The Spread of Smaller Scale Machinery in South Asia: Observations

Scott Justice, CIMMYT Nepal s.justice@cigar.org

Stephen Biggs, SOAS, London, UK biggs.s@gmail.com

Enamul Haque, Murdoch University, Bangladesh e.haque@murdoch.edu.au

Why the focus on smaller scale engines, equipment, and markets in services?

- Equity issues - that small scale via service provision makes “access” to agri-machinery more equitable
- “Operational Consolidation” - No need to physically consolidate land when small scale machinery are widely available (Mandal 2016).
- No evidence from traditional economists and engineers that current small scale mechanization on small holdings is any less productive than western-industrial farming
- Overwhelming concern of large scale agro-machinery in global economic debates.
Illustrations of what are we talking about: Rural Capital Goods

- Capital goods are assets such as machinery, equipment, vehicles and tools used in the production of other goods.
- Used in analysis of the flow of goods and services between economic sectors.
- Study of economic agents producing, acquiring and buying and selling services.
  - Concerned with structural dimensions of the economy.
  - Linkages between sectors of central importance.
Illustrations of what are we talking about: rural capital goods in SA

• “Good enough” diesel pump sets shallow tube wells and lay flat delivery pipe
Illustrations of what are we talking about: rural capital goods industry

25 meter shallow tube wells
Illustrations of what are we talking about: rural capital goods industry

Chinese **two-wheel tractors** but also Indian, Thai, and lately Vietnamese.
12,000 “Good Enough” Chinese Mini Tillers in hills of Nepal

- Where avg life of MT is 3 years but a pay back in 1-2 years.
- Many of these small machines operate in same space, same economic and social environment as smaller or larger equipment.
Illustrations of what are we talking about: rural capital goods “industry”

Examples of agro sales, manufacturing and repair industries

- Examples Nuwakot Nepal
- Hikarie Sales Agency in Sri Lanka and
- Rajkot, India mini-4WT factory
# Observations on the experiences from South Asia: #1 - diverse patterns of ag & rural mechanization (Estimates for 2012)

<table>
<thead>
<tr>
<th>Energy Source</th>
<th>Bangladesh</th>
<th>India</th>
<th>Nepal</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>No Units</strong></td>
<td><strong>Total hp</strong></td>
<td>% of total hp</td>
<td>No. units</td>
</tr>
<tr>
<td><strong>2WTs</strong>*</td>
<td>500,000</td>
<td>7,500,000</td>
<td>53%</td>
</tr>
<tr>
<td><strong>4Wts</strong>**</td>
<td>35,000</td>
<td>460,000</td>
<td>3%</td>
</tr>
<tr>
<td>Irrigation shallow tube well pump Diesel ***</td>
<td>1.2 M</td>
<td>6,000,000</td>
<td>42%</td>
</tr>
<tr>
<td>Irrigation pumpsets Electric****</td>
<td>100,000</td>
<td>200,000</td>
<td>1%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>14,160,000</td>
<td>100%</td>
<td>220,000,000</td>
</tr>
</tbody>
</table>

Estimates of the numbers of power sources (and their horsepower ratings) used primarily in agricultural and processing uses, including groundwater irrigation pumps. It does not for example include the many engines used in Bangladesh to power riverboats, rice mills, processing, etc, although these are a major part of the Bangladesh agriculture and rural economy.

* Average of 14 hp per 2-wheel tractors (2WT
** Average of 30 hp per 4-wheel tractor
*** Diesel / petrol irrigation pumpsets are average 5 hp. 5 – 10 % of the pumpsets are petrol/kerosene
**** Average electric tubewell is 4 HP
Observation #2: Markets in “powered” services have always been present

In SA the Supreme Importance of Markets for providing needed agro-machinery inputs and SERVICES

- Water markets (STWs and LLPs) in Bihar, Bangladesh and Thailand
- Two and four wheel tractor tillage in Sri Lanka and Bangladesh
- Transport services in Nepal
Observation #3: Innovation in rural engineering from the field is particularly important

- Mini tillers Nepal- Came out of no where-Pvt sector led
- Jumping of technologies between sectors
  - Pump engines jump to rural transport - boat engines in Bangladesh and Vietnam
  - Layflat – Plastic drinking water pipe industry begins selling flexible hoses pipes in Indo-Gantetic Plains
Observation #4: South South Exchanges – A new thing?

• South Asia has a long history of South South exchanges and trade in small scale “good enough” equipment
  – Chinese pumpsets in Bangladesh (1980s)
  – Nepal: 2WTs from Japan (1970s) Korea (1980s) and China (1990 – present)
  – Vietnamese 2WTs into Sri Lanka
  – Chinese small scale equipment coming into India in last 10 years
  – Axial flow pumps from Thailand to Bangladesh (2013)
A growing recognition of importance of South South exchanges and trade in agro industry

- By projects - IFPRI South South, project, USAID India & “Triangular Trade” support into Kenya, Nepal, etc.
- Use of “South South” by export oriented “South” governments and MNCs based there and their claims that their products are solutions for African ag.
Lack of knowledge of available smaller scale equipment existing and spreading
- National governments promoting their large scale equipment for export under South South justification
Shortage of contemporary academic policy analysis of rural mechanization
Expensive large machinery used in research programs serve as examples for government programs and projects- skew national aspirations
Inadequate provision of training of operators and market support activities
Agri Machinery MNCs of the “West” now have heavy footprint in the South confounding “what is South”
Conclusions

There are no generalizations for agricultural and rural mechanization policies.

- Local natural resources
- Local and intl political context
- Trade and industrial policy
- Energy policy
- Agenda of donor, MNCs, government agencies
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• FACASI Colleagues
• CSISA and BISA India and IRMA colleagues
References


Chancellor, William J  See anything by Dr. Chancellor former head of Agri Engineering Division IRRI in the early 1970s such as:


iDE Bangladesh  2012  Study Into The Commercialization Of Selected Agricultural Machines In Bangladesh. International Maize and Wheat Improvement Center (CIMMYT) Bangladesh House 9, Road 2/2, Banani, Dhaka 1213 , Bangladesh.  http://repository.cimmyt.org/xmlui/bitstream/handle/10883/3394/98527.pdf


Samarasinghe, Melvin 2017 Recent History of the Agriculture Machinery Industry in Sri Lanka with special reference to Rice. Case Study written for IFPRI Sout South Project. (Forth Coming) Abeyratne,

Can the Big Learn from Small” Agricultural Mechanization Policy Experiments in Odisha Shambu Prasad C and Pratyay Jagannath Emerging Patterns of Rural and Or Agricultural Mechanization in Odisha: Policy Options???