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Political Ecology of Irrigation Agriculture in Dry Zone Sri Lanka

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Structure of the Paper

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1. Introduction

- Tank (*wewa*), Paddy Field (*ketha*) & Temple (*dagoba*): Central concept of Singhalese rural society in *dry zone*, covering two third of SL. Irrigation essential to agriculture. Village tank system of SL: *Globally Important Agricultural Heritage System* (GIAHS) by FAO (Koohafkan & Altieri 2011)

- Integrity of the SL hydraulic civilization: In decline since medieval downfall of Polonnaruwa Kingdom. British Colonialism & modern developmentalism ignore ancient irrigation technology (Mendis 2007).

- State intervention in irrigation concentrates on large-scale, multi-purpose schemes like Mahaweli Development Project (MDP) (Withanachchi et al. 2014)

Kantale Tank in old woodcut; sluice gate and idol. Image sources: *mysrilankaholidays.lk, sundayobserver.lk*

1. Introduction

- Government-sponsored agricultural settlement programs for small-scale farmers (cf. Muggah 2008; Peebles 1990) & the use of “Green Revolution” technology (chemical fertilizers, pesticides & mechanized agriculture, hybrid seeds) (cf. Jayatilaka 1989) shape rural life in dry zone SL since independence in 1948

- Social structure of rural life in the areas under research is characterized by small-scale agriculture (paddy cultivation & *chena*) on relatively fragmented plots (1-3ha)

- The majority made up by social group of Singhalese Buddhist paddy farmers *appear* to be homogenous; peasant became an ideological focus of nationalist discourse (Moore 1989, Bastian 2013)

Village Elder in narrative interview; paddy farmer family preparing field for seeding *Photographers:* S. Köpke, S. Withanachchi 2013

1. Introduction

- Challenges in rural society in dry zone Sri Lanka:

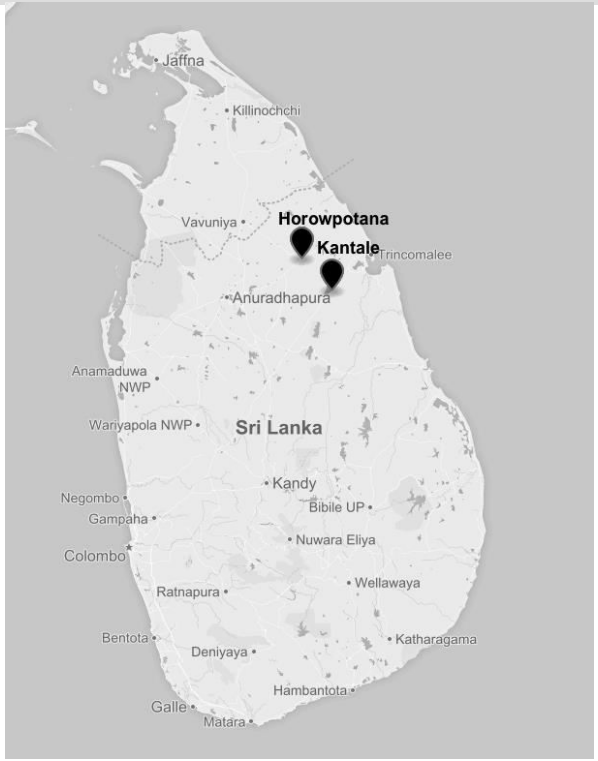
  - Modernization processes & intensified social mobility compromise social coherence ➔ 3rd generation problem, urbanization processes
  - Sri Lanka's status as post-conflict society after ethnic civil war (1983-2009)
  - Despite great improvements, rural poverty remains a serious issue
  - Climate change a threat to small farmers' livelihoods & economic security
  - Local-level debt crisis as consequence of micro-finance
  - Pressure on land due to on-going fragmentation of plots, leading to illegal encroachment in natural reserves and tank catchment areas

2. Theoretical Approach

Water Buffalos; young paddy plants. Sri Lanka, 2013/14. *Photographer:* S. Köpke

- *Political Ecology Approach:* inquires how socio-economic dynamics, power relations alter & dominate ecological processes. Explaining environmental change through a *political economy of nature* (Robbins 2012).
- Originally an approach in political geography, now interdisciplinary (sociology, anthropology, economics, political science, geography etc.)
- Global Political Ecology researches power imbalances, distribution of profits and losses in nature-society relations in the context of globalization (Bryant & Baily 1997; Peet et al. 2010)

2. Field Research Areas & Methodology



Map Source: Mapbox/Open Street Map

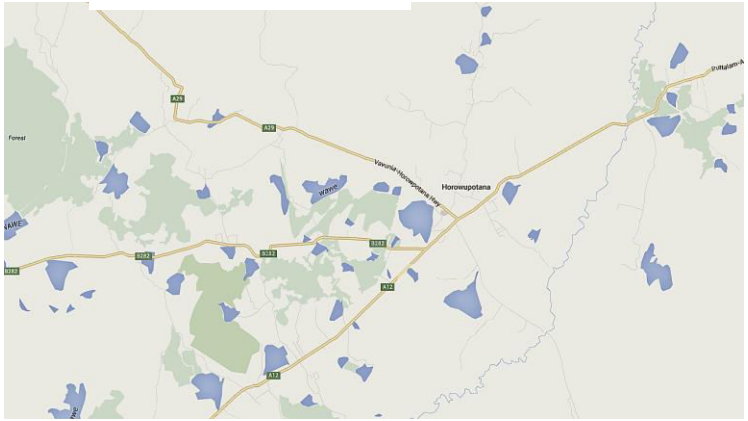
Two Field Research Areas in the Sri Lankan dry zone:

- Horowpotana DS, Anuradhapura District, North Central Province (May 2013)
- Kantale DS, Trincomalee District, Eastern Province (March-April 2014)

Research was conducted in a team of 2-3 persons (≥1 *Sinhala* native speaker)
Qualitative research methods incl. semi-structured and focus group interviews, participant observation; amended by quantitative data

Interviewees: Small farmers, other occupational groups in the rural economy, representatives of the local administration, local community leaders, members of NGOs, experts

Horowpotana

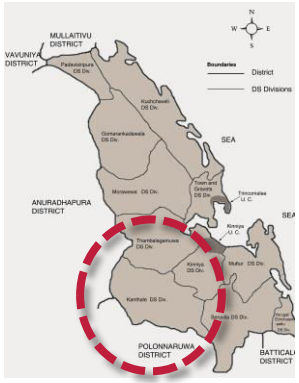


Map Sources: http://horowpotana.ds.gov.lk, Google Maps

Horowpotana: A rural town situated on the Puttalam-Anuradhapura-Trincomalee Road (A12). The Division is characterized by semi-arid climate and the prevalence of paddy farming, and *chena* vegetable farming. Many village tanks of different use.

Population (Division): 36,714 (2012)
Ethnicities: Sinhalese (~73%), Sri Lankan Moor (~27%)
Poverty Headcount Index: 24.95 % (2002)

Kantale



Map & Image Sources: http://statistics.gov,lk, OSM, Rajarata University

Kantale : A town situated on the Kurunegala-Habarana-Trincomalee Road (A6), famous for its large tank, *Kantale Tank*, one of the four greatest tanks in the dry zone, build by Aghaboddi II (608-616 AD). Rural economy slightly more diversified (dairy products, aquaculture fisheries). Division was affected by influx of civil war IDPs in the early 2000s (cf. Narman & Vidanapathira 2005).

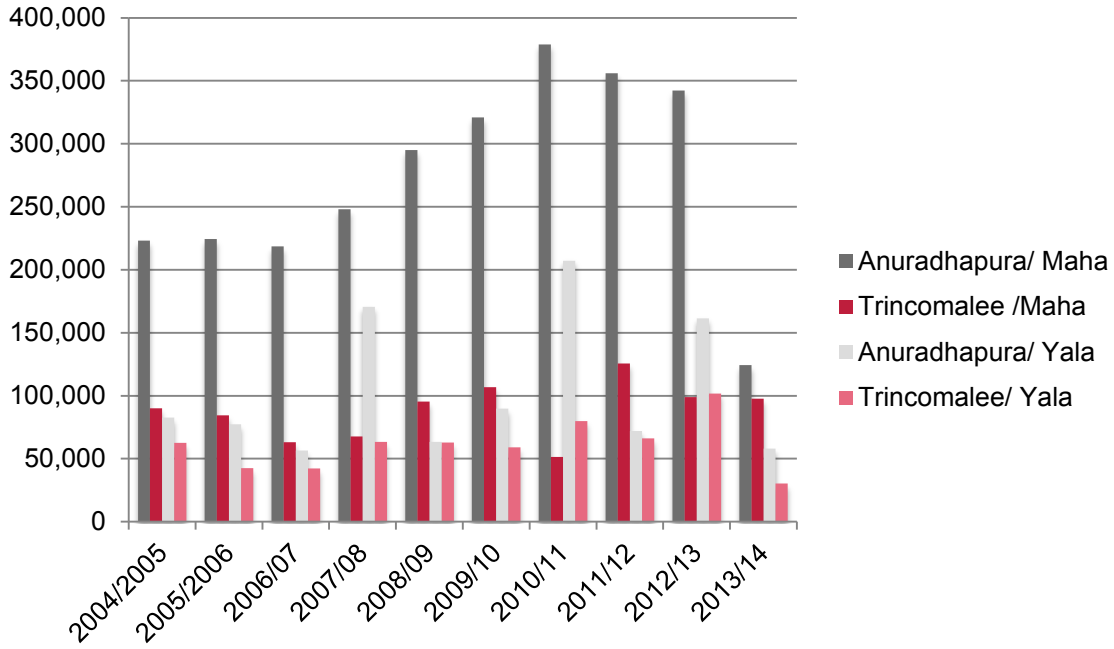
Population (Division): 46,641 (2012)
Ethnicities: Sinhalese (78.5%), Sri Lankan Moors (17.7%), Sri Lankan Tamils (3.7%) (2007)
Poverty Headcount Index: no data (Trincomalee District: 9%) (2012)

3. Results and Discussion

Truck carrying Paddy. Horowpotana, Sri Lanka, 2013. *Photographer:* S. Köpke

- Small-scale agriculture is characterized by a high degree of state intervention, from land titling to allocation of irrigation water and subsidies of inputs to price controls and state-led Paddy Marketing Board (PMB)
- Seasons are controlled by the Monsoon rains. Yields are expected twice a year, in *Maha*, the main harvesting season (October to February), and *Yala* season (April-May to September)
- Paddy farming main economic activity by small-scale farmers. Precarious due to climatic & economic volatilities
- In 2013/2014, Sri Lanka experienced an extremely severe drought, leading to harvest failure (World Food Programme 2014)

Paddy Harvest in Comparison: Anuradhapura & Trincomalee



Paddy Harvest in Tonnes in Anuradhapura and Trincomalee District in Maha and Yala Season
Data Source: *http://www.statistics.gov.lk*

3. Results and Discussion

Agrochemical advertisements. Bag of Fertilizer. Horowpotana, Sri Lanka, 2013.*Photographer:* S. Köpke

- Major threat to the well-being of rural populations: Quasi-epidemic of *chronic kidney disease of unknown etiology* (CKDu). Fatalities of mid-aged persons, economic hardship for the communities & families of deceased
- Different strands of explanation to the CKDu (chronic dehydration, fluoride, acute post-traumatic sufferings,…), but almost all point towards unsafe drinking water
- Hypothesis by Jayasumana et al. (2014) implicates responsibility of green revolution technology, use of chemical fertilizers and pesticides (*glyphosate*) for high occurrence of CKDu. Arsenic (As) poisoning from residues of chemicals *might* cause CKDu in combination with certain type of soil (Reddish Brown Earth, RBE)
- History of intentional pesticide poisoning in farmers (cf. van der Hoek et al. 1998)

3. Results and Discussion

- Paddy and *chena* farmers are aware of potential harm, but rely on agrochemical inputs to uphold profitable harvests. Agricultural officers lack capabilities to disperse knowledge on sustainable alternatives

- Ban of pesticides like glyphosate issued by the Sri Lankan government in 2014, lifted again due to fear of economic setbacks both to small-scale and plantation agriculture (Center for Public Integrity, 2014)

- Allocation of water is conflictual in large-scale irrigation schemes (Kantale, MDP), worsened by drought

- The *hegemonial* hold of nationalist governments on Singhalese farmers effectively supresses militant protest

Sri Lankan Moor *chena* farmer woman in vegetable garden. Horowpotana, Sri Lanka, 2013. *Photographer:* S. Köpke

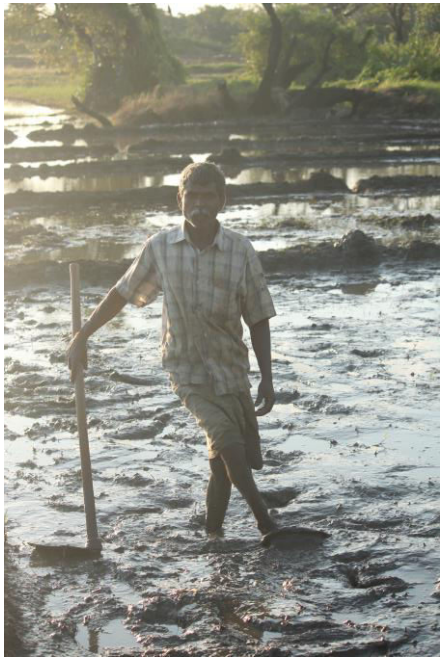
4. Conclusion

- The overuse of pesticides impairs drinking water safety in dry zone Sri Lanka, a semi-arid region already affected by water scarcity, possibly leading to high occurrence of potentially fatal CKDu. Climate change exacerbates this situation (2013/14 drought).

- Looks like classic “tragedy of the commons” (Hardin 1968) but really caused by complex interactions of market-based agricultural sector, government interventions, & global dynamics. Small farmers in *“Agrochemicals Dilemma”:* They cannot phase out use of potentially hazardous inputs due to economically dependence

- The current development model strained by inherent contradictions between a dynamic, growth-based industrial economy (Sri Lanka, the “Wonder of Asia” – Department of National Planning 2010) & the grievances of rural populations suffering the environmental consequences of modernization

4. Conclusion



Paddy farmer using traditional field preparation method. Horowpotana, Sri Lanka, 2013. *Photographer:* S. Köpke

- *Policy recommendations*:
  - Alleviate rural poverty
  - Restructure pro-poor development programs
  - Phase out use of glyphosate & harmful chemical fertilizers
  - Develop systems of sustainable intensification (IAASTD 2007)
  - Protect traditional knowledge on seeds, local & traditional food culture
  - Increase stakeholder participation
  - Water purification programs as a short-term measure
  - Invest in small-scale irrigation schemes (village tank restoration)
  - Promote diversification of rural economy

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