Key Issues that shape agricultural mechanization systems in AP Region

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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

High Level Multi-Stakeholder Consultation on Sustainable Agricultural Mechanization Strategy for Asia and the Pacific Region
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

Rice paddy yield in selected Asian countries
1980 to 2010

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

  - Feasibility and impact of using higher levels of farm power
  - Impacts of continuous & improper use of technology on environment and natural resources
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