Rice crop Establishment

Advances in technology

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Content

• Traditional practices

• New technologies

• Opportunities
Traditional rice crop establishment practices

- **Direct seeding**
  - Wet/puddled
  - Dry

- **Transplanting**
  - Wet/puddled

Other methods:
- Parachute transplanting
- Ratoon crop
- Dibbling
Traditional rice crop establishment practices – broadcast seeding

• **Advantages**
  – Labour saving - ~8 hr/ha
  – No nursery required
  – Water saving (dry seeding)

• **Disadvantages**
  – Difficult early season water management
  – Early submergence can result in poor emergence
  – High weed competition
  – Snail and bird damage risk
  – Non-uniform plant spacing and poor crop uniformity
Traditional rice crop establishment practices – manual transplanting

• **Advantages**
  – Water management
  – Minimise submergence risk
  – Pest and disease control
  – Weed competitiveness
  – Accurate plant spacing
  – Uniform plant distribution

• **Disadvantages**
  – Labour intensive process - ~100 hr/ha
  – High water requirement
  – High energy requirement for land preparation
  – Drudgery - unattractive to youth
Direct seeding

Wet seeding

• Where the turn over time between two seasons is very narrow

• Irrigated environment
Direct seeding

Wet/puddled

Major area: SE Asia

Messages

• Step change or shift?
• Cost of machinery is still a major driver
• Other practices like puddling intensity
Research opportunity (both biological and engineering)

- Anaerobic germination
- Seed to soil contact
  - Avoid bird/snail damage
  - Floating of seeds
- Reduce seed rate
Direct seeding

Dry seeding

• Relatively long window between two seasons
• Constraint of water availability
Direct Seeded Rice: dry seeding

Broadcasting

2 or 4 wheel tractor driven
Seeding or tillage or both
Seeds or Fertilizer or both
Rice or multiple crops

Drill seeding
Factors affecting decision of switching to “new system”

- Land holding (create lot of confusion)
- Topography
- Cropping system
- Accessibility, cost, ease of operation etc.
Messages

• Step change or shift?
• Cost of operations: multiple operation in one go
• Solution for system: multiple crops can be seeded
• Fertilizer drilling+seeding
• Opportunity of strip tillage

Trade-off

• Poor precision (crop geometry, seed rate etc.)
Opportunity
• Operations: Seeding and fertilizer drilling
• Solution for system: multiple crops can be seeded
• Zero tillage

Trade-off
• Poor precision (crop geometry, seed rate etc.)
Ideal Planting Architecture for Direct Seeding

- Broadcast
- Random

Drill-Sowing - Continuous planting

Drill-Sowing - 20 x 10 cm

10-15

20

20

Courtesy: J.K. Ladha
Transplanters

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Challenges

• Knowledge intensive: mat nursery and transplanting
• Machine design: especially row to row spacing
• Seedling/hill: depend on mat nursery but still very high
Transplanting of single seedling
Adoption Enabling Environment

- Machine for crop vs machine for system
- Service provision models
- Knowledge sharing model
Future crop establishment

Minimum/Zero tillage with and without residue

Coutsey: J.K. Ladha
Future crop establishment

Key focus on nursery management as a contracted business

Anaerobic germination – a game changer for direct seeding

Precision agriculture
- GPS guidance
- Nutrient management
Thank you