



**Palestinian Market
Development Programme**

MARKET SYSTEM ANALYSIS: ANIMAL FEED SUMMARY OF THE STUDY

JUNE 2015



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Introduction

Background

Livestock is one of the key sectors of the Palestinian economy, with over 15,000 low-income individuals involved as 'livestock farmers,' and hundreds of thousands of consumers of livestock products and derivatives. As part of its investigations into pro-poor growth opportunities in agriculture, PMDP identified the trend of increasing costs of livestock production. These are contributing to both more expensive livestock products for consumers and lower margins for livestock farmers. Initial investigations showed that the increase and fluctuation in prices is due to one key ingredient of livestock production – animal feed.

This analysis therefore focuses on the market system for concentrated animal feed, which is the root cause behind higher livestock prices in Palestine. This deeper assessment of is intended to provide an analytical base for interventions which could potentially increase competitiveness of concentrated animal feed production in Palestine.

Prior to the 1990s, Palestinian livestock farmers relied on harvesting their own grain to feed their livestock, including cattle and goats. At the time, the production of animal feed was more dependent upon local inputs. The taste preferences of Palestinian consumers also contributed to the practice of rearing grain-fed livestock, due to the higher preference for grain-fed red meat. Over time, several factors have contributed to a shift in feeding practices for livestock. These include an increase in citizens population, and decrease in grain production and grazing areas. New varieties of vegetables and fruits have also been introduced, leading to the reduction of reliance on grains as fodder,¹ and an increase in utilisation of concentrated animal feed. A general shift from full grazing to semi-intensive farming has also had a significant impact on livestock feeding practices which increased the demand on the concentrated animal feed.

Currently, the two prevalent types of rearing styles in Palestine are intensive² and semi-intensive³ - representing 100% and 98% of livestock cases in the West Bank and Gaza respectively. In the vast majority of cases, a typical herd is managed by the women and children of a farming family. For them, breeding sheep and goats (and sometimes cows) serves multiple functions. Livestock serves as a source of income, as a store of wealth, and is also used for household consumption. Women play an active part in the rearing process, particularly in feeding the animals, cleaning barns, and managing dairy production. They are less involved, however, in the production of animal feed itself.

The cost of producing animal feed in Palestine remains high, due to the high reliance on costly imports, and fluctuation in the prices and availability of raw materials. The market system is also hampered by falling production levels and fluctuating availability of grains and other inputs, which could serve as local replacements of imports.

¹ Fodder is food provided to animals, whether from grains or concentrated ha y, or both , or any kind of animal food

² Intensive Farming System is a system that depends on the provision of concentrated animal feed as a primary input in the production process, sometimes called closed feeding system (the percentage of grazing by animals = zero%).

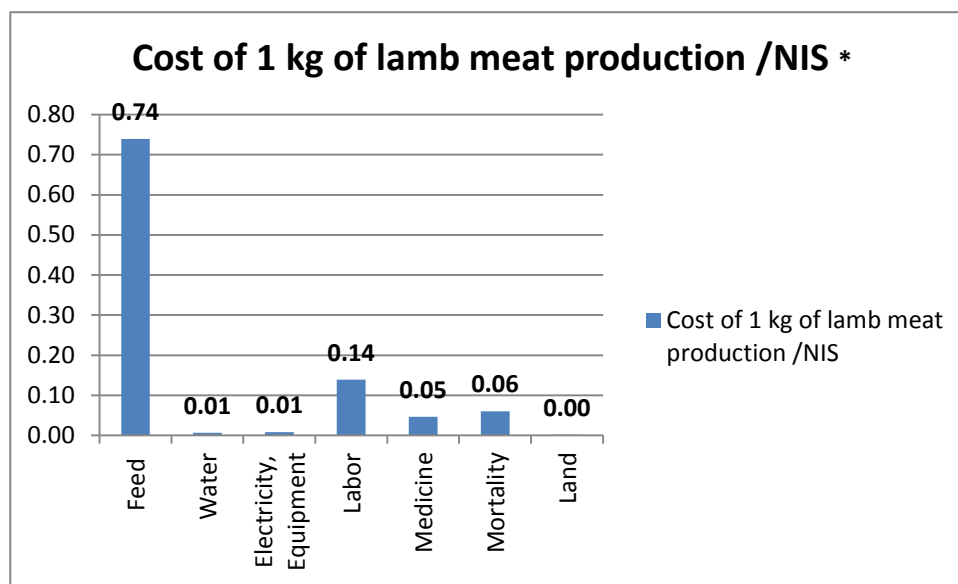
³ Semi-intensive Farming System is a system where breeders depend on providing portions from concentrated animal feed in addition to the partial grazing of animals in certain seasons.

The objective of this report is to analyse the animal feed market system, with a view to identifying and facilitating the execution of interventions which can increase the competitiveness of local animal feed production, thereby leading to a decrease in its costs.

Market Failure: The Rising Cost of Livestock Products in Palestine

Livestock products, which include meat and dairy, are core components of the Palestinian diet. Their prices have been rising in recent years, steadily moving out of the reach of average consumers.

The cost of raising livestock (meat and milk) is driven primarily by⁴ the high and rising cost of animal feed. Feed constitutes, on average, over 70% of the operational costs of ruminant farms (which produce both meat and milk). The table below shows the distribution of the different costs for inputs per 1 kg of lamb meat production.



* The cost is calculated for lamb before slaughter

Figure 1: Cost of 1 kg of Lamb Meat Production/NIS

The price of meat and dairy is highly affected by the cost of animal feed as demonstrated in the graph below:

⁴A Roadmap for Agribusiness Development in the Occupied Palestinian Territories, TechnoserveInc and Oxfam with support from Portland Trust, submitted by DAI under FNMD Programme 2011.Al Qab and Abu Omar 2015.

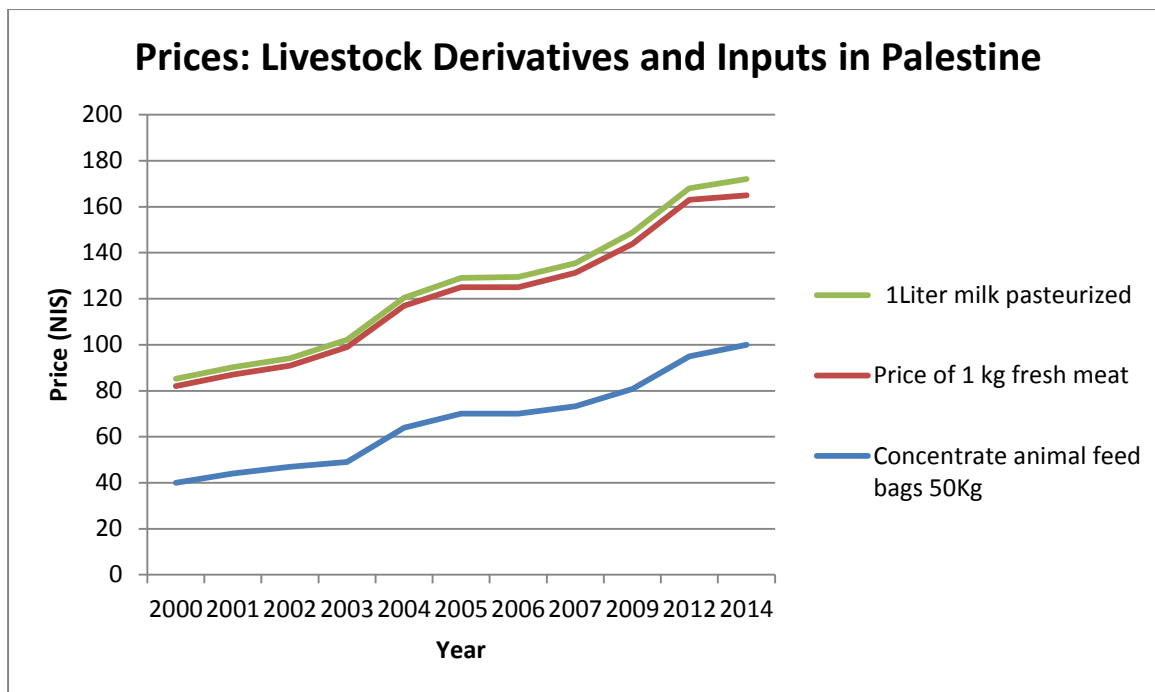


Figure 2: Price of livestock derivatives and inputs in Palestine (2000-2014)

According to the WFP (in 2010) when livestock herders are faced with high feed prices, they respond by:

- Reducing the animal feed rations given to their sheep or goats.
- Using lower quality, lower-cost animal feed, by reducing the amount of protein in the mix, or by increasing the amount of filler feed⁵.
- Moving to easily-accessible grazing areas to reduce the use of purchased animal feed. However, this can negatively impact the environment. Some livestock herders also allow their animals to graze on horticultural crops such as grapes and olives, which harm harvests.
- Selling part of their herds to obtain additional income or reduce operating costs. It is preferable to sell lambs and rams, as ewes are kept behind for milk production.
- Reduce spending on veterinary services.
- Reducing spending Spend less on their families' medical care and education, this has significant negative effects on the health status and education level of the family members, as well as productivity and future hopes in the development of the family business and livestock.

Therefore, reducing the cost of animal feed by facilitating increased competitiveness amongst the actors involved in its production has the potential to generate significant impact on livestock herders and meat and dairy consumers.

Objectives of the Study

This study is aimed at exploring one of the root causes of high meat and dairy prices in Palestine (West Bank and Gaza) due to its central importance to livestock, a key part of the Palestinian economy. Its objectives are to:

⁵Filler Feed means hay and straw and similar materials from plant waste that is provided for the animals in order to fill their rumen which usually has less nutritional content from concentrated animal feed.

- Analyze the dynamics of transactions between core actors in the animal feed market system (suppliers and buyers of concentrated animal feed)
- Analyse the rules and regulations which govern the animal feed market system
- Identify the supporting functions (or ancillary market systems) for animal feed
- Identify the key constraints keeping the sector from increased growth and competitiveness
- Determine opportunities to produce feed with higher nutritional value and at lower cost
- Assess farmer knowledge and practices around handling ruminant nutrition;
- Develop a future vision for the sector, along with interventions which can mitigate key constraints, and generate inclusive growth in the market system.

The study first maps the core of the market system, by analysing the demand for concentrated animal feed, as well as the value chain which supplies it. It pays specific attention to the practices of livestock breeders and herders, the quantities and qualities of feed that are produced and traded. Furthermore, the study identifies the key constraints preventing the sector's increased competitiveness, the supporting services that sustain the primary market system, and the rules that govern it. The study concludes with recommendations for increasing the market system's productivity and competitiveness.

Market Research Methodology

This study is based on the Making Markets Work for the Poor (M4P) methodology, also known as the market development approach. M4P is a framework for private sector development programmes which seek to identify and mitigate the root causes of constraints to economic growth. The market development approach is both a framework for analysis as well as for facilitating industry change. It consists of three main conceptual elements: the Core, Supporting Functions, and Rules. The Core maps the end markets for a specific product or service, as well as the spectrum of value chain actors engaged in bringing a product or service to market. Supporting Functions are interconnected market systems, which a primary market system relies upon. Rules refer both to formal laws and policies, as well as informal norms, which govern any industry, or market system.

Utilising this framework generates an in-depth understanding of the concentrated animal feed market, which can be used for the design of any potential PMDP interventions.

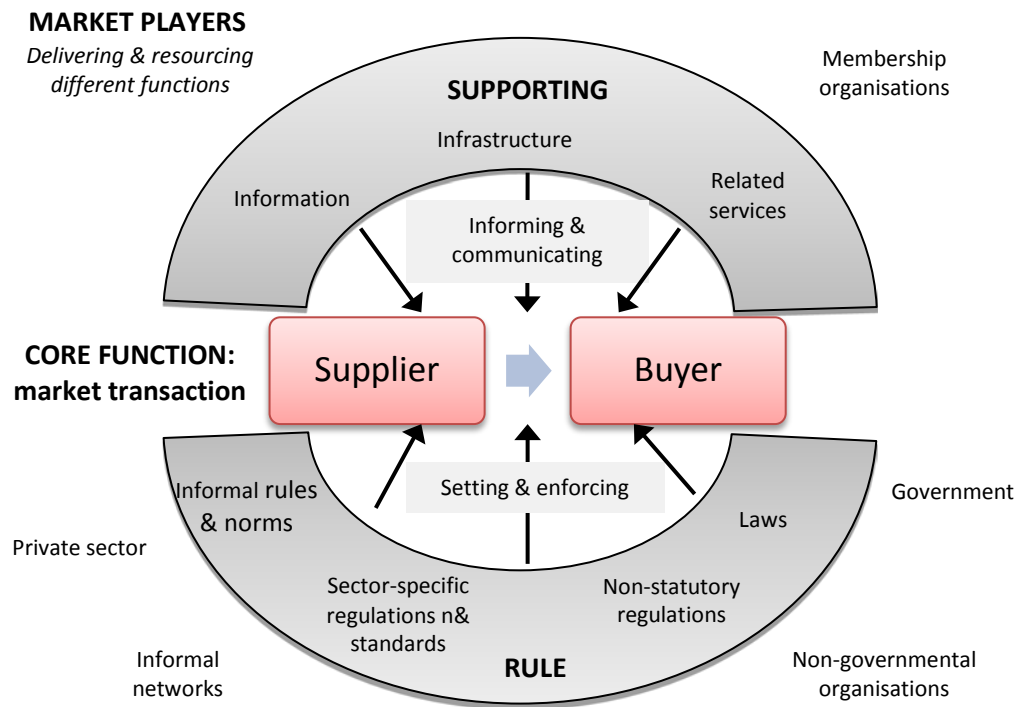


Figure 3: Market Development Methodology

This study has utilised several tools to conduct a comprehensive analysis. They include:

- Desk research and literature review of national and international publications.
- Field visits to meet with importers, manufacturers, and producers of animal feed, as well as wholesale and retail resellers.
- Meetings with other key stakeholders in the concentrated animal feed market, such as agricultural academics, inspection centers, laboratories, and relevant governmental departments in the Palestinian Ministry of Health and Ministry of Agriculture.
- Meetings with donor-financed projects supporting the livestock sector
- A field survey was conducted to study demand, targeting sheep, goat and cow herders, for both milk and meat production. A cluster⁶ sample methodology was used to create a precise representation of population under study. More than 500 breeders from both the West Bank and Gaza Strip were surveyed.
- Workshops were conducted in both the West Bank and Gaza to validate initial findings.
- Animal feed experts were consulted to generate an understanding of alternative feed mixtures that could deliver higher nutritional value to livestock at lower cost to farmers.

⁶This methodology took into account a number of factors within the equation to estimate the sample size n: P: Percentage of animal owners of all agricultural holders = 9.94%. Value of Z = 1.96 (confidence level 95%) e: the margin of error (confidence coefficient) = 5%. D.E: the impact of study design = 1. NR: lack of response = 5%

Core: The Value Chain for Concentrated Animal Feed

Demand for Animal Feed

The bulk of the demand for concentrated animal feed generated by the livestock sector. This includes the raising of both ruminants and poultry (though poultry is not a focus of this study). The type of feed required changes with the size of farm (small, medium, large), and the type of ruminant production taking place.

Livestock farmers that are engaged in meat production, mostly engage in intensive farming, and are therefore completely dependent upon concentrated animal feed. Those that produce dairy products utilise semi-intensive farming, and therefore less dependent. Perhaps the most important fact about the demand for feed is that the majority of livestock producers use intensive and semi-intensive farming. Therefore, they utilise concentrated animal feed rather than being dependent upon grazing.

During the grazing period, the demand for concentrated animal feed drops, since semi-intensive farmers shift to using grazing. Resultantly, feed production at mills drops by about 40%. The study also shows that most of those purchasing concentrated animal feed are low-income individuals, with limited monthly income of NIS 2000 or less. The West Bank's requirement for animal feed is higher than Gaza.

For 2015, the total combined consumption of concentrated animal feed for ruminants expected in the West Bank and Gaza is about 498,414 tonnes. The requirement for the West Bank is 427,886 tonnes and for Gaza, it is 70,527 tonnes. The combined requirement represents 35% ($498,414 \div 1,418,598$) of the total quantity of various types of animal feed to be consumed in Palestine this year.⁷ Approximately 40% of the requirement for concentrated animal feed is for the fattening of dairy sheep. Moreover, almost 60% of the total consumed concentrated animal feed is of the 18% concentration level.

⁷ Note that the combined animal feed category consists of concentrated animal feed, grain, various green feeds, hay and straw legumes, hay and straw field crops, silage, and concentrated feed and green feed mixture.

Annual consumption of total animal feed in oPt - 2015 estimates - (tonnes / year)								
Includes concentrated feed, hay, silage ⁸ and various green feeders								
Breeding Objective	Concentrated mixtures	Grain (Domestic and Imported)	Various green feeds ⁹	Hay and Straw Legumes	Hay and straw Field Crops	Silage	Concentrate feed and green feed mixture	Gross total of all feed
Dairy cattle	72,937	0	21,355	2,913	18,651	0	25,899	141,755
Calf Fattening	68,953	0	7,045	3,857	17,989	0	0	97,844
Dairy Sheep	177,604	192,512	61,994	16,115	224,569	6,544	7,102	686,442
Sheep fattening	112,419	38,971	23,071	13,536	40,232	0	7,352	235,582
Dairy Goat	41,170	59,828	18,178	17,458	59,713	0	38	196,385
Goat Fattening	25,330	4,721	2,583	7,791	18,456	0	1,713	60,593
Total	498,414	296,033	134,226	61,669	379,609	6,544	42,103	1,418,598
%	35.13%	20.87%	9.46%	4.35%	26.76%	0.46%	2.97%	%100

Source: consumption estimates based on field survey results and the statistics of the Palestinian Central Bureau of Statistics with respect to animal wealth.

Table 1: Annual consumption of total animal feed in oPt - 2015 estimates - (tonnes / year)

The total value of animal feed for ruminants consumed in Palestine is estimated to be NIS 930.3 million (\$245.1 million) for 2015. The West Bank's consumed 84%, valued at NIS 820.3 million (\$205.1 million), whereas Gaza's consumed around 16%, valued at NIS 160 million (\$40 million).

The value of consumption of ruminant feed in oPt - 2015 estimates - (thousand Israeli Shekel / year)								
Breeding Objective	Concentrate mixtures average cost	Domestic and imported grain	Green feeds	Hay and straw Legumes	Hay and straw Field Crops	Silage	Concentrate feed and green feed mixture	Total
Dairy cattle	141,096	0	26,392	2,622	40,294	0	31,283	241,687
Calf Fattening	154,193	0	10,436	6,974	22,897	0	0	194,500
Dairy Sheep	324,387	301,627	78,513	19,228	211,562	7,330	10,779	953,426
Sheep fattening	229,242	81,991	29,297	20,231	63,786	0	16,614	441,161
Dairy Goat	80,549	92,272	19,335	17,814	59,274	0	100	269,344
Goat Fattening	50,720	12,242	1,465	9,171	25,420	0	3,847	102,865
Total in NIS	980,187	488,132	165,438	76,040	423,233	7,330.0	62,623	2,202,983
%	%44	%22	%8	%3	%19	%0	%3	%100

Source: consumption estimates based on field survey results and the statistics of the Palestinian Central Bureau of Statistics with respect to animal wealth.

Table 2: Estimated Value of consumption of ruminant feed in the oPt, 2015

⁸ Silage is fermented high moisture feed which could be served to the ruminants as supplementary meal. It consists of a range of agricultural byproducts.

⁹ Green Feed: fresh green grass or cut agricultural byproducts that can feed to animals.

The total demand is met partly by imported concentrated animal feed from Israel, and partly by local production. The below table provides statistics about the source of the animal feed and its usage:

Type of animal feed	Locally produced VS Imported	West Bank	Gaza	Total
Ruminant Feed	Locally produced	70,400	6,120	76,520
	Imported from Israel	160,000	44,000	204,000
Total				280,520

Table 3: Ruminant feed breakdown (Imported vs. Locally produce) As of 2015

The Impact of Livestock Breeding Practices on Demand

The analysis shows that Palestinian livestock producers, particularly in the West Bank, have a strong preference for high-yielding hybrid livestock varieties. This includes high-productivity calves for fattening, high-yielding cows (milk), and high-yielding Assaf sheep (milk and meat). The situation is different for goats, as the pure Shami breed is used mainly for milk production. It is an expensive breed, so it is not commonly used for fattening.

In Gaza too, a mixture of pure and hybrid livestock strains are commonly found for cows (milk), sheep (fattening), calves (fattening), and goats (milk), sheep (Assaf breed).

This indicates that most livestock producers in oPt use either intensive (34.2%) or semi-intensive production (64.3%) systems. During the survey, less than 1.5% of livestock breeds in the West Bank were found to be fully dependent upon grazing (diffusive or open) alone. In Gaza, not a single case of such grazing breeds were found. There is an increasing dependence on concentrated animal feed, driving up the amount and varieties required.

The results of the study of breeding practices also reveal several other insights:

- 100% of sheep (milk) breeders in Palestine provide grains and filler animal feeds for their sheep. However, the mix of concentrated animal feeds (at varying levels of concentration, such as 18% or 16%) differs from one breeder to another.
- Breeders rely on intensive systems for fattening more than for milk production;
- Breeders use semi-intensive production systems more for sheep and goats than for cows;
- Particularly in the West Bank, farmers increasingly rely on intensive and semi-intensive breeding, except for milk sheep and goats, where pastoral breeding is still common in nomadic and semi-nomadic areas.
- Goats, especially pure breeds have the ability to subsist on grazing for long periods of time, including even when availability is low, such as in the summer and fall.

Approximately 85% and 23% of livestock farmers in the West Bank and Gaza respectively, do plant some of the key ingredients of animal feed on their own land, and engage in a mixture of agriculture and livestock. However, the share of self-grown inputs as part of the overall amount of animal feed consumed is modest. It represents only 5% of grain and 7% of straw utilised for animal feed in the West Bank, and 3% of grain and 1% of hay in Gaza Strip. This again underscores the fact that the vast majority of livestock farmers need to purchase concentrated animal feed, grains, and fillers

from the market. Pooled purchasing of larger quantities could increase their ability to negotiate more favourable prices and terms.

The Impact of Livestock Feeding Practices on Demand

Ruminant feeding practices are also of central importance to the type and quantity of concentrated animal feed demanded by livestock end market:

- Feeding practices differ between livestock farmers. In general, many livestock farmers provide large quantities of different feed for sheep and goats, exceeding the recommended daily need. This means that part of the feed is wasted, especially grain, straw, and hay.
- Cows that are kept for milk (especially heifers) production are quite often provided with lower quantities of total animal feed.
- Calves, sheep, and goats kept for fattening receive more feed in the second six months of their life, as compared to the first six months.
- Specialised feeds have been developed for goats and sheep, but that is not the case for cows or calves.
- Animals kept for dairy production are given more feed than those kept for milk production.
- In the West Bank, pregnant sheep and goats are given lower amounts of feed than those kept for milk. Virgin sheep and goats are fed even less. The practice in Gaza is to do the opposite.
- Most farmers purchase various types of animal feed separately, and then mix it themselves. A smaller percentage of livestock producers purchase readymade mixes.
- The type of animal strain and the product under consideration (meat or milk), has a direct impact on the quantity and frequency of feed provided. In general, animals kept for fattening receive more feed.
- Overall, cows require more feed than sheep and goats.
- Ruminant producers in Gaza often utilise alternative feed along with filler feed, instead of concentrated animal feed.

The Supply of Animal Feed

The Core of the Palestinian animal feed market system consists of a series of actors, performing a few distinct functions, and selling into several distinct end markets. Some of these actors are highlighted below:

- The production side of the value chain begins with the procurement of raw material, and a range of services and preparations known as pre-production.
- Animal Feed producers, who can be organized into separate channels, with varying degrees of manufacturing and technological complexity.
- Traders and importers of animal feed products and agricultural inputs, bringing in products either through Israel or other countries.
- Small, medium, and large scale farmers of poultry and ruminants, obtaining feed through retailers and/or distributors

The demand for feed (which comes from ruminant and poultry farmers) originates from various distinct end markets, which differ from each other based upon farmer preferences, feeding and

breeding practices, amongst others. The supply or production of feed can be organised into various channels, depending upon whether the product is “grain,” “filler feed,” or “concentrated animal feed” or even a combination of these.

Relationships between market actors can be understood in terms of vertical and horizontal links. In addition to these the value chain also includes a series of interconnected systems (often also called Supporting Functions). The supporting functions are ancillary market systems (such as feed, transportation, or financial services) which are key to the functioning of the primary value chain.

These relationships can be accurately represented in a value chain map, which is shown in Figure 4:

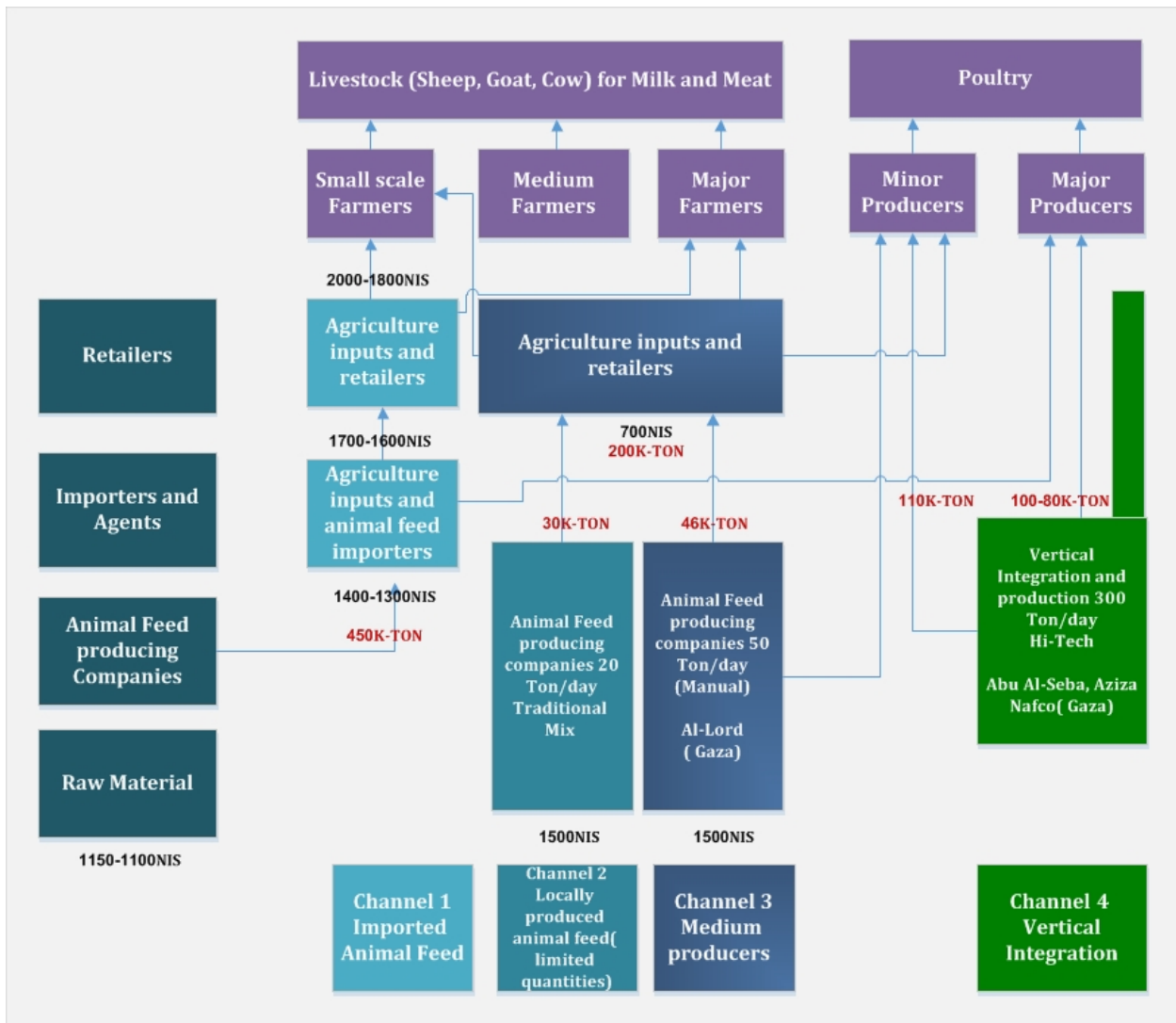


Figure 4: Diagram of animal feed value chain - Palestine's animal feed sector

Animal Feed Producers

The following presents the main characteristics of the animal feed producers:

- Mills¹⁰ and animal feed packaging factories constitute the largest share of production.
- Among the 44 Palestinian concentrate animal feed producers, there are 7 (4 in the West Bank, 3 in Gaza Strip), with advanced techniques, which specialize in chicken feed production¹¹.
- Mashed¹² animal feed constitutes more than half of the locally produced animal feed.
- All factories operate at utilisation of between 30% and 40%¹³, and ruminant feed factories normally lack storage capacity.
- 100% of producers are dependent upon the import of raw materials from Israel.
- Not a single factory in either the West Bank or Gaza Strip is quality-certified.
- The average number of employees in large factories is 15.
- None of the animal feed factories have laboratories to inspect the feed before shipping it to the market.

Number of Factories and Mixers in Palestine

Presently (March 2015), the supply of animal feed for ruminant is met from local production at 44 local factories (41 in the West Bank and 3 in Gaza) as well as from imports from Israeli factories. The total supplied concentrated animal feed is around 280,000 ton per year (220,000 in the West bank and 60,000 in Gaza), of which only 76,000 tons (70,000 West bank and 6,000 Gaza) are produced locally while the balance is purchased from Israel. The local factories are considered small suppliers in comparison with the Israeli suppliers. Israeli suppliers have access to the oPt market as well as the Israeli market. The Israeli market represents around 80% of their market and the oPt represents only 20%. The increased economies of scale means that they are in a more competitive position vis a vis local producers.

Sources of Raw Material for Concentrated Animal Feed

The local factories depend mainly on Israeli suppliers to purchase raw material. The raw material is bought either in bulk (that is transported in special trucks) or in large bags. All local factories buy the same raw material; however they try to differentiate their products in the formulas of the mixture. The local factories typically don't not buy big quantities of raw material due to the limited financial resources and the storage capacity, which could result in missing some opportunities to reduce the cost of feed at the time raw material prices are low or exchange rates are to their advantage, The availability of raw material is mainly controlled by the Israeli suppliers, who do not supply enough raw material when prices are expected to go up. The local factories typically have to either change the formula and start using alternative raw material or stop production until raw material are available in the market. As a result the local farmers do trust the local product due to

¹⁰Primitive factories that operate in grinding different grains using mechanical mills

¹¹Field visits to production factories during the implementation of the study

¹²Mashed Feed is produced from mixing crushed grains without any special processing and is considered by farmers as lower quality and through their experience they prefer granular fodder because it gives better results and it undergoes thermal treatment at production.

¹³According to estimates of experts and feed manufacturers

the constant change in the feed and the fluctuation in price that leads farmers to buying the Israeli product.

Raw materials used in the production of intensive formula

The Palestinian concentrated feed formula typically consists of: corn, wheat, soybean, sunflower, barley, bran, vitamins, lysine, Mithalin and salt. The mixture varies depending on the anticipated protein level in the feed depending on the expected use of the feed such as for dairy cow, cattle meat. Both in West Bank and Gaza the use animal waste and protein in production is prohibited by health and safety standard in the Palestinian Authority. The other component that Palestinians are not allowed to use in producing concentrated feed is the Urea since it is prohibited by the Israel to be sold in the West Bank and Gaza.

In Gaza, the local factories usually produce lower quality feed to keep the price at a low level. The Israeli factories typically offer the higher quality, higher price product, which leaves some room for the local suppliers in the market.

The following figures show the production levels (2013) in the West Bank and Gaza for the constituent ingredients of Animal Feed:

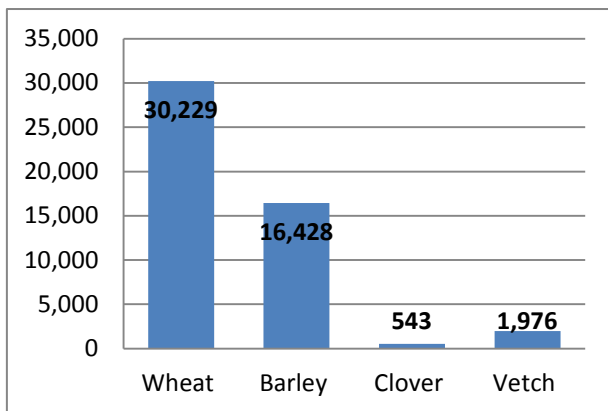


Figure 5: Production quantities of animal feed grain in the West Bank in tons during 2013

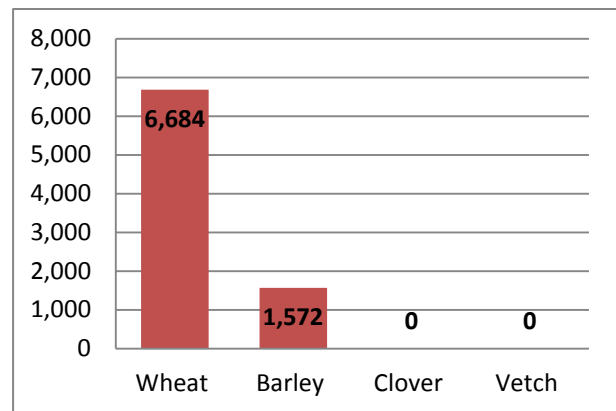


Figure 6 : Grain production in Gaza during 2013

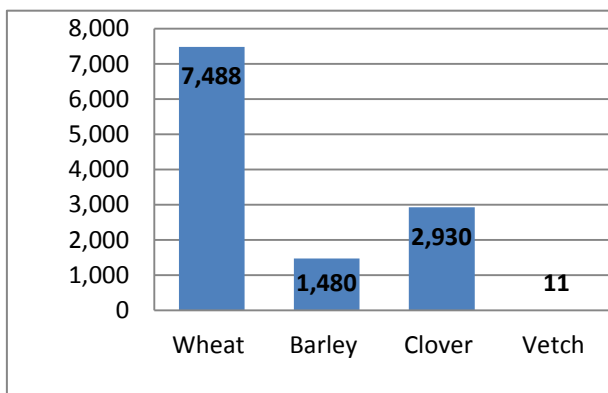


Figure 7 :West Bank's production of straw and hay

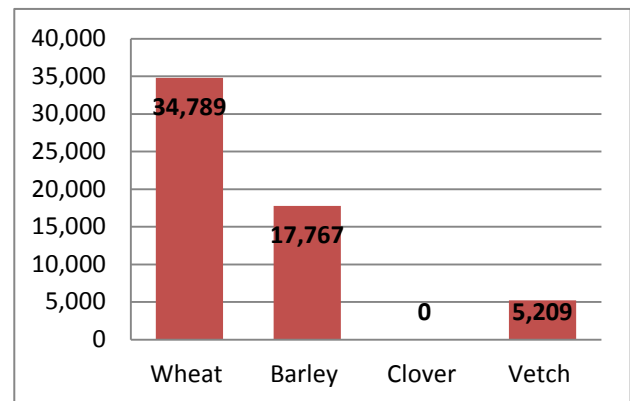
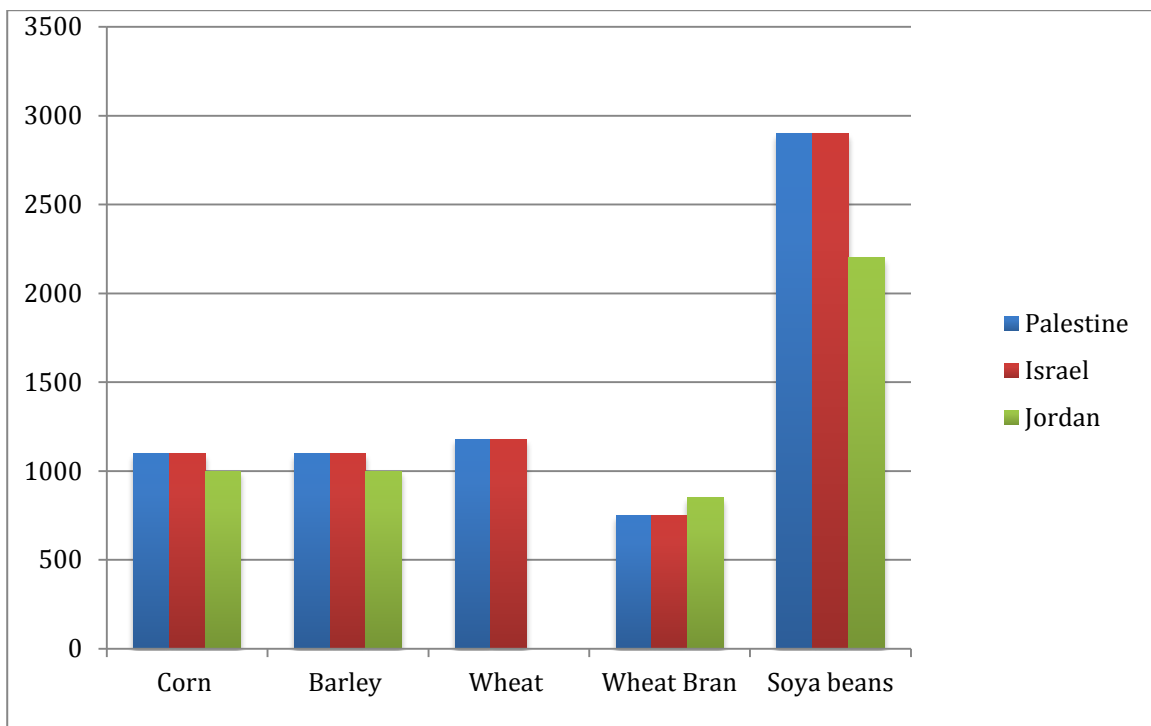


Figure 8 : Gaza Strip's production of straw and hay

Comparison of Raw Material Costs in the Region

The key ingredients of concentrated animal feed are corn, barley, wheat, wheat bran, and soya beans. Grains constitute 95% of the cost of raw materials.¹⁴ The cost of animal feed manufactured for milk production (sheep, goats, and cows) is almost the same in Israel, OPT, and Jordan with the exception of some grains which are slightly cheaper in Jordan. Wheat is not utilised in the animal feed mix in Jordan but it is in the oPt and Israel.

The chart below indicates that a major contributor to the cost of animal feed is soya beans. Soya beans are a main source of the protein in the Palestinian animal diet. Israeli factories also use soya beans, but they also have access to protein alternatives which reduce the cost of feed, and provide Israeli producers with a key competitive advantage.



Source: *Animal feed Mixes and Development Potential to Increase Nutritional Value and Economic Returns*, study conducted by Dr. Jamal Abu Omar (Palestinian Market Development Programme, 2015).

Figure9 : Comparison of the cost of raw materials involved in animal feed production between oPt, Jordan, and Israel as of Feb 2015

The below chart describes actual cost of one ton of feed for lamb in a Palestinian factory compared to the Israel produce of the same feed.

¹⁴ It is worth noting that the source of the protein content in the Israeli animal feed is from animal sources, which reduce the cost of the manufactured animal feed

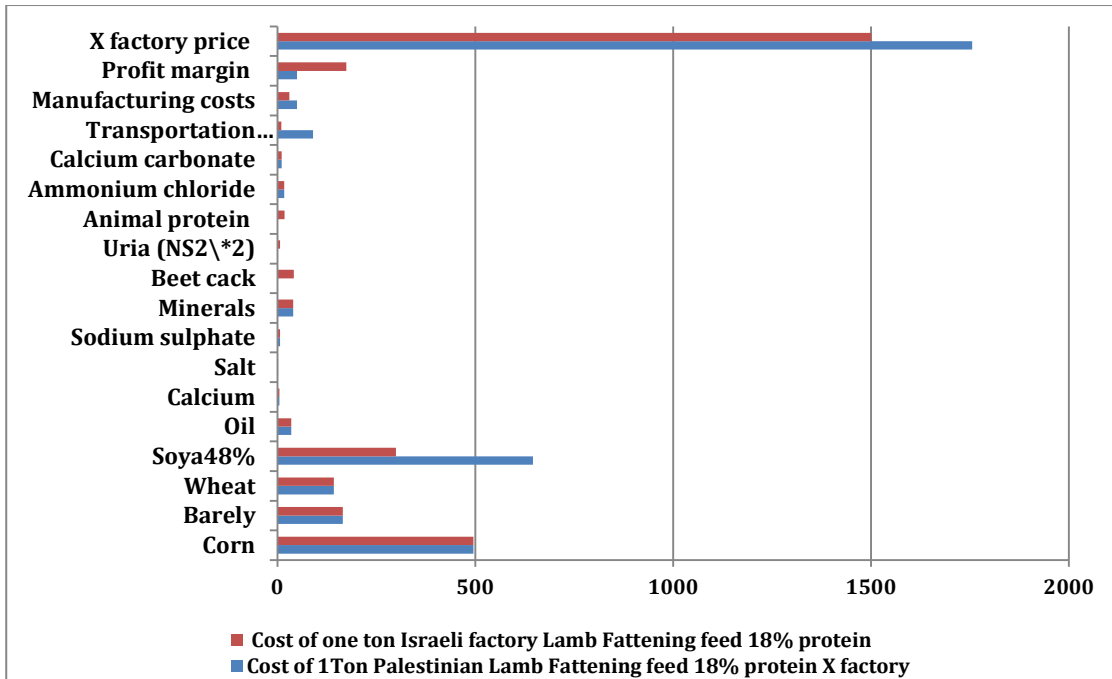


Figure 10: comparison breakdown for the cost of producing 1 ton of animal feed in Israel and oPt

The chart below shows that an Israeli factory is able to produce the same type of animal feed at 379 NIS lower than an average local factory. This is due to the utilisation of a better mixture of ingredients, which lower production cost without reducing yields.

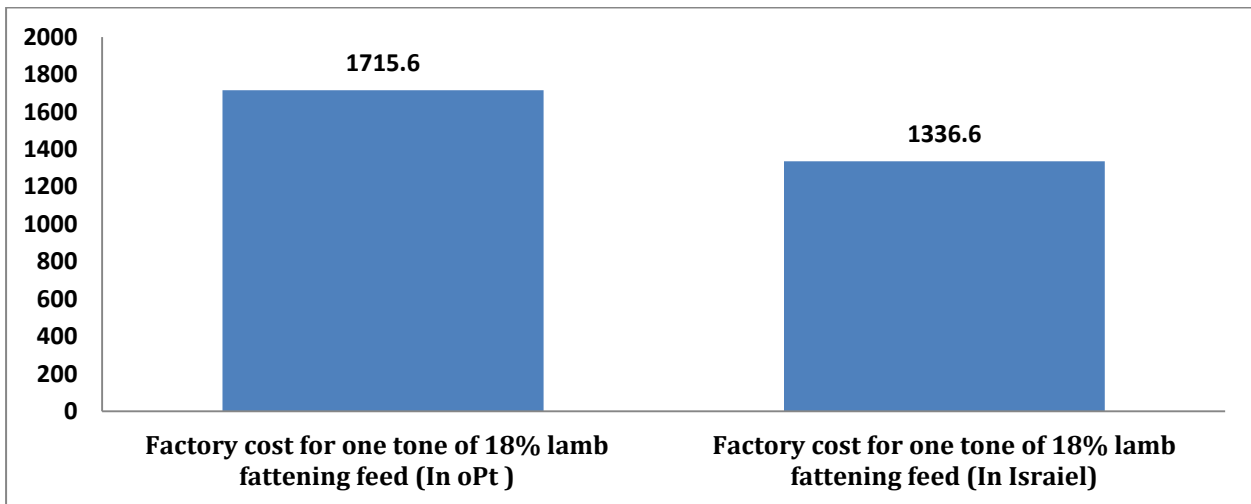


Figure 11: Comparison between Israeli and Palestinian produced lamb feed 18% protein

Different ingredients have direct impact on the price of dairy feed with no reduction in the dairy yield.

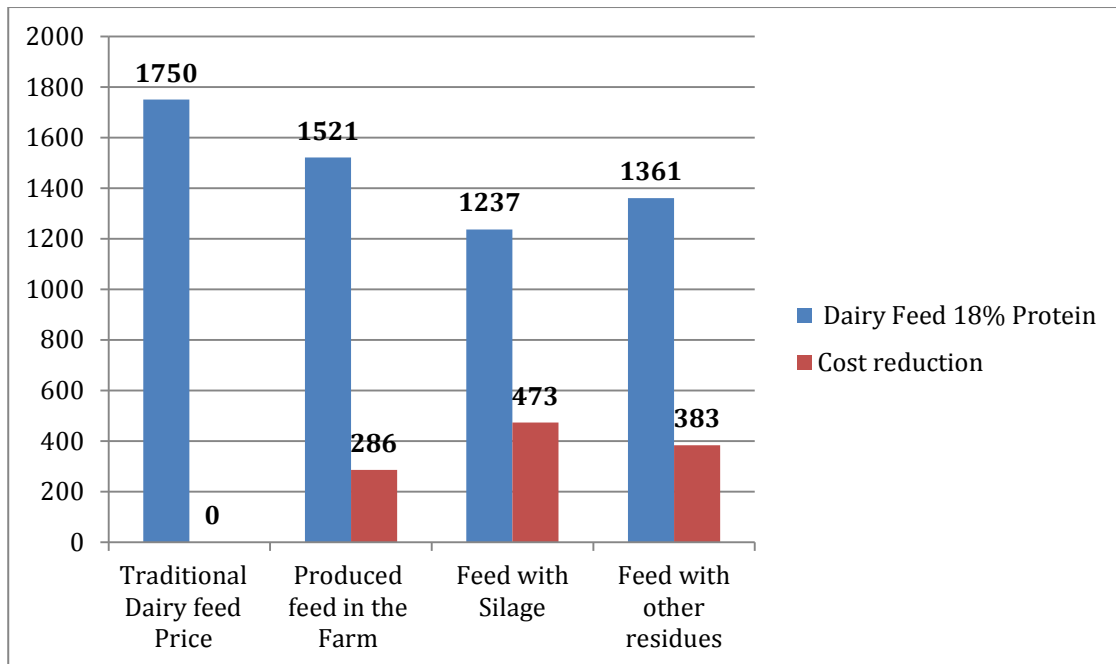


Figure 12: Cost of 1 ton animal feed production as per production type

However, there are large price differences between the three origins when it comes to concentrated animal feed itself, despite the similarities in cost of inputs. These differences are captured in the table below:

Animal Feed Type	Price in Israel	Price in the oPt	Price in Jordan
Fattening of sheep and goats	1800 NIS	1800 NIS	Ranges from NIS 1,100 to NIS 1,400 depends on the % of protein and usage. The reason for the lower prices, than Palestinian and Israeli Animal Feed is that the production occurs largely on the farm instead of buying ready-made mixes ¹⁵
For various sheep and goats' breeding purposes, and cows for milk production purposes	50 to 100 NIS/ton higher than Palestinian-produced ¹⁶	Ranging between 1650 to 1800 NIS	
Calves' fattening (16% and 18% protein)	Israeli feed is higher by 350 to 500 NIS/ton depending on % of protein.		

Table 4: Difference in Price of Animal Feed Type

The below table presents the prices of the local factories and the Israeli suppliers to the Palestinian farmers per use of feed:

¹⁵Communications with the producers and farmers in Jordan, and verification of experts from oPt and Jordan

¹⁶Here we must clarify that these official rates do not take into account the current practice in the market (tax evasion of 18%), which makes the Israeli product cheaper.

Despite higher prices, Israeli-origin feed constitutes more than three times the output supplied

Type of concentrate feed	Price of concentrate feed for the farmer (NIS) Palestinian factories	Price of concentrate feed for the farmer (NIS) Israeli animal feed prices (Anbar)
Cow Fattening Feed 18% Protein	1800-1700	2000-1700
Cow Fattening Feed 16% Protein	1700-1600	1900-1600
Cow Fattening Feed 14% Protein	1600-1500	1800-1500
Lamp Fattening feed 18% protein	1900-1800	2000-1800
Lamp Fattening feed 16% protein	1800-1700	2000-1700
Lamp Fattening feed 14% protein	1700-1600	1900-1600
Cow Milking Feed 18% Protein	1800-1700	1800-1600
Cow Milking Feed 16% Protein	1700-1600	1700-1500
Cow Milking Feed 14% Protein	1600-1500	1600-1400
Goat and Sheep Feed for Milk 18% Protein	1900-1800	1900-1700
Goat and Sheep Feed for Milk 16% Protein	1800-1700	1800-1600
Goat and Sheep Feed for Milk 14% Protein	1700-1600	1700-1500

Table 5: prices of the local factories and the Israeli suppliers to the Palestinian farmers per use of feed from Palestinian factories into the Palestinian market for feed. This is largely due to the following reasons:

- Israeli animal feed regularly enter Palestinian territories without paying customs and tax, where as local produce has to pay 18% Value added tax.
- Longer payment terms offered by Israeli animal feed agents and distributors to local farmers (payment by instalments).
- The agents of the Israeli product have less operational cost since they do not have to pay for storage and other operational expenses.
- Israeli producers offer discounts in the event of ordering huge quantities and provide discounts for cash payments.

Merchants and Wholesalers

Feed merchants (This includes retailers who typically sell all kinds of agriculture supplies or wholesalers who typically specialize in selling concentrated animal feed only) earn a profit of 3-10%, depending on the source and ingredients of the product and sales methods (retailers earn higher profits when selling in 50 kg packages). Wholesalers are reliant upon short turnaround times. They are able to get feed on credit from Palestinian manufacturers, and are able to offer discounts on the purchase of large quantities, and cash payment. However, Israeli feed producers are able to offer them better terms of credit than their Palestinian counterparts.

The sales of animal feed are seasonal - factory owners and merchants indicate that sales drop by about 40% during spring, when many farmers take advantage of availability of natural pastures for feeding livestock, especially those farmers who depend on the mixed feeding style (semi-intensive).

One of the biggest obstacles faced by Palestinian merchants and wholesalers is smuggling. Certain dishonest merchants, particularly in the West Bank, procure feed from Israeli factories and bring it into the West Bank without paying mandatory VAT and duties. Smuggling is known to reduce the merchants' cost of importing by about 18%, which allows them to undercut the market through lower prices. In the West Bank, the locally produced feed is unable to compete with imported feed unless they use alternative sources of protein such as beet cake and corn Gluten Meal, that could be less expensive but will provide enough protein to the mixture.

Cash flow constraints for animal feed producers and re-sellers

- One of the biggest constraints facing Palestinian producers and re-sellers (those who are distributing products other than Israeli imports), is cash flow. Normally they buy raw material inputs or end products in cash and they sell them forward on deferred payment. This leads to a problem in cash flow needed to sustain the business. Often, the limits in their cash supply prevent them from exercising greater purchasing power and availing discount opportunities in international and local markets.
- Second, retailers also face difficulties in collecting the money owed to them by farmers who make their purchases in deferred payments. Debts often have to be written off.

Farmers' relationship with concentrated feed suppliers

Aside from the high prices, there are also several other product quality issues related to concentrated animal feed, which constrain the growth of the livestock sector. These include:

- Farmers have trouble identifying expired goods, as most products (locally produced and imported) do not contain an expiry date.
- Sometimes farmers discover mold or moisture inside the feed. However, feed sales are final and neither refundable nor exchangeable.
- Locally produced feed quality often fluctuates. The real composition/concentrations can vary from those advertised, and therefore, farmers can often get different results even when utilising the same quantities and proportions of mixtures. The fluctuations in quality negatively impact feed conversion ratios, thereby reducing farmer profits.
- In the absence of a quality-control regime, there are no organised bodies that can advocate on behalf of farmers.

In an interview conducted by PMDP, 93% and 89% of breeders in the West Bank and Gaza Strip, respectively, indicated that concentrated animal feed prices fluctuate regularly. Fluctuating prices and inconsistent quality has earned Palestinian feeds a poor reputation.

The resellers and distributors of imported feed are able to offer better payment terms to farmers, since they get more flexible credit terms from Israeli producers. This gives them an advantage over Palestinian mills. Moreover, Palestinian mills are also dependent upon Israeli supplies of raw materials and inputs, and the quantities, prices, and delivery dates determined by such suppliers.

Reliable arbitration systems are not available in the event that there are conflicts over damage done to livestock output from the use of faulty feed. This means that Palestinian farmers give a great degree of importance to quality and price when making feed purchasing decisions. The origin of the feed is less important than what it will deliver.

Shortages of veterinary drugs and supplies are also commonplace. The resulting poor animal health can also adversely affect a herd's milk and meat output.

Supporting Functions

Information and Knowledge

Ruminant producers are not easily able to access accurate information about agricultural best practices and inputs. Information sources are scattered and oftentimes inaccurate, hampering the ability of farmers to maximise their potential. For example, livestock herders and farmers, particularly in rural areas, have a low level of appreciation of the handling and feeding requirement of non-domestic livestock strains. Only 45.5% of the breeders know the recommended validity period for concentrated animal feed to maintain its nutritional value, which is 90 days from the date of production. While 48.2% stated that they have no knowledge of it.

Livestock keeping is a livelihood that is normally passed down from one generation to another.¹⁷ While this leads to useful accumulation of knowledge, it also contributes to a reliance on traditional practices rather than modern solutions. The most common sources of information to farmers (in order of importance), include friends and family, agricultural extension workers, and to a lesser degree, books and internet.

PMDP's survey shows that on average, more than a third of the livestock farmers in the West Bank and Gaza do not seek advice before deciding on daily feed rations.¹⁸ A further third obtain information from animal feed suppliers, other farmers, or extension workers. About 20% try to utilise scientific information.

The results of these inadequacies in information mean that:

- Palestinian livestock keepers have oftentimes lower than average feed conversion ratios, as animal feed is wasted due to excess feeding.
- Nutrient composition of feeds is incorrect, leading to a detrimental impact on the health of ruminants, and thereby reducing yields.
- Farmers lack information about crucial aspects of feed utilisation, such as the lifespan of the feed. E.g. in PMDP's survey of livestock farming, a striking
- There is not enough knowledge about alternatives to concentrated feed, such as silage and fodder. Most livestock farmers (84.1%) are not aware of silage. In many cases where they have heard about it, the benefits are not fully known to them.
- Farmers are not knowledgeable about how policy changes, such as those regarding taxation, impact raw material costs and hence, their bottom lines.

¹⁷ 44.2% and 64.3% of livestock farms ownership in the West Bank and Gaza have been inherited through a parental lineage

¹⁸ 48.5% and 35.7% in West Bank and Gaza respectively.

There are also variations in the technical ability of farmers to prepare animal feed mixes. Producing your mixture at the farm can provide advantage such as providing the appropriate mixture to the animals as needed and required by the diet and can also make use of other alternatives as available at the farm. PMDP's interviews results indicate that only 20% of farmers in the West Bank prepare concentrated and green feed mixes by themselves, while the remaining 80% prefer ready-made mixes. 76% of livestock farmers indicate that this is due to lack of knowledge.

In Gaza, the study indicates that the vast majority of farmers (94%) prefer to prepare their own concentrated and green feed mixtures, while 6% prefer to buy ready-made mixes. 40% of the farmers indicated that they have the knowledge as well as the content used and their alternatives, and they prepare the mixtures periodically. 48.5% of farmers consider the mixtures they prepare not up to the standard of mixtures present in the market but good enough on the level of production efficiency. This is a direct result of the inconsistent availability of feed in the market due to the situation in Gaza.

Despite the availability of knowledgeable livestock advisors at the Ministry of Agriculture (MoA), they face logistical difficulties in providing full cover to the farming communities in the West Bank and Gaza. 45% of farmers in the West Bank and about 33% of those in Gaza are unable to access agricultural extension services. Even where they have been able to reach, the public sector extension agents have not been effective in instituting more effective animal feeding practices.

Moreover, only 8% of farmers report having consulted an agronomist to determine their feed mix. This is primarily due to the fact that the focus of the public extension system is on veterinary services, rather than animal feeding.

Rules and Regulations in the Concentrated Animal Feed Market System

The legal environment

The registration of a feed factory requires compliance with different authorities and ministries such as the Ministry of National Economy, Ministry of Agriculture, Ministry of Health, and the Environment Quality Authority, which makes it complicated to be formally registered and achieve the operation license. The complicated process means that many businesses in this industry choose to remain informal.

The Palestinian law of the year 2003 has assigned the following responsibility to the Ministry of Agriculture in regards to the animal feed¹⁹:

- Preparation of the bylaws and regulations related to the used raw material, finish product as well packaging and storing conditions.
- Registration of the concentrate feed and additives, supplements and imported compound feed.

¹⁹ Even though the law was available at the time of conducting this market system analysis, the bylaws were not published.

- Setting the internal control measures for the factories and monitor the compliance at the factory. This includes preparing the factories and providing them with the required training to properly implement the control measures.
- Regulating the types of raw material that can be used in producing animal feed.

Even with the existence of the Palestinian Ministry of Agriculture, the Israeli Ministry of Agriculture still controls the ingredients of the animal feed and the importation of the raw material.

Current Feeding Practices and Norms

One of the differences between Gaza and the West Bank is a norm in the latter to not make regular changes to their feed mixtures. The majority of the farmers interviewed in the West Bank (76.5%) reported that they hadn't changed content ratios or concentration levels in their feed mix in the past five years. By comparison, 42.9% of interviewed Gazan farmers had made changes in the past five years, and 42.9% of them had realised production efficiencies.

The calibration of proportions of feed given to ruminants is closely tied to the purpose for which they are being raised, their position in the life cycle, and their age and weight. E.g. the feed mix for ruminants raised for milk production depends on whether they are at the dry, impregnated, or milking stage. For ruminants raised for meat production, it was found that Gazan farmers consider animal age for calves and sheep to have the most influence on feed proportions. In the case of goats, the most influential factor is the strain. Weight came across as the second most important factor.

The respective costs of various types of feeds is also, naturally, an important factor. To counter the rise in feed prices, a considerable minority of farmers (approximately 28%) report that they blend in cheaper feeds, even when it reduces quality.

Farmers often gain technical information through informal conversations with feed distributors. The latter however, report that it is easier to convince new farmers to adapt their feeding practices than older farmers, who are more set in their ways even if they are inefficient.

Research and development of high-yielding commercial strains of ruminants is another area of weakness. There is also a gap when it comes to commercialising higher yielding species – farmers are often unaware of these.

Smuggling

This is one of the biggest problems facing Palestinian animal feed producers, as smuggled feeds from Israel constitute the major share of the Palestinian market and compete directly with local feeds. Overall, there are weak controls over Israeli products crossing over into the West Bank. Customs authorities are only able to exert checks and balances on official Palestinian companies that import goods through legal channels. Customs police is unable to fully check goods that are being smuggled, and hence the Palestinian Authority loses a substantial amount of revenue.

Another issue is that Israeli feed producers have direct links to markets, and are able to source their feed ingredients directly, normally at lower freight and shipping costs. As a result, their end feed products cost less than equivalent products made in Palestinian mills. Smuggling compounds the

process and makes Palestinian feeds even less competitive, by making Israeli feeds cheaper than they would be if they were brought in through legal channels.

Absence of Quality and Standards Setting

The 'Inspection Committee' of the Animal Feed Department at the Ministry of Agriculture carries out periodic inspection of animal feed factories and mills in the West Bank and Gaza. These take place at one to three month intervals. The Committee then collaborates with laboratories at Birzeit University in the West Bank and Islamic University in Gaza to test whether the feeds' actual contents match the labelled specifications. The labs at the two universities are primarily equipped to test the ration of calcium to phosphorus, proteins to minerals, and moisture levels. In certain extraordinary cases, tests for fungus, mold, and toxic substances are also conducted.

Lab testing is not as sophisticated as it should be. For example, protein composition is not investigated fully, which opens up the room for manipulation of standards. Farmers often end up with different results from mixtures which seemingly have similar proportions of key ingredients. Butchers often complain about high fat levels in cattle – an issue that is normally directly correlated with animal feed.

There is also a dearth of mechanisms to monitor the quality of imports, or to check the type of production technology being used at Palestinian feed factories.

Gender: The Role of Women in the Market System

The analysis indicates that the women play a limited role in the supply of concentrated animal feed. Women do not have an active role in feed production, perhaps due to some of the following reasons:

- Men have traditionally had a prominent role in feed production
- There tends to be limited knowledge amongst women about opportunities in this industry
- There are few incentives for females to enter the industry as businesswomen
- Traditionally, women are focused on the production of food for human consumption (cooking, meat preparation, milk, cheese, etc).

However, women were found to play a prominent role in certain activities in the value chain, such as in milking processes and cheese production. They are also involved in breeding, providing feed for livestock, and helping in farm management.

Women also play an influential role in purchasing inputs for livestock. Donor projects often try to prioritise women in capacity building activities pertaining to livestock, due to this influence.

Some livelihood development programmes have tried to involve women in production, as a means of economic empowerment. E.g. through the raising of sheep, and through milk production/processing. Some associations, such as the Palestinian Businesswomen's Association and local savings and credit associations, have supported female farmers with animal husbandry activities.

International Assistance to the Livestock Sector

Several international assistance programmes are supporting the Palestinian livestock industry:

- **Livestock Breeders' Livelihood Strengthening Project in Area C "Rawasi."** An EUR 3.33 million programme funded by the European Union and implemented by CARE International, in partnership with ICARDA and the Agricultural Relief Foundation. The project targets village areas surrounding Ramallah, Jericho, North Jordan Valley, Nablus, Jenin, and Tubas, as well as all the Bedouin residing in the area "C". The project is working to improve resilience amongst the most vulnerable livestock farmers by improving their productivity, access to fixed property, and product diversification. The project has also worked on a few small scale (pilots) of some alternative feed to demonstrate the benefits.
- **Sulalah Project:** Funded by the European Union and implemented by Union of Agricultural Work Committees, in collaboration with the Ministry of Agriculture and in partnership with the Italian Civil Volunteers Group, the Palestinian Hydrology Group, the Italian Lauro Sardinia Association, the Qatar Foundation, the Cooperative Development Society for Livestock Development, and the Jericho Cooperative Association for Livestock Growth and Development. The project is working on graduating livestock breeders from dependence on foreign aid to self-sufficiency by improving livestock management and marketing practices. The project is also working on the improvement of breeding and production methods and agricultural policy reforms. Its geographic focus is on Jerusalem, Bethlehem, Hebron, and Jericho.
- The FAO is also supporting the livestock sector at an institutional level, through a three year, EUR 3.45 million EU financed programme with the Ministry of Agriculture. The project is trying to support food security and provide livelihood to the most vulnerable segments of the population, particularly residents of Area C territories.

Constraints in the Market System for Concentrated Animal Feed

The market system infographic below summarises the main constraints affecting concentrated animal feed.

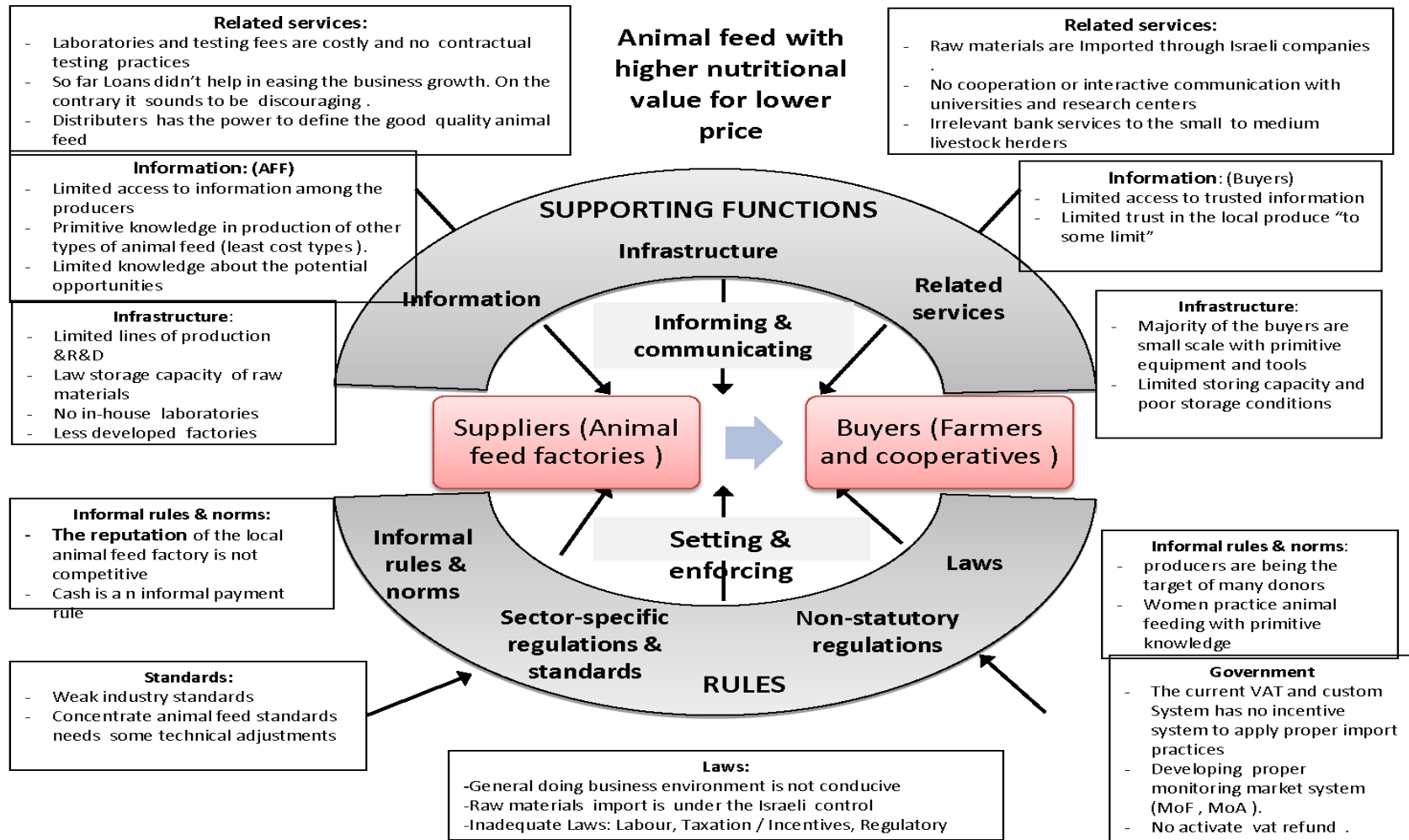


Figure 13: Market System for Concentrated Animal Feed

Recommendations for Enhancing the Competitiveness in the Animal Feed Market System

PMDP's comprehensive analysis of livestock production practices and the market system for animal feed has revealed a series of key constraints. While the market system is indeed afflicted with serious limitations, some of these can also be seen as opportunities to increase the competitiveness of local feed production. This section summarises a series of potential interventions, which could be undertaken by a market facilitator to increase competitiveness amongst actors in the animal feed market system.

Raise Quality Standards

- Raise awareness about the importance of raw fibers
- Share information about the uses of rumen degraded protein.
- Establish mechanisms to test animal feed for impurities and additives
- Increase the non-protein nitrogen materials in calf fattening feed after weaning and verification of compatibility with local animal types (strains).
- Investigate the feasibility of using digestible protein digestible protein instead of raw protein.
- Investigate the utilization of animal protein to reduce animal feed costs.
- Enforce the labelling of animal feed with expiry dates
- Inspect hygiene and safety standards at mills

Enhance the Knowledge, Attitudes, and Practices of Palestinian Animal Feed Producers

- Regulation of the sector, in particular the monitoring of feed prices, keeping in mind the international prices of raw materials.
- Taking practical measures to improve the brand image of the quality of Palestinian feed.
- Encourage the use of international, local and regional expertise to develop animal feed mixtures linked to the local ruminant species.
- Introduce modern technologies that would systematically change the production culture and the quality of locally produced animal feed.
- Investigate mechanism for improving farmer knowledge, and after-sales exchange of technical information.
- Developing total mixed rations "TMR", which provide all the nutritional needs for cattle. In addition to working on raising the awareness of farmers on the importance of such mixtures.
- Develop local and regional partnerships to provide a consistent and affordable supply of animal feed ingredients.
- Encourage local animal feed factories to diversify their product base (e.g. by commercializing silage), and to enhance the efficacy of existing products by using inputs such as plant remnants.
- Encourage animal feed factories to consider investing in their own farms, through which they can also conduct farmer training to disseminate best practices.
- Encourage animal feed factories as well as farmer to improve their record keeping so as to be able to track inputs and costs.

Enhance Knowledge, Attitudes, and Practices amongst Livestock Producers

- Disseminate best practices in farm management. Encourage healthy competition between livestock farmers.
- Encourage the spread of knowledge regarding high-yield livestock varieties.
- Encourage livestock farmers to consider planting high-protein plants such as Moringa, which can be used as an alternative ingredient for animal feed
- Develop mechanisms for pushing technical information about livestock production out to farmers. Subjects could include a) silage and its benefits, b) methods of production, c) feed storage methods, d) methods for determining animal feed quality, e) proper application of animal feed types to different types of livestock, considering age, strain, and product type. The Palestinian Standards Institute and the Ministry of Agriculture could be potential partners for such an intervention.
- Spread knowledge amongst farmers about how they can identify the productivity levels of various livestock species. E.g. by paying close attention to animals during breastfeeding periods.
- Improve documentation and record keeping amongst livestock farmers.

Improve Awareness about Alternative Feed Varieties

- Investigate the feasibility of silage as an alternative, potentially cheaper feed type. The feasibility of producing silage in commercial quantities in Palestine should be investigated. Such an intervention could potentially coordinate with the JICA and EU-funded *Rawasi* and *Solalah* projects, in order to benefit from the results of their work in promoting local silage production.
- Support the scientific assessment of silage use requirements for various livestock types. Currently, there is great deal of mistrust of the technical information available.
- Develop standards around alternative animal feed mixtures that can be utilised by Palestinian livestock farmers. Spread knowledge amongst livestock farmers about how they can produce their own animal feed, and how they can use different type of mixtures to counter the fluctuating prices of ingredients.
- Promote livestock production and animal feed development as areas of academic specialisation and research at Palestinian institutions. Link scientific research centres and universities with agricultural extension centres, so that the results of research can be transferred to farmers more directly.
- Facilitate the establishment of partnerships between Palestinian and international agricultural (livestock) institutions, so as to mobilise the flow of information and knowledge about best practices and appropriate production technologies to the Palestinian livestock industry.

Facilitate Targeted Public Policy Reforms

1. Work with the Ministry of Finance and the Ministry of National Economy to:

- Develop the collection system in a manner that guarantees limiting tax and customs evasion.
- Develop an incentives system to encourage and enable importers and retailers to commit to official importing standards.
- Alter Palestinian customs clearing forms to capture information on the quantities and types of inputs for all animal feed imports.
- Apply taxation laws on agricultural input producers and importers.
- Coordinate activities between animal feed producers, livestock producers, and the Palestinian Disaster Risk Reduction and Insurance Fund. Support local products and factories that were damaged by 2014 Gaza war.
- Activate the law on insurance against agricultural risks.
- Incentivize animal feed producers to use local raw materials and give. E.g. through utilizing tax exemptions.
- Establish the amount of animal feed actually being imported into Palestine.
- Encourage investors to consider investing in quality local animal feed production, perhaps in cooperation with an agency such as PIPA.

2. Work with the Palestinian Ministry of Agriculture to:

- Develop an accessible database of key information on the animal feed sector. This could include information on total annual feed requirements, actual production, products available in the market, regional differences, and industry best practices. It could also include data on animal feed production processes and mixtures, which could be utilized by extension agents and disseminated to farmers.
- Streamline information sharing processes between the Ministry of Agriculture's various departments, such as extension and veterinary services.
- Encourage the cultivation of animal feed crops in rain fed areas
- Update the extension service programs on livestock in order to include topics on nutrition. Improve coordination between government bodies dealing with livestock; explore ways of reviving public sector monitoring and quality control departments.
- Encourage the Ministry to partner with private sector to explore PPPs which could potentially launch commercial consulting services for the livestock sector (around productivity, animal nutrition, breeding, etc).
- Support the development of infrastructure and incentives which can enable farmers in Gaza to make productive use of additional agricultural areas – such as former settlement areas and land adjacent to wastewater treatment plants. Some of these areas are conducive to production of green feed.
- Promote the use of nutrition-rich crops for animal feed.
- Activate the role of the Ministry of Agriculture in producing improved local livestock breeds (cows, sheep and goats).

3. Collaborate with other stakeholders working to improve conditions in the livestock sector (such as NGOs and donor-supported programmes) to encourage livestock farmers to produce different types of animal feed from local plant cultivation on their farms.
4. Advocate for a national-level steering committee which can mobilise efforts for the establishment of a quality control regime and associated enforcement mechanisms for the Palestinian animal feed industry.
5. Investigate the feasibility of collective silo storage of animal feed inputs and grains amongst the animal feed factory / mills owners and/or major distributors.
6. Study the feasibility of establishing a “national animal feed bank” which could purchase and store animal feed ingredients. This would allow for capitalizing on opportunities when prices are low, maintain availability of ingredients at all times and will help in reducing the cost to the farmers.
7. Coordinate with the relevant governmental agencies in order to limit the smuggling of animal feed to the West Bank.
8. Re-introduce the *Shami* goat variety for meat and milk production. Additionally, search for other livestock breeds being used internationally, which could be suitable for the Palestinian climate and topography.
9. Encourage the emergence of dairy cooperatives which could help improve dairy competitiveness through some of the following activities:
 - Collective bargaining on behalf of livestock farmers for purchase of animal feed, vet services and other inputs at competitive prices.
 - Support livestock farmers in negotiation with dairy factories and meat retailers.
 - Enhance quality standards in dairy production, manufacturing, transportation and storage.
 - Establish animal feed production units (planting hay, silage. etc).
 - Improve the legal status of farmers as commercial enterprises.

Impact Logic and Intervention Priorities

An Impact Logic (alternatively also known as a theory of change), maps the logical series of changes required at the individual enterprise and market system levels, if inclusive growth and competitiveness are to be achieved.

In the case of animal feed, this would mean mapping the potential sequence of changes which could lead to a drop in the prices of animal feed, increase in the profitability of livestock farmers, and an increase in average livestock holding. The eventual result would be higher incomes and employment for actors in the market system, and more affordable meat and dairy products for Palestinian consumers. Figure 14 shows the impact logic for concentrated animal feed.

The following have been selected from the analysis of the market system for concentrated animal feed, as priority areas for intervention:

Quality of Locally Produced Animal Feed

- Address product inconsistencies and the resulting poor reputation of local feed.
- Upgrade the level of production technology currently deployed.
- Explore ways for Palestinian products to compete with cheaper, higher quality imports.

Farmers' Access to Knowledge and Finance

- Access to finance pre high seasons: The demand for meat increases tremendously during holidays, however most farmers are forced to sell newborn livestock to purchase feed for the rest of their herders. Therefore a finance mechanism is needed for farmers to be able to keep their new born livestock until maturity level is reached and they can make more profits.
- Consider interventions to facilitate improved technical knowledge of farmers, especially pertaining to animal nutrition.
- Explore how the weak supply of agricultural credit to the sector can be addressed.

Effective Production and Competitiveness

- Explore how specialized veterinary services and advice on animal nutrition can be delivered to livestock farmers on a sustainable, ideally commercial basis.
- Conduct pilot projects to showcase how plant remnants can be used to enhance the nutritional quality of animal feed. Other substitute ingredients, such as palm date by-products and silage should also be considered. Explore the possibility of improving the transfer of technical information to farmers through the use of technology (SMS/mobiles/internet).

Concentrate Animal Feed Impact Framework

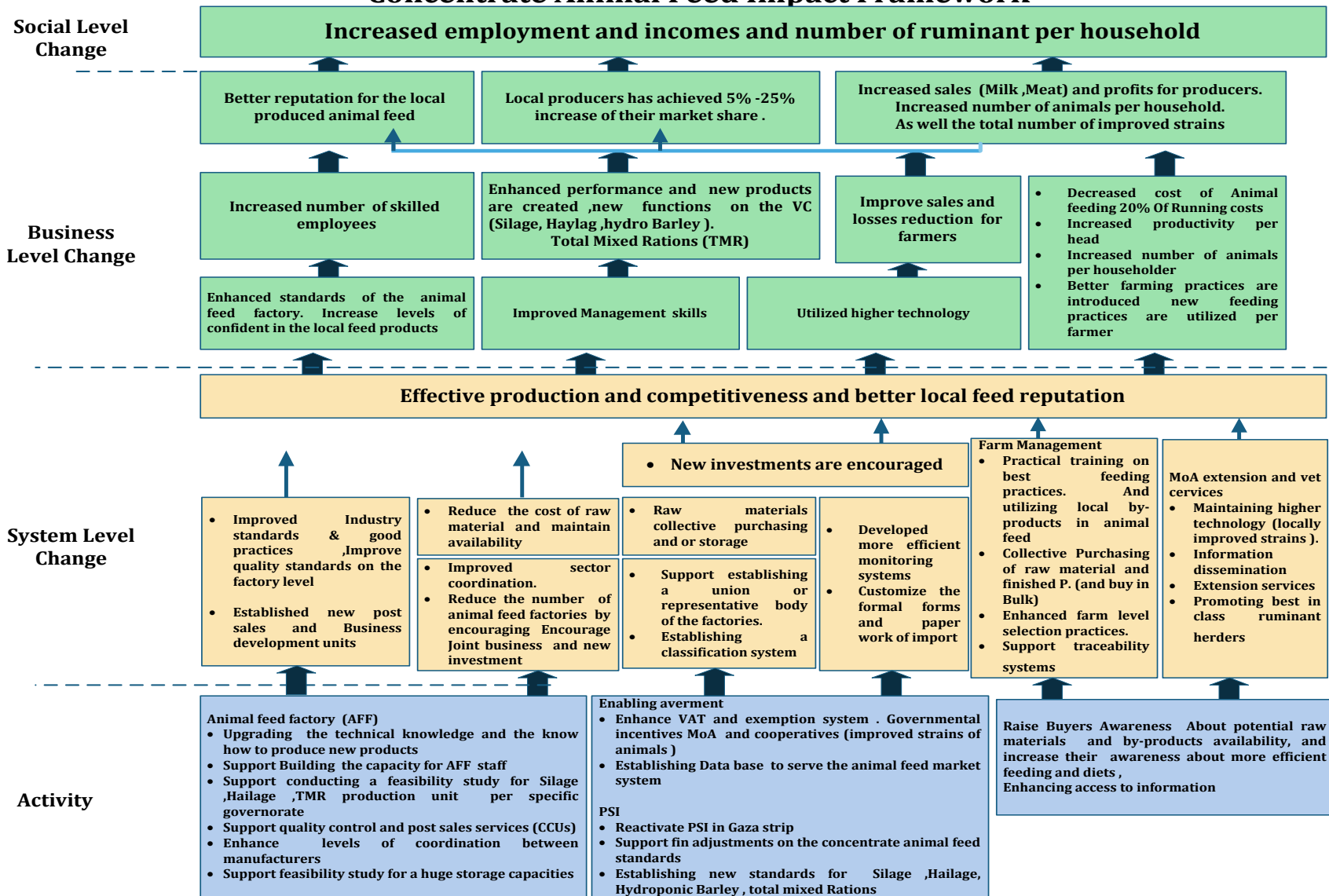


Figure 14: Impact Logic- Concentrated Animal Feed

Validation Workshop

To validate the findings of its analysis, PMDP conducted a 'Validation Workshop' on 3rd April, 2015, with key stakeholders from the animal feed production and livestock production industries. The workshop raised a number of short, medium, and long-term interventions which could potentially unlock inclusive growth in the sector.

The feasibility of each of these merits further exploration, as does the question of whether they should be undertaken by a market facilitator, the private sector, the public sector, or through collaboration between these entities.

Potential Short-term Interventions

- Disseminate the Animal Feed Market System Study to as many relevant parties as possible.
- Update the concentrated animal feed standards for the different types of ruminants.
- Encourage a more active monitoring role that limits smuggling and unethical practices in animal feed.
- Create a new standard for silage, grown hay and whole animal feed.
- Support quality trainings on proper feeding quantities for different types of animals based on the breed and purpose of production.
- Support model farms to obtain production technologies to reduce the cost of animal feed and increase production.
- Highlight the investment opportunities in the alternative animal feed market system and promote it to investors.
- Facilitate connections between machinery producers and feed makers.
- Examine the feasibility of using plant remnants for the purpose of creating silage, haylage and other alternative animal feeds.
- Examine the economic feasibility, on a national level or at the level of factories / mills or other private sector bodies, of producing silage and hailage²⁰ and whole filler²¹.
- Explore ways of increasing the flow of technical information on feed composition and breeding to livestock farmers.
- Develop programs for transferring technical knowledge to farmers through electronic media such as websites, mobile apps and short videos in Arabic. Topics could include growing hay, creating mixtures and any modern techniques.
- Implement awareness raising campaigns around key topics pertaining to best livestock production practices "raising, feeding, marketing, taxation and legal issues ... etc."
- Hold coordination meetings for the bodies supporting the livestock sector.
- Network with scientific research centers to study the possibility of producing alternative materials that could be used by animal feed factories (Al-Najah University, Agricultural Research Center "Qabatia", Palestine Technical University "Khadori", Hebron University, Al-

²⁰Fermentation of dry plant remnants "hay" in order for them to be provender ready to be served in the portions of ruminants.

²¹ Filler feed is an animal feed composition that contains fibers and hay with the addition of limited amounts of animal feed and grains.

Quds Open University, agriculture faculty in Al Azhar University & Islamic University in Gaza Strip, etc).

- Build the capacity of production managers at animal feed factories for them to be able to improve production and maintain the level of quality and good reputation.
- Motivate local producers to give attention to quality aspects in production and adopt systems that guarantee sustainable quality of production (enable them to obtain the information relevant to that).
- Gaza Strip: raise the purchasing capacity of farmers (particularly small ones) through cash support programs and/or coupons in order for them to purchase animal feed mixtures along with training programs to improve feeding practices.
- Gaza Strip: assist farmers to return to work after the war through renovating barns, providing water resources and labor, and provide improved breeds of ruminants to compensate for the ones lost.

Potential Mid-term Interventions

- Support animal feed factories in obtaining quality certificates for production.
- Support the regulation of animal feed production
- Explore the possibility of establishing a database of key information under the management of the animal feed department at the Ministry of Agriculture.
- Form a national team of experts in nutrition and specialists in ruminants.
- Assist the development of specialized extension service centers (cows, sheep, and goats) that provide quality advisory services.
- Support entrepreneurial farmers who wish to produce meat using locally and at the farm available alternative feed such as agricultural byproducts and hydroponics.
- Study investment opportunities in animal feed input storages (grains and other inputs).

Potential Long-term Interventions

- Develop grain silo infrastructure on a regional and national level.
- Support the development of a national program to improve local livestock varieties.
- Mobilise investment in high-quality Palestinian animal feed production (filler, concentrated, whole).
- Establish breeding farms for highly productive breeds of cows, sheep and goats (for the production of milk and meat).
- Support the creation of centralized storage for animal feed ingredients. Suggested storage capacity of 150,000 tonnes to 600,000 tonnes.

Future interventions on the above will be discussed in close cooperation with relevant stakeholders.

Annex 1: Sample Selection Methodology

To investigate the demand for concentrated animal feed, several factors were kept in mind, in particular the ones below:

- **Geographic Distribution:** The sample was selected from both the West Bank and Gaza:

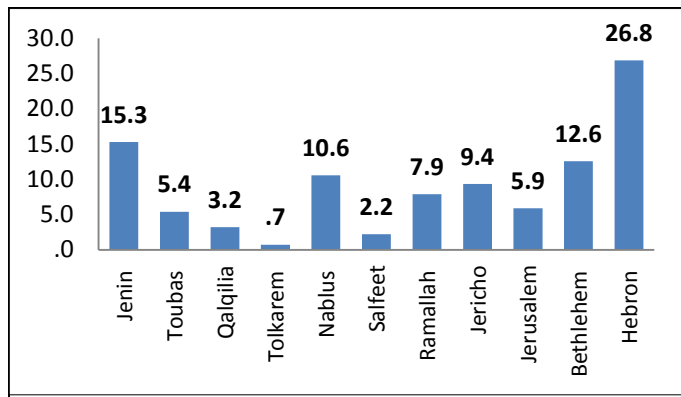


Figure1: Study sample distribution in West Bank

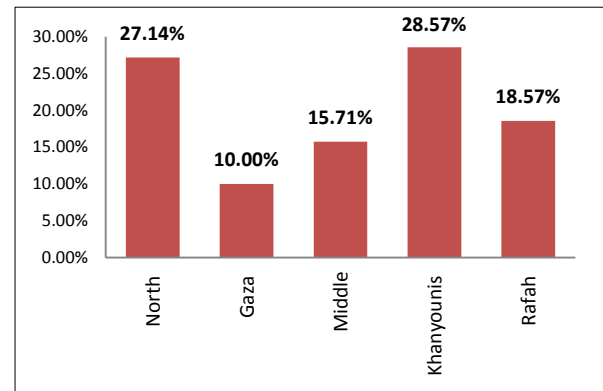


Figure2: Study sample distribution in Gaza Strip

- **Gender:** 91% of those interviewed in the West Bank and 93% of those in Gaza were male, with the remainder being female, despite the fact that women are very involved in the feeding and taking care of livestock. Unfortunately however, traditional and cultural prevented a higher number of female interviewees.
- **Age Group:** Most of those interviewed were of the age group “41-65 years”, with percentages of 60.1% and 57.1% in the West Bank and Gaza Strip, respectively. That is followed by the age group “26-40 years” with percentages of 36.0% and 37.1%, while the remaining 3.9% and 5.7% of the sample were from the age group “18-25 years.” The robustness of the older age bracket reflects the traditional nature of the families working in livestock farming.
- **Marital Status:** Most of those interviewed were married, with percentages of 92% and 91% in the West Bank and Gaza Strip, respectively.
- **Educational Level:** Varying levels of education were represented in the survey, as shown by the charts below.

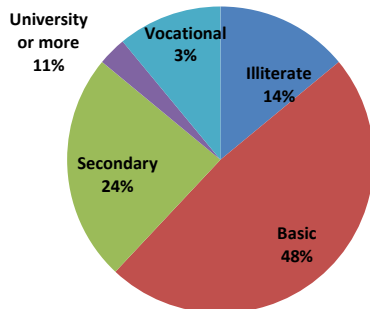


Figure3: Study sample distribution in West Bank by educational level

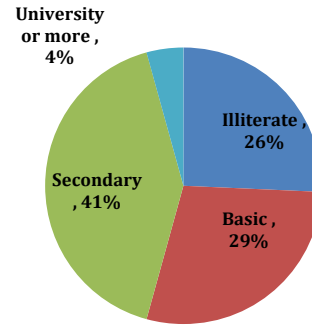


Figure4: Study sample distribution in Gaza Strip by educational level

- **Family Size:** Approximately 56.7% and 62% of households in the West Bank and Gaza Strip, respectively, were of seven family members or more. 34.7% and 30.0% of households in the West Bank and Gaza samples, respectively, had an average family size of 4-6 members. The rest were small households which contain 1-3 members.
- **Income Level:** The results confirm the low income levels of ruminant farmers. The majority of the interviewed farmers had monthly income of less than NIS 2,000 (97% in Gaza, 36% West Bank). , while about 84% in the West Bank had income of less than NIS 5,000. Most of these families are of seven or more members, which underscore the difficult financial circumstances of most raisers of ruminants in Palestine.

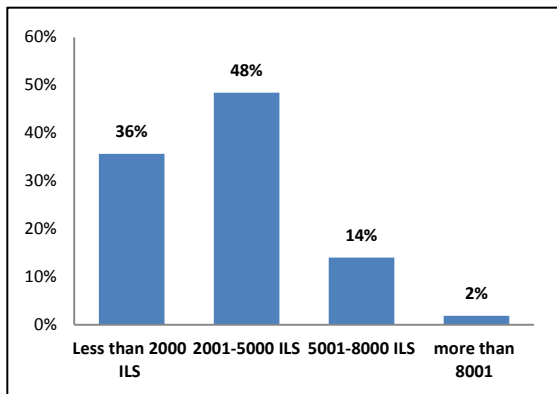


Figure5: Study sample distribution in the West Bank by family's income level

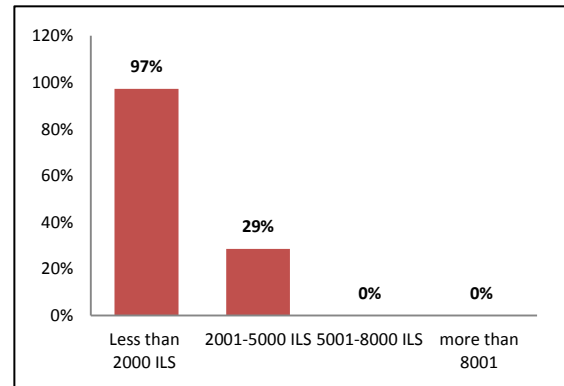


Figure6: Study sample distribution in Gaza Strip by family's income level