Agricultural Mechanization in Thailand

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OVERVIEW

- Since 1960s, rapid and extensive mechanization through locally-adapted, locally-made, small-scale machinery

- First wave — affordable, small-scale, power-intensive, multipurpose machines, owned and operated by smallholders
  - Axial-flow low-lift pumps
  - 2WT for paddy and dry land cultivation, transport, powering other machines

- Second wave — larger, control-intensive, specific purpose machines, owned/operated by large farmers/contractors
  - Threshers
  - Combine harvesters
DEVELOPMENT AND SUPPLY OF MACHINERY

Many small-medium enterprises and a few large firms

Small engineering workshops of 4-5 workers in 50 m²

Freely copied and adapted imported machinery

Close proximity to rice farmers in Central Plain

Large firms with 100+ workers also sprang up in industrial provinces north of Bangkok

Close communication with public-sector engineers who shared designs

Otherwise very little policy support
Figure 2. Number of two-wheeled tractors in Thailand, 1975-2000 (estimated from Chancellor 1983; Coxhead and Plangpraphan 1998; Thepent 2000, 2015)

- 90,000 in 1975 to 2.7 million in 2008
- Growth rate of 11%
- One 2WT per 7 ha in 2008
THRESHERS AND COMBINE HARVESTERS

- Development of power threshers in late 1970s
  - Blueprints released for commercial production (AED, IRRI)
  - Self-propelled Thai thresher developed (2 t/hr), ideal for contractors
  - By 2000, 88% of rice farmers used a power thresher

- Development of combine harvesters in late 1980s
  - Local firms made small, track-type rice combine harvesters, 0.4-0.9 ha/hr
  - By 2000, 35% of rice farms used combine harvesters
  - By 2013, 28% of all farms and 54% of rice farms used combine harvesters, 97% through a contractor
GROWTH OF MACHINERY PRODUCTION AND EXPORTS

- In 2009 there were 1,607 machinery production businesses and 1,192 repair and maintenance businesses.
- Exports of agricultural machinery increased more than five times from 2009 to 2014 to USD 0.79 billion.
- Most important export - 2WTs.
- Major export destinations - Cambodia, Myanmar, Indonesia, and Saudi Arabia.
EXPLAINING PATTERN OF MECHANISATION
DEMAND SIDE

Agriculture dominated by small-medium landholdings (3 ha) growing rice and field crops
Axial-flow pumps saved labour and facilitated irrigation
Expansion of irrigation and double-cropping of rice in Central Plain created labour bottleneck in land preparation
Production for domestic and export markets (elastic demand)
Industrialization led to rural-urban migration
Rapid fertility decline added to rural labour shortage
Mechanization driven by farmer demand for small-scale suitable and affordable machines
SUPPLY SIDE

Capacity of small and medium engineering workshops to develop, produce and repair suitable and affordable machines for farmers (pumps, 2WT)
Emergence of larger firms producing single-cylinder engines, locally adapted threshers, harvesters, small 4WT, implements
Informal interaction with farmers and agricultural engineers
Policy environment supportive of smallholder agriculture (e.g., credit), agribusiness, and manufacturing
Mechanization driven by small-scale domestic industry able to freely adapt generic technology to develop suitable and affordable machines for farmers
In 1979, the National Committee for Agricultural Mechanization was established to formulate a policy and strategy, which was approved by Cabinet in 1985.

The strategies involved collaboration between public and private sectors in research and development, standardization of machinery to enable certification, training of farmers and manufacturing workers, and facilitating long-term credit for farmers and machinery businesses.
The Tenth and Eleventh Plans (spanning 2007-2016) made a significant shift to the notion of a “sufficiency economy,” emphasizing sustainable agriculture, food security, bio-energy production, energy efficiency, and environmentally appropriate technologies, but none of these emphases has been interpreted or applied in a way to affect ongoing developments in mechanization.
NATIONAL AGRICULTURAL MACHINERY PLAN

The 12th National Plan (spanning 2017-2021) is to reduce production costs and increase income for farmers.

The strategies id to pushing large-scale rice farming, insisting that the model will help cut production costs, improving rice quality and ensuring higher earnings for farmers.

In addition, machinery rings plan to set up which a grouping of farmers and others involved in agriculture. Machinery rings will support this policy that with common investments and mutual aid the managing process of the individual farm should become more efficient and reduce production cost.
CONCLUSION

Mechanization is widespread on both irrigated and rainfed croplands, for rice and field crops (sugarcane, cassava, maize), due to scarcity and cost of labour.

Domestic manufacturing started with local inventions and adaptations in response to farmer demand.

Small machines (2WT, small harvesters) have spread even though farm size is relatively large cf. other Asian countries.

Smallholders have benefited by owning multipurpose machines or hiring machinery services.

Mechanization largely driven by private sector, with timely sharing of blueprints and prototypes by public sector.