



FACASI

Farm Mechanization and Conservation
Agriculture for Sustainable Intensification

Designing and implementing small-scale mechanization R&D projects: Lessons from FACASI

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This brief draws on the findings of the ACIAR-funded project FACASI (Farm Mechanization and Conservation Agriculture for Sustainable Intensification), which tested and promoted small-mechanization choices based on the use of two-wheel tractors, and commercialized these choices in rural Ethiopia, Kenya, Tanzania and Zimbabwe from 1 March 2013 to 28 February 2017.

The process of developing innovations and scaling them up through commercialization goes through four phases: 1) market assessment, 2) partnership creation and research and development (R&D), 3) pilot and demonstration, and 4) commercialization (Figure 1).

Phase 1: Market assessment

Technology selection

Tasks to be mechanized should not be identified on the basis of drudgery and labor productivity alone. It is important to identify mechanization options that can support business opportunities as well.

The experience of FACASI shows that in rural eastern and southern Africa there is more demand for post-harvest operations and transport than for planting.

The acceptability of no-till technique appears to be country-specific, for instance, acceptability is higher in Zimbabwe than in Ethiopia.

Site selection

When promoting small-scale mechanization, consider the following aspects during site selection:

- Agriculture is relatively commercial oriented, e.g., presence of cash crops
- Agriculture is constrained by labour shortages, at least seasonally
- Costs of maintaining draught animals can be high, such as when there is feed shortage
- Fields are accessible, i.e. feeder roads are present
- Services for hire exist, e.g., ox ploughing
- Soils are relatively deep and free of stones
- The size of the fields are at least 0.1 ha.

Selecting service providers

Consider the following aspects when selecting early service providers who will be key in creating demand for small-scale mechanization:

- Young
- Interested
- Entrepreneurial
- Educated
- Able to contribute to the cost of the machinery
- Preferably having an experience in similar businesses and particularly in mechanics

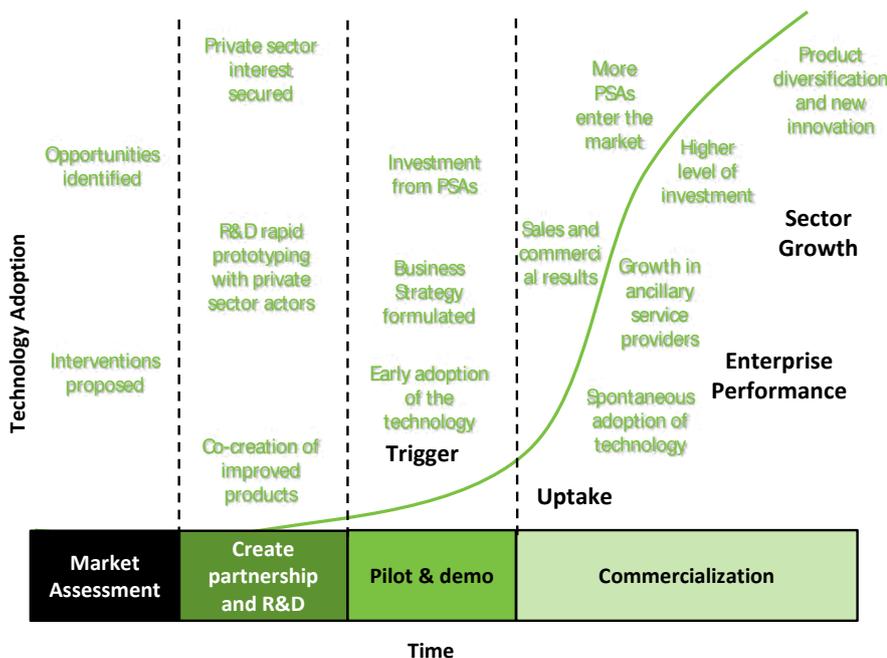


Figure 1. Phases in the development of innovations and scaling them up through commercialization.

Phase 2: Creating partnerships and R&D

Technology adaptation

FACASI focused on performance, rather than cost, as an important factor during technology selection. Three out of four countries favored seed planters made in Brazil but their high cost is prohibitive to aspiring service providers in these countries. The cost as well as performance of small-scale mechanization (there is often a tradeoff between the two) are important at the early stage of a small-scale mechanization project.

Although best bets can be identified for the conditions prevailing in eastern and southern Africa from other national markets (e.g., China), they will still need to be adapted (for best bets to become best fit). Crops may be different (e.g., tef in Ethiopia) and the need for transport between clients is generally greater in eastern and southern Africa than in Asia (lower population density).

Views are diverse among international and national engineers on what a good two-wheel tractor seeder should look like. Ultimately, it is the views of service providers and their clients that will count.

Early commercialization

It is risky to commercialize technologies when there is no confidence in their appropriateness. Commercialization should only start after a phase of thorough testing of new equipment.

It is important to involve private sector stakeholders during the R&D stage.

First-generation technology development may be led by the public sector (particularly when the technologies are new and untested), but the second-generation technology development necessitates feedback from users to local manufacturers.

Phase 3: Pilot and demonstration

Reaching a trigger

It is a myth to think that business models can be developed without some form of subsidy. Incentive schemes such as matching grants, soft loans, guarantee funds, etc., are necessary to set up supply chain stakeholders in business.

It may take time and a lot of public investment before a trigger is reached.

An approach centered on the private sector alone may not work when targeting marginal areas (e.g., rainfed systems dominated by staples), or marginal groups (e.g., resource-constrained smallholders), or technologies providing public goods (e.g., conservation agriculture), or complex technologies (not a 'product').

Market linkages

The role of the public sector in commercialization is to create a conducive business environment to attract the private sector. To commercialize, demand creation and capacity development (of private sector actors, which should be on-going) are crucial.

FACASI may have placed too much emphasis on service providers (making their businesses viable) and not enough on farmers (proposing cropping systems that reduce the cost of production and/or increase income). FACASI assumed implicitly there would be mass adoption of services once service providers had emerged. It is important to develop—and promote—an attractive mechanized production system (thinking of the entire cropping system) to secure farmers' adoption.

Phase 4: Commercialization

Finance

Strong links to financial products are vital for commercialization to expand. However, financial products adapted to service providers are lacking across the region.

Public sector credits (e.g., in Ethiopia) and subsidies (e.g., in Tanzania) are often associated with poor-quality machinery.

Very small (and cheap) machines may be adopted without any financial support and can be very profitable. This is the case with single cob shellers.

Project design

When designing a project promoting small-scale mechanization in eastern and southern Africa, four dimensions are important:

- **Time.** FACASI was designed for 3–4 years in each country, including both the R&D and partnership creation phase and the pilot and demonstration phase. In retrospect, 4–6 years may be required.
- **Flexibility.** The focus should be on outcomes, not outputs and milestones. A flexible partnership, not prescribed in advance, is also necessary.
- **Implementing partners** with the right capacity and skills in market systems development and policy research, and not only in technology testing, should be selected. These implementing partners should also embrace the principles of adaptive management.
- The role **international partners** should be mainly in the exchange of equipment, experts and knowledge, and in documenting project results.

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Project Partners



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