Designing Agricultural Development Investments to Yield Mitigation Co-Benefits in Livestock and Rice Systems

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Survey of GHG Emissions of USAID Agricultural Development Projects

15 countries
42 systems
20 interventions
SOURCES OF AGRICULTURAL GHG EMISSIONS

South Asia
- Rice cultivation: 15%
- Manure applied to soils
- Manure management
- Manure left on pasture
- Enteric fermentation

Southeast Asia
- Rice cultivation: 43%
- Manure applied to soils
- Manure management
- Manure left on pasture
- Enteric fermentation

Overall:
- 65% for South Asia
- 32% for Southeast Asia
Alt. Wetting & Drying (AWD)

Water-efficiency practice of drying and re-flooding irrigated rice fields
- Decreases anaerobic decomposition of organic matter
- Reduces methane production

HIGH: Mitigation/ha
LOW: Scale of adoption

Urea Deep Placement (UDP)

Nutrient-efficiency practice that reduces input costs and increases yields
- Reduces losses of nitrogen to the environment and lowers fertilizer requirements

LOW: Mitigation/ha
HIGH: Scale of adoption

Short Duration Varieties of Rice

Shortens the duration of crop production, reducing the duration of cropland flooding
- Decreases anaerobic decomposition of organic matter
- Reduces methane production

LOW: Mitigation/ha
HIGH: Scale of adoption
ACCELERATING AGRICULTURAL PRODUCTIVITY IMPROVEMENTS—BANGLADESH

- Alternate wetting and drying
- Urea deep placement

**Absolute Emissions**
- ↓ 2% - 44%

**Productivity**
- ↑ 9% - 14%

**Emission Intensity**
- ↓ 14% - 48%
HELPING ADDRESS RURAL VULNERABILITIES AND ECOSYSTEM STABILITY—CAMBODIA

- Short duration variety rice
- Alternate wetting and drying

Absolute Emissions ↓ 43%
Productivity and PHL ↑ 90%
Emission Intensity ↓ 70%
### Herd Size Management

- Increased off-take rate and decreased herd age at slaughter can reduce livestock herd size

- Herd size, animal weight and feed drive emissions. The larger and heavier the herd, the higher the emissions

- HIGH: Mitigation/head
- HIGH: Scale of adoption

### Feeding Quality

- Improvements to forage mix and feed supplements can improve productivity and reduce emission intensity

- Feeds with high fiber to starch ratios result in higher enteric emissions

- LOW: Mitigation/head
- HIGH: Scale of adoption

### Grassland Improvements

- Improved nutrient/water inputs, species composition and rotational grazing increase productivity

- Pasture growth and composition affects carbon storage in soils

- LOW: Mitigation/ha
- HIGH: Scale of adoption
LIVESTOCK FOR IMPROVED NUTRITION - BANGLADESH

Feed Quality

Herd Dynamics

Absolute Emissions

9% - 11%

Productivity and PHL

45% - 90%

Emission Intensity

24% - 43%
RESILIENCE AND ECONOMIC GROWTH IN ARID LANDS—ACC. GROWTH KENYA

Feed Quality

Herd Size

Absolute Emissions
↓ 10%

Productivity and PHL
↑ 50% - 67%

Emission Intensity
↓ 33% - 40%
## DESIGN CONSIDERATIONS IN LIVESTOCK AND IRRIGATED RICE PROJECTS

<table>
<thead>
<tr>
<th>Mitigation per hectare/head</th>
<th>High</th>
<th>Low</th>
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<tr>
<td><strong>High</strong></td>
<td>Alternate wetting and drying Herd size management</td>
<td>Feed quality improvements Grassland improvements</td>
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<tr>
<td><strong>Low</strong></td>
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FEASIBILITY STUDIES

Livestock management (East Africa) and irrigated rice systems (South & Southeast Asia)

- Geographic suitability maps
- Qualitative research on farmer costs and barriers to adoption
- Enabling conditions to encourage farmer adoption (social, information, capacity and broader institutional, and governance enabling conditions).
- Identify public and private incentives to encourage large-scale farmer adoption of priority LED actions in target countries.

Support countries in implementing their agricultural NDC commitments by developing country level investment plans to achieve priority LED interventions.
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