Key Issues that shape agricultural mechanization systems in AP Region

Dr. Peeyush Soni

Assistant Professor; **Asian Institute of Technology**
Vice-President; **Asian Association for Agricultural Engineering**
soni.ait @ gmail.com

CSAM

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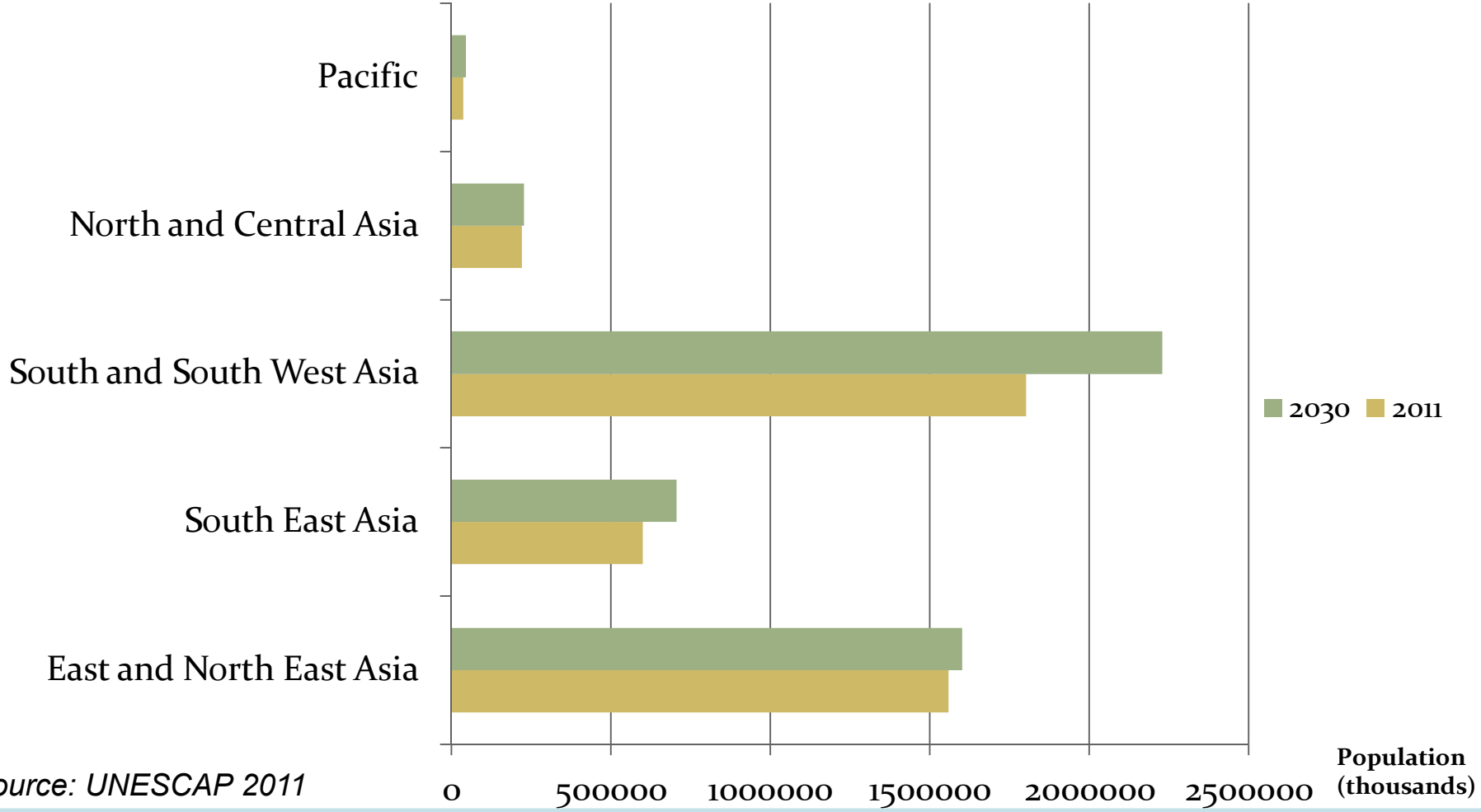
Context of the Region

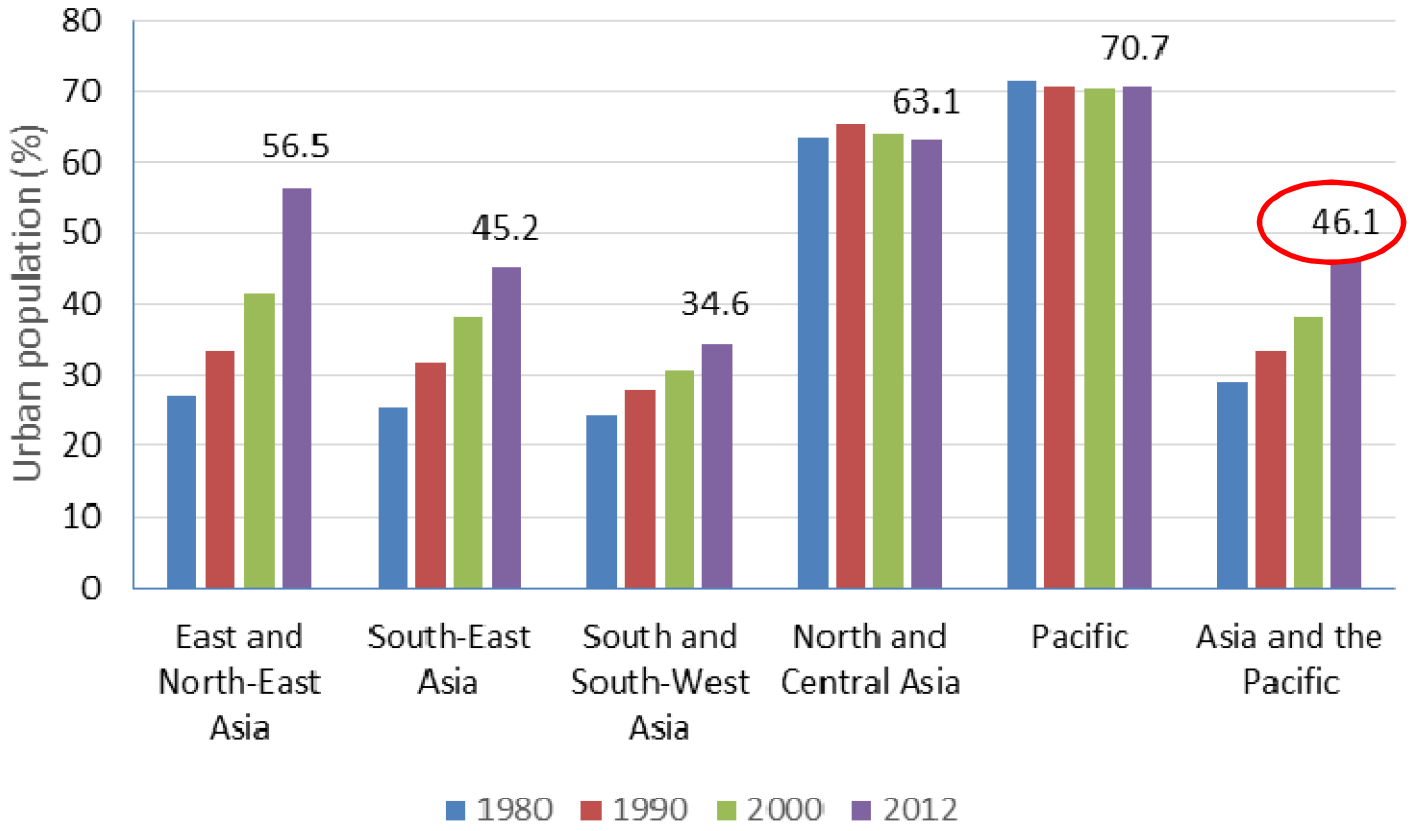
- **87**% of the World's **500** M small farms (<2ha) live in the AP Region.
- Asian farms are predominantly **SMALL**, and getting **SMALLER.**
  - Average size of operated area (actual area cultivated) per holding in the AP Region varies widely from as low as **0.4** ha to **4** ha
- Five countries in the Region host about **70**% of the small farms globally (China- **198** M, India- **98** M, Bangladesh- **24** M, Indonesia- **22** M, Viet Nam- **10** M)

Population Growth Continues Across the Region



Source: UNESCAP 2011

The Region is Rapidly Urbanizing



UNESCAP (2013)

Changes Associated with Urbanization

- Increasing **feminization of agriculture**
  - More men migrating to cities than women
- Ageing Rural Population and the **"greying of agriculture"**
  - Young and educated are migrating to cities

What these Demographic Trends Mean

- **More food will be required** to feed future populations.
  - By 2025, the AP region would need **684** Mt rice (**20**% more than the 2000's rice production) → equivalent of adding **2-3** Mha/year of new land at current average yield levels.

- **More labour saving equipment will be required** to facilitate the work of women.

- **Greater efforts need to be made to engage youth** in agriculture.

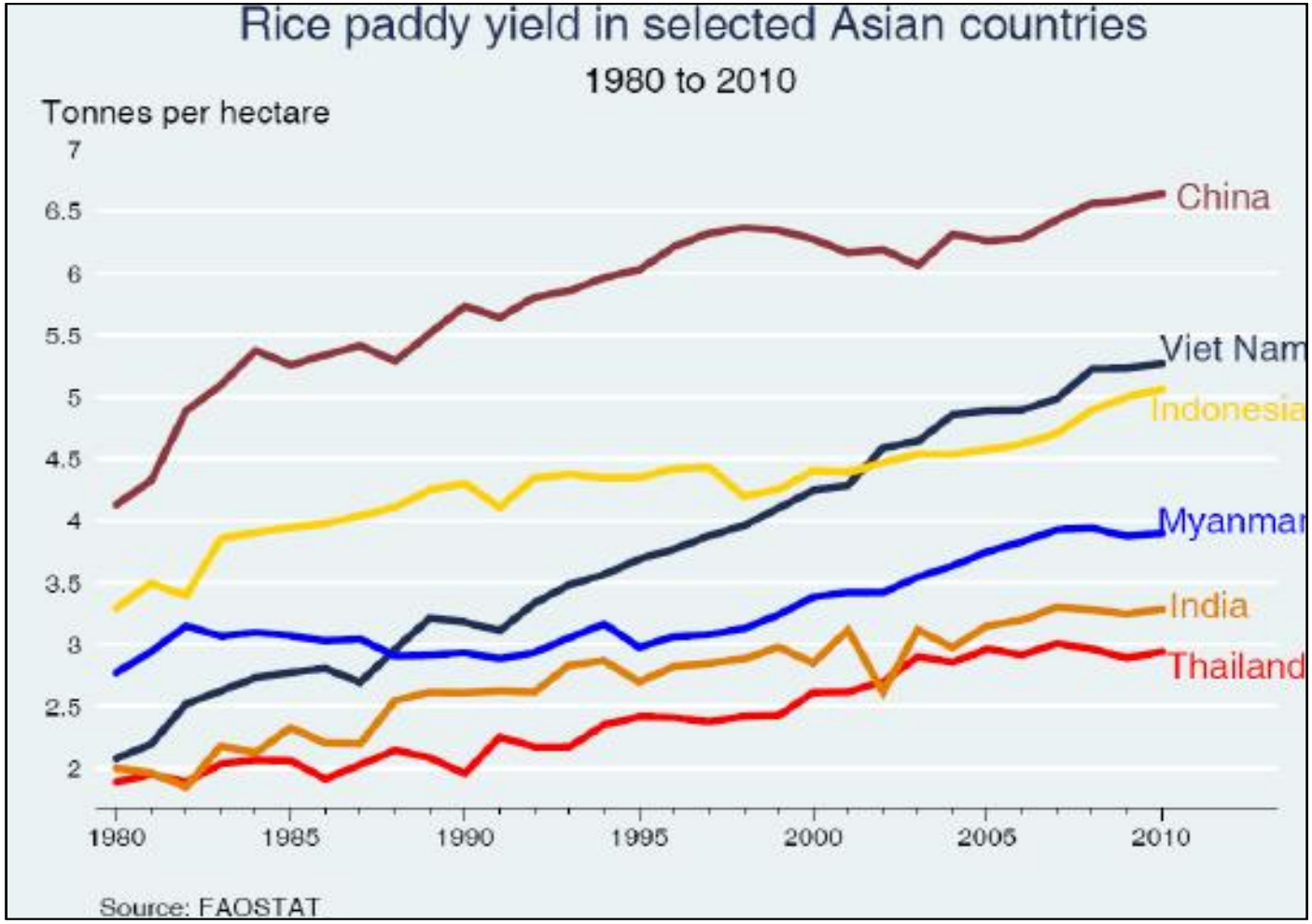
Trends in Agricultural Production Systems : Case of Rice

- **Decline in Productivity Growth**
  - Growth in rice yields has fallen mainly due to a decline in R&D investment on rice productivity enhancement from **2.2**% (1970-90) → **0.8**% (1990-2000) (IRRI)

- **Land available for rice production is declining** as land around urban areas is being converted for other uses such as for housing and industry.

- **Availability of water for rice cultivation is declining** as demand by industrial and municipal users is growing rapidly

Rates of Growth in Agricultural Production Are Slowing



Trends in Agricultural Mechanization in AP Region

- The **AP Region has emerged as the largest market in the world in terms of agricultural machinery sales** – projected to have sales of USD **49** Billion in 2015 (World Bank, 2010)

- Higher mechanization of processing and irrigation than the mechanization of crop husbandry and harvesting operations

- Wide differences across the region, with respect to the use of farm power

- Declining use of draft animal power in Asian agriculture:
  - In India, number of draft animals declined from **85** M (1975) → **53** M (2005) → **18** M (by 2030) (Singh, 2013)
  - In China, by 2025 the draft animals will be completely replaced by 2WT and 4 WT (Renpu, 2014)

Technical Issues

- **Changing source of farm power:**
  - Rapid change from animate (animal and human) to mechanical power
  - Increasing use of 2WT/4WT,
  - Increasing use of irrigation pumps (diesel/electric),
  - Increasing use of post-harvest & processing equipment

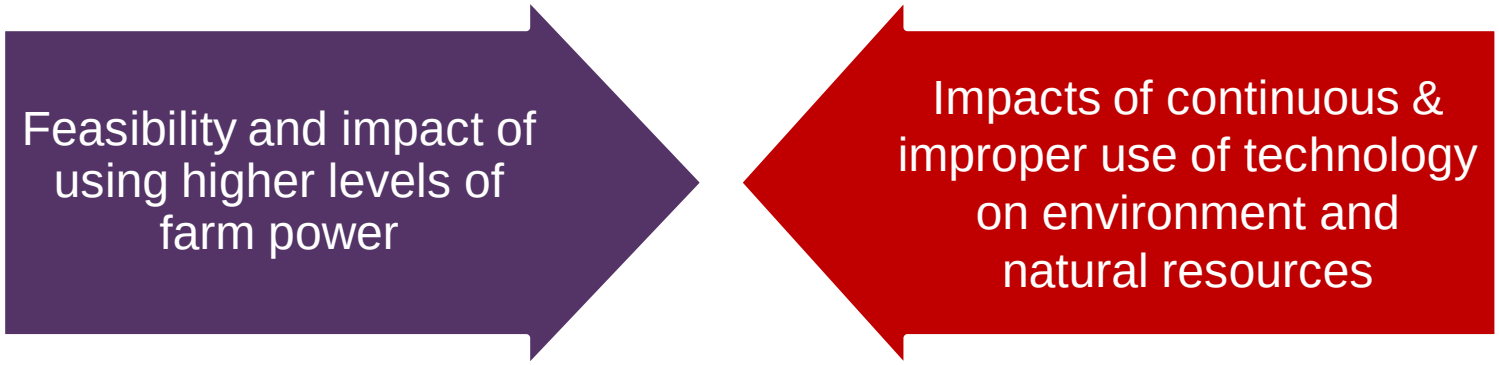
- **Little change in land preparation and planting techniques**
  - Land preparation in most countries in near future, is likely to remain the same in a significant part of the cultivated land
  - Amidst rapid changes in the sources of farm power, conventional tillage and planting techniques are likely to continue to dominate the Region

Technical Issues

- **Increased use of mechanization in harvesting and on-farm post-harvest operations** with the use of combine harvesters and mechanical threshers
  - Entrepreneurs offering these services across countries in the Region through custom hiring, contract farming arrangements etc.

Agricultural Mechanization in AP Region

- Mechanization is powerful tool for achieving sustainable agricultural production
- From a *sustainability perspective* the Ag Mechanization debate revolves around two aspects:



Environmental Issues and Concerns

- **Accelerated soil erosion and soil compaction** owing to inappropriate use of mechanization.
- **Overuse of chemical inputs**.
- **Threat of climate change**:
  - Rice-based production systems in most developing Asian countries are highly vulnerable to climate change risks
  - Delta countries' i.e. Viet Nam and Bangladesh being most vulnerable to sea-level rise, floods and erratic weather

Policy Support

- **Is critical to agricultural mechanization**

  Especially when sustainability issues are concerned

  May require major change in current practices

- **Will be required**, not only in agricultural but industrial and trade policies, as well (manufacturing and imposed duties on imported equipment)

- **Need be closely coordinated with governments** (Ministries of Agriculture, Trade and industry, Finance and Planning)

Institutional Issues

- **Research and development**
  - Public sector initiatives are usually multi-sectoral, but poorly coordinated
  - Private sector have most serious R&D, some are by MNC branches, others are home grown local companies
- **Standards and Testing**

  Still a long way to go towards regionally harmonized protocols that will enhance trade in Ag Machinery & Implements and consequent price reduction
- **Manufacturing**

  With a market of over US$50 billion for agricultural machinery and regarded as a low cost manufacturer globally, the removal of non tariff barriers to trade in the region will contribute significantly to cost reduction

The Asia-Pacific Network for Testing Agricultural Machinery (ANTAM) has a role to play in facilitating standards and testing and manufacturing

Institutional Issues

- **Technology transfer, Technical Support Services & Training**
  - Reluctance of private sector to get too involved in promoting SAM.
  - Capacity development curricula are static.
- **Mechanization of Supply Chains**
- **Financing**

  Credit and finance are critical for agricultural mechanization investments and so with SAM technologies

Conclusions

- Agricultural development is the most effective way for addressing food security challenges; and appropriate mechanization is a powerful tool for achieving sustainable agricultural production
- Issues of Agricultural Mechanization have gone beyond merely using higher levels of farm power; but they now also include impacts of its improper use on environment and natural resources
- Amidst several challenges, the AP Region treasures huge potential of successful (rewarding) adoption of SAMS

Thank you