

GHG Mitigation Projects in Rice Production Systems: Status and Prospects for Carbon Certification in Farmers' Fields

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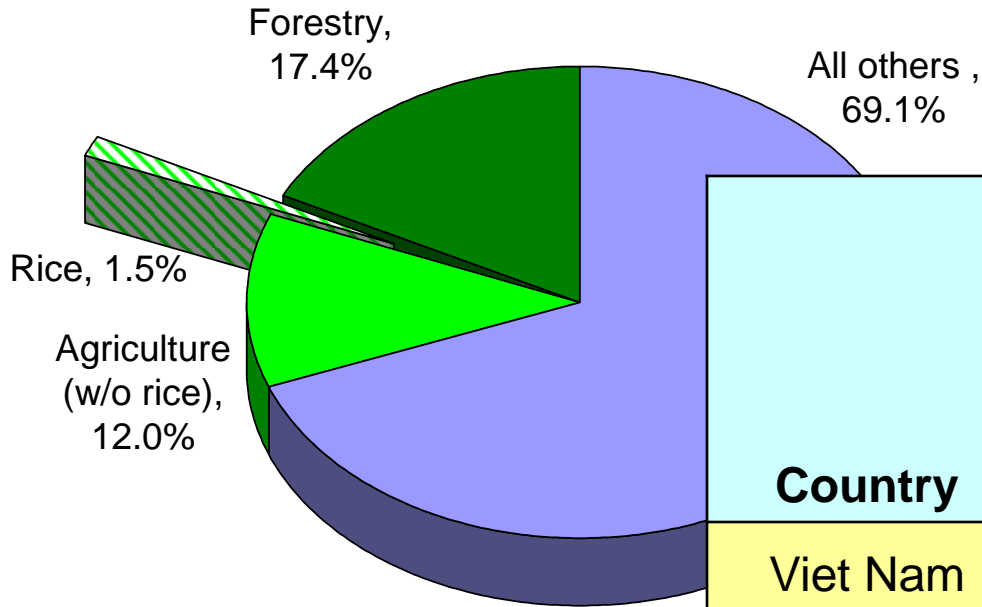


Outline

1. Significance and measurements of GHG emissions from rice
2. Possible mitigation options
3. Basics of CDM with respect to rice
4. Other mitigation mechanisms
5. Conclusion



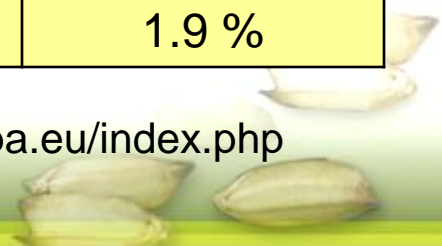
Significance of Rice Fields for GHG budgets



(IPCC 4th AR, 2007)

National Scale in SE Asia: Emissions from rice production		
Country	(Mt CO ₂ eq)	Perc. of total
Viet Nam	38.199	17.9 %
Philippines	21.706	16.0 %
Thailand	44.156	13.5 %
Indonesia	53.856	1.9 %

Data: <http://edgar.jrc.ec.europa.eu/index.php>



US-EPA project (1991-1995)



Open-top chambers
(Temp./ CO2 effects)



Closed chambers
(Methane emissions)

Measurement Approaches



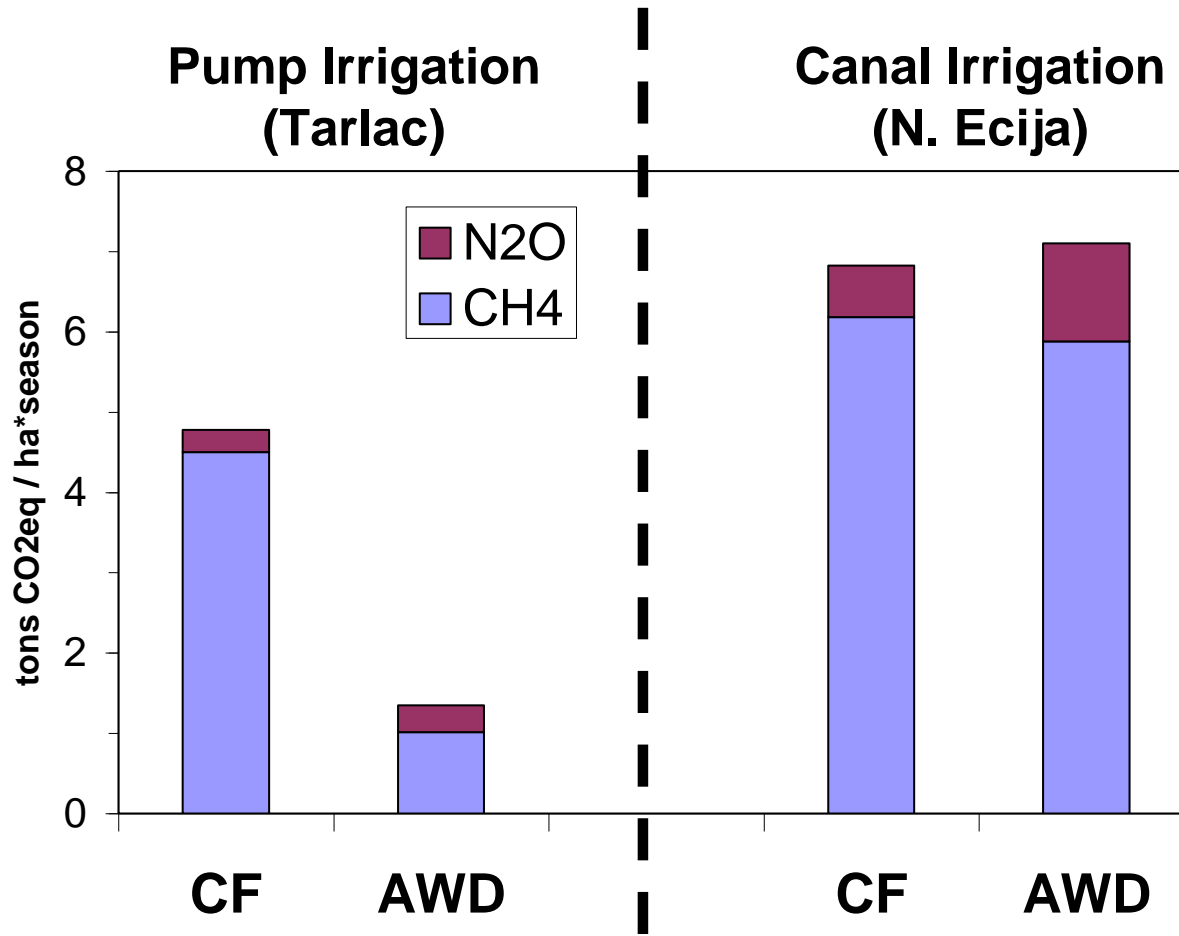
GHG Measurements:
Automated and Manual



Alternate-Wetting-and-Drying (AWD)



Global Warming Potential under Continuous Flooding (CF) and AWD



B.O. Sander, pers. Comm.



'Site-Specific Nutrient Management' (SSNM)



- Applying nutrients as and when needed
- Adjusting nutrient application to crop needs in given location and season



Preventing Straw Burning

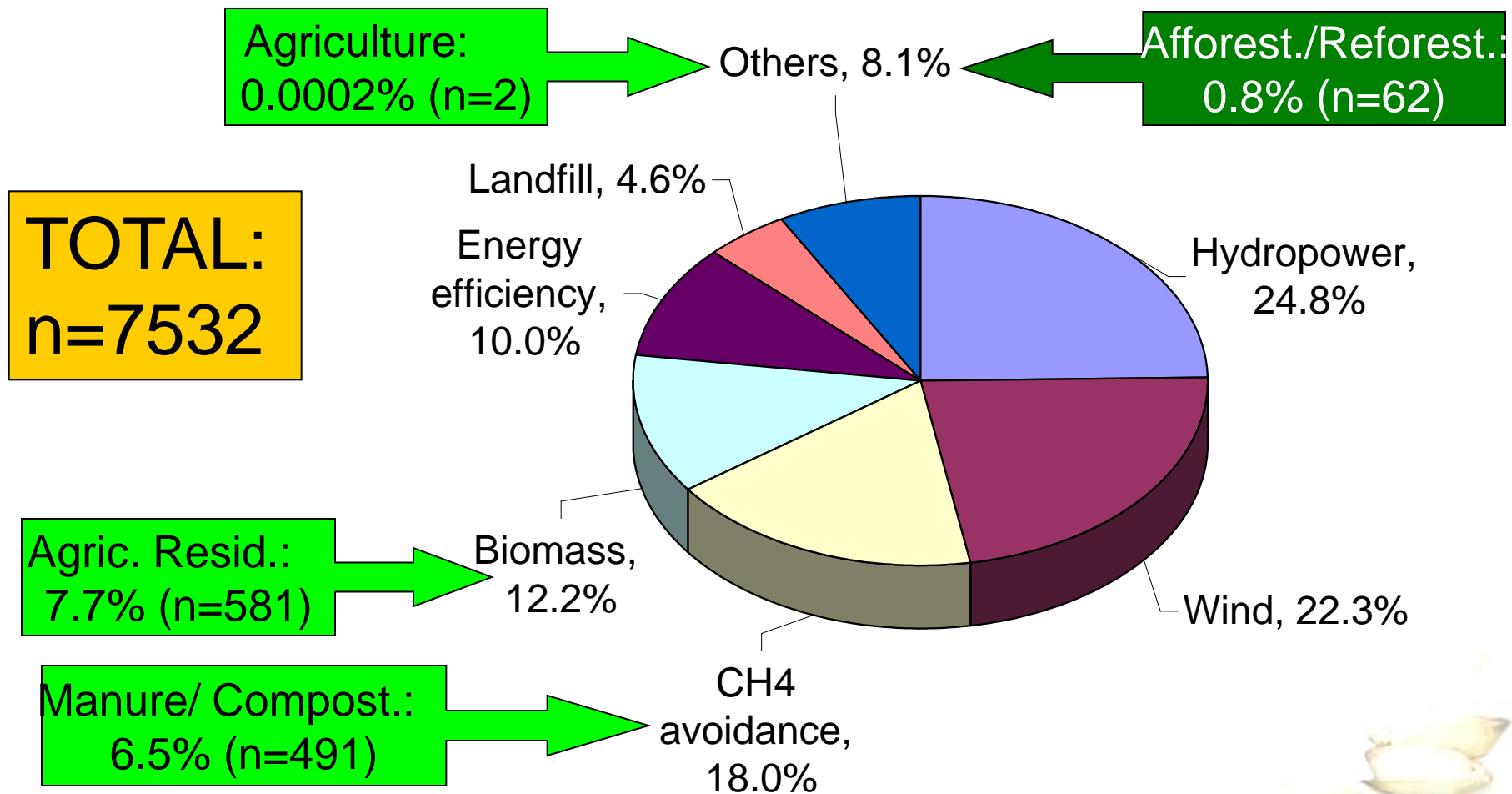


Technological options for using rice straw as renewable energy:

- **combustion,**
- **biogas technology (in combination with animal husbandry),**
- **conversion of rice straw to ethanol,**
- **... and bio-char technology.**



Clean Development Mechanism: Projects in the pipeline (as of Jan. 2012)



<http://cdmpipeline.org/cdm-projects-type.htm>



Clean Development Mechanism



SSM – Small Scale Methodology Approved by UNFCCC

The screenshot shows a web browser window displaying the UNFCCC CDM Methodologies database. The page title is "AMS-III.AU.: Methane emission reduction by adjusted water management practice in rice --- Version 2.0". A callout box points to the title of the methodology, which is "Methane emission reduction by adjusted water management practice in rice".

Key details from the page:

- Title:** Methane emission reduction by adjusted water management practice in rice (251 KB)
- Version number:** 2.0
- Scale:** Small scale
- Type:** III
- Status:** Active
- Validity:** Valid from 16 Mar 12 onwards
- Sectoral scope(s):** 15

Previous Versions:

- Title:** Methane emission reduction by adjusted water management practice in rice (245 KB)
- Version number:** 1.0
- Validity:** Valid from 15 Apr 11 to 15 Mar 12

Requests for registration can be submitted until 16 Nov 2012 23:59:59 GMT

<http://cdm.unfccc.int/methodologies/DB/0PBIWSATAUPXN7HKKG3E060T8CN7C4>

Tabela Project of Bayer CropScience



Bayer Indonesia developed 'Tabela'-method for direct seeding

Required water management during the first month in Tabela is like AWD

Bayer funded emission measurements (conducted by Indonesian Agric. and Environm. Research Institute)

IRRI provided technical assistance on MRV issues (Measurem./ Report./ Verif.) and literature research



Tabela CDM project in Java

Water regime

Baseline:	Conventional
Project:	TABELA
DIFFERENCE	

@ 5 USD per tCO₂eq => 23.1 USD/ ha yr



Obstacles of CDM in rice production

- Low returns per ha (only suitable for projects with large areas)
- Involvement of many stakeholders/
transaction costs
- Measurement/ Reporting/ Verification (MRV)
- Emission savings based on area –
and not on grain production



Voluntary Emission Reductions in Rice

- New Methodology currently under review by



- Developed by
 - o Environmental Defense Fund
 - o California Rice Commission
 - o Two private companies

<http://www.americancarbonregistry.org/carbon-accounting/emission-reductions-in-rice-management-systems>



Voluntary Emission Reductions in Rice

Approach:

Emission savings are quantified using a simulation model (DNDC = Denitrification – Decomposition)



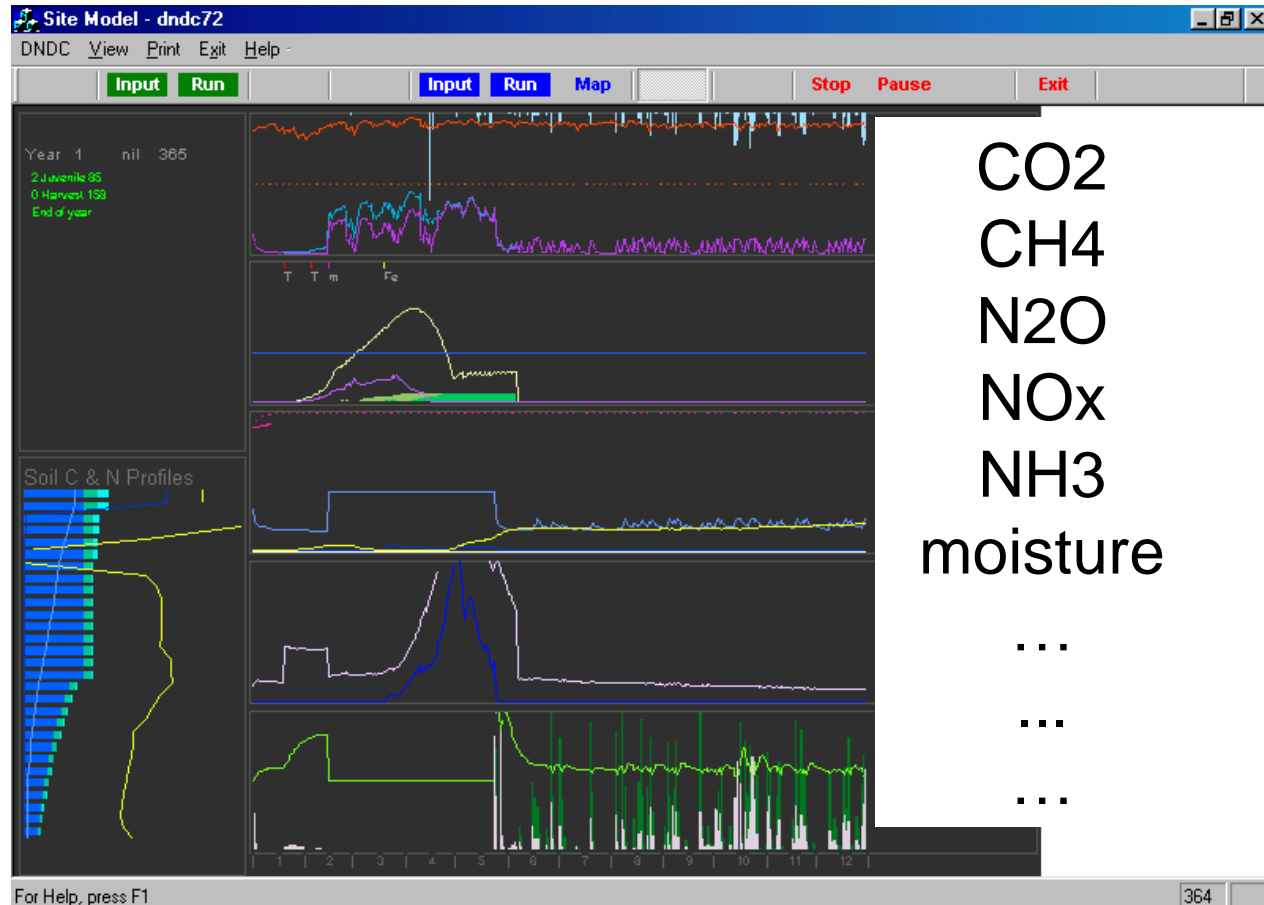
Modelling emissions using DNDC model (**De**Nitrification-**De**Composition)

Inputs

SOIL
Texture, pH,
C and N content

CLIMATE
Temp., rainfall

MANAGEMENT
N inputs, tillage,
irrigation etc.



Li et al. 2000



Voluntary Emission Reductions in Rice

Approach:

Emission savings are quantified using a simulation model (DNDC = Denitrification – Decomposition)

Status of review:

The 1st version of the proposal was posted on the web in June 2011 and received substantial criticism, in particular because of unclear model validation procedures



Food Certification/ Labeling

Organic Farming



Forest Conservation



Forest
Stewardship
Council



Programme
for the
Endorsement of
Forest Certification

Carbon Footprint ???



Conclusion ...

... in terms of adoption:

Wishful thinking	Wide-spread implementation of mitigation projects as part of farming routine
Realistic outlook	Individual mitigation projects with limited geographic domain



Conclusion ...

... in terms of economics:

Wishful thinking	Significant impact on farmers' income and poverty alleviation
Realistic outlook	Attaining additional funds for rural development (irrigation facilities, improved technol.)



Thank you

Rice
Science
for a Better
World

