



Business Case: Farm Mechanisation Service Provision (land preparation and harvesting)



Description of Business Model

The business model is developed for a potato producing/onion lead farmer who has a tractor and mechanization equipment required for the primary production. He will provide small scale and emerging farmers with approximately 200ha of mechanization services for land preparation and harvesting per year.



Typical Entrepreneur

Existing emerging farmers or farmer cooperatives looking to make the progression to mechanized farming.

This opportunity is particularly relevant for the youth, who would have a good fit with the technical skills and potentially interest in delivering a new service.

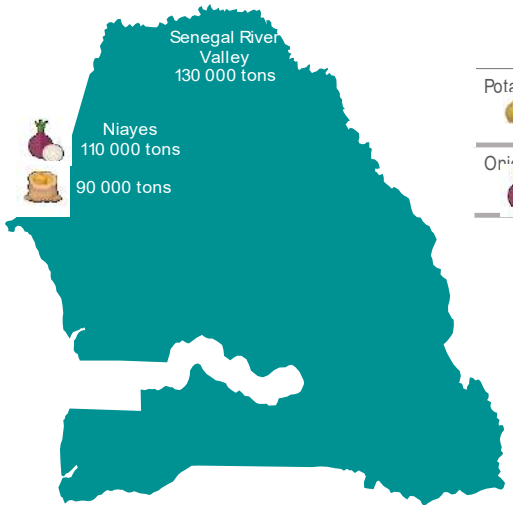




The Opportunity

Market

- There's a growing demand for high quality potatoes and onions on the local market. To accommodate this demand production has been expanding. In the case of potatoes this is largely in the Niayes.
- Regional opportunities also exist to export onions and potatoes, but these are dependant on an improvement in the quality of local onions.
- Typically, land preparation and harvesting is carried out manually, which raises a few important challenges:
 1. Competition for labour at harvest time is increasing in this region- increasing costs and availability of labour.
 2. Land under cultivation can be expanded with mechanisation.
 3. Losses of onions and potatoes begins at harvest time. Itinerant labour rush to harvest, using sub-optimal harvest techniques and often leaving onions and potatoes in the soil.
- Emerging farmers typically loan equipment from established integrated producers. Some mechanisation services do exist, but these are relatively few.



Product or Service

The business model includes the three following services:

1. Land Preparation (Ploughing/Rotavator)
2. Planting
3. Harvesting

The demand for the mechanizations service for the harvesting is highest. As a result the going market price for the harvest is approximately 60% higher than that for land preparation and planting.

The market price breakdown for the mechanization services is following:

- 1ha land preparation-40,000 FCFA
- 1ha planting- 50,000 FCFA
- 1ha harvesting-140 000-200,000 FCFA
- The current model assumes a price of 140 000 FCFA per ha

Rationale for investment

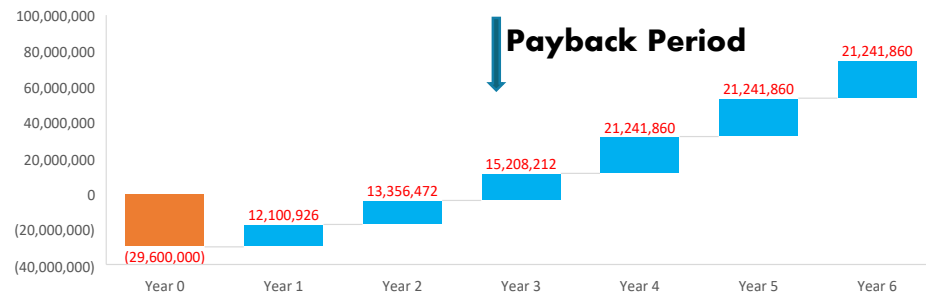
- Intense competition for the labour during the harvest time rising **costs of labour** mean that mechanisation has a benefit for lead farmers themselves.
- High quality mechanization services can **increase productivity** and as a result improve the financial sustainability of lead farmer farms.
- By offering mechanisation services, the lead farmer is able to keep mechanisation cost low for their own land.
- As a service provider they have an income stream throughout the season lowering demand for **working capital**.

Production Costs & Gross Margins

Senegal: Mechanization Service Profit and Loss (FCFA)						
Scenario 1	2020	2021	2022	2023	2024	2025
Total revenues	28,800,000	28,800,000	30,900,000	38,250,000	38,250,000	38,250,000
Total variable costs	8,548,112	8,548,112	9,206,288	10,522,640	10,522,640	10,522,640
Gross margin	20,251,888	20,251,888	21,693,712	27,727,360	27,727,360	27,727,360
Gross margin%	70%	70%	70%	72%	72%	72%
Total fixed costs	8,150,962	6,895,416	6,485,500	6,485,500	6,485,500	6,485,500
Net income	12,100,926	13,356,472	15,208,212	21,241,860	21,241,860	21,241,860
Net Income %	42%	46%	49%	56%	56%	56%
Cumulative net income	12,100,926	25,457,398	40,665,610	61,907,470	83,149,331	104,391,191

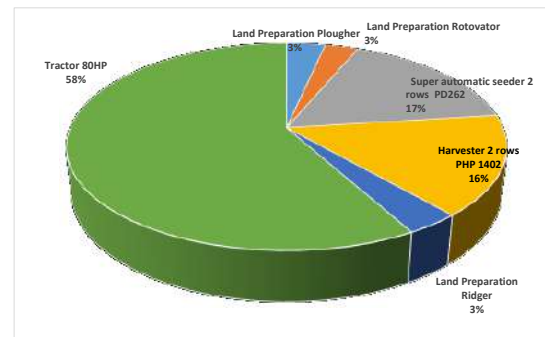
Note1: the fixed cost is much higher in year 1 and 2 due to the investment loan repayment (20 mln FCFA) over 20th months.

Senegal: Mechanization Service Payback Period (FCFA)							
Period	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Cash Flows	(29,600,000)	12,100,926	13,356,472	15,208,212	21,241,860	21,241,860	21,241,860



Note 2: The investment payback calculation includes the total capital investment and as well as the cost of investment credit repayment.

Mechanisation Service CAPEX Breakdown



Investment Required

The project requires an investment of FCFA 27,566,000 in assets for the following:

- Land preparation plougher.
- Land preparation rotovator.
- Land preparation ridger
- Super automatic seeder 2 rows, PD262.
- Harvester 2 rows, PHP 1402
- Tractor 80HP

An important investment that needs to be made at sector level is the improvement of mechanization equipment and supplies maintenance service and as well as practical short-term training programs for mechanization service providers and farmers.

Return on Investment

- Annual turnover estimated at FCFA 28,800,000 for year 1 & FCFA 38,250,000 at full capacity in year 4.
- Net income before taxes is approximately FCFA 12,100,926 in year 1 and FCFA 21,241,860 in year 4.
- The investment payback period is 26 months and includes:
 - Capital investment cost: FCFA 27,566,000
 - Cost of credit (annual interest rate 15%): FCFA 2,000,000
- A Capital investment loan of FCFA 20,000,000 is required for 20 months.
- The annual break-even point is approximately 200ha of mechanization service. This assumes a blend of the land preparation, planting and harvesting services.



Key Assumptions

Service Calendar

The mechanization service is required at 2 critical periods in the year, but the specific months differ slightly depending on the location of the service provider.

Senegal River Valley:

- The September to November land preparation and planting season for onions
- The February harvest

The Niayes

- The September to October land preparation and planting season for onions and potatoes in the Niayes
- The harvest of onions and potatoes from February and March
- The late season planting for potatoes and especially onions from March
- The Late season harvest in May

Area of the service

- Total land size served is 100 ha in year1 and 2, and next three years the land size is 200ha
- The average size of the serviced plot is assumed be 1-3 ha
- The average number of clients is 100 farmers
- The lead farmer services an area that allows for 10-20 minutes of travel between plots.

The geographic location: Niayes area, a coastal stretch from Dakar to St. Louis that offers favorable weather conditions and along the Senegal River delta

Staffing

- The model assumes that the service provider is heavily involved in service provision and is the primary deliverer of the service
- They have 1 assistant who is responsible for marketing and sales, proactive assessment of the land to ensure that the land is suitable for a tractor and that there are clients clustered tightly together to minimize travel times. This planning and logistics role is critical.

Mechanisation Equipment :

- The mechanization equipment specific in the model allows for a quality services with measurable returns for clients. A plough, harrow and ridger are all allowed for in the mechanization equipment. This is flexible enough to allow for the preferred current distances between the rows. The tractor has sufficient power to allow for ploughing of heavier soils in the Senegal River Valley.

Specified Mechanisation Equipment





1

Efficient Logistics and operations planning

The location of the farms requiring land preparation and harvesting is a critical issue in this model. If the distance between plots is high, then the service provider spends an unsupportable amount of time travelling when compared to the direction of the service.

When the farms are tightly clustered, the service provider is able to service at least 5-6 ha per on 2-3 farms. Ideally distances should be >30km.

Logistics planning is thus a critical activity. The better the firm is at marketing in a defined area & then planning services so that travel is minimized, the more profitable the service. Having a dedicated sales-person who can market the services, assess the farms in advance and then plan an uninterrupted schedule with short travelling distances is thus essential.



2

Proactive Maintenance

Access to high quality, affordable maintenance equipment is very important to ensure that the mechanization service provider (farmer in our model) does not have gaps during the seasonal period.

This requires proactive planning around maintenance so that the farmer is ready for the opening of the short growing season. To ensure a smooth maintenance period the farmer should be able to access the relevant supplies, equipment and replacement parts. There are New Holland dealers in Dakar and Saint Louis.



3

Quality Services- Equipment & Skills

A skilled service provider is an important component to minimizing damage to the equipment and being able to carry out minor repairs. Access to training is thus essential.

This should include both theoretical and practical courses. Usually, these types of courses are 2-3 weeks duration with the practical sessions in the field and conducted by the importers or local experts.

Development of the mechanization maintenance practical manuals for farmers and as well as for the service providers.



4

Access to insurance & finance

Insurance systems is one of the main preconditions for the technical and as well as for the financial sustainability.

Particularly important is to develop the insurance product for the supply/input materials. This can be also linked with the warranty terms that official importer will provide for the specific supply/input materials.

Working capital credit product development.



Risk Analysis

Government & development sector crowding out

Expansion of government and NGO services tend to crowd out independent private service providers.

Skills development and land assessment

Practical skills development is a great challenge in Senegal. Interested investors will need to develop their skills in this area. Typically, these skills are not a part of the training packages of the mechanization equipment suppliers.

Unanticipated Equipment Damages

The basis of the model is that the farmers extends services to land they are not familiar with. This model thus opens up risk to damages to equipment from poorly assessed lands. It's essential that the planning and logistics manager is proficient at spotting dangers to equipment.

Cash Collection

Collecting cash will be an important part of the business operation. Pre-financing is typically done using own finance, loans from networks and traders and in a few cases from MFI's. Cash collection does however remain a risk and will need to be handled well.

Travel times

Servicing plots with high spacing between them will place great pressure on the financial sustainability of the model.

Risks & Risk Management



Risk Mitigation

Dedicated Planner & Sales Assistant

A skilled planner with good sales skills and an ability to plan a dense, sensible schedule is a must.

Marketing through Collaborations

Developing relationships with local professional associations might be helpful in planning of services. For example, the Association for market gardeners in the Niayes (AUMN) is a major distributor of potato seed. Working with them would allow mechanization services providers to have forewarning of farmers who are ready to plant. It's also possible to offer the service as a part of seed purchases.

Insurance, warranties & respected dealers

Sourcing equipment from respected dealers who offer after sales services is an important measure to keeping equipment well maintained. It also ensures that the farmer is not required to navigate import duty regimes to access exemptions from duties, customs clearance etc. To ensure that the equipment is well covered for repairs, equipment and spares. Finally, accessing suitable insurance products is helpful to protecting the service provider somewhat. But it does require a skilled planner to first minimize the risk of damages.

Cash on or pre- delivery

Unless off takers become a part of the equation, service providers should insist on cash on or pre-delivery.



Economic & Social Impact

- Mechanisation presents an opportunity to increase yields by minimizing the volumes of onions and potatoes left in the ground at harvest.
- Good land preparation also has benefits for yields. This has a positive impact on the livelihood of these producers.



Environment Sustainability

- There are high levels of waste in the potato and onion chain. Mechanised harvesting allows for a reduction in this waste and ensures that maximum value is returned for investments in inputs. Many of these are imported e.g. fertilizer and pesticides and potato seed.



Women & Youth

- Mechanisation services are typically better geared to youth who have interest in developing the skills needed.
- By offering mechanisation services women are better able to farm the parcels of land they are able to access- sometimes with great difficulty. It also allows higher returns on their investments, which has a positive impact on their communities and families.



Knowledge Transfers

The Netherlands holds deep knowledge in the techniques and agricultural practices required to maximise yields and quality for potatoes and onion in general.

There are some general knowledge transfers possible as a part of a larger onion and potato extension services & seed distributions project. However, the mechanisation equipment is not suitable to the Senegalese local context. Adaptations will be required.



Commercial Trade

While the Netherlands has vast and specialised equipment for services further down the value chain, there are no discernible potential for trade in the equipment needed for land preparation, planting and harvesting.



Technology

While the Netherlands are major suppliers of onions, potato seed etc. the technology required for mechanisation services to small scale producers is not appropriate.

The equipment available in Senegal is suitable to the conditions. However, there is some work required to improve the service and repairs.



State Institutions, Universities

Extension Services

ANCAR is responsible for coordinating extension services. They work through agencies that focus on specific tasks in the various regions.

Mango development has not been tackled by ANCAR to a great extent. Nevertheless they could be useful allies in setting up the system and integrating knowledge into existing programs.

SAED

Along the Senegal River Valley SAED, the Senegal River Development Authority is heavily involved in organising farmers and supporting their projects that involve irrigation. This includes technical support. Working with SAED would be a sensible move as they are very aware of the local farmers, new areas for expansion, the topography etc.



Private Sector

Mechanisation Equipment Dealers

Expansion of irrigation services has come about largely due to the financing offered by equipment suppliers. This is a useful model for mechanisation service provision. In this model suppliers would provide financing at 0% interest rates to MFI's. They would then provide finance to these lead farmers and investors in this equipment.

Industrial Producers

Industrial producers have expressed an interest in expanding their services to emerging farmers. The current model would involve using their existing equipment. However, this has a poor fit with small scale producers. Nevertheless, there are opportunities for these firms to support emerging farmers – as technical support, co-financiers etc. This would represent a significant investment in building stronger ties with the local business community. In the case of potatoes this would have a meaningful impact on the quality of potatoes that a firm, such as Senegindia, could source from small scale producers.

Banque Agricole (CNAAS), Banks & MFI's

Insurance is an important requirement to reduce risk for these investors. It will thus be important to stimulate the development of specific insurance for mechanisation services & then to ensure that these are a key part of loans offered to investors via MFI's and formal banks.



Professional Associations

IPOS

This is the overarching association for the onion chain. They are increasingly active and are supported by the Dutch organisation PUM. They could be a helpful partner to identifying opportunities for mechanisation investors, locations, potential partners and coordinating efforts with equipment dealers.

AUMN

This is the leading market gardener association in the Niayes. They are local distributors of potato seed. As a result investing in mechanisation, or working with farmers to expand into mechanisation seems to be a logical next step to getting the best returns from the potato seed they retail.

Onion Local Associations

Additional active local associations to consider are:

- GPAR (Union des Groupements et Agriculteurs de Rao).
- UFMT (Union Forestière et Maraîcher de Thieppe).
- APOQ (Association des Producteurs d'Oignons de Qualités de Potou).
- UGPM (Union des Groupements des Producteurs de Mboro).

Potato Local Associations

- Book Ligueye Notto Gouye in Diamma; APMK Association des Producteurs Maraîchers de Kayar; GIE des Producteurs Maraîchers de Kayar; Association des Producteurs Maraîchers de Fass Boye.



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