Mechanization of rice production and challenges in the Asia-Pacific region - the ***Save and Grow*** view –

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Outline

- Rice mechanization in Asia
- Issues with rice production in Asia
- Save-and-Grow approach to rice
- Implications for mechanization
- Conclusions

Rice mechanization in Asia

- Trend to fully mechanized systems: time and labour saving
- Major aspects:
  - Tillage and Puddling
  - Mechanical transplanting
  - Mechanical direct seeding
  - Mechanical harvesting, from two stage to one stage

Issues with rice production in Asia

- Labour shortage
- Water shortage
- Sealing of land area (flooding)
- Methane and Nitrous oxide emissions
- Limited yield responses (degraded soils)

Save-and-Grow approach to rice

- Save and Grow: the concept of sustainable intensification
- Base concept for Save and Grow: Conservation Agriculture, complemented with other good practices (IPM, IPNM, Biodiversity/Genetic Resources management, integrated water management...)

Save-and-Grow approach to rice

Conservation Agriculture (CA) is an approach to managing agro-ecosystems for improved and sustained productivity, increased profits and food security while preserving and enhancing the resource base and the environment. CA is characterized by three linked principles, namely:

1. Continuous minimum mechanical soil disturbance.
2. Permanent organic soil cover.
3. Diversification of crop species grown in sequences or associations.

(www.fao.org/ag/ca)

Save-and-Grow approach to rice

- No-till, no puddling
- Direct seeding or no-till transplanting

Save-and-Grow approach to rice

- No hardpan, no permanent flooding
- Option: permanent bed and furrow systems

Save-and-Grow approach to rice

- Residue retention/management
- Agronomic management according to SRI

Save-and-Grow approach to rice

- Reduced labour/time/fuel (50-70%)
- Reduced water requirements (50%)
- Reduced methane and nitrous oxide emissions
- Reduced seed requirements (70-90%)
- Reduced fertilizer requirements (50%)
- Increased yields (10-100%)

Implications for mechanization

- Laser levelling as initial investment
- No ploughing, puddling

Implications for mechanization

- No-till compatible transplanters and direct seeding equipment with precision to seed/transplant single plants per hill
- With good handling of rice residues

Implications for mechanization

- Seeding equipment, tractors and harvesting equipment eventually compatible with permanent bed systems (CTF)

Implications for mechanization

- Permanent bed and furrow systems for CTF can be mechanized at all levels

Implications for mechanization

- Harvest preferably combining to reduce turnover time/retain straw residues in field

Implications for mechanization

- Even residue spreading/chopping, high stubble/stripper

Conclusions

- Mechanization in rice based systems will increase to respond to labour shortage
- At the same time rice based cropping systems will have to change to respond to global challenges (water, GHG emissions)
- The change in the cropping systems will have implications for the type of mechanization with new opportunities for the industry

Save and Grow
the Agriculture of the Future – the Future of Agriculture

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http://www.fao.org/ag/ca

http://www.fao.org/ag/save-and-grow

Join the CA-CoP!