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

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Flooded field is left to dry out when water level drops to a threshold (15 cm below soil surface), the field is irrigated again.

AWD saves up to 30% of irrigation water.
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_{AWD} = 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)
Supporting scale-out of AWD - Climate and Clean Air Coalition (CCAC)

Goal:
Support of national plans and development programs with evidence-based information and strategies to reduce CH₄ emission from rice

Online information platform:
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
- CH₄ 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**
- High GHG emissions
- Toxic air pollution

**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
Thank you very much!

More information
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