FACASI

Farm Mechanization and Conservation Agriculture for Sustainable Intensification

TECHNICAL BULLETIN 01

Mr. Henry Mwiti, a CA service provider in Laikipia Kenya planting on the FACASI CA demonstration plot with a 2WT drawn Fitarreli 2 Row direct planter

Delivering appropriate mechanization to smallholders in sub-Saharan Africa: the FACASI experience

Introduction - Business models for small scale mechanization

For agricultural development to occur amongst small scale farmers in sub-Saharan Africa (SSA), a more commercial and market-oriented approach to farming is needed and this can be supported by mechanization. The situation in SSA is more conducive now to mechanization than it has ever been. The demand for mechanized services has increased amongst smallholders but it has been recognized that it is only viable to serve smallholders through hire service provider business models. With this thinking an ACIAR[1] funded project entitled Farm Mechanization & Conservation Agriculture for Sustainable Intensification (FACASI) was designed to examine different business models for hiring services with the aim of improving the access of smallholder farmers to two-wheel tractors (2WT) and their accessories in Eastern and Southern Africa[2].

But what is a business model? Simply put a business model is concerned with value creation and what is needed for a business to offer value to its customers. The concept has been defined by Osterwalder (2004) as "*how a company organizes to generate revenue and sustain itself*". In its most simplistic form, it is a blueprint of how a company does business. Business models raise questions about innovation, entrepreneurship, organization, marketing and strategic management, contains elements and relationships that enable businesses to show how they can acquire their customers, service them and make money in doing so. Business models can be regarded as a sub-set of a supply chain or value chain. The business model approach focuses on addressing specific relations between key value chain stakeholders such as an agro-dealer, machinery manufacturer, service provider and their customers. Strong dealer-service provider-farmer relationships are the foundation on which commercially viable business models can be developed to provide mechanization services that meet farmers' requirements in terms of quality, price and support services.

A distinction, however, can be made between goods and service models. The production of goods refers to the act of manufacturing a material product in which there is little or no direct contact with the final consumer during the production process. Services by contrast, are intangible products which "*are not actually expressed in terms of a product per se, but rather of an activity or process, and which require a high degree of interaction with the customer in their provision*" (Huppert & Urban 1998). The 'pure' production of goods and the 'pure' provision of services can be better understood as two ends of a goods-services-continuum, with most goods/services falling in between.

Mechanization business models can be interlinked both between actors in the mechanization supply chain, dealers, manufacturers, service providers and farmers and between farmers and product buyers, input and output markets. 2WTs and their accessories can be used for both production and post-production operations and the link between production and the market is often essential for their financial viability.

1 Australian Centre for International Agricultural Research
2 The project covers four target countries of SSA: Ethiopia, Kenya, Tanzania, and Zimbabwe.

Business model analysis

Business modelling was used as an analytical tool to understand how the businesses operate and how costs are covered, how profits are made and how these businesses interact with customers. An analytical framework was developed to analyses the businesses of the key actors in the supply chain the dealers, manufacturers and service providers and their links to smallholder farmers.

Criteria for business model analysis	
Infrastruc-ture	Business organization
	Partner collaboration
	Resources/ activities
Offering	Market attractiveness
	Unique value proposition
Customers	Customer benefits
	Customer segmentation
	Customer relationships
Monetization	Sales performance
	Costs/ revenues
Sustainability	Risk avoidance
	Changing competitive advantage
	Innovation
	Risk mitigation

The framework was used for all businesses in the 2WT supply chain. The analysis of each business model covers the components given on the table above. The results of a business model analysis enabled entrepreneurs to understand where they need to improve in order to compete more efficiently and to expand the demand for quality services.

Business model typology

Ten business model types were identified through the analytical process including both product and custom hiring service models. These are listed as follows:

1) Machinery hire service models:

- Collective ownership/ individual operator model (BM1) - Zimbabwe, Kenya, Tanzania, Ethiopia.
- Collective ownership/ group operator model (BM2) – Tanzania.
- Individual ownership/ operator model – local market, part time service provider (BM3) – Ethiopia, Kenya.
- Individual ownership/ operator model – wider market, full time service provider (BM4)[3] – Tanzania, Ethiopia, Zimbabwe.
- Contract farming – market linkage - corporate owner/ operator model (BM5) – Zimbabwe, Tanzania.

2) Machinery product business models:

- Multi-purpose hub (BM6) Kenya.
- Dealer-led collaborative model (BM7) – Zimbabwe.
- Dealer-led vertically integrated model (BM8) – Kenya, Tanzania.
- Manufacturer-led collaborative model (BM9) – Kenya.
- Manufacturer-led vertically integrated model (BM10) – Tanzania.

The business models are characterized according to two main criteria ownership and management, as described below:

Collective ownership: a) collective ownership of machinery through formal cooperatives (at both secondary and primary levels) and/ or informal farmer group organization, owned and managed as a collective good; b) collective ownership of machinery through formal cooperatives and farmer organizations with hiring services leased out to an individual entrepreneur and managed independently as an owner operator. Informal group activities often includes groups of women involved in irrigation and value adding activities for local markets.

Individual ownership: The individual ownership custom hire service models can be distinguished as follows: a) individual ownership of machinery managed by farmers on a part-time basis, b) individual ownership of machinery managed by an entrepreneur as a specialized hiring service.

Contract farming: Contract farming schemes with mechanization services provided under contract from an agro-processor or lead farmer with fresh produce sold in defined markets or as raw material for processing.

Multi-purpose hub: This model functions as a one-stop shop, providing mechanization services (2WT and 4WT based), together with complementary bundles of management and economic services. These include finance, training and advisory services, marketing with links to market outlets. The model is intended as a one stop shop to demonstrate technologies, provide spare parts and provide repairs and maintenance support. The contract farming and mechanization hub models are clustered as corporate led.

Private sector - dealer/ manufacturer led: Dealer/ manufacturer models can be divided into two categories - vertically integrated and collaborative models. The vertically integrated model is a situation where machinery that is imported or manufactured locally is distributed by the private sector who provide an additional hiring services to farmers as part of their value proposition. The collaborative model reflects a situation where machinery is imported and distributed by private sector dealers or manufacturers who are linked through a collaborative relationship to service providers. In this way, through a collaborative relationship, they can gain ease of access to spare parts and other support services.

The ten business models have been represented in figure 1.

Findings

The findings from the project to date suggest that business models located in higher potential areas with higher value cash crops as part of the farming system and more developed access to markets through more formalized value chain linkages, create a conducive environment for private sector led development (Kenya, Zimbabwe and parts of Tanzania). Dealers and manufacturers are more likely to drive the chain given the incentive system. The more consistent revenue flow also provides the incentive for independent owner operated custom hire services to flourish. The potential exists for stronger backward linkages to other supply chain actors like the mechanics, dealers and spare parts stockists. A prerequisite for value chain development in this situation is the conduciveness of the enabling environment, physical

3 In the case of individual owner operator models of service provision, the business models represent a cluster of businesses rather than a single case study.

transportation links, availability of finance and policy level incentives to promote entrepreneurship. These attributes are best reflected through the contract farming model where mechanization is viewed as part of a package of commercial services whilst providing farmers with an assured market outlet for sales of raw materials.

A contrasting situation can be found in the more remote areas where markets are weak (such as Ethiopia, parts of Tanzania). These locations are often characterized by more vulnerable smallholders with a lower value cropping systems that comprise staples. This is particularly relevant for potential clients neglected because of gender, ethnicity and other social barriers. Where smallholders (male and female) cannot afford to purchase the machinery directly owing to lack of access to finance, group ownership of mechanization technologies are more likely to be found. The organization of these farmers into groups, associations, clusters or networks provide opportunities for sharing the costs of the capital equipment, generating economies of scale and reducing transaction costs. When they adopt gender-sensitive practices, collective action can also increase women's empowerment, voice and representation in decision-making whilst enhancing access to markets and services. However, the performance of these groups will depend very likely on internal management arrangements and the management incentive system. Collective ownership and management of common assets is generally seen to be ineffective unless management systems are followed that encourage private sector involvement in the custom hiring.

Enabling environmental factors that impact on the development of the market for 2WTs and their accessories are illustrated in figure 1. The figure suggests that Ethiopia is located at the low market development part of the continuum owing to the low demand for 2WTs and accessories, weak private sector involvement, weak infrastructure and market access, low level of entrepreneurship capacity, limited access to finance for mechanization and intrusive public sector interference. Given these conditions the farmer group, cooperative and service provider group business models are more commonly found in the field, although scattered with some individual service providers.

In contrast, Zimbabwe and Kenya represent cases where the enabling environment for private sector entrepreneurship is strong although in both situations the demand for 2WT mechanization and accompanying operations is nascent. A distinction, however can be drawn. Kenya possesses good road infrastructure, strong market access, and a favourable financial environment albeit with a need for new products to support mechanization. Whilst, this largely conducive environment exists there is still limited awareness and demand for 2WTs although the long term trend of land fragmentation may suggest a potential for uptake. The business models found in Kenya are most commonly individual service providers part time service providers and entrepreneurs as well as the corporate model of the multi-purpose hub that has been designed to provide both goods (spare parts, equipment) and services (hiring services, extension and training). The Zimbabwe context is similar as far as the potential for entrepreneurship and the available infrastructure, but currently there is

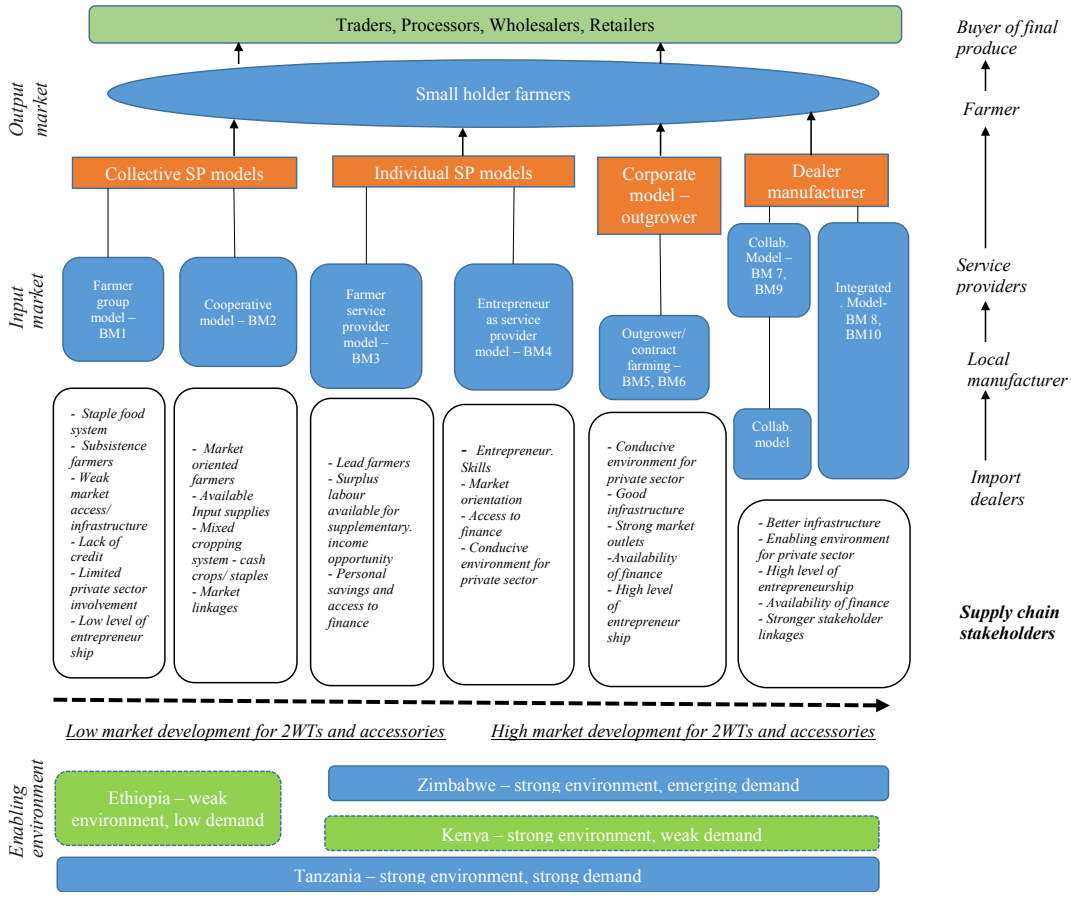

Figure 1: Business model analysis for the four FACASI participating countries

much greater awareness and demand for 2WT based mechanization. This is reflected in the predominance of contract farming opportunities and dealer/ manufacturer led collaborative models linking up to individual service providers in the project areas.

Tanzania represents a country case that transcends a wide range of business models and this can be explained by regional and district differentiations in terms of market access, road infrastructure and entrepreneurship culture. In this situation a range of business models can be found with collective action located in areas where smallholders may be more vulnerable to situations where the supply chain is more developed and private sector importers, dealers and manufacturers are more actively engaged. The main reason for this dynamic towards high market development, is that awareness of the potential for 2WTs exists largely as a result of government efforts over the last decade or two with over 6000 units (2014) operating in the country. However, the challenge is to enhance the demand for direct seeding equipment (as 2WT are only powerful enough to plough the lightest soils) and threshing/ shelling equipment.

Lessons learnt

- The findings from the case study analysis to date show under what conditions and in what contexts a particular model is likely to be found, depending on the location, the farming system, access to markets and infrastructure and an enabling environment conducive to private sector development.

- In short, business models need to recognize the local context and develop in a way that is compatible with the background characteristics.

- There appear to be no clear prescription as to what model works best as the performance of the models depends on operational and management skills, entrepreneurial commitment and the management procedures introduced. Each model has the potential to be effective if the owners and managers are flexible and able to respond through management adaptations to the challenges they face.

- Intermediaries as brokers and facilitators are crucial in facilitating supply chain linkages between the different business models. This is particularly prevalent amongst vulnerable farmers situated in localities with weak market access.

- There are some generalised findings that apply to all models which need to be recognized.

1) The purchase of 2WTs was found to be unprofitable particularly for smallholder farmers and rural entrepreneurs located in maize based farming systems owing to the heavy capital investments involved. Hiring services for farmers both individually or in groups is a more feasible option. Custom hire services transform machine work into divisible inputs which small-scale farmers can find affordable.

2) Service providers, who provide a bundle of technologies for multifunctional farm use and improved economic utilization are more likely to increase their profitability. This was seen to allow expensive equipment to be in productive use for a greater part of the year, reducing the unit cost of custom work.

3) Business models for mechanization need to be broadened to consider the need for closer integration between input and output markets. The link between the two markets is critical to generate the revenue flow required to afford either buying or renting farm machinery.

4) Gender neutral practices and approaches in developing business models do not necessarily lead to gender equitable results. Investment schemes and policy frameworks need to recognize and address the potential for women to be engaged in business as service providers or other types of rural enterprises. More attention needs to be given to the role of women and opportunities at upstream levels of the value chain beyond the farm family household. A gender sensitive policy environment to support entrepreneurship among women and youth is essential for achieving gender equitable outcomes.

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