Collective Action and Rice Farming: An Analysis of Irrigation Management in the Cambodian Floodplains

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Content of the presentation

• Background of agriculture
• Modalities of (Participatory) Irrigation Management
• Case study area and methodology
• Long term trends in water infrastructure and agriculture development
• Institutional Bricolage: Roles and responsibilities of actors
• Results
• Key messages
Background of Agriculture

- Cambodia: agriculture accounts for 22.8% of national economy (GDP)

- Rice (*Oryza sativa* L.) = food security and income generation for the rural population in Cambodia. Rice is the main crop while crop contributes by 60% to agricultural GDP 2020
Modalities of Irrigation Management

- Participatory Irrigation Management (PIM) and Development Policy enacted in 1999/2000
- Establishment of Water User Associations (called FWUC: Farmer Water User Community)
- FWUC responsible for maintenance of 2nd and 3rd tier canal systems through the collection of an Irrigation Service Contribution (ISC)
- Classic shortcomings of PIM policies (Challenges):
  1/ Reluctance of administration to devolve power/authority
  2/ Lack of capacity, legitimacy, accountability of FWUC
  3/ Unwillingness of farmers to pay ISC
  4/ Deferred maintenance problems/long term lack of sustainability
Case Study Area

- South of Cambodia at the border of Vietnam
- Large flood plains inundated between August and November
- Limited infrastructure development (when compared to Vietnam)

**PRASAC project** (financed by the EU) between 1998 and 2004 and **CAVAC project** (DFAT-Australia) between 2012 and 2017

- Large earthen drainage network supporting single or double rice cultivation
Historical development of the area
Circa 2016

Vinh Te Canal

Cambodia

Vietnam

Image Landsat / Copernicus
Mixed methods: qualitative interviews, Focus Group Discussion, small N quantitative questionnaire

- Key informant interviews
- Staff of administration (Ministry of Water Resources and Meteorology - MoWRAM)
- Representatives of Water User Associations (FWUC)
- Local Elected Representatives
- Private Water Sellers (15 in BANTIC and 16 in PLOVIC) representing 55 pumping systems
- 25 farmers (12 in BANTIC and 13 in PLOVIC) along secondary canals
To Vietnam

Main PRASAC Canal (canal 98/99)

‘Secondary’ PRASAC Canal (Ex: Saom, Plouv Touk, etc..)

Canal managed by PWS (can be called secondary or tertiary)
Hybrid local water governance

Hand-over Irrigation Service Contribution (140kg/ha/year)

If direct pumping, Pay Irrigation Service Contribution (140kg/ha/year)

PWS
Provide water to farmers by the mean of diesel/petrol pumps

FWUC

FARMERS
Pay pumping “service” 600-750kg/ha/season
Results: Characteristics of Farmers

- Half the farmers < 40 years old
- 95% of farmers have MFI Loans
- All farmers purchase input through short term credits (10% interest rate per season)

- Average owned area is **3,5 ha**
  - Minimum= 1 ha
  - Maximum= 12 ha

Water cost is
- **20 to 25% of total cost**
Results: Characteristics of Farmers

- High diversity of income source
- Rice cultivation is 60% of total income
- Net revenues very sensitive to paddy price in Vietnam (export of paddy)
- Early wet season rice (May-July) sensitive to water supply conditions

- Relative stability of income relative to farm area (little economy of scale)
- Average net income of 600 USD/ha/year (average price)
- Average net income of 3 USD/day/person (for 7 months work) (daily wage in ag. work >5 USD/ha/day)
Results: Characteristics of PWS

- Some PWS started operating before the PRASAC project (1998)
- PWS accessed water from natural lakes, reservoirs and Vietnam
- Often well connected to local authorities and administration

- Average area served in BANTIC is 51 ha (between 3 and 250 ha)
- Average area served in PLOVIC is 65 ha (between 3 and 250 ha)
- 9 out of 31 PWS have increased the area they served since their installation
- 16 out of 31 have decreased the area they served since their installation
- On average, PWS own 35% of the area they serve
- More than half the PWS have purchased land since they started their business
Results: Characteristics of PWS

- Pumping fee BANTIC: 125 USD/ha/season
- Pumping fee PLOVIC: 165 USD/ha/season

- Average operating cost of 155 USD/ha/year
- 55% of all cost are petrol cost
- Cost distribution high if served area <50 ha
- Economy of scale if area served > 50 ha

- Based on cost and revenue declaration, half the PWS appear to be loosing money
  - Recovery rate around 70%
  - 10-15% discount is common practice
- Average loss: 82 USD/ha/year
- Average gain: 66 USD/ha/year
Results: Characteristics of FWUC

- ISC Rate of 17 USD/ha/year in BANTIC
- Recovery rate of 40% in BANTIC
- ISC Rate of 30 USD/ha/year in PLOVIC
- Recovery rate of 30% in PLOVIC
- Self-irrigation of PWS land often not accounted for though 1/3 of the area
- Farmers who provided land for canal construction partially exempted
Results: Characteristics of FWUC

BANTIC Investment in maintenance
• 45% of all expenses
• 0.7 USD/ha/year
• 15 USD/ha over 20 years

• Needs: 5 USD/ha/year
• ISC Collected: 7 USD/ha/year
• ISC rate: 17 USD/ha/year

PLOVIC Investment in maintenance
• 65% of all expenses
• 3.4 USD/ha/year
• 64 USD/ha over 18 years

• Needs: 6 USD/ha/year
• ISC Collected: 10 USD/ha/year
• ISC rate: 30 USD/ha/year
Key messages

• Irrigation and drainage management in the PRASAC area takes a hybrid form involving farmers, public organization and small rural entrepreneurs selling water to farmers

• **Dynamic Agricultural Landscapes**
  – Relatively young farmers
  – Widespread indebtedness and vulnerability to water availability/price fluctuation
  – Underlying land concentration process (to the benefit of PWS notably)

• **Water pumping service**
  – In general well off farmers-cum entrepreneurs
  – Profitability of the service is rather low (eq. to 400 kg of rice/ha)
  – Significant scope for reducing operational costs (e.g. petrol)
  – The main advantage of being a PWS might be that is leads to lower rice production cost (20-25%) and related increase in income

• **Drainage system management**
  – Current rate of ISC recovery could allow for meeting O&M needs
  – Investment in maintenance lower than needs
  – Need to account for land tenure dynamics
Thank you for your attention!