL AGRICULTURAL SYSTEMS OF RICE PRODUCTION.

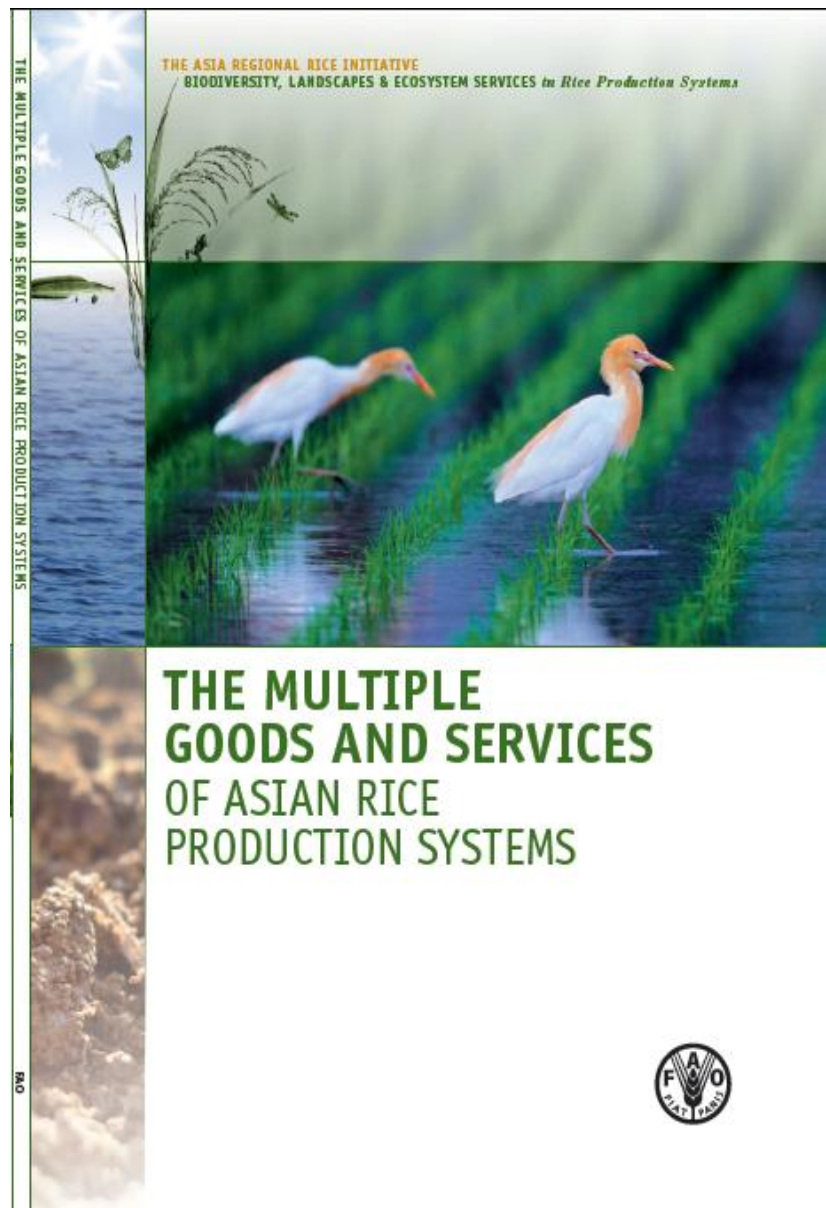
Bubble location indicates a specific combination of outcomes for ecosystem services (y-axis: enhanced, upper quadrants; diminished, lower quadrants) and yield (x-axis: enhanced, right quadrants; diminished, left quadrants) relative to comparison farming systems. Bubbles located on the axis itself indicate similar results to comparison systems. Bubble size indicates the percent of reviewed studies reporting each combination of yield and ecosystem service outcomes: largest: >50 percent of comparisons; large: 25-50 percent of comparisons; medium: 5-25 percent of comparisons; small: <5 percent of comparisons. Ecosystem services in each outcome are represented by the color ramp below.





Closing the ‘Nature Gap’

- Understanding ecosystem services & “eco-engineering” vital for local adaptation and responsible management
- Supportive policies, reducing subsidies on chemical farm inputs
- Investments in research and ecosystem-literacy training for smallholder rice farmers



International Wetlands Convention (Ramsar, 1971)

- COP-XI adopted Resolution XI-15 on rice paddy and pest control calling on governments to strengthen pesticide regulation for conservation of biodiversity and sustainable use of wetland ecosystem services.

Source: http://www.ramsar.org/cda/en/ramsar-documents-cops-cop11-cop11-drs/main/ramsar/1-31-58-500%5E25607_4000_0





A Regional Rice Strategy



A REGIONAL RICE STRATEGY FOR
SUSTAINABLE FOOD SECURITY
IN ASIA AND THE PACIFIC

FINAL EDITION



- FAO de-centralization
- Upon request by member countries, FAO formulated RRS, endorsed at March 2014 APRC in Mongolia
- Support for (re)formulation and implementation of **national rice strategies or policies**



A Regional Rice Strategy

A Vision for the Rice Economy

“Food-secure, better nourished and prosperous rice farmers and consumers in the Asia/Pacific region who benefit equitably from a vibrant, innovative and transformed rice sector that is more productive, efficient and environmentally sustainable by 2030”



Designed to:

Contribute to FAO Strategic Objective 2 (SO2) *“Increase and improve provision of goods and services from agriculture, forestry and fisheries in a sustainable manner”*

THE ASIA REGIONAL RICE INITIATIVE

Efficient Management for
SUSTAINABLE INTENSIFICATION OF RICE-BASED FARMING SYSTEMS

THE CHALLENGE:

TO FEED A GROWING WORLD POPULATION, THERE IS A PRESSING NEED TO INCREASE CROP PRODUCTION WHILE ENSURING SUSTAINABILITY AND ENHANCING RESILIENCE TO FACE NEW CHALLENGES.

This is particularly relevant to rice production in Asia, where increases in productivity are slowing and land, water and labour are moving out of production. Consequently, there is a need for achieving better efficiency, in particular:

- ✓ *Crops and varieties* suited to different agro-ecosystems and farming practices, and tolerant to the effects of climate change.
- ✓ *Farming systems* that offer a range of productivity, socio-economic and environmental benefits.
- ✓ *Water management strategies* that use ecosystem approaches to conserve water.
- ✓ *Soil health* by drawing on natural sources of plant nutrition and more judicious use of mineral fertilizers.
- ✓ *Plant protection* that relies primarily on healthy ecosystems and natural enemies to control pest populations.
- ✓ *Knowledge and market systems* that facilitate access by small-holder farmers.

Save and Grow

...in Asian rice production means increasing efficiency to produce more, with higher quality, while relying on fewer and more sustainable inputs:

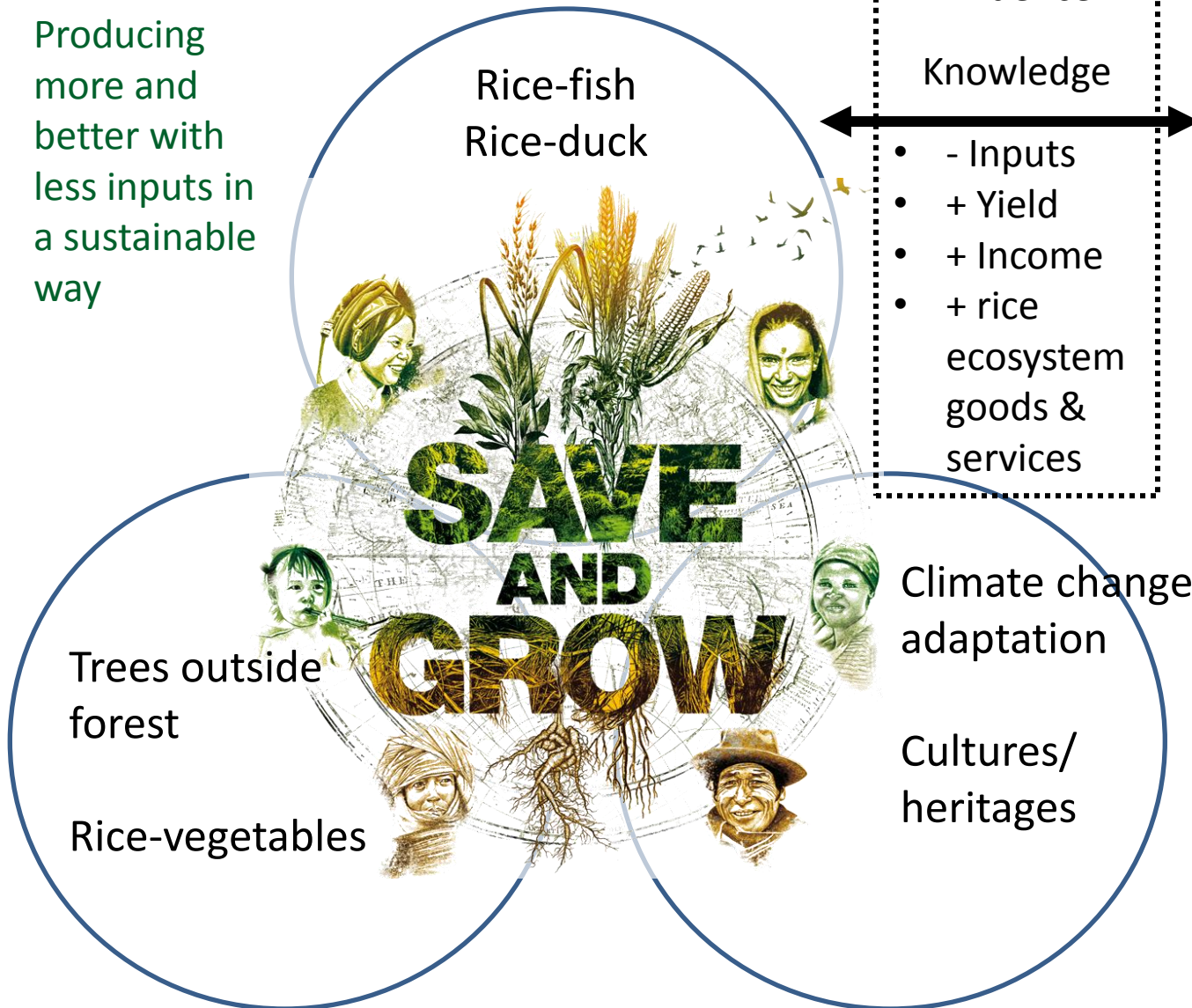
- Better choice of appropriate management strategies
- Building on ecosystem services
- Making more efficient use of inputs
- Conservation and sustainable use of natural resources

More with Less



Regional Rice Initiative (2013-15)

Producing more and better with less inputs in a sustainable way



Policy and strategy formulation and implementation

- National rice strategy/policy
- Farm input policy/reduce subsidies
- Code of Conduct Pesticide Management, Convention on Biological Diversity, Ramsar Wetlands Convention

The Way Forward

- **Closing both yield and nature gaps vital for global food and nutrition security**
- **No silver bullet solutions** – policies, *approaches, production systems & management practices need to be tailored to individual country and local smallholder farmer needs, opportunities & challenges.*
- **Sustainable production is knowledge intensive** – *investments in agricultural research for development and capacity building for ecosystem-literacy training are essential.*



New EU funded and AIT-FAO-Oxfam implemented project on System of Rice Intensification action research and training in rainfed rice-based farming systems in Lower Mekong River Basin:

<http://www.sri-lmb.ait.asia>

