Scaling appropriate agricultural mechanization world-wide
Two-wheel tractors and smallholders farmers

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Session 6: Examples of Successes and Failures; Lessons Learned
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Challenges & Problems: Two-wheel tractors to intensify smallholders farms sustainably

- Farm mechanization has transformed agriculture in high-income countries
- Adoption of mechanization in low income countries has been below expectations for years, despite:
  - 80% of agricultural production in developing countries from smallholder farms ranging between 0.25 to 2 ha
  - significant labor shortages and high drudgery/cost of alternatives (e.g. animal traction)
  - urgent need to professionalize and rejuvenate farming to stay competitive locally and internationally
  - Opportunities for rural entrepreneurship and mechanized service provision to reach smallholder farmer

- Responsibility check
  - Use of fossil fuels and ‘dirty’ technology, and need for regular repairs and maintenance
  - Risk of job displacement and shift to more knowledge intensive employment
  - Risk of business monopolies as in certain regions it is a specialty tool

Large-scale adoption of the technology can aid smallholders farmers to become more competitive and more responsive to changing environment
Tension between groups: Matching business cases with strategic collaborations

- **Farmers:**
  - need to improve farming practices to stay competitive, but require labor and precision in operations
  - need capital to invest, but financial service providers often don’t have confidence in agriculture/farmers
  - need services at specific times (planting, harvesting) whereas machinery service providers would like to spread service supply over area and time

- **Farm machinery service Providers:**
  - need sufficient farmers clients in proximity and in time to increase ROI
  - many models and accessories require good value chain integration
  - Skilled labour and repair/maintenance tasks have to be recognized

- **Politicians:**
  - small mechanization is often seen as unprestigious
  - afraid of short term unemployment (job and skill displacement), while failing to recognize importance of service provision and rural entrepreneurship
  - misguided subsidy or support programs without proper extension and coaching

Adaptable business models and value chain facilitation to generate push and pull towards movement for adoption
Lessons learned: Cross-regional feedback on scaling strategies

- **Two-wheel tractors are technically viable**
  - On-farm and fuel efficiencies are well-documented, but correct usage/maintenance is knowledge intensive
  - Multitude of accessories without clear notion of functional packages
  - Proximity and level of integration of value chain can complicate availability

- **Financial viability is major bottleneck to scaling**
  - Financial services do not invest spontaneously in tools for rural transformation
  - Investment cost is initially high and no collateral is available
  - Governments understand but poorly design subsidies

- **Leadership and position brokers**
  - The role of the leading institute should be flexible and adjusted on local situation
  - Clear collaborations on common goals and scaling effort should be brokered
  - Environment and job creation/displacement determine the optimal scale, rather than aiming for maximum scale

Two-wheel tractor smallholder farmers can become scale-catalysts offering mechanized and affordable services enabling rural transformation