Using value chains to scale up agricultural machinery services: The Cereal Systems Initiative for South Asia Mechanization and Irrigation (CSISA-M.I.) Initiative

SCALING UP Adoption and Use of Agricultural Technologies
Global Learning and Evidence Exchange (GLEE)
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In this presentation:

1. Project Background and justification (Why?)

2. A regional initiative: CSISA (What?)

3. CSISA-MI: Using value chains and service provision to go to scale (How?)

4. Concluding remarks
What constrains crop productivity in Bangladesh’s Feed the Future zone?

**Increasing labor scarcity and cost**
400% labor increase in last decade (Kumar and Ladha, 2011)

**Growing energy and fuel costs**
500% increase in last 15 years (BBS 2003)

**Limited irrigation**
Abundant water resources, few pumps (MoA and FAO 2012)

**Gap between farmers’ and attainable yields**
Salinity, extreme weather, late crop establishment, climate change related and drought risks, low input use efficiency

**Low crop intensity**
50% of 13 million farmers grow only 1 crop. land (MoA and FAO 2012).

**Limited knowledge of, and access to, innovative technologies**
Access to resource conserving practices and farm machinery lacking
The Cereal Systems Initiative for South Asia (CSISA)
Spanning the S. Asian bread basket, with a focus on E. India + Bangladesh

**Goal:** Increase food & income security at scale in through sustainable intensification of cereal-based agricultural systems.
Synergies, not duplication, with the wider CSISA Program

- CSISA-M.I. focuses on ‘upstream’ actors in the value chain, connecting them with the work of the CSISA-BD program and other existing farmer institutions and platforms.
Objective 1: Sustainable intensification through decentralized surface water irrigation

Tapping the South’s irrigation potential

Fuel efficient at low lifts, enabling lower cost irrigation

- Government of Bangladesh policy underscores need to expand surface water irrigation in the Feed the Future zone.
Breaking the irrigation bottleneck with new efficient low-lift surface water pumps

Collaborative research with national research partners for technology verification, redesign, and release

Field evaluation by farmers and local service providers
Forgoing the fallow with efficient surface water irrigation

Satellite remote sensing

Identifying dry season fallows

Tidal water flow
Salinity modeling
Flood dynamics
Elevation modeling
Google Earth for accessibility
HH Intensification Typologies

Technology targeting enables best-bet fitting of interventions
**Objective. 2: Broad access to agricultural mechanization services**

Power-tiller attachments: Facilitating precision agriculture

**Typical power tiller:**
≈ 450,000 in Bangladesh

- Reduced tillage
- Earlier planting
- Fuel savings
- Precision seeding + fertilizing
- Local service provision to reach even marginal farmers
Where there is no irrigation:
Reduced tillage vs. conventional practices S. Bangladesh

Trials under farmer management.
Error bars ± SD. Means separated by Tukey's HSD (α=0.05).
Where there is no irrigation:
Reduced tillage vs. conventional practices S. Bangladesh

- Increase profits +16% and +37% compared to conventional and farmers’ practices.
**Obj. 3:** New models of public-private partnerships to support irrigation and ag. mechanization technical capacity

- The current focus on technology development hampers product commercialization.
- CSISA-MI leverages good product design and partnerships to overcome supply chain weaknesses (mechanics, technology optimization, and agronomic advice).
Assessing the market for innovative agro-machineries in Bangladesh

Improved Seeder-Fertilizer Attachments for Two-Wheeled Tractors

• Lack of support services including mechanics, finance, spare parts.
• Local service provider (LSP) model is the way to scale up: > $20m potential value to be captured by LSPs.
• Market volume currently low at $250k/year in imports – mainly projects. Potential of $105m market in CSISA areas.
Engaging with lead Bangladeshi firms to scale up agro-mechanization

RFL Group

- Leading manufacturer of cast iron, PVC, and plastic products. Agreement with RFL Metal Ltd.
- 12,000 employees, 17 associated companies (incl. property, agro-dealerships, ground water tube wells).
- $300m revenue (2012). Dealer network and distribution channels.

Advanced Chemical Industries (ACI) Ltd.

- Family of companies specializing in seed, fertilizer, crop care, public health, motors, livestock and fisheries, etc. Project agreement is with ACI Motors.
- Specialist in quality farm machineries and light commercial vehicles.
- Little exposure to date in FtF zone
- Net turnover ≈$282m; gross profit of $73m (2012).
Leveraging institutional partnerships with lead firms requires going beyond project parameters.

Building trust & confidence in the partnership.
Value chain interventions to facilitate Axial Flow Pump adoption

Interventions to drive technology (supply)

Joint-venture agreements for:
- Consumer promotion: ‘discount model’
- Rural marketing and promotion (demos)
- Commission based sales team
- After sales service

Interventions to develop LSP businesses (demand)

- Building market access to farmers’ groups
- LSP capacity development (through ToT)
- Creation of FBAs to sustain access to market

Interventions to strengthen LSP support services (supporting services)

Access to services for improved machinery operations

SOURCE → RFL → DEALER → SALES OFFICER → LSP → FARMER

Customer for the technology
Customer for the service

Existing demand

Import

Manufacture from 2015

CSISA-MI

Conclusion

Outline

Justification

The broader CSISA

CSISA-M.I.
Interventions to strengthen key services in the market system

Testing and technology development services
Machinery optimization through PPP and HCD

Import

SOURCE

COMPANIES

Mechanics services
Improved through training and certification

Development Corp

MECHANICS

Financial services
Increased technology adoption through access to commercial finance

FSPs

SALES OFFICER

LSP

FARMER

Extension service

Agronomic advice services
Improved agriculture through organization and development of FBAs

CSISA-MI

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In Summary: Initial results/ challenges (after 6 months)

- Agreements for some $672,000 investment by RFL/ACI. Project investment of $190,000 in JV (3.5:1). To date, $363,000 investment realized from private partners for scale-up.
- 1,200 pumps imported and retailed through RFL distribution network in southern Bangladesh. All 70 seeder-fertilizer drills sold (complete consignment). Precision planting of > 650 ha underway.
- Some machineries require further optimization and refinement to become more marketable. HCD process planned in 2014.
- Commercial model is working though overcoming traditional mindsets (in public and private sector) remains an ongoing challenge.
In Summary: Technology alone is not the answer

- 13 million people in Southern Bangladesh rely on agriculture (MoA 2012)

Business as usual will not achieve scale

- Concentration on value chains and local agricultural machinery service providers to reach farmers at scale

Systems development for scaling up through value chains
Thank you! Questions?
Extra slides after this
Approach: Project Cycle Framework

‘Investigating’ Markets:
- HCD toolkit
- Literature Review
- Market Map
- Question Guide
- Fieldwork Manual

Analysing markets

Developing Strategy:
- Intervention Logic Analysis (ILA)
- Market Strategy Document
- Vision of Change Map

Designing Interventions:
- Results Chains
- Exit Strategies
- Business modelling
  - Analyzing overall model and individual links (BM Canvas)
  - Pilot and scale-up BMs
  - Business Calculations

Deal-making:
- Understand negotiating position for JVs
- Strategy and persuasion (deal-making)
- MoUs/ LoAs (as entry point)
- Trust and confidence building (pitching)

Delivery and iterative improvement
- MRM Quarterly outcome reports
- Results Chains and enterprise development indicators (DCED)
- External advisory support

Implementation

Intervention Identification

Intervention Design

Deal-making
Value chain interventions to facilitate seeder-fertilizer drill adoption

Interventions to supporting technology promotion
Joint-venture agreement to provide ‘discount’ models and other promotional strategies

Interventions to strengthen LSP capacities
Access to support services for improved machinery operation

Voucher scheme
Reduces purchase risk & facilitates future adoption

Demand created and farmers adopt

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SOURCE → RFL → DEALER → SALES OFFICER → LSP → FARMER

Import

Manufacture from 2015

Customer for the technology
Customer for the service
Aligning incentives at the LSP level

Business Model: Establishment of AFP LSP for irrigation services

Actors: Dealer, LSP, Support Service, Extension service & FBA, Farmers

Dealer (RFL) → AFP + Training → AFP LSP

Support Service (Mechanic/Spares) → Technical support/Maintenance → AFP LSP

AFP LSP → Irrigation service → Farmer

DAE & FBA → Advice/ training on Crop mgt/ BM

$ (FBA)/ mandate (DAE)

Conclusion

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Emerging drivers of change

Fuel cost for irrigation rising

- Diesel irrigation cost ($/L)
- Petrol irrigation cost ($/L)


Labor cost increasing

Daily wage (US$)

Labor scarcity growing

Agricultural labor force (%)

Data from IRRI (2012)

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