



MDF Case Study No. 4

SYSTEMIC CHANGE IN THE FODDER MARKET FOR SMALLHOLDER FARMERS IN PAKISTAN

A case study on triggering lasting systemic change in silage

The Australian Government-supported Market Development Facility in Pakistan

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Abbreviations and Acronyms

AK	Azad Kashmir Province
BOP	Bottom of the Pyramid
DFAT	Department for Foreign Affairs and Trade (Australian Government)
DRDF	Dairy and Rural Development Foundation
FDP	Farm Dynamics Pakistan Pty Limited
FDI	Foreign Direct Employment
FTE	Full Time Equivalent
GDP	Gross Domestic Product
KPK	Khyber Pakhtunkhwa Province
LUMS	Lahore University of Management Sciences
MDF	Market Development Facility
MOU	Memorandum of Understanding
PLDDB	Punjab Livestock & Dairy Development Board
PDDC	Pakistan Dairy Development Company
PKR	Pakistan Rupee
SE	Silage Entrepreneurs
SME	Small, Medium Enterprises
USAID	United States Agency for International Development
WEE	Women's Economic Empowerment

The fast read...



- 1 The Market Development Facility (MDF) in Pakistan is a flagship programme of the Australian government which aims to stimulate growth in sectors that have long-term, pro-poor growth potential:** MDF's interventions create pathways for pro-poor growth via investments, business innovations and regulatory reforms, resulting in better functioning markets. These pathways act as a mechanism to stimulate the market to operate in a faster, more inclusive manner, creating permanent change.
- 2 Pakistan is a large and well-established two-tier economy, but faces many challenges in addressing rural and inclusive growth:** Despite modest economic growth, poverty is prevalent in 45% of the population, reaching up to 90% in remote rural areas. Large tier 1 companies are well connected to innovation, investment and export markets, yet they lack penetration in rural and remote areas. Their customer bases are large corporate companies providing no incentive for them to deliver innovative products and services to small rural businesses. Conversely, the informal SMEs (tier 2), servicing large swathes of the rural economy, are disconnected from innovation, expertise and investment. As a result MDF typically needs to introduce agricultural innovation to smaller new companies, working with partners that sit between the two current extremes of tier 1 and 2 businesses, building up scale over time.
- 3 Livestock can play an integral part in reducing poverty and promoting inclusive growth:** Pakistan has the fifth largest livestock population in the world, 80% of which are owned by small farmers (landless and small landholders). Over six million households have some livelihood dependency on livestock for milk or meat.
- 4 Numerous constraints prevent increases in livestock productivity:** Despite its significant livestock population, the dairy and meat sector in Pakistan does not come close to achieving its potential. Small livestock farmers are disconnected from formal dairy and meat markets, as well as from the supply of agricultural products and services. Poor animal nutrition is the key constraint to livestock productivity, and fueling this is a 70% gap between livestock needs for nutritious fodder and the supply of nutritious fodder (i.e. based on livestock needs in Pakistan, nutritious fodder supply needs to almost double¹).
- 5 Silage provides a sustainable and affordable nutritional solution, rapidly increasing livestock productivity:** Silage is a highly nutritious and cost-effective fermented fodder made from maize (corn). Compared to fodders currently available in Pakistan, silage offers far superior nutrition, significantly enhancing livestock milk yields and improving overall animal health.

¹ Assessment conducted by Pioneer, Pakistan.



- 6 For over a decade previous interventions have failed to increase the uptake of silage:** Since 2006 the private sector, donor funded programmes and government departments have promoted the benefits of silage to corporate, commercial and small farmers. Whilst these combined efforts created nascent levels of awareness amongst small farmers, this did not translate into a significant level of silage uptake. The price and sheer size of large bales proved prohibitive for small farmers, as well as there being insufficient understanding of the nutritional benefits of silage.
- 7 MDF develops an innovative business model for silage:** MDF's extensive research of the dairy and meat sector identified an opportunity to develop an innovative business model for silage that provides small farmers with the right incentives. A key component of this was the development of a model for the production and distribution of a 60kg silage bale: for the first time, silage became available in the right size, at the right price and with the right distribution model.
- 8 MDF partner with Pioneer to roll out the innovative business model:** Pioneer is a world leading agri-business company. Using their extensive farmer network Pioneer helped identify fifteen silage entrepreneurs and provided them with technical support, whilst MDF provided the financial assistance. Potential entrepreneurs were identified as medium size farmers who had previous experience in making silage, and who were able to sell 60kg bales to small farmers.
- 9 MDF supports the first batch of small bale silage entrepreneurs:** Initial interest from farmer gatherings and other awareness raising activities was very positive. Uptake was rapid and demand significantly outstripped supply. Within 12 months the business model proved profitable, with the first silage entrepreneurs beginning to receive a return on their investment.
- 10 The business model evolves to meet the changing behaviour and needs of small farmers:** As the uptake of 60kg baled silage amongst small farmers increased, silage entrepreneurs began to independently adapt and improve the initial business model. After positive trials of the 60kg bale, landless farmers continued purchasing, whilst small landholders, stopped purchasing and started making silage on their own. This created a business opportunity for silage entrepreneurs to extend the business model to include machinery rental and contract farming.
- 11 MDF partners with other businesses to accelerate the momentum gained:** A key component of MDF's market system development approach is identifying trigger points for leveraging the initial momentum gained in pilot business models. Through the initial partnerships with Pioneer and silage entrepreneurs, MDF was able to learn more about the bottlenecks to inclusive growth. In order to accelerate systemic change, MDF developed a range of 'second layer' partnerships, broadening and deepening their engagement, ensuring a balance between tier 1 and tier 2 businesses.



12 The scale and breadth of benefits from small-baled silage exceed expectations: Since 2014 the results have been outstanding with benefits reaching small livestock farmers, landless women farmers, MDF's silage entrepreneurs and partners, and a wide range of other actors in the market.

- Milk yields have approximately doubled, increasing by three to six litres per day per animal²;
- To date, from just four MDF supported silage entrepreneurs in southern Punjab and northern Sindh, more than 750 small farmers have directly benefited from increased incomes, a result of improved livestock productivity.³ Beyond these four silage entrepreneurs (i.e. a further seven MDF-funded silage entrepreneurs and other silage entrepreneurs who have recently entered the market autonomously) it is estimated that more than 11,000 farmers have already benefited from the 60kg bale. Over the next two years the number of silage entrepreneurs will more than triple having a significant and scaleable impact on tens of thousands more farmers.
- Women have been freed from manual labour for an average 14 hours a week;
- 11 MDF supported silage entrepreneurs have entered the market and more than 37,000⁴ 60kg silage bales have been sold and;
- More than 60 jobs have been created for the rural poor with MDF silage entrepreneurs.

13 Significant systemic change achieved in a large and well-established economy: The business model is proving commercially viable, and silage entrepreneurs are taking autonomous decisions to expand or improve their businesses. Crowding in of 40 new silage entrepreneurs has occurred, and more than 10 other businesses have stepped into the market, providing supporting products and services for the model. Big companies like Engro have also ventured into the small bale silage model, after learning about the demand-supply gap in availability of nutritive fodder for farmers and the efficacy of the model from MDF's silage entrepreneurs. After just two years, there is evidence the market is showing intermediate to advanced signs of systemic change.

² Milk yields vary based on the breed and age of milking cow and the amount of silage fed

³ Results as at February 2017 based on MDF team field assessment

⁴ This doesn't include silage produced by autonomous crowding in of other entrepreneurs

Why this case study matters for pro-poor economic development practitioners in large and well-established economies



“When the poor at the BOP are treated as consumers, they can reap the benefits of respect, choice, and self-esteem, and have an opportunity to climb out of the poverty trap.”

C.K. Prahalad, *The Fortune at the Bottom of the Pyramid (BOP): Eradicating Poverty Through Profits*

This case study showcases MDF’s journey in piloting, and taking to scale, innovative business models in silage production and distribution, which are greatly increasing milk yields, and significantly impacting the livelihoods, of poor farmers in Pakistan.

The uptake of this innovative business model is happening at such a pace that systemic changes in the silage market are being seen just two years after its initial pilot.

The case study is being shared in the hope that this pro-poor inclusive growth business model will be replicated for other agricultural products, not just in Pakistan but in other parts of the world as well.

The case study can be used by development practitioners, entrepreneurs and academics interested in understanding a new model for successfully stimulating business innovation that leads to broad-based inclusive growth for both men and women at the Bottom of the Pyramid (BOP). It will be of particular use to donors and implementers (contractors, consultants, foundations, funds etc.) of market development programmes in developing countries.

This case study aims to provide the key insights, lessons learned and guidelines on what it takes to trigger lasting systemic change in large and well-established economies.



The Market Development Facility (MDF) is a multi-country private sector development programme funded by the Australian Government, currently operating in Fiji, Timor-Leste, Pakistan, Sri Lanka and Papua New Guinea.

The private sector is the engine of economic growth. MDF supports businesses with innovative ideas and investment that will increase business performance, stimulate economic growth and ultimately provide benefits for the poor.

MDF’s goal is to create additional employment and income for poor women and men in rural and urban areas through sustainable and broad-based pro-poor growth.

In Pakistan, MDF is working in three sectors: Dairy and Meat, Leather and Horticulture. It aims to create 7,800 additional Full Time Equivalent (FTE) jobs and increase incomes for 168,000 men and women households, potentially reaching 571,000 household members over a four-year period (2013 – 2017).

MDF contributes to the goals of the Pakistan and Australian Governments

A key priority of [The Government of Pakistan’s Vision 2025](#) includes achieving sustained growth in agriculture through various interventions in production, pre and post harvesting. Private sector and entrepreneurial-led growth, gender empowerment, investment, innovation, and capacity building through training and skills development are emphasised in Vision 2025. MDF’s sectors and focus in Pakistan are aligned with Vision 2025.

[The Australian aid strategy](#) also aligns with this objective. Private sector development is a central development goal. All aid programmes are required to consider private sector solutions as a first resort to addressing development problems.

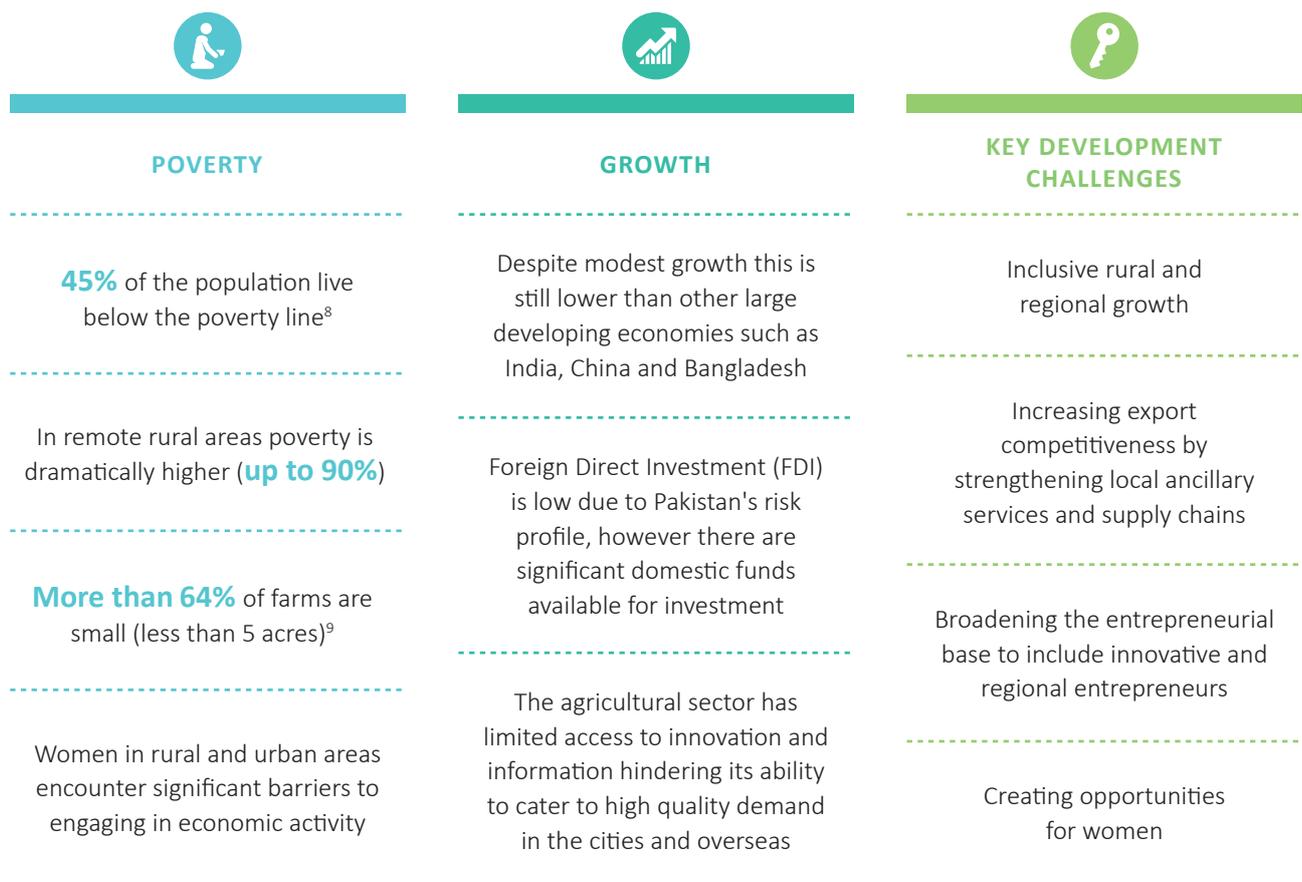
A quick look at Pakistan and its economy

Pakistan has a population of almost 200 million of which two thirds live in rural areas and 63% are under the age of 25.⁵ It is the world's 24th largest economy in terms of purchasing power and 43rd in terms of GDP.⁶ It is a lower middle-income country with GDP per capita of US\$ 1,275.30.⁷ Pakistan has a two-tier economy that is growing modestly compared to its larger regional neighbours e.g. India, China and Bangladesh. In the first tier sit large, listed private companies that are well integrated and participate in both domestic and export markets. The second tier, the large traditional economy, is populated by a vast number of SMEs serving the domestic market. While the large companies are well

connected to innovation, investment and export markets, they lack penetration in rural and remote areas. Their customer bases are large corporate companies providing no incentive for them to deliver innovative products and services to small rural businesses. Conversely, the informal SMEs (tier 2), servicing large swathes of the country outside the major urban centres, are disconnected from innovation, expertise and investment.

Herein lies a significant opportunity to grow the economy in an inclusive manner.

Figure 1: Poverty, growth and challenges for Pakistan



⁵ Friedrich Ebert Stiftung, Pakistan 2016

⁶ The World Bank, 2015

⁷ Ibid

⁸ Oxford Multidimensional Measure, UNDP

⁹ Agri Census 2010, Pakistan

Livestock's role in poverty reduction in Pakistan

“Livestock contribute to three major pathways out of poverty by: increasing resilience; improving smallholder and pastoral productivity; and increasing market participation.”

International Livestock Research Institute, 2007

Pakistan has the fifth largest livestock population in the world. Livestock products, including meat and dairy, account for 12.0% of national GDP and 55.4% of the total value of agriculture. Livestock are a vitally important component of rural activity, invariably a part of a mixed farming portfolio that minimises risk of crop failure

or market fluctuations. They provide regular income from milk and contribute to the financial security of farmers as they can be sold for meat in times of financial hardship. Small subsistence farmers hold 97% of the livestock. Between 40-55 million people (over six million households) have some dependency on livestock.

Table 1: Key facts about the dairy and meat sector

 Dairy Sector	 Meat Sector
<ul style="list-style-type: none"> • Farmers primarily keep cattle and buffaloes for dairy production. • Pakistan's milk production equates to approximately 40 billion litres per annum. • Less than 5% passes through formal sales channels. • 95% of milk is either kept by small farmers for domestic consumption or sold through informal channels to neighbours, relatives or middlemen (dhodi's). • Pakistan has a three billion litre milk demand-supply gap which is increasing with the population and as socio-economic conditions improve. • Milk processors prefer to source local fresh milk but also reformulate imported milk powder to fill the supply gap. • The dairy processing sector is seeing increased involvement from formal companies e.g. Nestle, Engro (recently acquired by FrieslandCampina from Holland), Shakaganj, Gourmet, Adams, Fauji etc. 	<ul style="list-style-type: none"> • Meat production in Pakistan (excluding poultry) equates to 2.5 million tonnes but less than 2.5% of annual production is exported. • Meat trade is predominantly a by-product of the dairy sector i.e. male animals and culled dairy cows, but it does also include goats and sheep. • 95% of meat processing and retailing is dominated by butchers and roadside vendors using ancient practices. • The sector however is seeing increasing involvement from formal meat processors and meat exporters. Currently 24 formal companies. • Formal meat processors are seeking to expand product ranges and quality. • Recent trend towards commercial feedlots.

Figure 2: Snapshot livestock farmer types and their characteristics – Pakistan

Livestock Farmer Type	% Total Farms ¹⁰	Herd size	Herd usage	Land size	Land usage
 Corporate Farms (owned by large formal companies)	1%	>500 0.2% of total livestock population	Fresh milk supply to domestic market Feedlots for beef export	>50 acres	Cash crops and fodder crops
 Commercial	3%	>25 3% of total livestock population	Fresh milk supply to domestic market Feedlots for beef export	25 to 50 acres	Cash crops and fodder crops
 Medium	32%	>5	Milk production for own consumption and balance sold to domestic market Beef for domestic and feedlot markets	5 to 25 acres	Cash crops and fodder crops
 Small and Landless	64%	Small: <5 Landless: 1 to 3 Both hold 97% of livestock population	Milk production for own consumption and balance sold to local informal market Sale of livestock to meat market for income in times of need	<5 acres	Small: Cash crops and fodder crops Landless: Are forced to search for green fodder from other people's land e.g. they are often allowed to cut green fodder from the lands of farmers where they are labourers on or alternatively they have to travel 2km to 4km seeking fodder from public land

Source: Agri Census, Pakistan 2010; MDF Sector Assessment Report for Dairy-Meat and Leather, 2015; MDF Pakistan Country Strategy; MDF staff field assessments and key informant interviews, February 2017.

¹⁰ Agri Census, Pakistan 2010

Understanding the constraints to increasing livestock productivity



Despite having a significant livestock population, the dairy and meat sector in Pakistan does not go near to achieving its potential. Only by understanding what prevents poor small farmers from increasing livestock productivity can MDF develop potential solutions.

MDF's sector assessment identified poor animal nutrition as the key constraint to livestock productivity. There are several factors preventing animal nutrition from being maximised with small farmers.

Limited availability of nutritious fodder: Availability of quality fodder is a serious concern in Pakistan. Fodder is seasonal and is only available for four to six months of the year and supply is 70% less than demand. Farmers often use expensive fodder alternatives that are low in nutrition, resulting in low milk yields and undernourished animals.

This problem becomes more severe in winter when green fodder is not available. In some areas of Pakistan green fodder is scarce all year due to poor terrain and climatic conditions, leaving farmers to rely on wheat straw, cotton seed cake and left over pieces of dry bread. The latter is often infected with fungus damaging animal health.

Poor access to formal markets reduces the incentive to invest: In areas where milk collection centres and milk processors are absent, most small farmers do not have access to formal markets. Isolation means poor farming households lack the understanding of the required quality of milk or meat. As a result they earn less and have less incentive to invest in animal nutrition products that can improve the productivity of their livestock.



Limited access to animal nutrition products: Availability of quality animal nutrition products is a serious concern for almost all livestock farmers. This is acute for small farmers that are distant from market towns - most inputs cannot be purchased in villages. Farmers are forced to rely on green fodder, which alone is not sufficiently nutritious. Most big input supply companies only target the large commercial dairy farmers, and they do not see sufficient profit in targeting the smallholder farmers.

Lack of information and knowledge of animal husbandry: Many farmers lack knowledge of the benefits of appropriate husbandry and nutritional inputs for livestock. They continue to use ancient practices depriving themselves of significant productivity gains and increased income. The government provides negligible extension services. Milk processors and input manufacturers' sales

teams tend to target larger farmers. These problems are exacerbated for female farmers who, due to cultural and societal norms, do not have direct access to extension services and are not able to purchase inputs from the town market themselves.

Limited access to finance: Farming households do not have access to formal financial services - only 2% of Pakistan's population has a formal bank account. Access is worse for rural populations and for women. Small farmers are heavily dependent on middlemen as a source of finance. The middleman is often also the provider of advice and inputs, but this does not necessarily lead to optimal outcomes for the farmer as the middleman's interest is principally in the trading margin and not the quality of produce. Often inputs provided through these channels are of poor quality.

Silage: a nutritional solution that rapidly increases livestock productivity

Silage is a highly nutritious and cost-effective fermented fodder made from maize (corn). Compared to current fodders available in Pakistan silage offers far superior nutrition, significantly enhancing livestock milk yields and improving overall animal health. Farmers can achieve two to three crops of silage maize per year, as the growing time is 75 to 90 days. Whilst silage maize is grown and harvested from February to October, once fermented (after 30 days) it can be stored for long periods of time, either in bunkers or in bales, making it available at any time of the year – particularly during fodder-less seasons.

Silage is not the only fodder that should be fed to livestock. To achieve its optimal results, silage should represent approximately 40% of an animal’s daily fodder intake (e.g. 40% silage, 50% green grass, 10% other food supplement).

Other nutritive crop-based fodders for livestock include Rhodes grass, Rye grass and Alfalfa; however, these fodders are in the early phases of being introduced and currently have low levels of awareness and trial.

Figure 3: The problems silage addresses

 PROBLEMS	 SOLUTIONS PROVIDED BY SILAGE
<p>Gap in supply of fodder (40% supply-demand gap)</p>	<p><input checked="" type="checkbox"/> Availability of silage leads to increase demand and uptake reducing gap in fodder supply</p>
<p>Fodder-less months (4 to 6 months per year)</p>	<p><input checked="" type="checkbox"/> Available all year round. Can be stored for long periods of time</p>
<p>Alternative fodders can be expensive</p>	<p><input checked="" type="checkbox"/> Cost effective to wheat straw, cotton seed, rice husk and other fodders currently available</p>
<p>Farmers use low nutrition alternatives in fodder-less months</p>	<p><input checked="" type="checkbox"/> Highly nutritious compared to wheat straw</p>
<p>Low milk yields</p>	<p><input checked="" type="checkbox"/> Consistent usage can increase milk yields by up to six litres per animal per day</p>
<p>Poor animal health</p>	<p><input checked="" type="checkbox"/> Can increase overall animal health improving livestock productivity</p>
<p>Low carcass weights</p>	<p><input checked="" type="checkbox"/> Improves animal health and ability to reach genetic growth potential</p>
<p>Traditional cash crops no longer providing good return (cotton, wheat and potato)</p>	<p><input checked="" type="checkbox"/> Silage can offer an additional 10% to 20% price premium on other cash crops</p>

Why a decade of interventions failed to increase the uptake of silage?



For over a decade the private sector (Nestle and Pioneer Seeds), donor funded programmes (USAID and DFAT) and government departments (PLDDB) have promoted the benefits of silage to corporate, commercial and some small farmers. These efforts have been concentrated in the Punjab with little to no outreach to other regions of Pakistan.

By 2014 these combined efforts in silage promotion had created nascent levels of awareness amongst small farmers, but this did not translate into a significant level of uptake of silage.

Several factors prevented small farmers from accessing silage – combined these removed almost all incentives for small farmers to start purchasing or producing silage.

Size: Silage was predominantly¹¹ being sold in large bale sizes e.g. 300kg and one tonne, which are impractical for small farmers to handle. These large bales require machinery (e.g. forklifts and trucks) to transport. Small farmers usually have a bicycle, or at best a motorbike, in

which to transport farm inputs and cannot afford to pay for additional transportation costs.

Additionally when a silage bale has been opened it needs to be used within three days before it is no longer fit, or effective, for the animal to consume. For small farmers with less than five animals large bales cannot be consumed within this time.¹²

Cost: Large bales are cost prohibitive for small farmers. They do not have the available money to pay for 300kg and one tonne bales. Additionally when trialing silage for the first time, there is a significant level of production and financial risk involved. Paying PKR 2,400 (A\$30) for a 300kg bale is well outside a small farmer's acceptable margins of risk.

Limited suppliers of animal nutrition products: By 2014 silage was available in just 3% of agricultural nutrition outlets, the majority in southern Punjab. Silage was sold only in markets close to formal milk processing centres such as those run by Nestle and Engro Foods.¹³

¹¹ Prior to 2014 it is estimated that there were only 11 silage entrepreneurs producing 60kg bales in Pakistan.

¹² Recommended quantity per animal per day is 15kg to 20kg

¹³ Engro Foods is one of Pakistan's largest and fastest growing food companies. For more information [click here](#)

Traditional mindset: Small farmers use traditional livestock practices and are extremely conservative. An awareness of silage and its benefits is not enough to change their practices. They usually need to see several other small farmers use a new product or service successfully before they will consider changing.

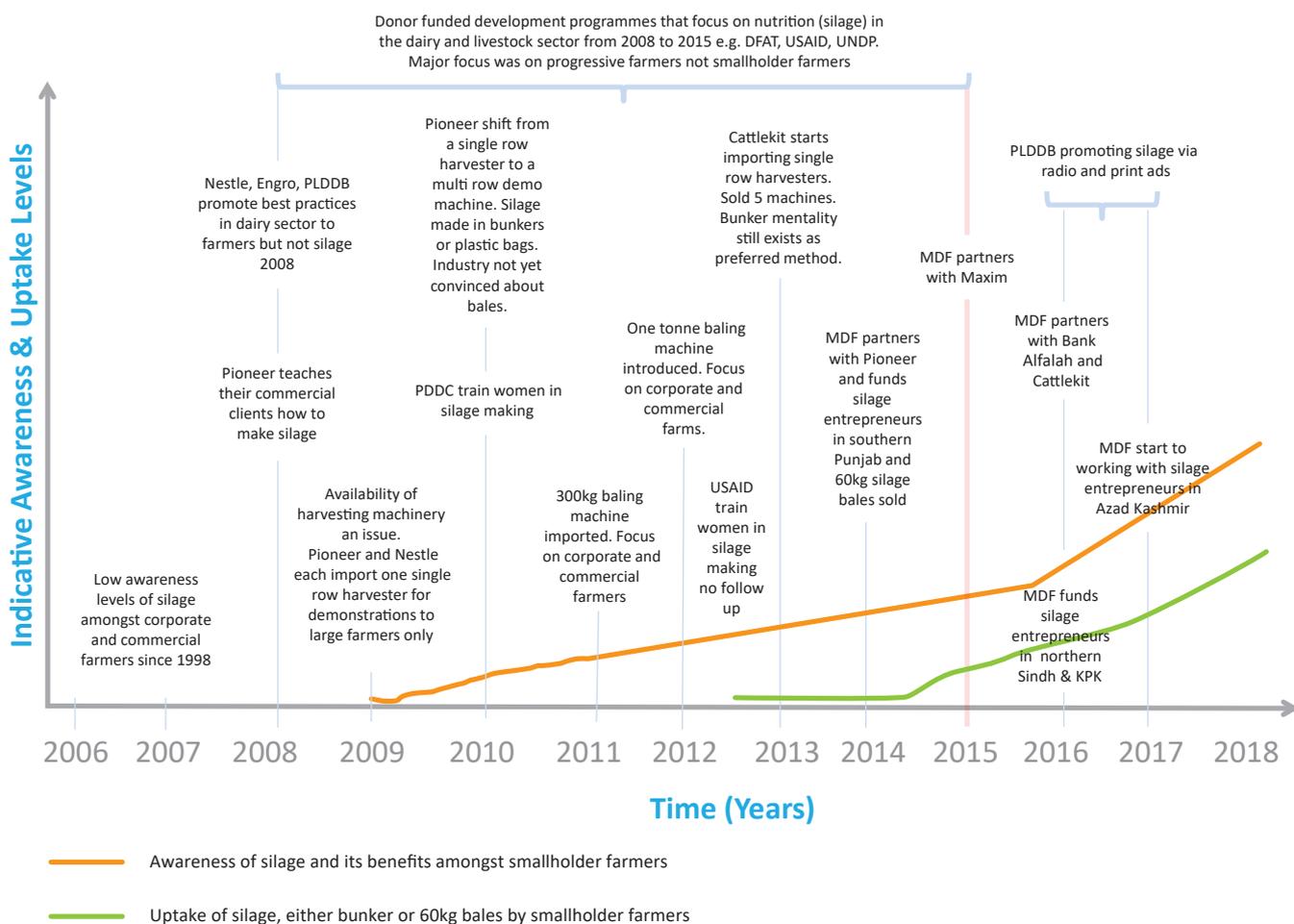
Exclusion of women: Accessibility issues are exaggerated for female farmers, as often culturally they cannot go to markets. This limits their access to animal nutritional inputs and information. This is a severe restraint as it is the women who overwhelmingly look after the animals.

In addition to factors directly preventing small farmers from accessing silage, there are several other barriers that impact its wider availability:

Limited number of silage machinery suppliers / importers: Most machinery for silage production is targeted at corporate and commercial farmers with large acreage and large bale sizes. There were no suppliers of silage machinery suitable for farmers with small land holdings.

Absence of financing options: In order to produce baled silage several machines are required e.g. chopper / harvester, tractor, trolley, baler and wrapper. Entrepreneurs need significant cash to invest and obtaining financing is difficult. In Pakistan many entrepreneurs refuse to take loans from financial institutions for religious reasons¹⁴ preferring to pay cash. For those prepared to take a bank loan there were no suitable financial products for machinery available.

Figure 4: A potted history of awareness raising activities in silage



¹⁴ The concept of interest is forbidden in Islam.

MDF develops an innovative business model for silage



After extensive research of the dairy and meat sector MDF identified that the existing incentives for small farmers to either purchase or produce silage by themselves were not significant for a change in behaviour. Raising awareness of silage and its benefits was simply not enough.

MDF's approach had to be different - fundamentally different.

The MDF team developed a new business model with significant incentives for small farmers to purchase silage and for medium farmers to commercially produce and sell silage.

THE INNOVATIVE BUSINESS MODEL

A silage bale that is offered at the right size, the right price and with the right distribution model.

-  **Size:** 60kg (practical for farmers with <5 animals)
-  **Price:** Approximately A\$6 to A\$7 per bale (cost comparative to wheat straw and within a small farmer's margins of risk)
-  **Distribution model:** Easily accessible to small farmers (especially women) i.e. available for sale within a 2km to 10km radius of their farm / home

MDF does not work directly with the poor, and nor does it invest to become an entrepreneur itself; these are unlikely to lead to lasting improvements in the market. Instead

MDF sought to minimise its footprint in the sector by facilitating and supporting other businesses to become silage entrepreneurs and pilot the business model.



MDF's market systems approach to silage:

- Identified the dairy and meat sector as an effective vehicle for pro-poor inclusive economic growth. There is unmet local demand for milk and international demand for meat. Connecting small farmers to the demand, as well as improving their productivity, is key.
- Analysed bottlenecks in the market - identified nutrition as a key constraint to productivity.
- Developed and piloted an innovative business model that addressed this key constraint.
- Developed partnerships with key private sector actors, and;
- Supported and strengthened pro-poor pathways for small livestock farmers that will improve their productivity, employment opportunities and incomes.

Pro-Poor Pathway: Improving access to inputs and services (such as fodder, vaccinations, veterinary services) so that products and information are available to the large number of small farmers.



For more detailed information on each step of MDF's market systems approach go to:
How MDF works

MDF's first partnership for silage – Pioneer Pakistan Seed Limited

Pioneer is a world leading developer and supplier of advanced plant genetics, providing high-quality seeds to farmers. It also provides agronomic support and services to help increase farmer productivity and profitability. It is Pakistan's largest seller of silage maize seeds, known for their quality and yield. Whilst large corporate farms form the bulk of Pioneer's clientele, the company recognises small farmers are a significant untapped market.

Since 2008 Pioneer had been offering technical support on the process of making silage. They had watched the market evolve from bunkered silage to baled silage in large sizes. In 2013 they realized that farmers were ready to purchase small bales of silage and they attempted to link potential silage entrepreneurs with machinery providers. They struggled; despite approaching several machinery providers the small bale equipment was not readily available in Pakistan, and the investment in importing machinery was significant for an individual entrepreneur. Pioneer was stuck. Their core business is seeds and genetics, not machinery, and they were not prepared to invest.

Early in 2014, following the sector assessment, MDF contacted Pioneer as a potential partner.

When first approached by MDF, the Pioneer team was a little skeptical – they had seen over a decade of development programmes in the dairy and meat sector with little effect. However, it was the combination of the proposed business model, MDF's innate business sense, and their extensive knowledge of silage that triggered Pioneer to become engaged. Rapidly it became clear that Pioneer was a strategically placed business incentivised to harness the opportunity to increase the scale of silage production in Pakistan.

MDF and Pioneer shared the same vision for the dairy and meat sector i.e. increasing quality inputs to small farmers. More specifically, Pioneer wanted to sell more seeds to small farmers in Pakistan, and MDF wanted to improve the availability of nutritious feed. Together the two organisations could establish a critical mass of viable localised businesses producing and selling small bales (60kg) of silage within their communities across Pakistan.



MDF partnership video: Pioneer



Watch Ghulam Mustafa, from Pioneer, talk about why Pioneer needed MDF to develop the silage market for small farmers.

» DETERMINING THE DIVISION OF RESPONSIBILITIES BETWEEN MDF AND ITS PARTNERS

In determining how best to support businesses in making a strategic contribution to inclusive growth and poverty reduction, MDF has learnt that a pragmatic approach is most effective. There is no single solution to the constraints of all its business partners; MDF designs individual support packages, rather than implementing ready-made plans and standardised forms of assistance.

Partnership agreements specify the terms and objectives of MDF's assistance. These agreements are adaptable and based on genuine partnership: companies have real ownership and a clear commercial interest in the project and are therefore also expected to share its costs. Such ownership is seen as critical to achieve lasting solutions that continue to benefit the poor after the end of the partnership.

» THE PARTNERSHIP BETWEEN PIONEER AND MDF

The partnership between Pioneer and MDF was in the form of an MOU with no funds exchanged between the two organisations. Recognising the strengths and weaknesses of both organisations enabled MDF and Pioneer to divide responsibilities and activities appropriately. They both agreed that a phased approach (Table 2) would be the most effective way, commercially and practically, of piloting the business model.

Using their extensive farmer network, Pioneer helped identify rural silage entrepreneurs and provided them with technical support, whilst MDF provided the financial assistance and guidance in procuring machinery from a new supplier of small bale machines i.e. new since Pioneer had tried to source machines in 2013. Potential entrepreneurs were identified as the medium size farmers who had previous experience in making silage and could produce and sell commercially 60kg silage bales to small farmers in their communities.

Other partnership activities included:

- Pioneer providing silage entrepreneurs with the technical support for cultivating silage maize and producing quality silage;
- Pioneer supporting silage entrepreneurs sourcing high quality maize by linking them to other farmers (backward and forward linkages);

- MDF supporting Pioneer to arrange farmer gatherings for awareness raising activities of silage.

In selecting the medium size farmers as silage entrepreneurs a pragmatic approach was taken using the following selection criteria:

- have the **financial capacity** to invest in the business, with sufficient cash reserves to cover operational costs, especially during the start up phase
- have **minimal risks** that could impact the success of the business e.g. personal health issues, high debt levels etc.
- are **highly influential**: it is important to understand the extent of their circle of influence and existing networks of potential customers
- have **prior knowledge of silage**
- have a good **understanding of the dynamics of the dairy and meat sectors**
- located in areas where they can achieve **significant outreach to small farmers**
- show **enthusiasm** for the business model, yet also understand the realities of starting a business



Table 2: MDF and Pioneer adopt a phased approach to roll out the business model



PAKISTAN



MoU with Pioneer	PHASE 1 Southern Punjab	PHASE 2 Northern Sindh	PHASE 3 Khyber Pakhtunkhwa	PHASE 4 Azad Kashmir
October 2014	2015- present	2016- present	March 2016- present	2017- present
	Number of Silage Entrepreneurs Supported: 3	Number of Silage Entrepreneurs Supported: 2	Number of Silage Entrepreneurs Supported: 5	Number of Silage Entrepreneurs Supported: 2
	Business Model Supported: Production and distribution of 60kg silage bale	Business Model Supported: 60kg silage bale PLUS Machinery Rental Model	Business Model Supported: 60kg silage bale PLUS Machinery Rental Model	Business Model Supported: 60kg silage bale PLUS Procurement of silage maize from other provinces
Marketing & Outreach Support: Farmer gatherings, marketing collateral and radio/cable TV ads				

» EXPECTED RESULTS

The partnership aimed to:

1. Increase incomes for small livestock farmers as their quantity and quality of milk and meat improves through the use of silage
2. Increase incomes of households producing silage maize through the sale of maize crop to the silage entrepreneurs
3. Increase employment opportunities: the rural poor will be hired by silage entrepreneurs to assist in the production of 60kg bales.



Box 3: Lesson 1 – Establishing business models using a phased approach allows for adjustments to market dynamics

In large countries with multiple regions, that have the potential to benefit from pro-poor business models, choosing where, and in how many locations, to pilot new business models can be daunting. MDF's experience shows that starting with one area and taking a step-phase approach to adding locations, can maximise the business model's success.

- Choose one area that offers the least risk, with the greatest opportunity for success. Individual success criteria will vary sector-to-sector, and country-to-country.
- The purpose of a business model pilot is to test the model's sustainability and resilience, and to allow it time to adapt or improve in line with the dynamics of the market. Selecting one location as a control group can minimise conflicting and confusing feedback that multiple regions could provide.
- Nurturing new partnerships for pilots can be time consuming and resource intensive. Start with one area to ensure partnerships have the attention they deserve. More often than not multiple locations do not offer any advantage, they merely put unnecessary pressures on the team. And finding partners who have the ability to rollout the business model in multiple regions can be difficult.
- Assess the levels of security risk of different regions: in conflict-affected countries, security levels vary from region to region.



MDF's approach to identifying potential private sector partners:

MDF identifies organisations to partner with that are strategically well placed to address the bottlenecks and harness the opportunities of a sector. Most of MDF's partners are private, profit-driven businesses.

Identifying partners usually comes from four activities: MDF's research; calls for proposals; unsolicited project ideas submitted by businesses, and; word of mouth.

In silage, the MDF team found that once they had begun engaging in conversations with potential partners, a snowball effect took place. It then becomes a process of elimination.

Pakistan is a big country with a big economy, and a vast number of businesses with whom MDF can potentially connect. Only a limited number of businesses provide national coverage. MDF identified that they would also need to work with regional operators, and with businesses interested in growing towards providing national coverage.

In assessing each potential partner, MDF followed a clear methodology, outlined in the programme's *Partnership Proposal and Justification* guidelines. The team are required to develop a clear logical reasoning behind each partnership: including how the company addresses constraints for inclusive sectoral growth; why MDF support is needed and, if the company is strategically placed compared to other actors in the market to partner with MDF. For each diagnostic question, specific issues related to Women's Economic Empowerment (WEE) are also reviewed. Further, any risks and possible mitigation strategies are elaborated.



Supporting the development of the first batch of silage entrepreneurs

The nuts and bolts of the silage entrepreneur

partnerships: Once identified, MDF assessed each silage entrepreneurs' financial proposals line by line and specified that funds would be provided for no more than 50% of the equipment costs. MDF also agreed to provide funds for marketing activities to raise awareness of the benefit and availability of 60kg silage bales amongst

small farmers. In return the entrepreneur agreed to start producing and selling commercially 60kg silage bales to small farmers, and arrange farmer gatherings and outreach activities (i.e. radio/cable TV advertisements) to build on nascent levels of awareness and provide small farmers with the technical information to ensure the correct feeding of silage.¹⁵

Box 5: MDF silage entrepreneur funding guidelines



MDF Funding Guidelines:

Funds a maximum of 50% of the start up costs

Funds only released on actual purchases i.e. MDF does not provide funding prior to entrepreneur purchasing the equipment

Only funds items that are a one time cost to the business, and those costs that are essential to the business model e.g. capital items such as machinery (single row cutter or baler)

Does not provide funding for items that the entrepreneur could use for personal purposes e.g. vehicles or refrigerators

Does not providing funding for operational expenses

¹⁵ Silage should be introduced slowly and incrementally to cattle for the first time until the optimal 15kg to 20kg per animal per day is achieved

Expected Results: It was expected that each silage entrepreneur would sell 60kg silage bales to 50 to 100 small farmers in their immediate area, triggering increases in milk yields. They would also employ two to three

full time workers to operate the facility and a further 10 as casual labour during the harvest season i.e. key baling season.



MDF partnership video: Silage entrepreneur



Meet one of MDF's first silage entrepreneurs Abou Sufyan. Hear him talk about how MDF has helped kick start his 60kg silage bale business.



Initial response and uptake by small farmers



The initial interest from farmer gatherings and other marketing activities was very positive. The speed of uptake by small farmers varied depending on their existing levels of awareness. In Pakistan ‘seeing is believing’ is a key condition required before a small farmer will purchase a 60kg silage bale. They need to have seen several farmers with similar farming practices, either neighbours or relatives, who have taken the risk and successfully trialed silage, before they will consider using it. Once this happens ‘copycat’ behaviour begins and the ripple out effect takes place.

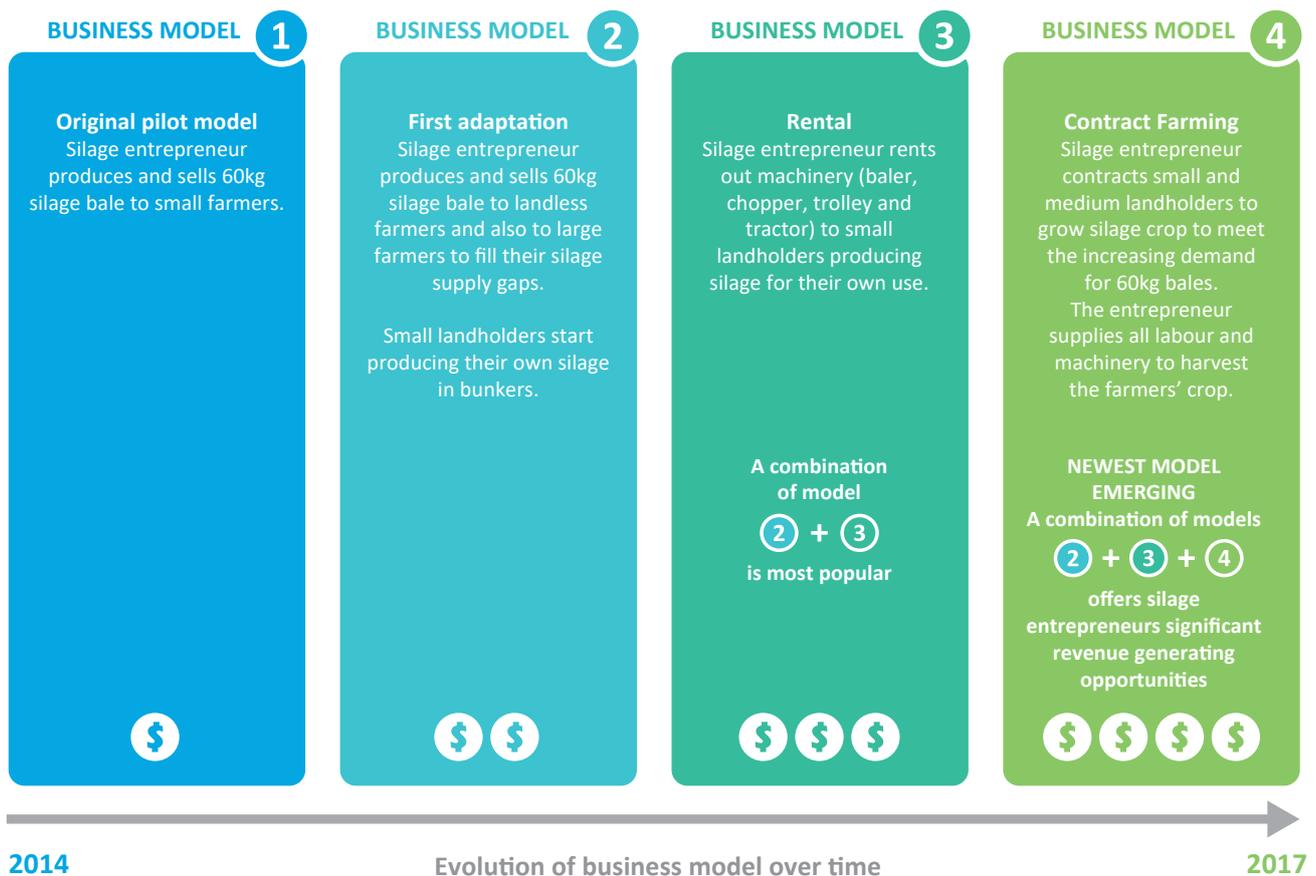
MDF’s initial assumptions for the 60kg silage bale was that once a small farmer was convinced from ‘seeing is believing’, they would purchase a bale, trial it, see the positive results and continue to purchase. These initial assumptions were challenged and silage entrepreneurs saw different behaviours emerge between landless farmers and small landholders (those with one to three acres). While landless farmers continued purchasing bales after a successful trial, some of the more progressive small landholders trialed the product and then commenced making silage on their own in bunkers. Silage entrepreneurs also observed increased demand for 60kg bales from larger farmers to fill their own silage supply gap. Overall the demand for silage, particularly 60kg bales, continued to significantly outstrip supply.

The business model evolves to meet the changing behaviour

To increase production, entrepreneurs expanded the acreage devoted to silage on their own farms. They also realised that once they had completed harvesting of their own silage crop, their silage harvesting equipment was idle and not generating revenue. Meanwhile neighbouring small landholders were manually harvesting their new silage crops. Silage entrepreneurs capitalised on this opportunity, adding machinery rental as an additional service to the business model.

By 2016 sales had increased so significantly that the silage entrepreneurs could no longer rely solely on crops from their own land to meet demand. Entrepreneurs began sourcing additional silage crop from small landholders, introducing another model to their business – contract farming.

Figure 5: The evolution of the silage business model for small farmers (2014 – 2017)



EARLY SIGNS OF SUCCESS

- ✓ Increase in number of bales produced: average 60% increase year on year (southern Punjab)
 - ✓ Increase in acreage of silage maize grown: doubled in size e.g. six acres to 12 acres
 - ✓ Start machinery rental service: represents between 15% to 40% of business revenue
 - ✓ Start contract farming with small farmers: sourcing silage maize from an average three farmers per entrepreneur in southern Punjab
-



MDF partnership video: Silage entrepreneur



Watch Aamir Nazir talk about how MDF's partnerships and activities fast tracked the growth of the silage market in his local area, and helped kick start his own silage business.



MDF partners with other businesses to accelerate the momentum gained

A key component of MDF's market systems development approach is identifying trigger points for leveraging the initial momentum gained in pilot business models. Through the initial partnerships with Pioneer and silage entrepreneurs, MDF was able to learn more about the bottlenecks to inclusive growth. As the silage business

model evolved, new opportunities arose, allowing MDF to explore a 'second layer' of partnerships. These new partnerships would address cross-sectoral constraints such as access to finance and access to other agricultural inputs (Figure 6) creating a balanced portfolio of tier 1 and tier 2 businesses (Figure 7).

Figure 6: MDF partnerships and the trigger points used to leverage the momentum gained from initial partnerships





MDF PARTNERSHIP PROFILE: CATTLEKIT AND BANK ALFALAH

Improving access to finance for silage entrepreneurs



After initially funding silage entrepreneurs, MDF recognised that a more sustainable approach would be for financial institutions to provide the entrepreneurs with a flexible and affordable loan.

MDF also realised that as the small bale business model evolved into machinery rental services, improving access to machinery via a new financial product was also needed. Cattlekit, a silage machinery importer, was well aware

that limited access to finance to medium size farmers significantly constrained demand for their products. MDF and Cattlekit formed a partnership.

Three banks were initially approached, but they all lacked the appetite to develop a financial product for medium sized farmers. However Cattlekit had an excellent business relationship with Bank Alfalah, so together with MDF they negotiated a tri-party MOU.



ABOUT THE PARTNERS

Cattlekit is a Pakistani company that imports quality farming equipment for the dairy industry. It was the first company in Pakistan to import a 60kg silage bale wrapping machine. Cattlekit's goal is to sell more small bale silage production machinery into the rural areas of Pakistan.

Bank Alfalah is one of Pakistan's leading private banks with a large agribusiness division. Its goal is to sell more financial products and to expand their client base. Like most banks in Pakistan, Bank Alfalah has traditionally targeted corporate and commercial farmers, not small farmers.



MDF PARTNERSHIP ACTIVITIES

Cattlekit witnessed that most farmers who applied directly to a bank for a loan, were invariably rejected. Cattlekit offered to become a loan facilitator, assisting farmers to complete applications for financial assistance to invest in the silage business and forwarding them onto Bank Alfalah. They also agreed to provide a substantial fund,

subsidising the bank's interest rate, making it more affordable to silage entrepreneurs. MDF supported Cattlekit's initiative with funding to setup promotion centres to provide information and support to the silage entrepreneurs, and for marketing activities and farmer gatherings to promote the uptake of small bale silage.

Table 3: MDF, Cattlekit and Bank Alfalah Triparty MOU – planned activities and contributions

 Planned Partnership Activities	 Who Contributes
Develop and promote the relevant financial product	<ul style="list-style-type: none"> • Bank Alfalah
Provide a fund to Bank Alfalah to subsidise the interest rate i.e. 9% p.a. versus 15% p.a. from other banks	<ul style="list-style-type: none"> • Cattlekit • Bank Alfalah
Conduct 96 farmer gatherings to raise awareness about the financial product and educate farmers on the commercial viability of a small bale silage business model.	<ul style="list-style-type: none"> • MDF • Cattlekit
Establish four promotion centres in southern Punjab. The centres act as facilitators between Cattlekit, the farmers and Bank Alfalah. The promotion centres will host business development officers who cater to potential and existing customers of Cattlekit. Requests for loans received at the promotion centers will be forwarded to Bank Alfalah for processing.	<ul style="list-style-type: none"> • MDF • Cattlekit
Develop promotional materials on the financial product	<ul style="list-style-type: none"> • MDF • Cattlekit
Offer a two year warranty, and four free services, to customers purchasing machinery using the loan.	<ul style="list-style-type: none"> • Cattlekit

 **PARTNERSHIP RESULTS AND IMPACT**

Whilst it is premature to report any major results as partnership activities began in January 2017, both Bank Alfalah and Cattlekit have received an excellent response to date. The first promotional centre has been opened with 400 farmers attending the launch. Within the first

month there have been 300 inquiries, 125 applications and 20 loans processed. Within the next six months it is anticipated Bank Alfalah will issue 50 loans and a further 60 loans within two years. The long term results MDF expect include:

- ✔ More informed farmers who understand the technicalities of silage-making and the commercial viability of running a silage business
- ✔ Increased localised production of silage
- ✔ Crowding in of other banks offering financial products for medium and small farmers’ silage related businesses
- ✔ Crowding in of other machinery importers, or local machine manufacturers, for the small bale market



MDF partnership video: Cattlekit



Watch the video of Sajid Bodla, CEO of Cattlekit talk about why they partnered with MDF, and the benefits MDF bring to their business.



MDF partnership video: Bank Alfalah



Listen to Yahya Hameed, Head Agricultural Division, Bank Alfalah talk about why the bank believes it is the right time to take a leap of faith and develop the first financial product for small bale machinery.





MDF PARTNERSHIP PROFILE: MAXIM INTERNATIONAL

Scaling up production and distribution of 60kg silage bales



To rapidly bring to scale the production of 60kg silage bales and to significantly broaden its geographical outreach, MDF extended its partnerships from its original small silage entrepreneurs to Maxim, a well-established medium size company already supplying fodder seeds to small farmers all over Pakistan. This network would enable silage bales to be distributed to areas where there are no small bales available and farmers are unable to grow silage maize crop.

Maxim had already conducted a feasibility study on manufacturing large quantities of 60kg silage bales, but did not have sufficient capital to proceed. MDF agreed to provide financial assistance reducing Maxim's financial risk.

ABOUT THE PARTNERS

Maxim International sells high quality concentrate and compound feed to dairy farms in Pakistan. A key strength of Maxim is their distribution network - 140 distributors

and 500 dealers all over the country. A total of 92% of Maxim's nutrition business is with small farmers.

MDF PARTNERSHIP ACTIVITIES

- Set up a silage manufacturing facility for 60kg bales
- Boost transport capability for distribution of silage bales directly into villages
- Outreach programmes to small farmers raising awareness of the benefit and availability of silage



EXPECTED RESULTS AND IMPACT

Maxim estimates it will sell 100,000 bales per year of silage to over 1,300 small farmers. The first year of production presented some challenges, as the silage machinery did not arrive until well into the silage harvest season. They were unable to purchase silage crop when

there was plenty of supply, limiting their production capacity, but also resulting in having to pay a premium price, thus reducing profitability. Despite these challenges, they produced and sold 20,000 60kg bales in their first year.



MDF partnership video: Maxim



Watch the video of Hamza Faisal, Silage and Alfalfa Hay Manager at Maxim, talk about the challenges of starting a business in an agricultural commodity market such as silage.

OTHER CROSS-SECTORIAL PARTNERSHIPS

Since 2014 MDF has partnered with **Shakarganj Food Products Limited**, a medium-sized milk processor and dairy product manufacturer, to establish milk chilling centres, extension services and input sales for small dairy farmers in the Punjab. The partnership has been so successful it is now in its fourth phase of activities.

In 2016, MDF partnered with **Farm Dynamics Pakistan** to assist to popularise other highly nutritious fodder crops such as Rhodes and Rye grass, selling seeds in small sizes; affordable and practical for small farmers.

In early 2017, MDF developed a partnership with **Mustafa Brothers** to support the establishment of a distribution network and extension services for increasing adoption of preventative medicine (e.g. vaccines) among small farmers.

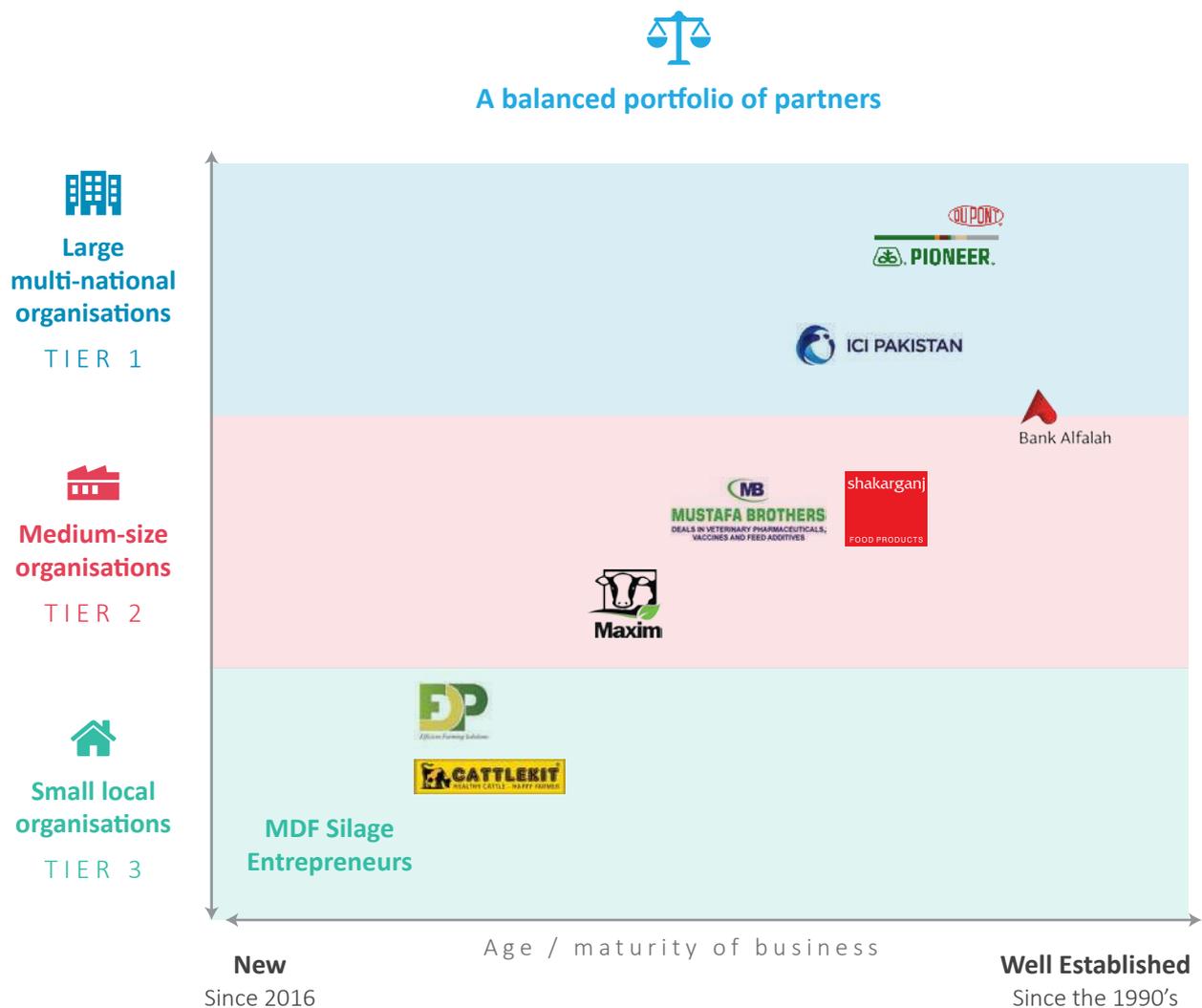
Building on initiatives to increase access to inputs for small farmers, in 2017 MDF partnered with **ICI Pakistan**. The partnership will support the uptake of animal health treatment remedies among smallholder farmers through the expansion of a distribution network and an awareness campaign in Khyber Pakhtunkhwa.



Box 6: Lesson 2 – In large and well-established economies a balanced portfolio of partners is important

- A wide range of partners allows for different constraints to be addressed and opportunities to be harnessed. One partnership is rarely enough to create the extent and resilience of change to qualify as being ‘systemic’.
- A portfolio of partners allows for multiple levels of change to take place. Adding partners at different times over the programme period enables new partnerships to add another layer of change to the previous. Cumulatively, these can close a market system gap, creating and/or cementing systemic change.
- Often large, well-established businesses (tier 1) need just as much assistance in innovation or knowledge as new or fledging businesses (tier 2 and 3) need in finance.
- A portfolio of tier 1, 2 and 3 businesses can provide the incentives and stimulus for tier 1 businesses to begin innovating for the BOP, rather than remaining focused on wealthier market segments.
- When tier 1 businesses establish business relationships with tier 2 or 3 businesses, regional and national linkages are created broadening the entrepreneurial base of the country.

Figure 7: MDF’s balanced portfolio of partners





Critical success factors of a partnership

- ✓ **A shared vision:** partnerships should be made up of a cohort of business people who have a shared vision of what MDF is doing. The details of how each get there may differ but, ultimately, if the vision is shared the partnership should be successful.

- ✓ **Complementary skills:** understand what skill sets partners have and what value these add to the partnership. And equally understand what skill sets you offer and what the perceived, or real, value is to the partner.

- ✓ **Flexibility:** the very flexible nature of the market systems approach means that the original goal posts are likely to shift as assumptions are challenged. Businesses or organisations that are not prepared to be flexible do not make good partners.

- ✓ **Trust:** without taking the time to build trust with partners there is a strong chance that the partnership may not flourish. Often you need to prove to a partner (especially the private sector) that you are a credible partner for this initiative by sharing knowledge and experiences e.g. sector assessments, results of pilots, financial models etc. Trust needs to be both ways.

- ✓ **Champions:** identifying at least two champions within the partner organisation is key to ensuring commitment to the initiative. Having more than one champion reduces the risk of partnerships failing and increases outreach within the partner organisation.

- ✓ **Promote your business sense:** in developing countries the private sector has seen many development programmes fail and can be skeptical about development-funded initiatives. Potential private sector partners want to know that your approach is different. They want to know that you have a strong sense of business.

Results: The scale and breadth of benefits from small-baled silage



“Silage has become one of the most usable and feasible fodders in Pakistan.”

Kamran Farooq, Business Unit Manager, Maxim

Box 8: The headline results: small baled silage (October 2014 - present)



Milk yields have approximately **doubled**
(av. 3-6 litres per animal per day)



750 small farmers have increased incomes from improved livestock productivity



11 new MDF-supported silage entrepreneurs



60 jobs created for the rural poor with MDF silage entrepreneurs



37,000
60kg silage bales sold



Women freed from manual labour
for an average 14 hours a week



Evidence of income benefit going towards **children's education**



Improved financial security,
well-being and resilience of farmers

WHICH FARMERS ARE BENEFITING?

Landless farmers living within a 10km to 20km radius of a silage entrepreneur now have access to a 60kg bale of silage all year round. This is particularly beneficial in the fodder-less months. The additional income

earned by landless farmers from increased milk yields is used to purchase more silage bales, invest back into additional livestock (assets), or to purchase essential household items.



Video: Three smallholder livestock farmers using 60kg silage bales



Listen to three smallholder farmers talk about the benefits 60kg silage bales have delivered to them and their livestock.

Landless female farmers: A 60kg silage bale significantly reduces the time women spend sourcing green fodder and the burden of the manual labour involved. On average, baled silage can save a woman up to 14 hours a week, freeing up her time for other household duties and childcare, and to engage in paid employment on neighbouring farms.

The story of silage and women is only just beginning. There is more MDF can do to ensure the benefits of small-baled silage reach more women in Pakistan. MDF's work has highlighted that women are quick adopters once they have the initial awareness, and that despite cultural norms, they can influence decisions about livestock within their households.

Small landholders: The introduction of a 60kg bale provided the stimulus for small landholders to trial silage, and subsequently for them to start making their own. As the demand for silage bales increased, silage entrepreneurs turned to small landholders for additional silage crop. This has enabled many small landholders to replace traditional cash crops with a more profitable and productive option.

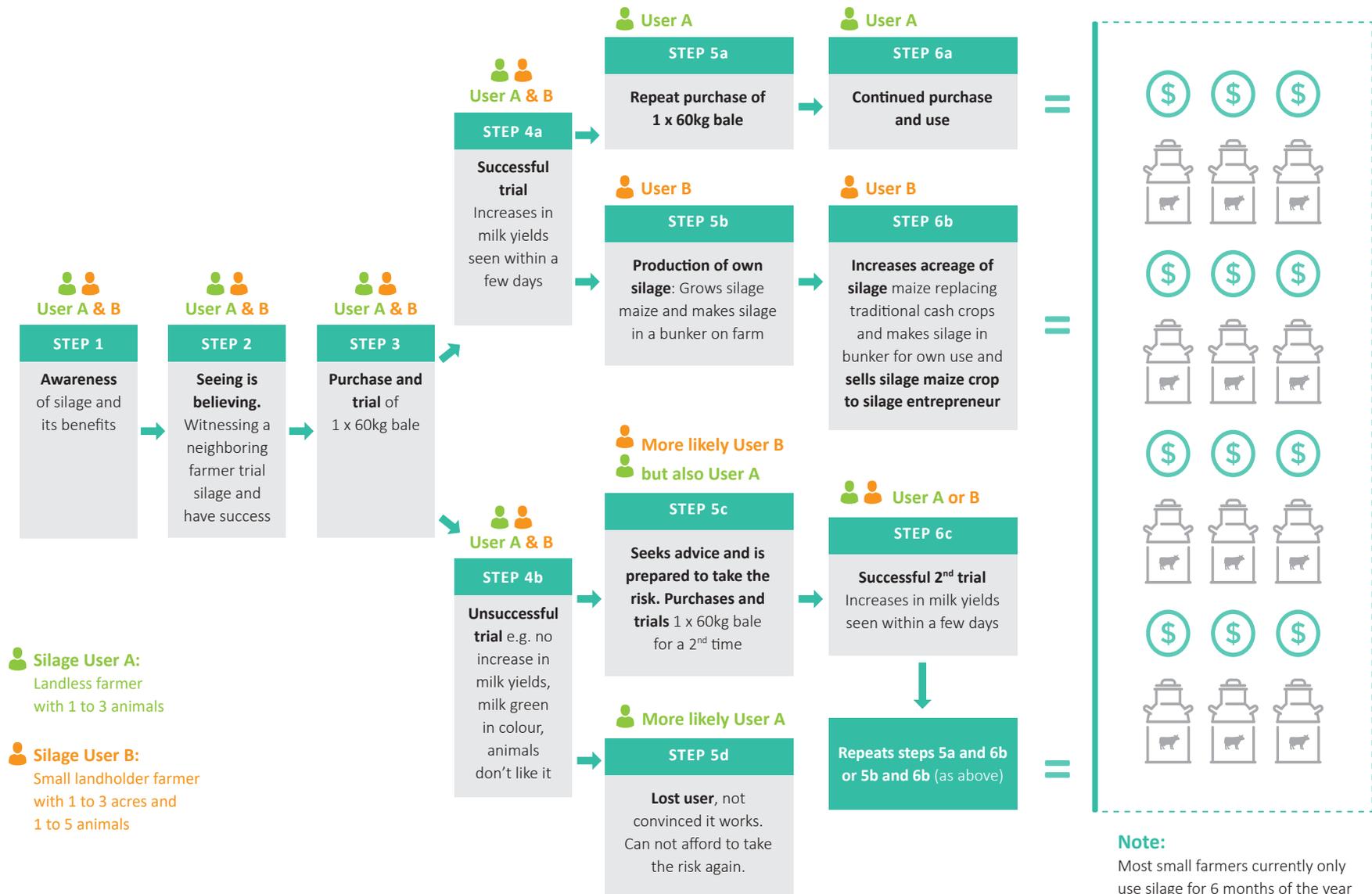
With the introduction of the machinery rental service, small landholders now have access to machinery and labour enabling them to harvest silage crop at least three times a year and make bunker silage. The savings from making bunker silage versus purchasing 60kg bales is A\$2.25 - A\$3.73 per 60kg of silage.

The extra income earned from increased milk yields and a more valuable cash crop is usually invested into additional livestock (assets) and into essential household items.

Small-baled silage has also had an impact on **medium farmers**. Like small landholders, medium-sized farmers are able to grow silage as a valuable cash crop, both using the silage for their own livestock and selling to silage

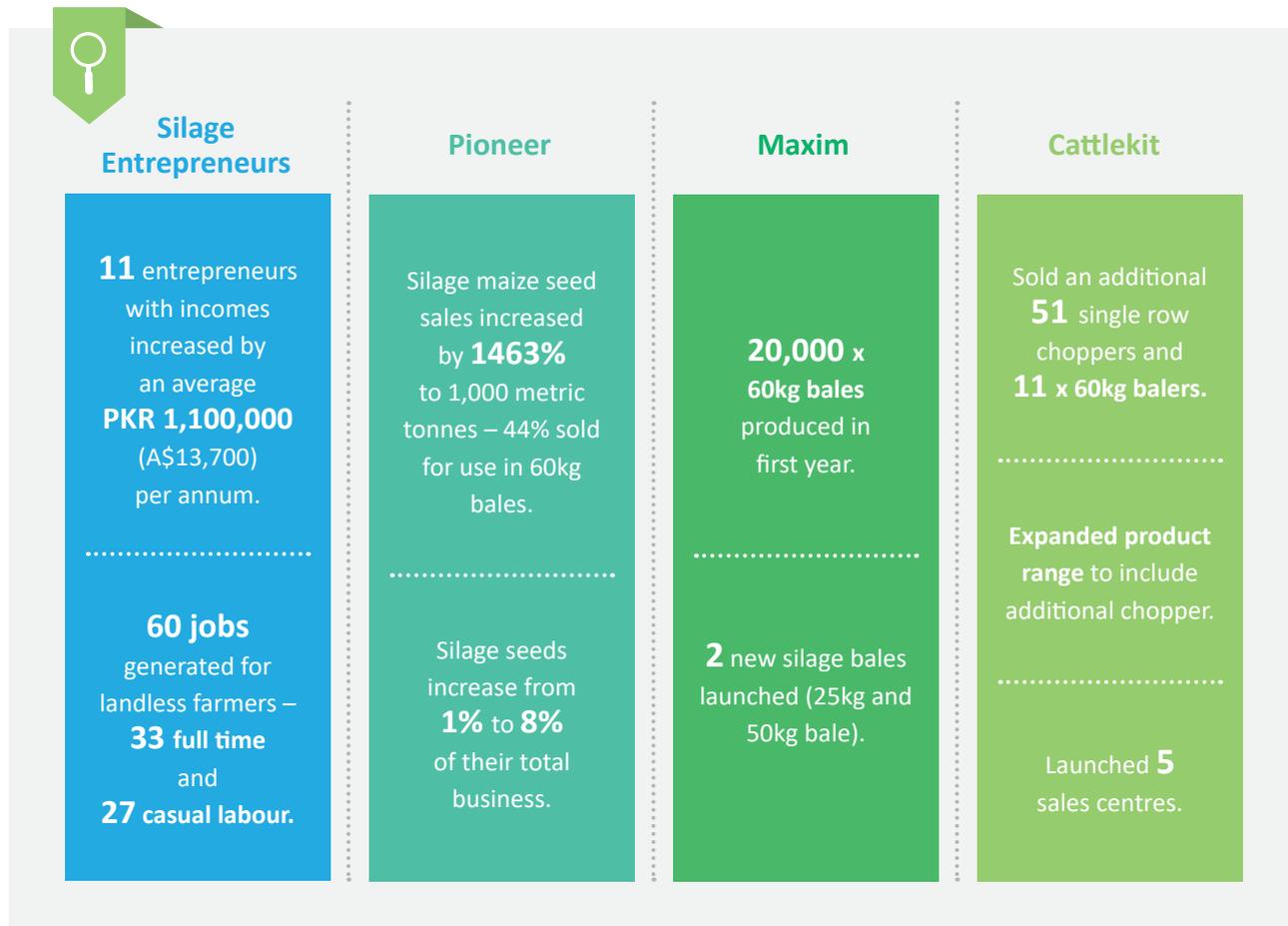
entrepreneurs. For some medium-sized dairy farmers, the 60kg bale sourced from MDF silage entrepreneurs has filled a gap in their silage demand as and when required.

Figure 8: Behaviour of landless and small landholder farmers in the uptake of silage in Pakistan



Time taken to achieve uptake of silage amongst small farmers

Box 9: Partners experience outstanding results (2014 - 2016)



Further details on the benefits to MDF’s partners are as follows:

Silage entrepreneurs: for the first 11 entrepreneurs (three are still in start-up phase), the small bale has provided them with a profitable and growing business. On average their household incomes have increased by PKR

1,100,000 (A\$13,700) per annum enabling them to invest in better education for their children or reinvest back into their business. Between them, they have generated 60 jobs for landless farmers – 33 full time and 27 casual labour.

Pioneer: From 2010 to 2016 the volume of silage maize seeds sold increased by an outstanding 1463%. This equates to 1,000 metric tonnes of seed, of which 44% was sold for use in 60kg bales. Silage maize seed now accounts for 8% of Pioneer’s total business, up from just 1% in 2014. They estimate by 2020 silage seeds will account for 20% of their total business in Pakistan.

The increased volumes of silage being produced by both entrepreneurs and farmers have raised some concerns about quality standards. In response, in 2015 Pioneer launched a new product, silage inoculants, to assist maintain quality silage and to also speed up the fermentation process.¹⁶ Although the growth for this product is not as fast as silage maize seed, it is still significant as 700 bottles were sold in 2015, and 1,500 were sold in 2016.

¹⁶ An inoculant is added to silage to provide a faster, more efficient fermentation.

Maxim: In their first season (2016) Maxim produced 20,000 60kg bales. Demand far outweighed supply with 100% of 60kg bales selling within three months. Demand has been widespread across Pakistan with 20% sold in the Punjab and 80% sold to the provinces of Khyber Pakhtunkhwa and Azad Kashmir. The demand for silage has prompted Maxim to expand their distribution network by an additional 150 dealers and 50 distributors by July 2017. They have also introduced two new small silage bales to their product range, a 25kg and 50kg, the first of their type in Pakistan. Maxim intends to invest in a larger

warehouse in order to keep greater stocks on hand to cater for demand in fodderless months. Growth in silage has been a stimulus for growth of Maxim's other nutrition products. As farmers' animal health knowledge improves and they see productivity increases from silage, they are becoming more aware of the importance of investing in nutritional inputs. Since 2014 Maxim has experienced 30% growth year on year of other livestock nutrition products. The company continues to expand their fodder product range, recently adding Haylage and Alfalfa hay.

Cattlekit: Since 2014 Cattlekit has seen significant growth for small bale silage machinery. In 2014 it imported 13 single row choppers and four, 60kg balers. By 2016 this had increased to more than 51 choppers and 11, 60kg balers. Whilst 80% of their sales have been in the Punjab, 20% have been in Khyber Pakhtunkhwa and 20% in Sindh. In 2017 Cattlekit expects a further 200% growth in both the single row chopper and baler.

Due to the increase in demand for silage and the emergence of the machinery rental business model, in 2016 Cattlekit expanded their product range to include

a new sized chopper and a vacuum pack baler for small sized bales. Since 2014 they have expanded their sales centres from one to five.

In February 2017 Cattlekit added financial services to their business. Capitalising on the growth of the machinery rental business model, they partnered with Alfalah to launch a financial product for financing small bale machinery. They are currently developing another financial product to capitalise on the growth of the contract-farming model to meet increased demand for silage maize. The product will be launched in the second half of 2017.

Bank Alfalah: With the launch of their small bale machinery financial product in February 2017, it is too early to determine the exact results. However, initial indicators are positive, with 300 inquiries, 125

applications and 20 loans approved. It is anticipated that within six months Bank Alfalah will have secured 50 loans for farmers.



What it takes to trigger lasting systemic change in a large and well established economy



“We believe in innovation. This business model needs to be replicated... in Pakistan it’s a very good success story. We are taking it to other parts of Asia... our challenge is in finding the right partners in these countries.”

Ghulam Mustafa - Marketing Development Manager, Pioneer Seeds Ltd Pakistan

“Had MDF not been around, silage would be 10 to 50 years behind where it is now. MDF’s activities have enabled the market to get to where it is quickly.”

Moneeza Ahmed, The Engro Foundation

'Systemic change' is a change in the underlying causes of a market's performance that can bring about a better functioning market system.¹⁷

To manage and monitor systemic change, MDF asks two fundamental questions. For each question three parameters define the quality and scale of change.

1 Are there appropriate incentives for market players to interact with poor people and to continue, expanding and adapting the new business model?

- i Autonomy
- ii Sustainability
- iii Resilience





Quality of change

These measure the strength of the **business case** underpinning the change

2 Is the adoption and adaptation of the new business model continuing to serve the interests of poor men and women?

- i Inclusiveness
- ii Scale
- iii WEE





Scale of change

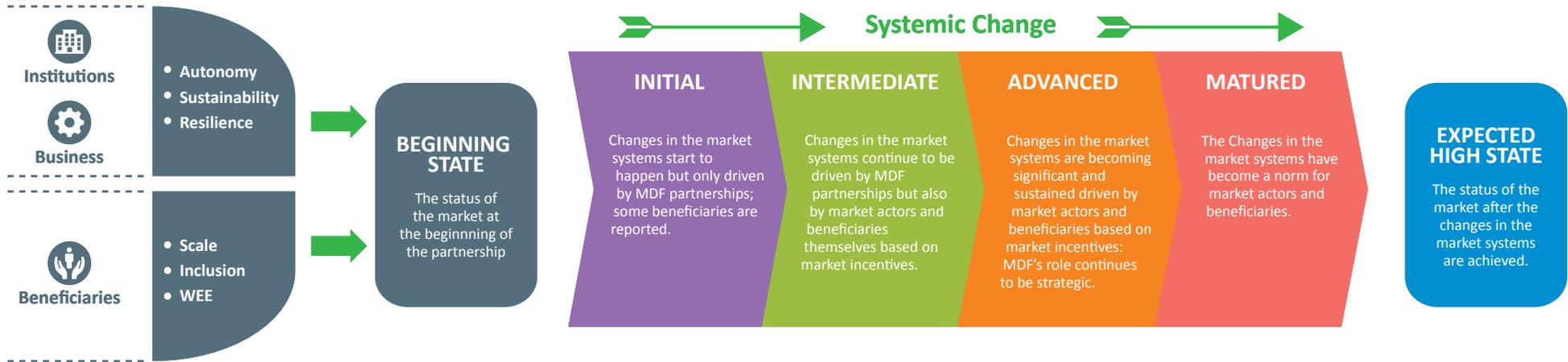
These measure the extent to which the **beneficiaries** are benefiting from change

There are four stages of progression along the pathways to systemic change: initial, intermediate, advanced and matured (Figure 9).



¹⁷The Springfield Centre.

Figure 9: MDF's pathway to monitoring and measuring system change



When MDF started working in silage in 2014 one systemic pathway from the dairy and meat sector was chosen that specifically related to the innovative business model.

Systemic Change Pathway 1: Improving access to input and services (such as fodder, vaccinations, veterinary services) so that products and information are available to large numbers of small farmers.

This pathway is the key mechanism by which MDF creates change in the sector. MDF designs partnerships and activities around this pathway to move from the 'beginning state', what the market looked like before MDF started its partnerships in silage, to the 'end state', what the market will look like after changes in the market system are achieved.

Initial indicators that transformative change is taking place are that: partners are taking autonomous decisions to expand or improve the business model; the business model is proving commercially viable for the partner; and that other actors in the market step in to collaborate with the partner business through supporting services.

Figure 10: Systemic Change Pathway 1 (increasing access to inputs) — the before and after picture

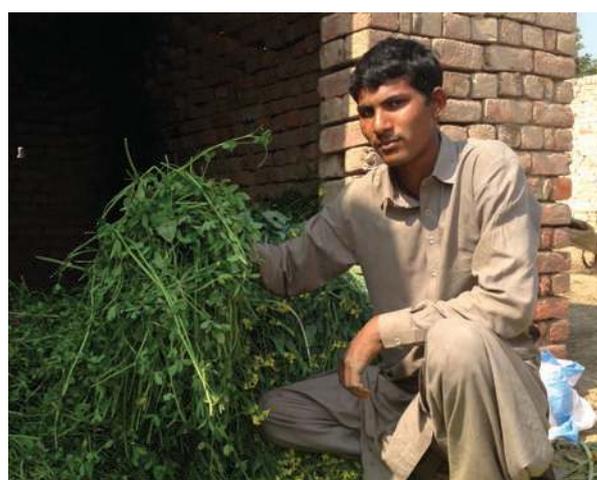


BEGINNING STATE The before picture

- 👍 Input companies and service providers focus on larger commercial livestock farmers and lack widespread distribution arrangements.
- 👍 Small farmers do not have access to relevant and timely information on inputs, weather, crop or livestock practices.
- 👍 Formulated inputs, hybrid fodder, silage and veterinary inputs which improve animal husbandry, health and nutrition are available only in those areas where formal processing activity is occurring. In areas where there is no formal activity, only traditional feed and seeds are available and these often have quality and availability issues.
- 👍 Government extension and R&D services are dysfunctional - information not applicable to small farmers or never reaches them.
- 👍 Small farmers are forced to rely heavily on local informal intermediaries (dhodis and beoparis) to sell milk and meat. Intermediaries provide them with finance ensuring farmers are bound to sell to them. Inputs supplied by these intermediaries are often adulterated and knowledge provided on production improvement is often ill-informed.
- 👍 Private sector finds it difficult to engage with smaller grassroot farmers, focusing only on large farmers from where they can source large quantities of milk under one purchase arrangement.

EXPECTED HIGH STATE The after picture

- 👍 Input suppliers deliver quality fodder, veterinary medicines, vaccines, supplements and herd management solutions through widespread trading and retailing distribution systems to small farmers.
- 👍 A number of private and public sector enterprises provide relevant and timely information to the wide spectrum of livestock farmers using radio, television, print media and ICT.
- 👍 Business membership organisations engage with provincial and national government agencies to reflect the needs of the livestock sector and address constraints to improve distribution of quality inputs.
- 👍 Government is able to generate updated and relevant research and information reaching more small male and female livestock farmers.



Significant changes are already emerging in the sector: In just over two years since MDF started partnerships for silage, the market is showing intermediate to advanced signs of systemic change.

Autonomy: There is evidence to show that partners are taking independent, significant and sustained action beyond what was agreed in the partnership agreements to adopt, improve and apply the 60kg silage bale business model. MDF entrepreneurs have responded to the dynamics of the market with four versions of the business model emerging.

In addition, more than 40 new silage entrepreneurs have adopted the business model over the last two years.

Sustainability: MDF silage entrepreneurs are making a good return on investment with profits being reinvested into the business. Several are purchasing additional machinery to increase production and developing a machinery rental business.

Resilience: Sixteen businesses in support markets have a vested interest in the resilience of the business model and are making significant and often multiple investments. See 'crowding in'.

Inclusiveness: More than 2,000 (1,300 Maxim, 750 Pioneer southern Punjab and northern Sindh) small and landless farmers now have access to small bale silage as a direct result of MDF-supported activities. Beyond MDF support to entrepreneurs, it is estimated that more than 11,000 farmers not only have access to small bale silage but have also experienced increased incomes as a result of improved livestock productivity from feeding silage.¹⁸ By 2019, it is expected that the number of silage entrepreneurs will triple.¹⁹ With a total of 40 million small farmers in Pakistan, there is the potential for many more farmers, including women, to benefit. New and existing silage entrepreneurs have a significant vested interest in maintaining the business model so that it continues to service the poor.

Populating small bale silage has provided incentives and market opportunities for a few large companies to now target small farmers. For example, Bank Alfalah's development of the first financial product for medium farmers. There is still enormous potential for other large companies to innovate for the BOP.

Scale: Significant numbers of small farmers (estimated more than 13,000²⁰) now have access to a highly nutritious fodder exceeding initial expectations. The crowding in of silage entrepreneurs has occurred at a faster pace than expected.

WEE: The 60kg silage bale business model has benefited women by providing additional income and a reduced workload. Jobs created for women by silage entrepreneurs such as farm labourers during sowing season of silage maize, have not yet generated significant numbers of new jobs. Business partners understand the important role women play in the livestock sector, however, to date they have not targeted women specifically.

¹⁸ From 40 autonomously developed entrepreneurs.

¹⁹ MDF estimate based on current growth rates of silage entrepreneurs.

²⁰ 2,000 smallholder and landless farmers directly impacted from four MDF entrepreneurs and a further 11,000 impacted from 40 autonomously launched silage entrepreneurs.

SIGNIFICANT NUMBERS OF BUSINESSES START TO 'CROWD IN'

'Crowding in' occurs when other businesses that support the sustainability of the business model start to emerge in the market. These businesses can launch an improved version of the existing silage business model or simply

replicate it. They can also be businesses that launch new products or services that complement and support silage, or replace imports.

'Crowding in' – the results to date

40+ new silage entrepreneurs

4+ new machinery rental business

6 new suppliers of small bale silage machinery

4+ new suppliers of silage maize seeds

2 local manufacturers of plastic wrapping for silage bales replacing imported products

2 businesses launch other innovative nutritional fodders

1 new financial product specifically for silage machinery with one more due to launch 2017

1 new bulk producer of 60kg silage bales with one more due to launch in 2017

MDF's activities in silage have been the stimulus for more than 60 independent entrepreneurs to 'crowd in' in the sector. More than 40 of these are silage entrepreneurs who have independently improved and adapted MDF's initial business model. A number of dedicated machinery rental businesses have also entered the market. Medium to large companies such as **The Four Brothers Group**

and **Nestle** are also offering embedded machinery rental services for their customers.

The sector has seen more than 16 businesses launch new products and services that complement and support the 60kg silage bale.

BULK PRODUCTION AND DISTRIBUTION OF SILAGE OVER AND ABOVE MDF'S PARTNERSHIP WITH MAXIM

In May 2016 the government invested in the **Punjab Livestock Dairy Development Board** (PLDDB) to produce and distribute more than 120,000 60kg silage bales per year, from four production facilities. Whilst there is concern that this government initiative could flood the market with subsidised silage bales, after 12 months, the demand for silage is so great that the quantities produced by PLDDB are too small to, as yet, have a negative impact.

In December 2015, **The Engro Foundation** ran a four-month pilot using the **Engro Foods** milk processing centres to sell and distribute 60kg and 300kg silage bales, in 200 villages across the Punjab. The Engro Foundation

provided a fund for a 60% credit facility, to small farmers wanting to purchase silage bales. The pilot was successful and in 2017 Engro will open a manufacturing plant for 60kg silage bales.

In late 2016 Engro Foods also signed a partnership with PLDDB to act as a distributor of their silage bales. Engro Foods has an extensive network of milk processing centres that target small livestock farmers.

In 2016 **Matra Asia** also started manufacturing of 60kg bales in bulk.

MORE OPTIONS FOR PLASTIC BALE WRAPPING

In 2014 and 2015 the only plastic wrapping available for 60kg silage bales, a key component of its production, was imported.²¹ Since late 2015 at least three new local companies, **Circle International**, **Ravi Agric** and **IJ Plastic**,

have commenced manufacturing quality plastic bale wrapping. There is evidence to suggest a new Chinese manufacturer, **Silage Packaging Co Ltd**, will enter the market in 2017.²²

SMALL FARMERS HAVE ACCESS TO SMALL BALE MACHINERY OVER AND ABOVE CATTLEKIT

Six new competitors are now supplying small silage bale machinery. Two of these companies are importing machinery from China and Turkey e.g. **Ravi Agric** and

Western Agri Products. There is also at least four engineering firms who have commenced manufacturing small bale machinery locally e.g. **Agritech Engineering**.

INCREASED OPTIONS FOR SILAGE MAIZE SEEDS

Three new international silage seed brands have entered the market: **Syngenta**, **The Four Brothers Group** and **Maxim**. In addition, three locally produced silage seeds brands have launched: **Hi-sell**, **Data** and **The Petal Seed Company**.²³ Whilst it is good to see more businesses

crowd in, farmers have raised concerns about the poor quality of the locally produced seeds, with significant differences in crop yields compared to the high quality imported seeds.

THE GOVERNMENT REALISES THE IMPORTANCE OF QUALITY SILAGE

In January 2017, the Government of the Punjab included silage in the Punjab's Animal Feed Stuff and Compound Feed Act 2016, and developed Standard Operating Procedures (SOPs) to ensure production of quality silage.

Following the regulation of these SOPs in late 2017 the Department of Livestock will be responsible for their implementation.

INCREASING THE AVAILABILITY OF OTHER NUTRITIOUS FODDERS

The introduction of silage has sparked an interest in other nutritional fodders. In 2017 three companies (Farm Dynamics Pakistan, Maxim and Matra Asia) will launch

seeds for three innovative fodders: Rhodes grass, Rye grass and Alfalfa.

INCREASING ACCESS TO FINANCE

Increasing access to finance: Cattlekit and Bank Alfalah are currently developing a second financial product for small landholders engaged in contract farming.



Video: Independent silage entrepreneur



Watch Veterinarian and independent silage entrepreneur Muhammad Naveed Akther briefly discuss the growth of his silage business and how he and his wife have helped poor women become involved in the silage business.

²¹ Baletite <http://www.silotite.com/product/baletite>

²² Chinese manufacturer of silage plastic wrapping attends trade fair in Karachi

²³ KP government approves maize hybrid seeds to promote agriculture

Figure 11: The silage market ‘crowding in’ following MDF’s interventions





'CROWDING IN' - A CHAMPION FOR RURAL WOMEN AND SILAGE

Sadiya Farooq trained as a human nutritionist and left her job in 2014 to spend time at home with her children. When she heard about the MDF silage business model from her husband Naveed, it immediately sparked an interest in her – nutrition was something she understood.

In April 2015 Sadiya started a silage business, whilst her husband continued in full time employment. In 2016 having experienced significant growth, Naveed was able to leave his job and join Sadiya. In 2017 the business employs six permanent staff and 25 seasonal staff. They aim to produce 80,000 bales of silage in 2017, of which 50% will be 60kg bales sold to landless farmers within a 5km to 6km radius. Every month they are adding 70 to 80 new customers, 40% to 50% of them are female landless farmers.

The story doesn't end there.

Realising early on in the business the important role landless women play in animal husbandry, and the speed at which women are prepared to trial silage once they know about it, Sadiya developed a business model specifically targeting landless women. In the past 12 months she has supported three women.

The business model involves providing landless women with one to two 60kg bales on credit. The women initially trial the silage themselves as well as selling to other women to trial. At first the women are accompanied to build their confidence in door-to-door selling in their local village. After the initial assisted visits the women commence door-to-door selling by themselves. As their female customers begin to see improvements in milk yields after a few days, demand for silage increases. The businesswomen sell more silage making a small profit – enough to pay for the initial bales and order more.

The results thus far have been outstanding with the three landless female entrepreneurs selling 60kg silage bales to women in more than 1,000 households in seven different villages.

The female entrepreneurs have increased their income from both sales of silage as well as increase in milk yields of their own cows. One of the three women has gone from selling one to two bales to selling 80 bales of silage in eight months. The other two women are now able to send their children to full time school, rather than sending them out as child labour on neighbouring farms. In addition all the women who are purchasing silage are experiencing increased incomes from the increase in milk yields.



FROM DAIRY FARMER, TO SILAGE CONVERT TO BUDDING MACHINERY ENTREPRENEUR

Ajmal Chatha is a medium-sized dairy farmer, with 50 milking cows and 18 ½ acres near Multan. His story reflects the story of many new local entrepreneurs in the rural economy following MDF's silage interventions.

In 2014 he heard about silage from Nestle, who purchase his milk, and planted three acres. Each year Amjal has increased the land he dedicates to silage maize and in 2017 he will plant 15 acres. Before silage Amjal didn't think it was worth investing in his livestock's health, however having seen significant milk yield increases in his own herd, he has now started investing in other animal health products such as mineral concentrates and vaccines. In 2016 he noticed that many small farmers

(one to three acres), had begun to grow small amounts of silage and harvest it manually. Many complained about the difficulty of finding farm labour to come at the time when the crop needed harvesting. Ajmal Chatha saw a business opportunity – purchase a single row silage maize harvester, suitable for small land, and rent it out to these small farmers. In January 2017 he learned from Nestle about the Cattlekit and Bank Alfalah financial package at reduced interest rates. The timing was perfect. He immediately applied and has placed his order with Cattlekit for his first silage harvester – he will be ready to start his machinery rental business in time for the next harvest.

NEXT STEPS: INCREASING THE SCALE AND QUALITY OF SILAGE INNOVATIONS

Tracking and analysing the progress of systemic change helps MDF determine what is working well and what new strategies are needed. In 2017 MDF will be implementing

several new partnerships to increase the scale and quality of change in the silage sector.

USING MOBILE TECHNOLOGY TO PROVIDE SMALL FARMERS WITH RELEVANT AND TIMELY INFORMATION

Mobile agricultural services play an important role in the development of the dairy and meat sector's efficiency and cost-effectiveness.

Telenor is one of Pakistan's leading telecommunications companies. In December 2015 it launched a mobile technology solution, Agricultural Value Added Services (Agri VAS), in the Punjab providing subscribers with two alerts daily – a morning weather forecast and a farming tip for their preferred crop, and an evening alert on livestock management. Due to low literacy levels in rural Pakistan

the alerts are either sent via SMS or outbound robo calls. The programme also has an Interactive Voice Response (IVR) number (7272) where farmers can access content for multiple crops, manage their profile and receive product support through a manned helpline - with discussions focused on questions and answers related to agriculture, nutrition and livestock. MDF has established a partnership with Telenor to provide information to small farmers. Initially this will concentrate on weather alerts to small farmers in Gilgit-Baltistan and in the future intends to expand into provision of information to livestock farmers.

DEVELOPING AN INNOVATIVE BUSINESS MODEL FOR FEMALE ENTREPRENEURS IN SMALL BALED SILAGE

Inspired by the female silage entrepreneur, Sadiya Farooq, MDF is currently researching the viability of scaling up an innovative business model specifically designed for landless female farmers to become silage entrepreneurs. The business model will be similar to Unilever's²⁴ micro-entrepreneurship programme in Sri Lanka – providing products to poor women on credit and arming them with the necessary skills to conduct door-to-door sales to other women at the village level. MDF will look to partner with

new or existing silage entrepreneurs with a vested interest in adapting their business model to specifically target women. The model will also rely on MDF partnering with female champions at a district level who have the respect of poor female farmers. The proposed intervention aims to significantly increase the number of female farmers receiving the benefits of small bale silage through increased income and job opportunities.



Box 10: Lesson 3 – Women can be significant catalysts for change, but this will only be realised if the initial business model and all subsequent adaptations have an explicit gender focus

MDF's experience in developing the business model for silage have highlighted the following key lessons for ensuring Women's Economic Empowerment:

- A business model that has been developed for the BOP does not mean it will benefit women, even if 70% of that economic activity is carried out by women.
- In countries such as Pakistan where exclusion of women is prevalent, business models need to be adapted to ensure women have improved access to information, inputs and employment opportunities.
- Finding businesses with a vested interest in investing in gender sensitive business models can be challenging. In large economies with a substantial market of small farmers, there is sufficient available profit for investors in targeting male small farmers, rather than for them to try and overcome the significant challenges of accessing female farmers.

²⁴ Unilever's Project Saubhagya empowers rural women through entrepreneurship



MDF CREATES TRANSFORMATIVE SYSTEMIC CHANGES IN PAKISTAN’S DAIRY AND MEAT SECTOR IN JUST OVER TWO YEARS:

Profitable small businesses are created that specifically target the poor: more enterprises start up or restructure their existing business model to be more productive; small businesses are connected to producers and buyers; incomes are increased and job opportunities expanded.

Established businesses introduce innovations that benefit the poor: innovative new products and services enter the market; poor farmers have access to these improving, their agricultural productivity; improvements in milk and meat quality open up opportunities for improved access to formal markets (domestic or export) by the poor.

More businesses achieve resilience and growth: More innovative business models grow and become profitable; businesses initially co-financed by MDF integrate additional business functions into their core business model, gradually expanding.

More poor people directly contribute to, and benefit from, growth: a growing number of rural poor have access to better quality jobs and increased incomes.

Women are socially and financially empowered: existing and new businesses have a vested interest in providing products and services that benefit women as consumers, suppliers or employees; more opportunities for women to be active participants in economic decisions and transactions; female entrepreneurs emerge; incomes are increased.

Economy’s reliance on imports reduces: Improvement in milk productivity reduces the domestic milk supply-demand gap and reduces reliance on imported powdered milk; new businesses enter the market with locally produced inputs that replace imports.

Linkages between local and regional entrepreneurs (tier 2) work alongside large well-established businesses (tier 1); small, innovative and regional business ventures scale up and broaden the entrepreneurial base of the Pakistan economy; more products and services available to small farmers.

Rural village economies are stimulated: Businesses act as demonstration cases encouraging an entrepreneurial spirit with more businesses populating the economy; people benefit from these businesses as either consumers, suppliers or employees; increased disposable income available for expenditure in the rural economy on a diverse range of products and services.

Enhanced rural livelihoods reduce the rural-urban poverty drift: more job opportunities for rural young men and women.

Government responds to assist competitiveness of the sector: new legislation is adopted that ensures production standards are maintained; small farmers produce better quality milk and meat.

Conclusion

This case study has shown that achieving lasting systemic change in a large and well-established economy is possible.

It highlights that investing in innovative products and services, if specifically targeted for the BOP, can yield significant results. The business model has to be underpinned by the most robust research and understanding of the whole market system. It has to ensure the poorest have the right incentives and knowledge for changing behaviour, and that real benefits accrue to them swiftly.

Women can be significant catalysts for change, but these benefits will only be realised if women are central to the design and implementation of every stage of the business model.

In developing the business model a phased approach proved extremely effective, starting with tightly focused pilots that adapted quickly to market dynamics.

In large and well-established economies a balanced portfolio of partners, from large national businesses to small rural based enterprises, helped ensure rapid systemic change by addressing a range of constraints in the market system.

Once the financial benefits of the business model became apparent crowding in became almost automatic: large businesses broadened their client base to include poor farmers, and entirely new businesses, products and services, entered the market.

MDF has demonstrated that the 'sweet spot' for market development interventions is found where there is the combination of:

- A sector that is fundamental to the livelihoods of millions of poor people;
- A market system that is of sufficient size to be of significant financial interest to the private sector and;
- A business model with innovations that have real potential for rapid and lasting pro-poor systemic change.

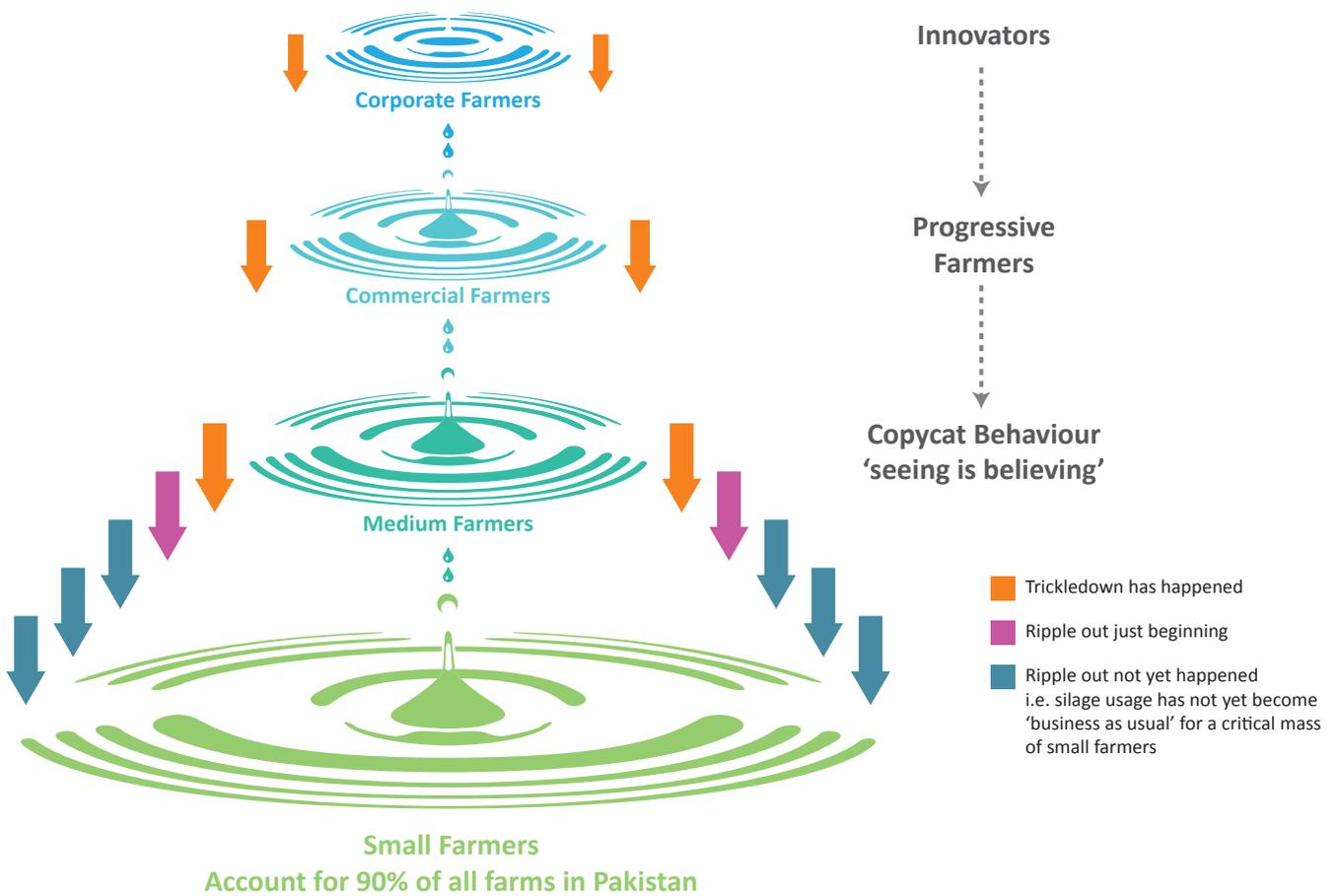
In Pakistan, it is silage.



Appendix

APPENDIX 1: THE TRICKLEDOWN – RIPPLE OUT EFFECT OF SILAGE IN PAKISTAN (2006-2017)

Trickle down and ripple out effect



APPENDIX 2: MDF'S PROGRESS IN ACHIEVING SYSTEMIC CHANGE IN THE SILAGE MARKET (2014 - 2017)

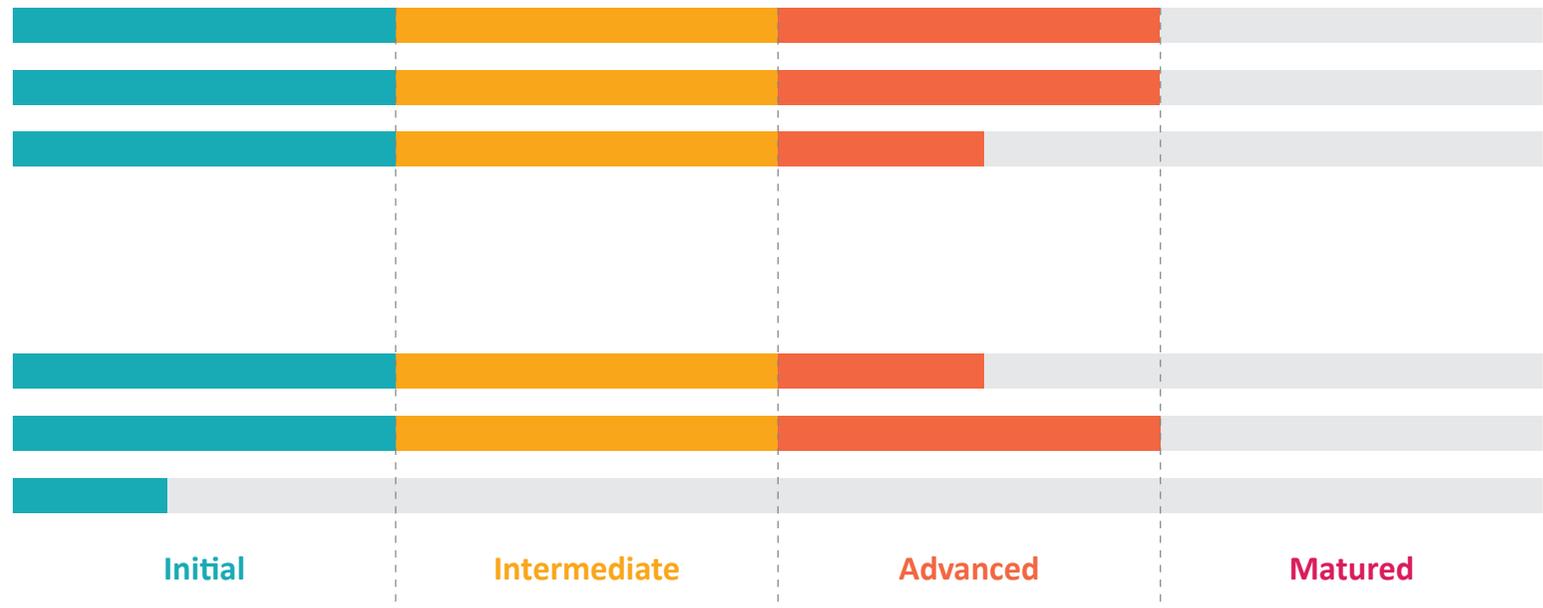
Progress within the framework

Business and Institutions

- Autonomy
- Sustainability
- Resilience

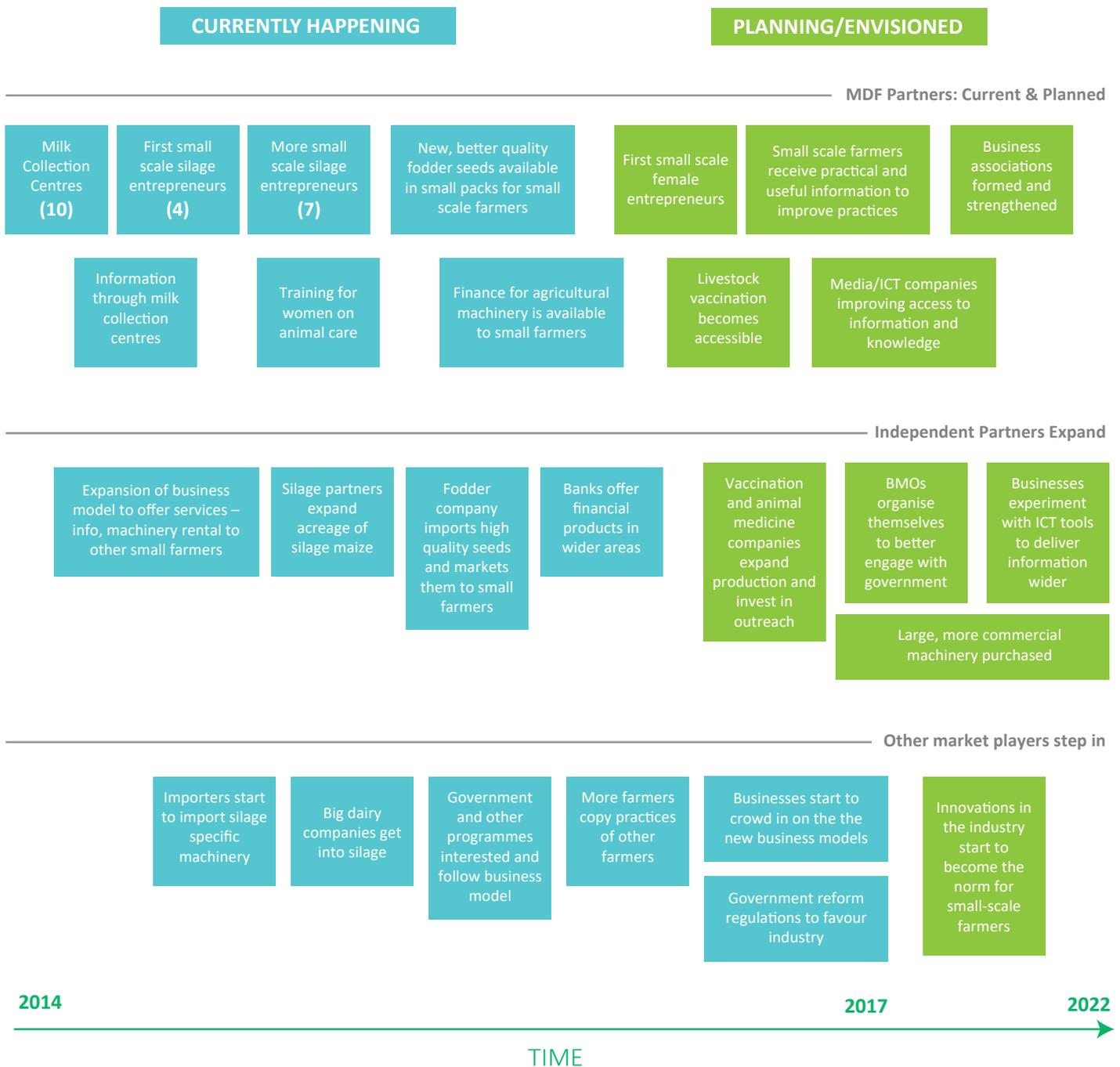
Beneficiaries

- Scale
- Inclusiveness
- WEE



Coloured areas = achieved | Gray = not yet achieved

APPENDIX 3: MDF'S SYSTEMIC CHANGE PATHWAY FOR THE DAIRY AND MEAT SECTOR (SILAGE) — PROGRESS 2014 TO 2017





- **Fiji:** Level 5, Fiji Development Bank Building, 360 Victoria Parade, Suva, Fiji Islands
- **Timor-Leste:** 2nd Street, Palm Business & Trade Centre, Surik Mas, Dili
- **Pakistan:** 95-E/1, Syed Shamshad Haider Road, Hali Road, Gulberg III, Lahore, Pakistan
- **Sri Lanka:** No 18 Police Park Avenue, Colombo 5, Colombo, Sri Lanka
- **Papua New Guinea:** Level 6, PwC Haus, Harbour City, Port Moresby, Papua New Guinea

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