

# From Research to Implementation: IRRI's Activities on GHG Mitigation in Rice Cultivation

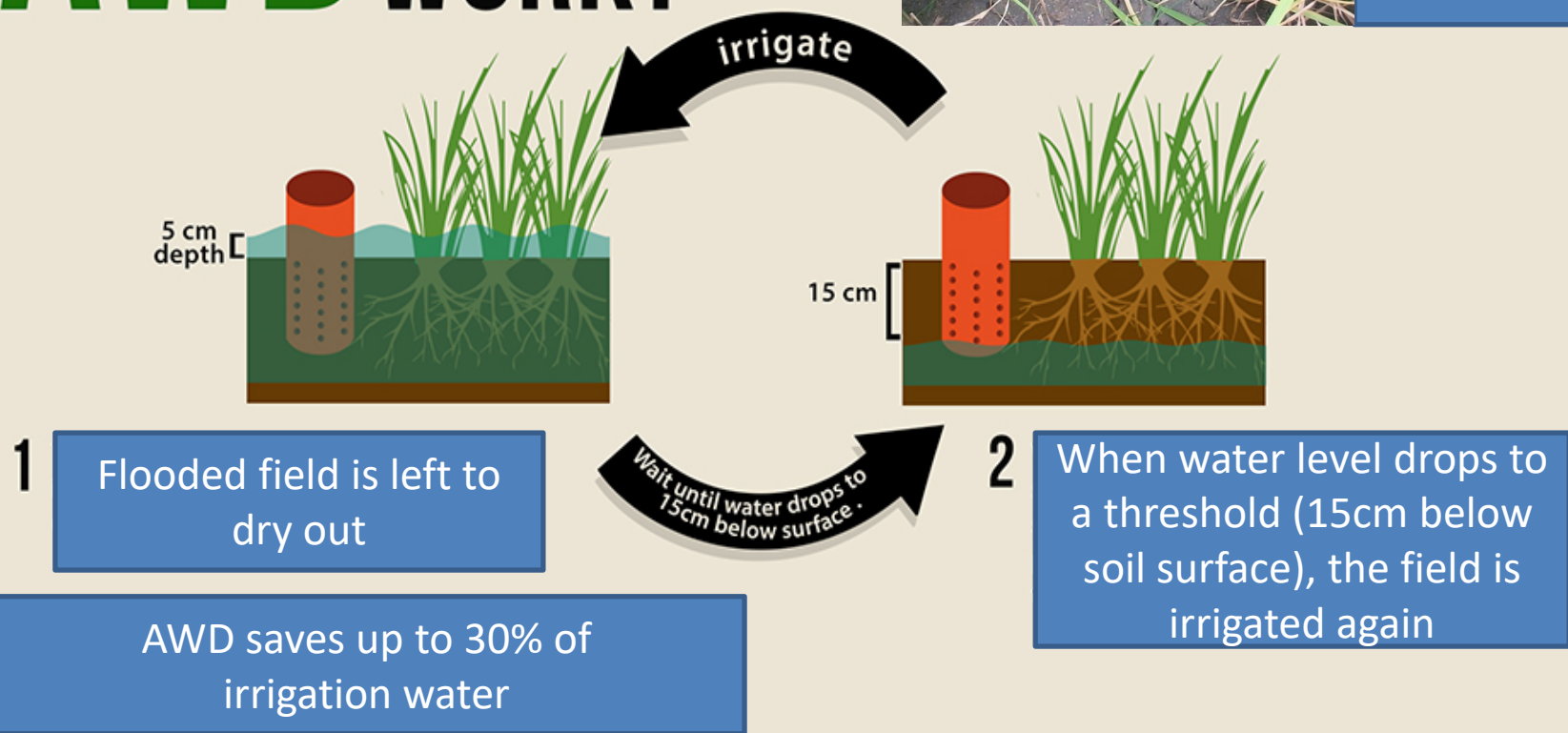
Björn Ole Sander

International Rice Research Institute

# HOW DOES AWD WORK?

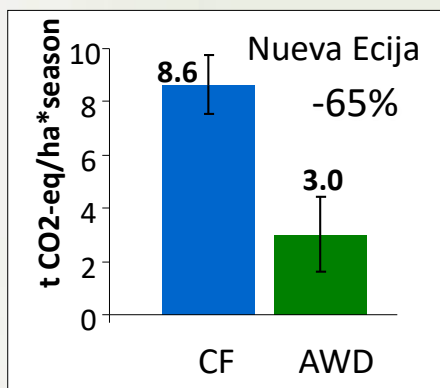
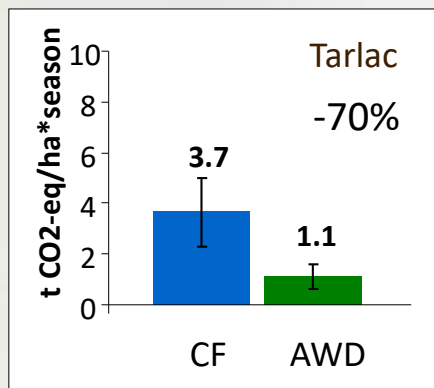
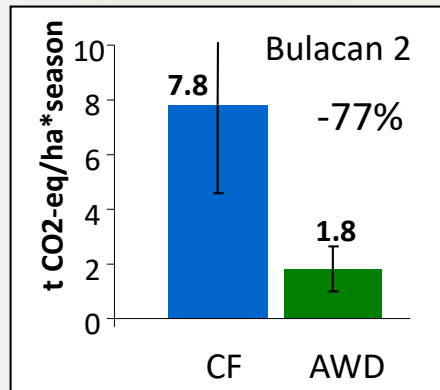
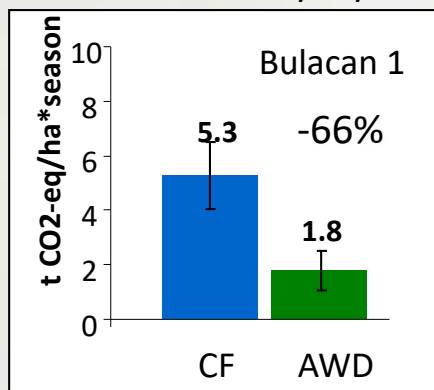


Perforated tube for observing water level in the soil



# Mitigation potential of AWD - results from farmers' fields

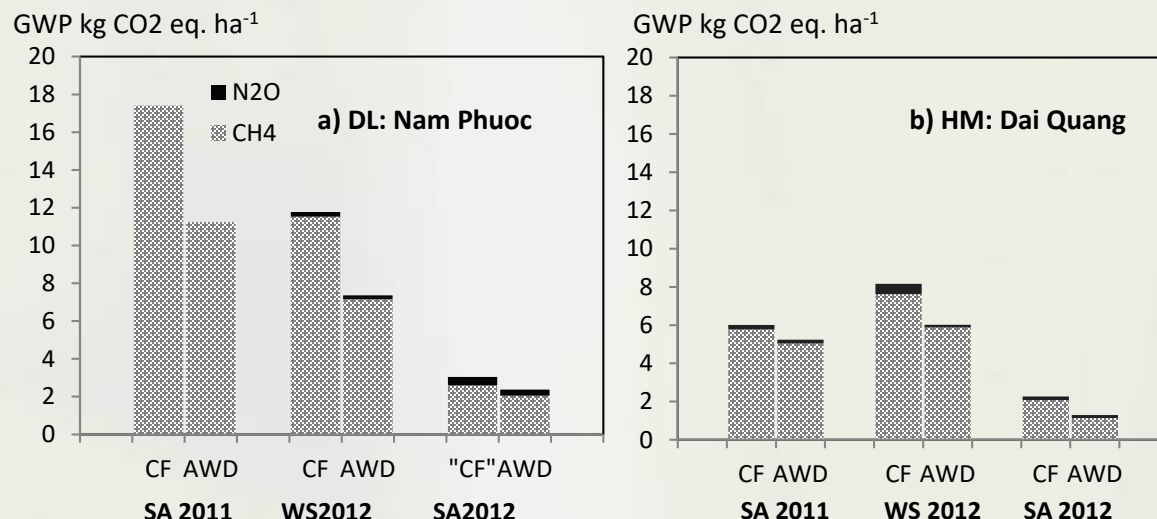
*Sander et al., in preparation*



Global average mitigation potential of AWD: 48% (IPCC, 2006)



# Mitigation potential of AWD - results from central Vietnam



Developed EFs for two rice growing environments in central Vietnam:  
 4.1 kg/ha/d (delta lowland)  
 2.0 kg/ha/d (hilly midland)



Scaling Factor<sub>AWD</sub> = 0.71

*Tirol-Padre et al., 2017, doi: 10.1007/978-981-10-2624-9*

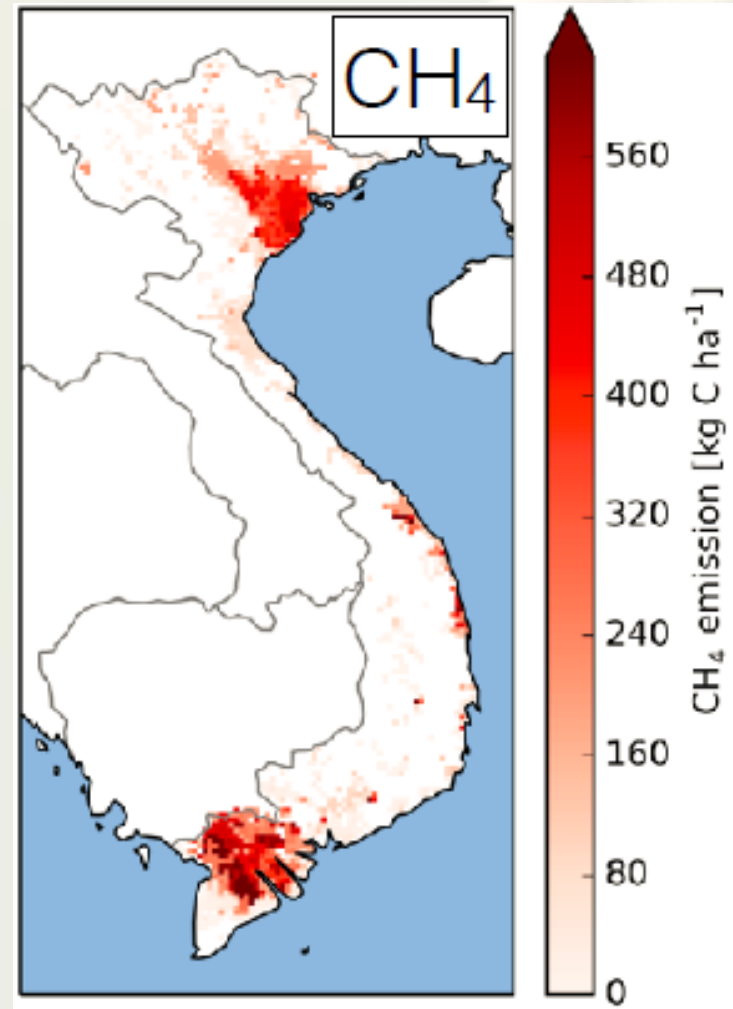


# Emission Hotspots in Vietnam

- Using landscape-DNDC (→ KIT) to identify emission hotspots
- Target mitigation actions
- Use as tool to improve national inventory (→ training)



RESEARCH PROGRAM ON  
**Climate Change,  
Agriculture and  
Food Security**



# Supporting scale-out of AWD - Climate and Clean Air Coalition (CCAC)



Mitigation strategies in rice production, in collaboration with the Climate and Clean Air Coalition



Regions  
Latin America  
Southeast Asia  
South Asia

Flagships  
Low Emissions Agriculture



CLIMATE &  
CLEAN AIR  
COALITION  
TO REDUCE SHORT-LIVED  
CLIMATE POLLUTANTS



## Goal :

Support of national plans and development programs with evidence-based information and strategies to reduce CH<sub>4</sub> emission from rice

Online information platform:  
[GHGmitigation.irri.org](http://GHGmitigation.irri.org)





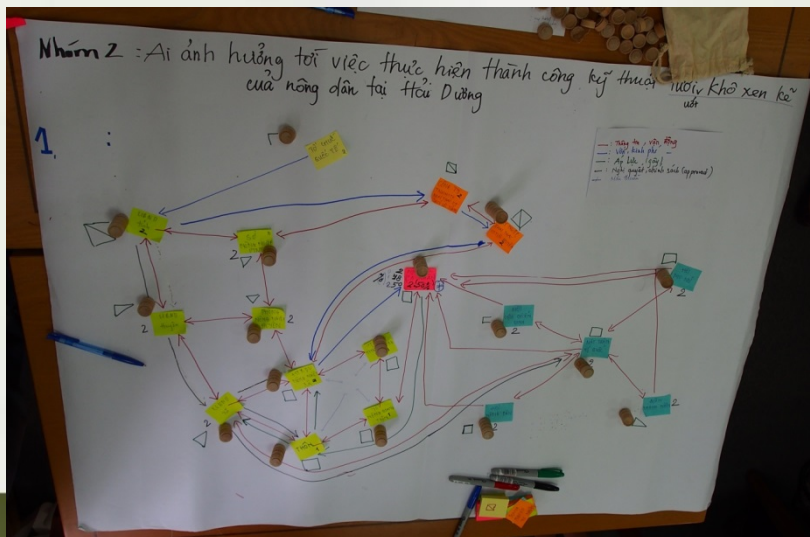
# Stakeholder influence mapping - NetMap

Participatory approach to identify key influencer in complex stakeholder networks

- Development of engagement strategies, information campaigns
- Input for Agent-based modeling

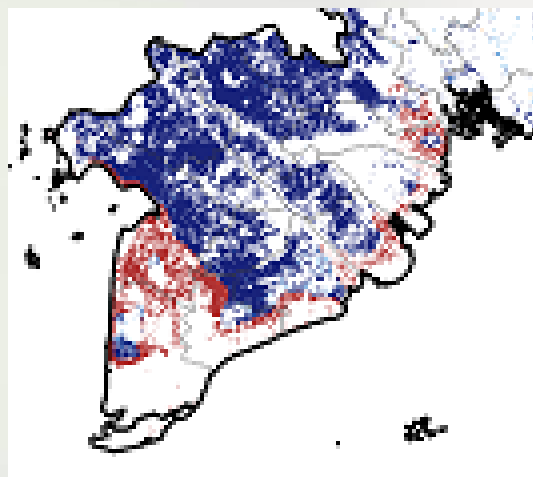
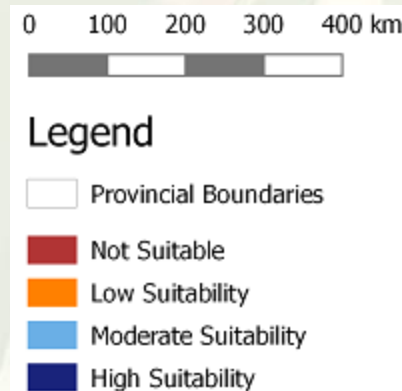
**Question:** Who influences the adoption of AWD?

Collaboration with Inst. for Policy and Strategy of MARD

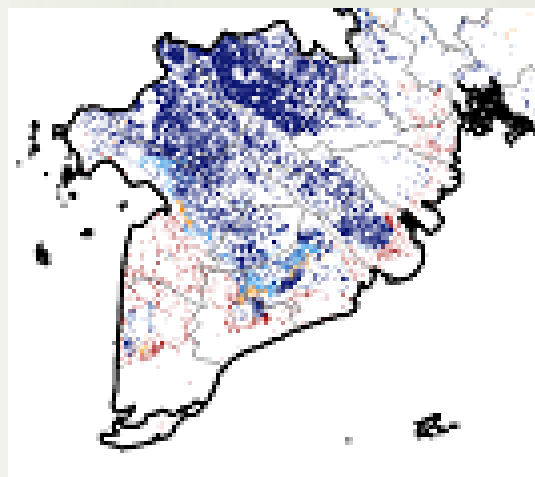


# Climatic AWD suitability maps, MRD

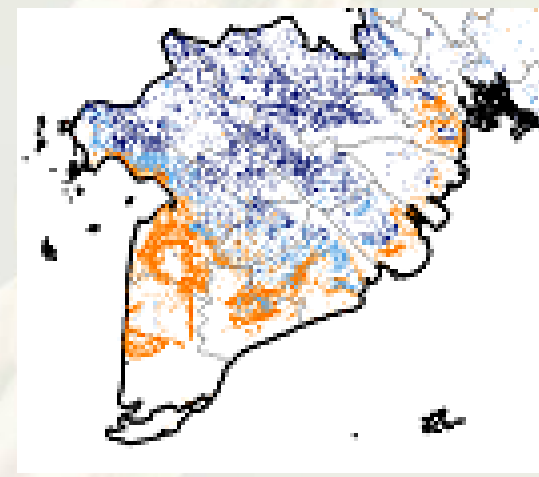
- Based on PhenoRice, precipitation, soil texture, salinity risk (biophysical factors only, methodology: *Nelson et al., 2015*)
- Target AWD dissemination activities
- Current improvement: Including flood risk data



Jan-Apr. harvest



May-Aug. harvest



Sept.-Dec. harvest



# Next envisaged steps towards large scale adoption

- Identify most suitable 500k ha for AWD
- Identify high priority provinces, develop plans w/ provincial governments
- Engage more strongly w/ private sector, integrate low-emissions rice production in contract farming (→ Sustainable Rice Platform)



# Other mitigation options in rice production (AWD+)

- Mid-season drainage
- Fertilizer deep placement
- Coated urea
- Short-duration varieties
- Low-emissions straw management
- Site-specific nutrient management
- Biochar
- Laser land leveling
- Solar bubble dryer
- ...





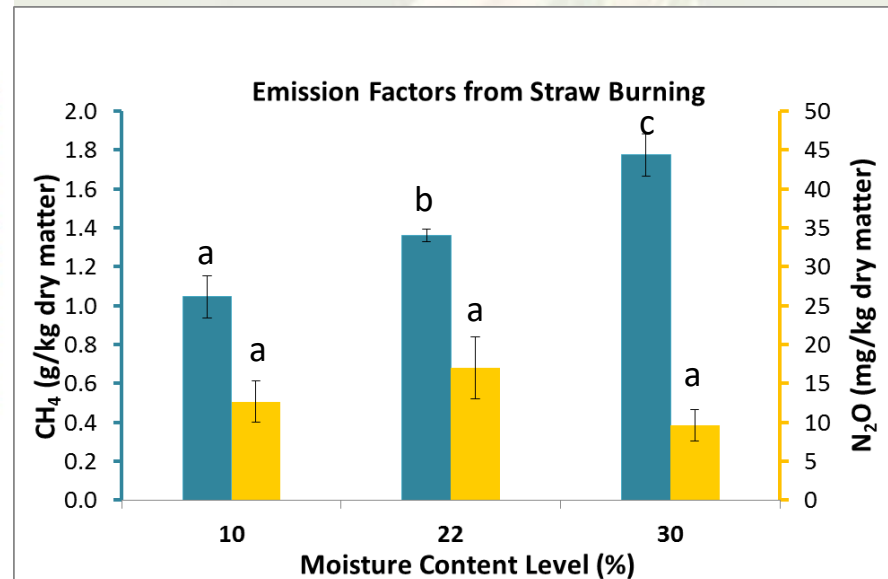
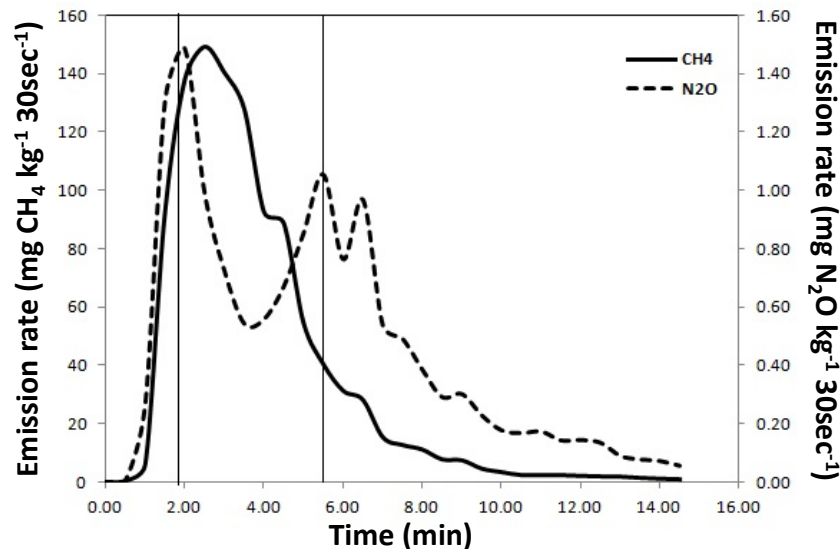






# Emissions from straw burning

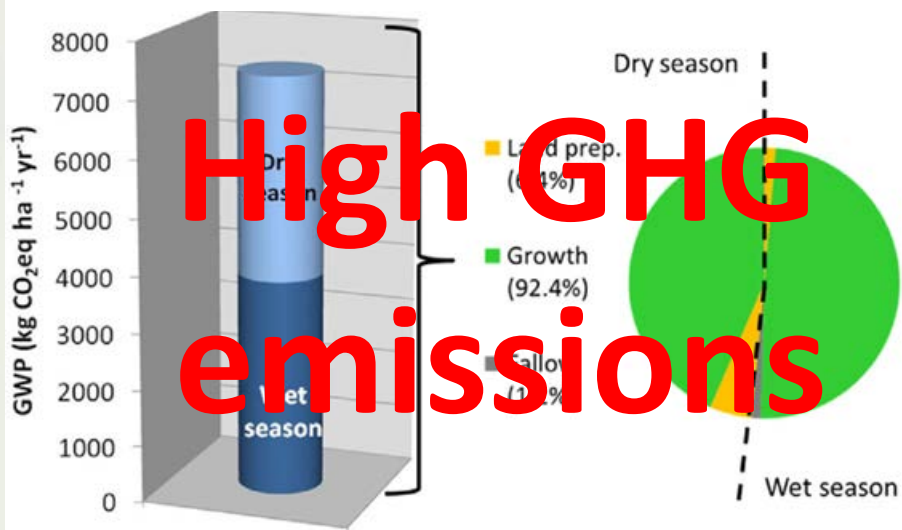
- Not much info on GHG from burning
- Baseline data for full assessment
- Measured in flow-through equipment .....➔
- CH<sub>4</sub> dependent on moisture content



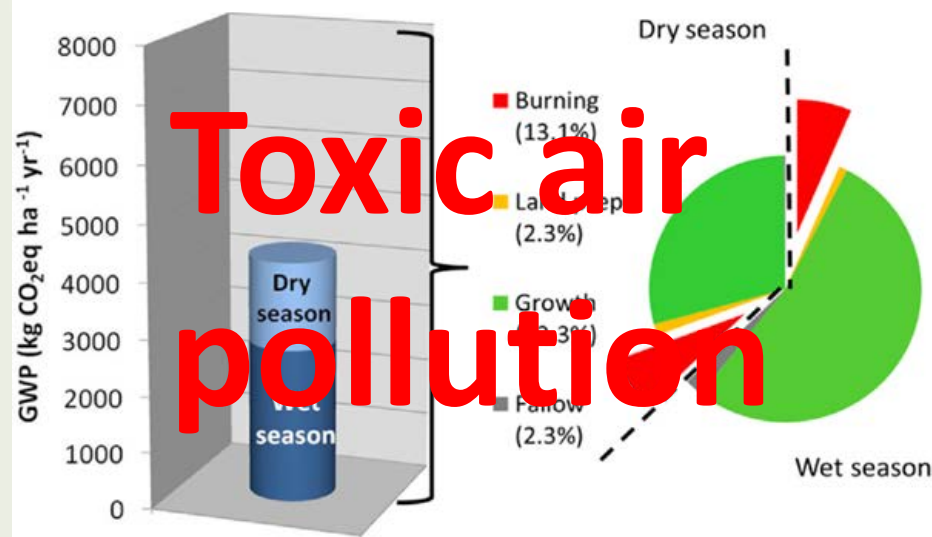
# GHG emissions of straw mngmt options

- Field experiments comparing emissions from incorporation of straw vs. burning of straw

a) Straw incorporation



b) Straw burning



- Lower GHG emissions from burning **BUT** burning leads to toxic air pollution

*Romasanta et al., 2017, AgEE*



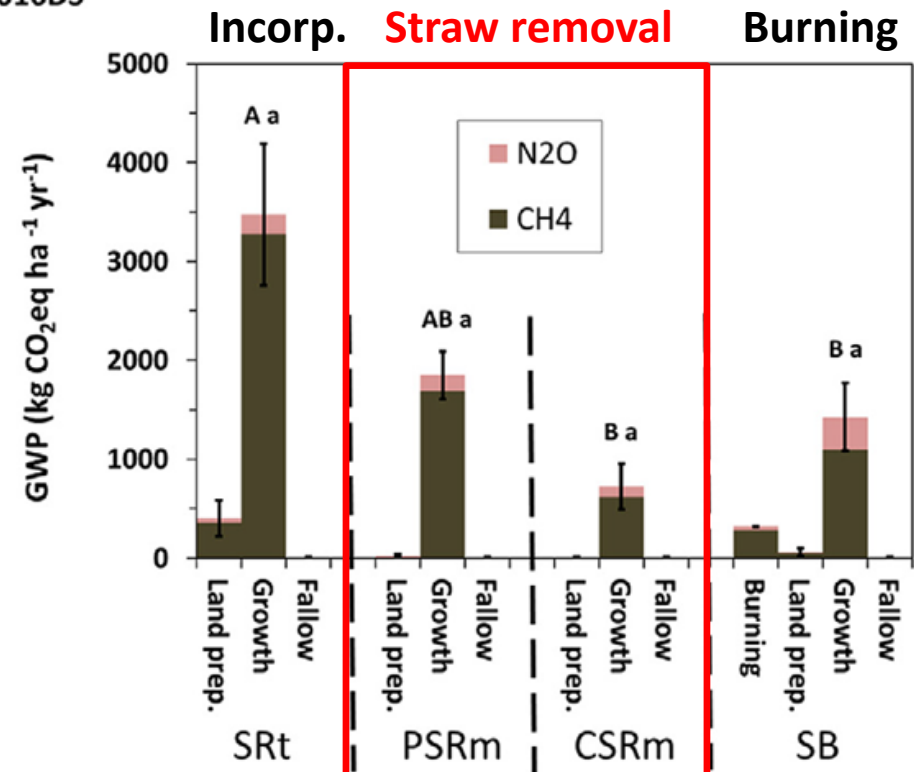
# Straw removal

- Straw removal reduces GHG emissions compared to incorporation
- Straw can be used/ sold as by-product
- Partial straw removal can be intermediate solution:
  - 1) retain soil health
  - 2) reduce GHG
  - 3) create profit



Federal Ministry  
for Economic Cooperation  
and Development

(b) 2016DS



# Thank you very much!

More information

[ClimateChange.irri.org](http://ClimateChange.irri.org)

[GHGmitigation.irri.org](http://GHGmitigation.irri.org)

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