

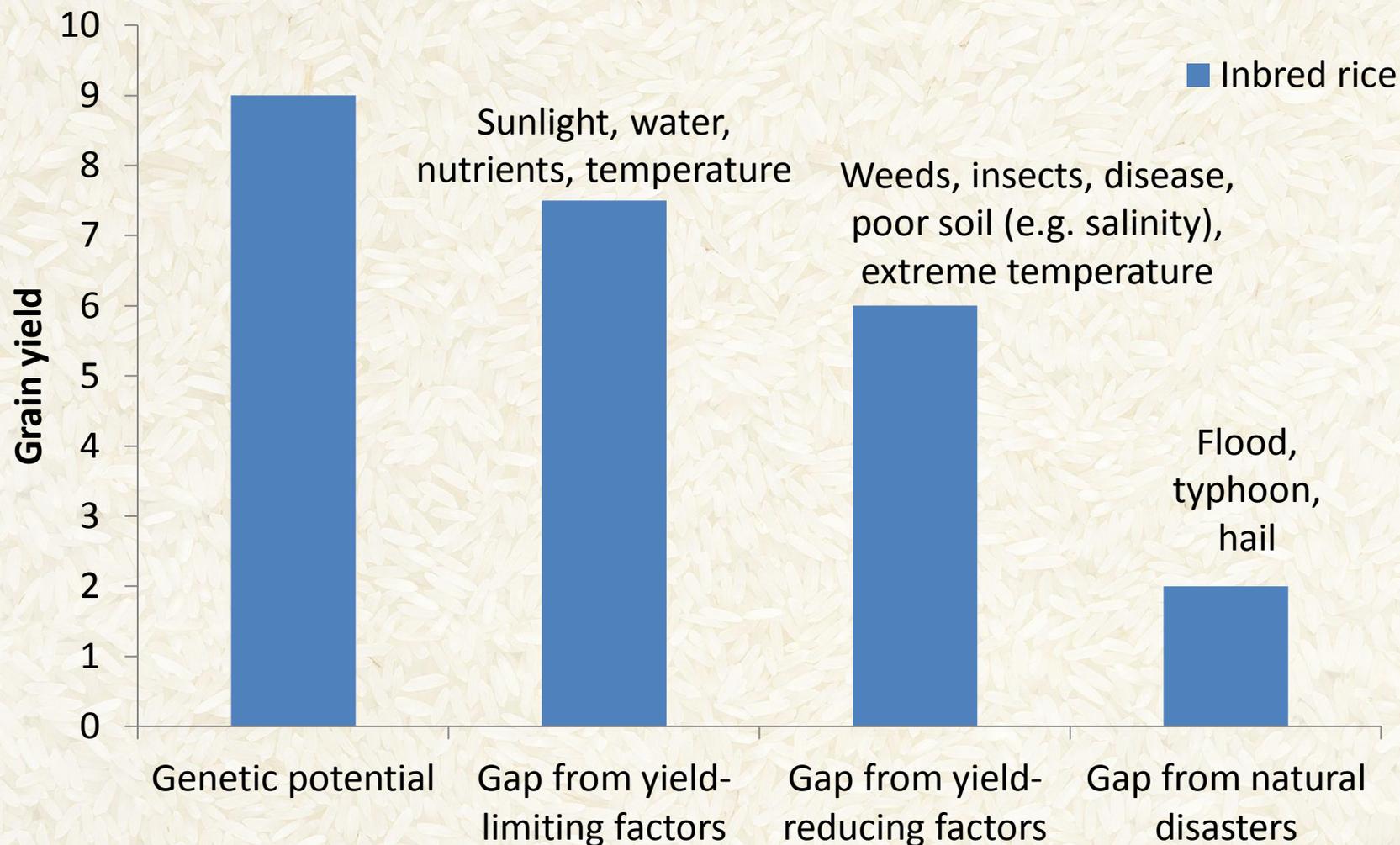
# How can crop management enhance genetic gains from breeding?

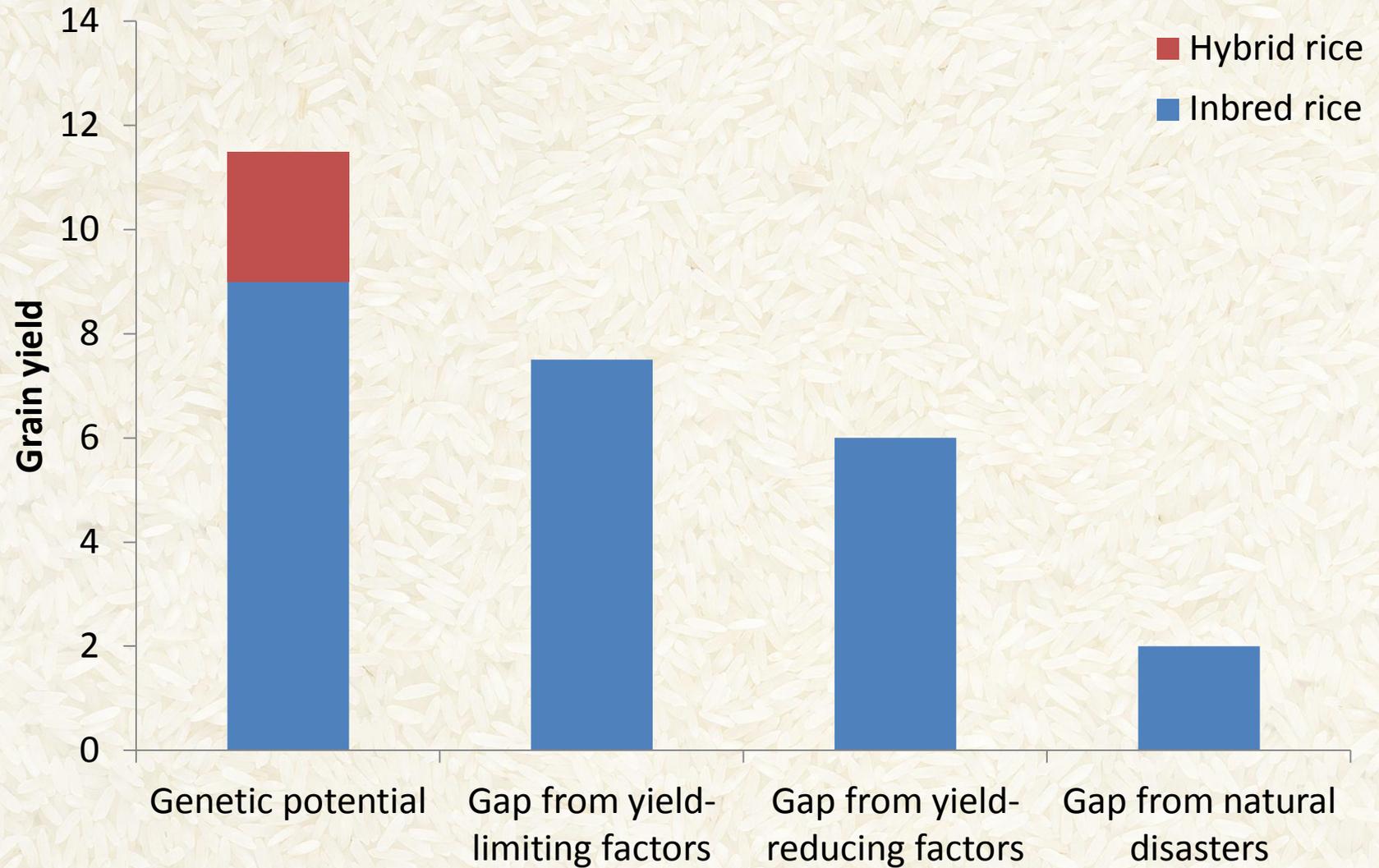
Sarah Beebout

International Rice Research Institute

*March 31, 2016*

# Yield gaps





# After the farmer gets great seed...



## 1) Crop establishment: When? How?





## 2) Weed control: When? How?





### 3) Crop nutrition:

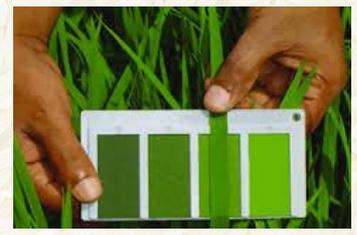
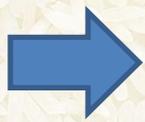
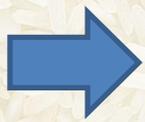
What?

What form?

When?

How?

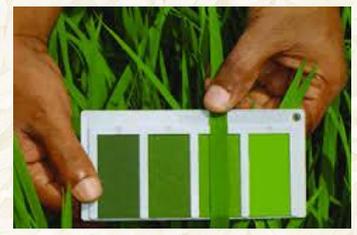
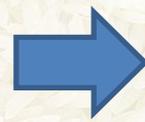
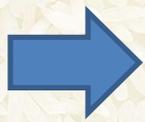
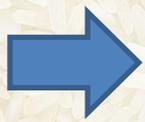




4) Crop protection:  
Which ones are pests?  
How much damage is likely?  
What is the best control option?



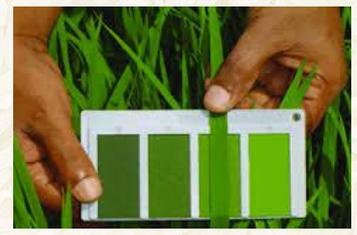
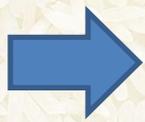
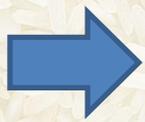
IR



# 5) Harvesting and threshing: When? How?



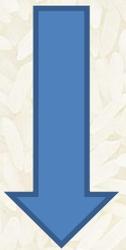
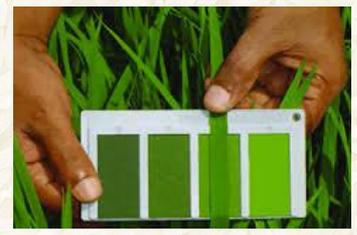
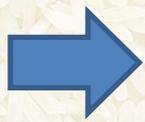
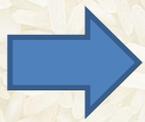
IR



6) Drying:  
When?  
How?



IR



7) Selling or storing:  
When?  
To whom?  
How?



# Where can farmers get information?



family



neighbor



(Poster to inform on the use of pesticides from Vietnam)

pamphlets



mobile apps

online



extension events



# Directly from supplier



Syngenta



Tegra



# What is the Sustainable Rice Platform (SRP)?

A roundtable representing a broad range of rice stakeholders

Conveners: IRRI and UNEP

Governments: Sri Lanka, Thailand, Vietnam, Germany (GIZ)

Research: Asian Institute of Technology, Punjab Agricultural University, UPLB

Rice product retailers: Ahold, Kellogg's, Mars, Nestle, Olam

Agricultural input suppliers: Bayer CropScience, International Fertilizer Industry Association, PetroVietnam

Social and environmental NGOs: AidEnvironment, Solidaridad, UTZ Certified



Rice suppliers: Farmers, cooperatives

Rice Exporters and Traders: International Finance Corporation, Louis Dreyfus Commodities, Olam

Public sector

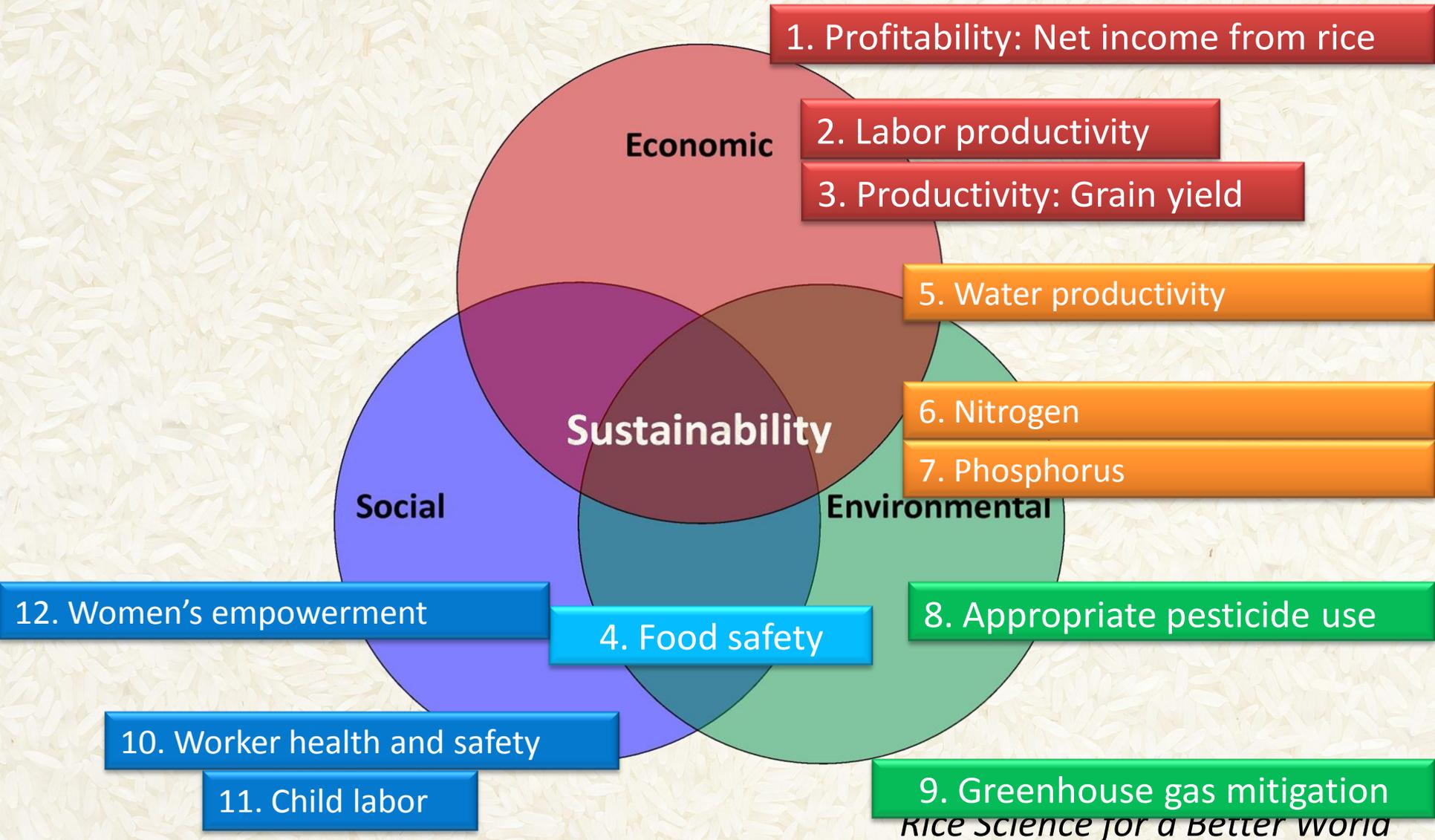
Private sector

Civil society

# Goal: Reduce environmental footprint while increasing quantity and quality of rice production



# How do we define sustainability?





Grain yield



Labor productivity



Water-use efficiency



Nitrogen-use efficiency



Food safety



Profitability

# *The 12 core SRP indicators*



Phosphorus-use efficiency



Pesticide use



Worker health and safety



Child labor



Women empowerment



Greenhouse gas emission

# Water-saving Irrigation



Known as “alternate wetting and drying” (AWD)

- Irrigate when water is 15-20 cm below surface
- Keep 5-cm flooded at flowering

# Water quality

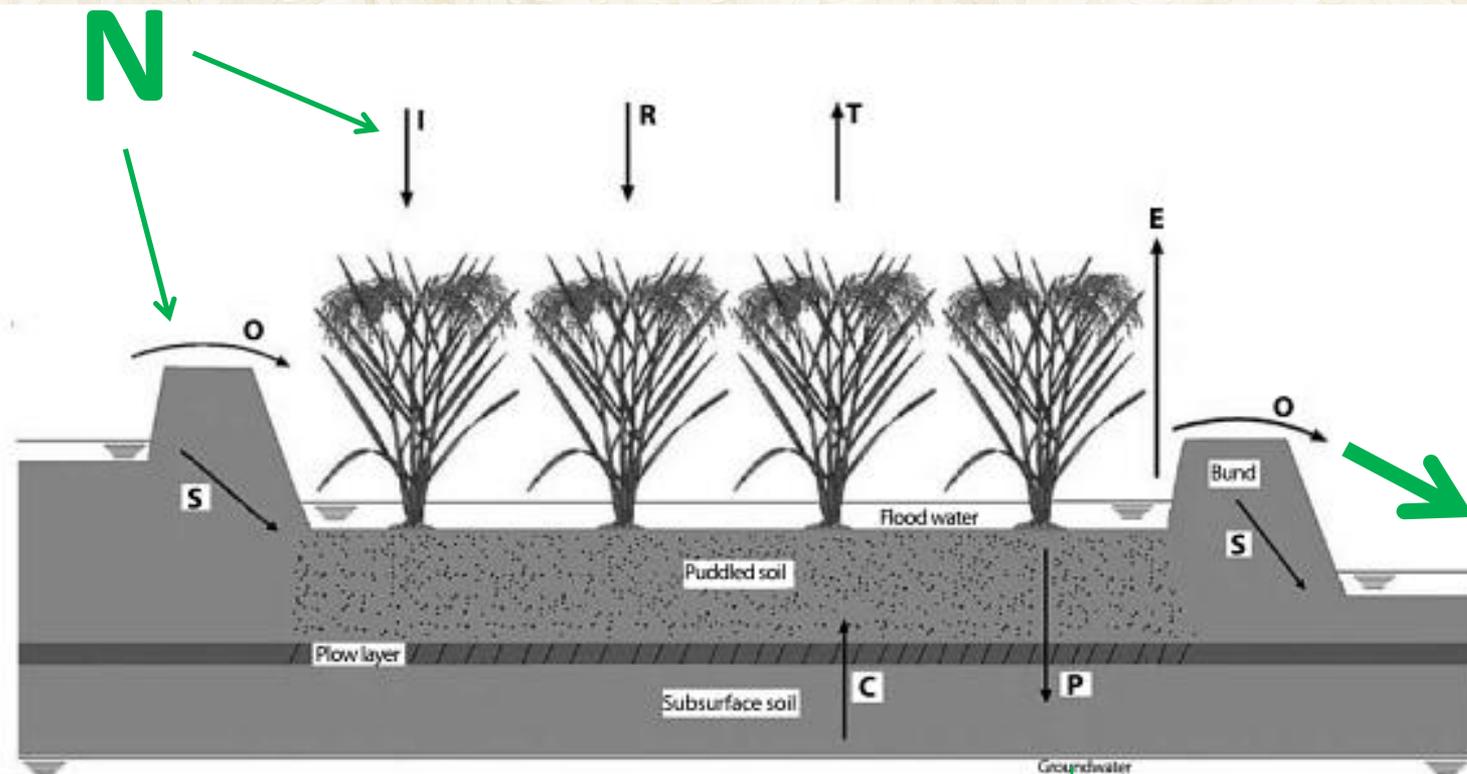


Fig. 1.2. **Water balance** of a lowland rice field. C = capillary rise, E = evaporation, I = irrigation, O = overbund flow, P = percolation, R = rainfall, S = seepage, T = transpiration.

From Bouman et al., 2007

# Air quality



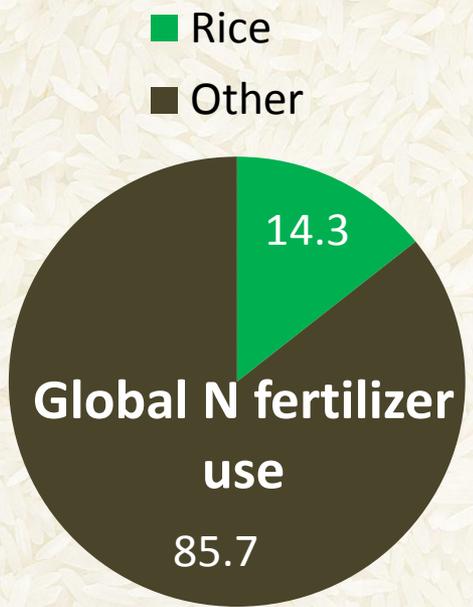
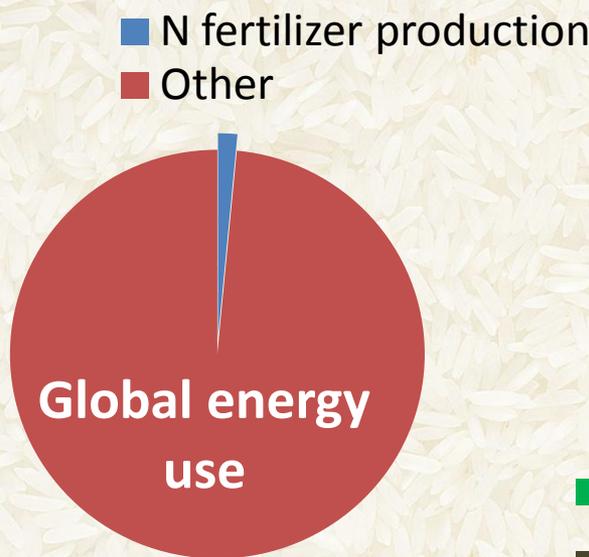
**burning  
straw**



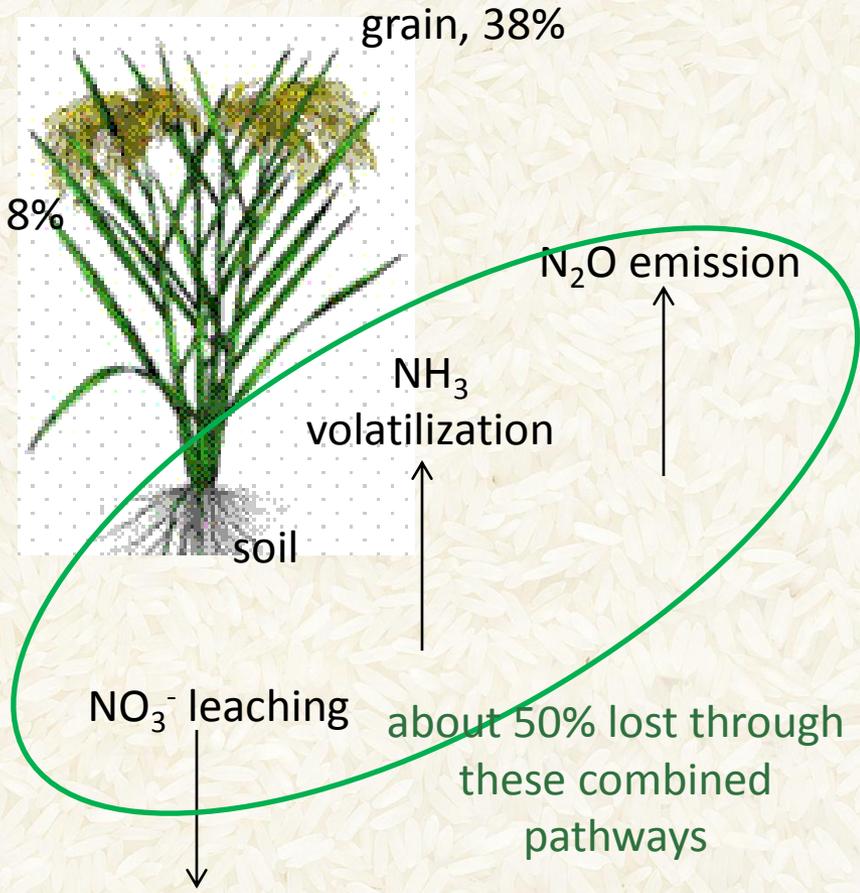
PM<sub>2.5</sub> is listed as  
a group I  
carcinogen by  
WHO

PM<sub>2.5</sub>= fine particulate matter (<2.5 μm)

# Nutrient Use Efficiency

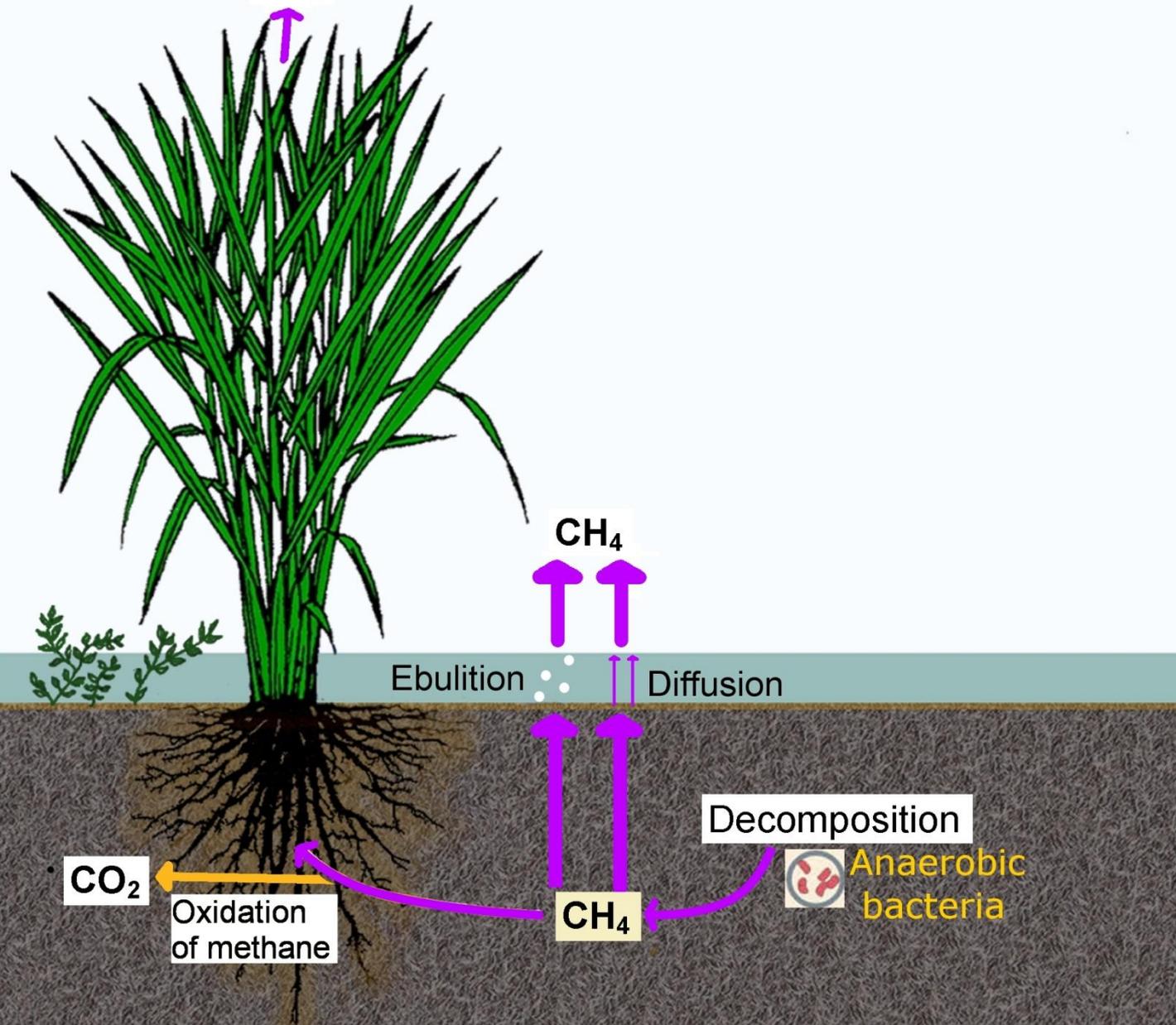


IFA Database, 2010-11



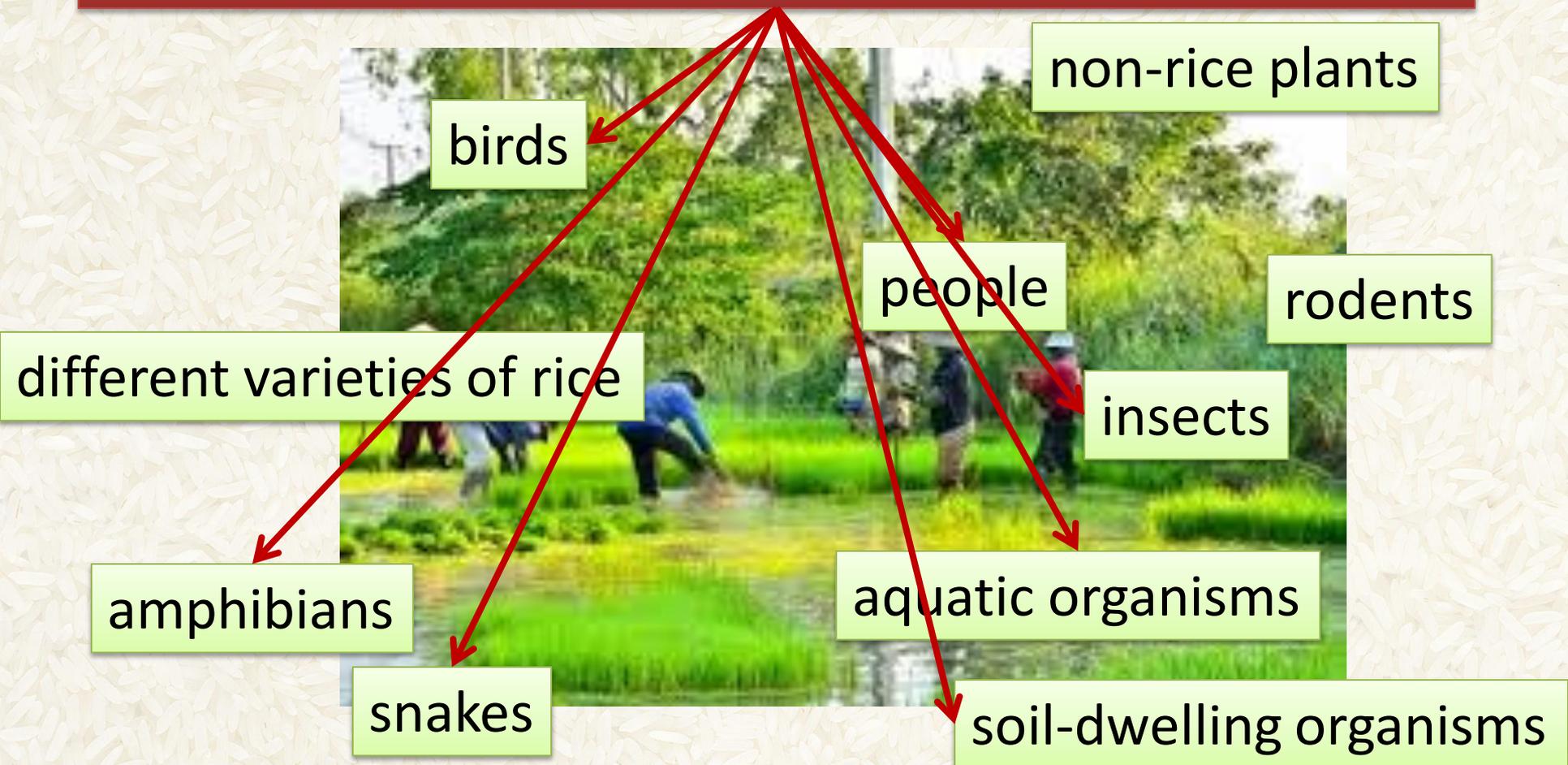
Rice Science for a Better World

# CH<sub>4</sub> Methane emission



# Biodiversity

insecticide mis-use threatens the good:bad balance of:



# How can *you* be involved in helping growers be more profitable and sustainable?

1. Connect them with high-quality general information
2. Partner with IRRI to provide real-time site-specific recommendations
3. Become a member of the Sustainable Rice Platform ([www.sustainablerice.org](http://www.sustainablerice.org))

