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MARKET SYSTEM ASSESSMENT FOR THE DAIRY VALUE CHAIN

Irbid & Mafraq Governorates, Jordan

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EXECUTIVE SUMMARY

The dairy industry plays an important role in the economy of Jordan. In the early 70's, Jordan established programmes to promote dairy farming - new breeds of more productive dairy cows were imported, farmers learned to comply with top industry operating standards, and the latest technologies in processing, packaging and distribution were introduced. Today there are 25 large dairy companies across Jordan. However inefficient production techniques, scarce water and feed resources and limited access to veterinary care have limited overall growth. While milk production continues to steadily increase—with 462,000 MT produced (78% of the market demand) in 2015 according to the Ministry of Agriculture—the country is well below the production levels required for self-sufficiency.

The initial focus of the assessment was on cow milk, however sheep and goat milk were discovered to play a more important role in livelihoods of poor households, and therefore they were included during the course of the assessment. Sheep and goats are better adapted to a semi-arid climate, and sheep represent about 66 percent of livestock in Jordan. Sheep contribute up to 28% of locally produced milk, while goats represent about 6-8% of the fresh milk supply¹.

According to the Oxford Business Group, the agricultural sector has been significantly affected by the influx of refugees. Sixty percent of Syrian refugees are located in small towns and villages in four governorates (including Irbid and Mafrq), where agriculture production is an important livelihood. Border communities that had previously benefitted from government subsidies and inexpensive animal feed from Syria, or earned income by trading Syrian agricultural inputs through informal trade networks, have seen the cost of production rise significantly. Agricultural commodities that once travelled overland through Syria to markets in the Arabian Peninsula and Iraq or were shipped through the port of Latakia to Eastern European countries are now transported through ports in Israel, Turkey and Egypt or by air from Lebanon at a much higher cost to producers².

The Mafrq and Irbid dairy markets are characterised by industrial-scale farms and processing plants, and small-scale farms and dairy shops respectively. 50% of Jordan's bovine population is located in Mafrq governorate and 15% in Irbid, according to the Ministry of Agriculture. Overall demand in dairy markets has increased as Syrian dairy imports have decreased. Refugee arrival in Jordan has also increasing potential consumption levels. This presents a window of opportunity for the Jordanian dairy market to grow to meet this increased demand, and for low and semi-skilled labourers in urban areas to find employment in both industrial-scale and small-scale dairy productions. Syrian refugee women in both Mafrq and Irbid earn small, regular incomes from home-based dairy businesses, turning fresh milk into yogurt, *labaneh*, and cheese using traditional methods. However, despite this potential, the constraints are such that overall the dairy market is stable rather than growing. Imported dry milk from Egypt seems to be filling the gap in production³, and therefore market forces are steady, with no widespread signs of lack of availability or increased prices due to heavy demand.

Input constrains inhibit market growth, in particular the cost of feed, veterinary care, and water. The ARC project will look at alternative models for local production of feed, particularly for poor farmers, with the goal

¹ FAO, found at: <http://www.fao.org/ag/agp/agpc/doc/counprof/jordan/jordan.htm>

² Oxford Business Group, found at: <http://www.oxfordbusinessgroup.com/news/impact-syrian-refugees-jordan%E2%80%99s-economy>

³ Govt of Jordan, found at: http://www.dos.gov.jo/dos_home_a/main/cd_yb2011/pdf/agri.pdf

of creating new businesses that address this gap, instead of importing feed and fodder. The project will also work with micro/small businesses and youth to improve business skills and market linkages.

METHODOLOGY

This assessment, along with the preceding rapid market assessment, utilised Mercy Corps' Market Analysis Guide and Resources as the primary tools of assessment. The process started with a desk review and identified a broad set of sectors for further consideration. These fifteen sectors were narrowed down to seven, which were then scored against a set of criteria—growth potential, feasibility, and relevance for target groups⁴. Once these seven markets were identified, more in depth desk review was done to identify existing market information and analyses. This was done to ensure that this market assessment did not spend a significant amount of time gathering information that was already available.

The rapid assessment was done using semi-structured interviews that focused on understanding the market chain, relationships between market actors, power structures, and inequities or imbalances in the market. The use of secondary data was important in guiding interview questions, allowing for deeper follow-up and minimizing the amount of new data gathered. Market maps were also created both as an analysis tool and to help visualise the available information. To some extent, market maps provide stakeholder mapping information as well, with more detailed information available in chart form.

Once interview data was gathered, the team analysed the information for gaps and performed supplementary research as necessary. It is important to note that it was difficult to get financial information, or hard numbers of any kind, from interviewees, except where that information was already widely available. This will mean that any cost models developed for implementation should be considered approximate at best until trust has been built between the team and the individual for data verification.

TARGET POPULATION

While all of ARC's targeted beneficiaries—women, youth, vulnerable Jordanians, and Syrian refugees—could benefit from the development and growth of the dairy sector, the activities recommended in this report are most likely to target women or youth already in a cohesive group (such as a women's association or an active youth group), small and medium-sized businesses working in the agricultural sector (especially feed), and women operating small, home-based dairy processing businesses.

JUSTIFICATION FOR MARKET SELECTION

The dairy sector was a clear choice for further market assessment, as it scored well across the selection criteria⁵ and dairy value chains are highly accessible to Syrian women and youth. The sector is a good match for many of their existing skills, providing a foundation for more sustainable growth. The cost of entry in the dairy sector is low, and there is high consumer demand for local products. In addition to seeking opportunities in the dairy sector itself, the assessment looked into whether there was room for innovations in feed/fodder that could create new business opportunities.

⁴ see the "ARC Rapid Market Assessment Report" for more detail

⁵ see the "ARC Rapid Market Assessment Report" for more detail

AREA OVERVIEW

Mafrq and Irbid

Mafrq is considered as one of the key agricultural areas in Jordan, hosting 27% of Jordan's total field crops (by cultivated area) and half of Jordan's cows. Irbid governorate, in contrast, is the second largest business centre in Jordan after Amman, home to 71% of all enterprises in the north. It also has the second largest industrial city—with regards to volume of investment—Al Hasan Industrial City.

In Mafrq, 65% of (non-farm) enterprises are commercial (food retail, clothing, household goods), 14% are industrial (metal industries, leather & textile), 6% are tourism, and 4% are services. In Irbid, 34% of the work force is in public administration, 14.7% in education, 13.2% in wholesale and retail trade, 7.2% in transportation and warehousing, 4.7% in healthcare and social services, 2.7% in agriculture and 1.7% in tourism⁶.



Map 1 | Map of Jordan with Irbid & Mafrq

The northern governorates of Irbid and Mafrq also host the largest population of Syrian refugees in Jordan. The number of Syrians in Jordan has risen over the last six years, and it is estimated that 134,900 are living in Mafrq (approximately 52% of the population) and 240,250 are living in Irbid (approximately 12% of the population)⁷. This population influx has strained already limited water and electricity resources, and overburdened the public education, healthcare and sanitation systems.

Unsurprisingly, the poverty rate in both governorates is higher than the national poverty rate, according to ILO. 19.2% of the population in Mafrq and 15% of the population in Irbid are poor. Six districts in Mafrq (Ruweished, Salhieh, Deir Al Kahef, Um Al Qutain, Um Al Jmal, and Sabha) and three provinces in Irbid (Koura, Northern Mazar, and Northern Shouneh) are considered poverty pockets. Additionally, inflation rates in both governorates exceeded the national inflation rate in 2016.

The average household in Mafrq spends about 7675 JD per year, and Irbid households spend approximately 8639 JD. Both figures are below the national average of 9626 JD. Average household expenditure break downs can be seen below in Chart 1⁹:

⁶ ILO, Local Economic Development Plans for Mafrq and Irbid

⁷ ILO, Local Economic Development Plans for Mafrq and Irbid

⁸ ILO and FAFO, Impact of Syrian Refugees on the Jordanian Labour Market, Svein Erik Stave and Solveig Hillesund

⁹ ILO, Local Economic Development Plans for Mafrq and Irbid

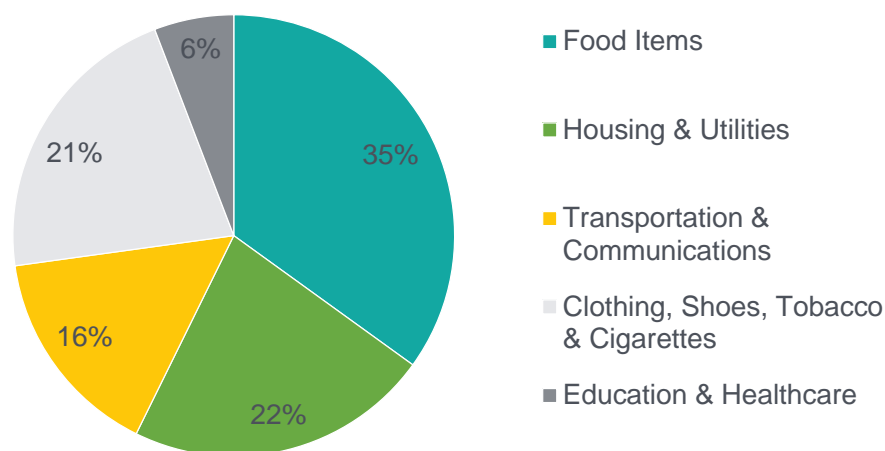


Chart 1 | Household Expenditures in Irbid & Mafrq

While some claim that Syrians have been crowding out Jordanian workers in the hospitality, retail and construction sectors, this problem is less severe in agriculture, since typically Jordanians are not as interested in working in this sector. The agricultural sector in Jordan has struggled to recruit enough labourers in recent years, and thus the influx of Syrian refugees can be seen as a boon. However, Egyptian workers are perceived to be more skilled and efficient agricultural labourers, though recently Syrian workers seem to be preferred in harvesting and post-harvest handling stages.

Micro, Small & Medium Enterprise (MSME) Environment

The World Bank estimates that Jordanian Micro, Small and Medium Enterprises (MSMEs) account for 95% of active businesses in Jordan, providing 70% of private sector employment and generating around 40% of GDP. Yet MSMEs receive only 13% of commercial loans¹⁰. A large share of this business activity is informal so there are no official figures, but estimates put the MSME contribution to the Jordanian economy at 40-45%. Nevertheless, despite the large investments in vocational training and higher education in Jordan over the last few years, employers remain frustrated by the mismatch between education and market needs. This mismatch is often linked to soft skills (e.g. time-management), rather than technical skills that can be taught on the job¹¹.

UNDP's Gender Inequality Index – a composite measure reflecting inequality in achievements between women and men in reproductive health, empowerment and economic status – ranks Jordan 77th out of the 187 countries measured. Data from the Central Bank of Jordan shows that women's access to formal financing (via commercial banks) is much lower than men's. Men have over four times more access to credit, although women's make nearly one third of all deposits. In addition, the mean value of men's loans is 18% higher than the mean value of women's loans¹². Women's access to formal financing is limited by traditional property arrangements, because although women are legally allowed to own property, in practice, their husbands often hold most property titles. As a result, women often do not have the collateral required

¹⁰ Univ of Minn, Humphrey School of Public Affairs, found at <http://conservancy.umn.edu/bitstream/handle/11299/172490/Schiff,%20Schmidt,%20Troncoso-%20Entrepreneurship%20Assessment%20in%20Jordan%20May.pdf?sequence=1>

¹¹ Jordan Education for Employment (JEFE), found at <http://www.wise-qatar.org/edhub/jordan-career-education-foundation>

¹² GoJ Dept of Statistics, found at https://unstats.un.org/unsd/gender/Finland_Oct2016/Documents/Jordan_paper.pdf

to access commercial loans, resulting in lower levels of debt financing available for women. These lending practices create institutional barriers, for although bankers argue that their credit policies are gender neutral, Jordanian business women claim that their male counterparts receive more favourable treatment¹³. Interestingly, some find that being married has a positive effect on women’s business success, while being single has no effect¹⁴.

Informal employment represents 44% of the Jordanian economy – this includes both those who are self-employed (either at home or outside the home), as well as those who are working for wages without contracts and/or benefits in the private sector. A majority of self-employed individuals (56%) had less than a secondary education, and the percentage was even higher (71%) for informal wage labourers¹⁵.

Refugees make up a large percentage of the informal workforce in Jordan, as many fear that their humanitarian aid packages will be taken away if they take on formal employment. A recent study by ILO and FAFO found:

“Syrians are willing to accept lower wages and harsher working conditions compared to Jordanians. The impact of this is not just crowding out the Jordanians but also an increased informalisation of the Jordanian labour market, making compliance with labour standards a serious threat for all workers alike. Deteriorating labour standards also put more strain on the Jordanian authorities in terms of their ability to enforce existing labour laws such as compliance with the minimum wage.”

Market Structures in Mafrag And Irbid

The Mafrag dairy market is characterised by large and medium sized industrialised dairy farms with 200-4000 cows who sell to supermarkets in major cities. In addition to these industrialised farms, some medium-sized farms run local dairy shops that provide on-site processing of their own dairy products, and occasionally bring in milk from other farmers. There is also a robust informal sector consisting of small farms and herders, as well as household dairy processing operations. The Mafrag dairy market has been positively impacted by the Syrian crisis, due to increased consumer demand for dairy products as well as a decline in dairy imports from Syria.

The formal sector is dominated by a handful of large companies, four of which are in the Al Khalidiah municipality of Mafrag: Hamoudeh Dairy Company (Al Khalidiah), Al-Samiah Dairy Factory (Suma al-Sourhan), Diyar Dairy (Al-Khalidiah), and Al-Barakah Dairy (Al Khalidiah). There is only one dairy factory in Irbid, Dairy Cattle Breeders. These industrialised farms often have several thousand cows, and purchase milk from medium-sized farmers who have a few hundred cows. Most, if not all, of the employees on these farms are male, and many are Egyptian labourers, although Jordanians are



Photo 1 | **Milking Operations Medium-sized farm in Mafrag**

¹³ Ibid.

¹⁴ British Journal of Marketing Studies, found at <http://www.eajournals.org/wp-content/uploads/2014/07/The-effect-of-sex-Gender-on-the-success-of-businesswomen-in-the-business-environment-in-marketing-in-Jordan.pdf>

¹⁵ UNDP, found at

<http://www.undp.org/content/dam/jordan/docs/Publications/Gov/The%20Informal%20Sector%20in%20the%20Jordanian%20Economy-jo.pdf>

employed on the dairy farms as well. Challenges in this sector include 1) the need for better refrigeration in transport and storage, 2) the high cost of livestock feed, which is largely imported from Argentina, Spain, Brazil, and Egypt, and 3) low retention of workers, particularly Egyptian foreign labourers.

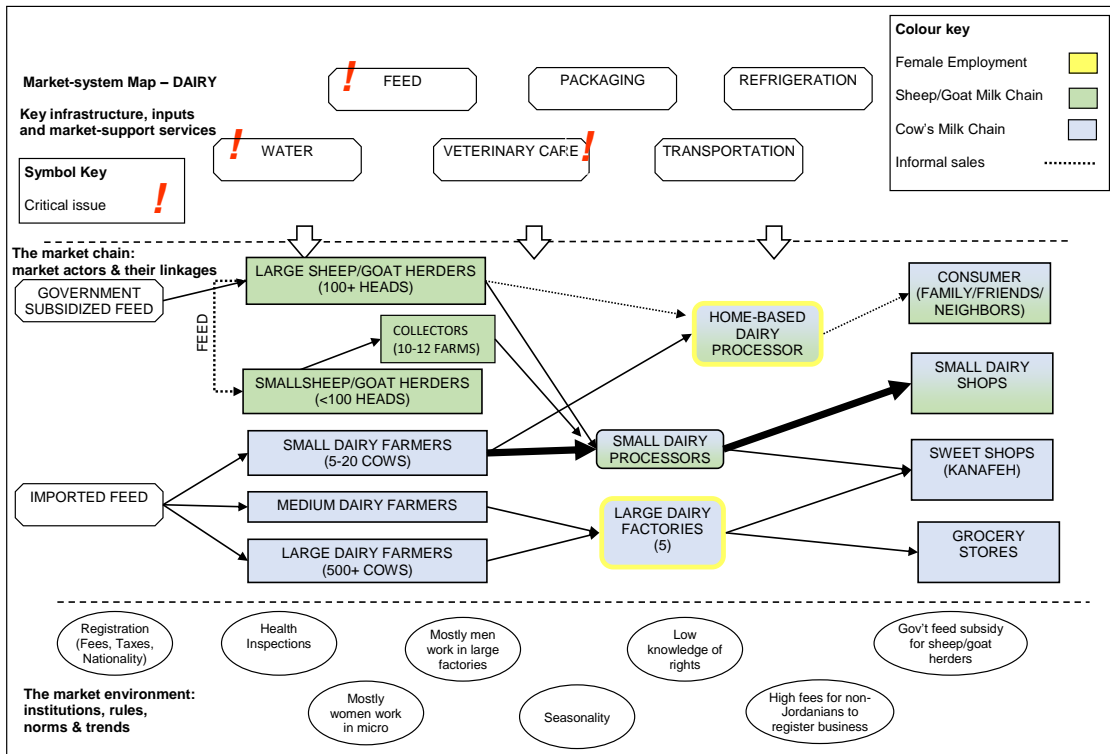
The informal sector is dominated by various small operations, either consisting of family farms and goat herders or household dairy processing operations, where fresh milk is purchased from local dairy wholesale shops and turned into yogurt or *labaneh*. Since the Syrian crises, the number of small-scale dairy outlets has increased, as Syrian refugee families have started to make traditional dairy products to meet Syrian demand. This has increased the supply of homemade dairy products, yet overall demand in the area has remained constant over the past two years. These small dairy productions are largely run by women, usually within the same extended family. They are unregistered and have no formal advertisements, selling their products through reputation and word-of-mouth. This lack of oversight has created something of a community health risk. These dairy businesses remain unregistered because business opportunities for non-Jordanians are limited and the costs of entry are too high for refugee households. Transport costs do not affect the informal sector as much as the formal sector, since producers are selling to consumers within a small geographical area, usually in the same neighbourhood.

In contrast to Mafraq, the Irbid dairy market is characterised by many small dairy farms (up to 40 cows) and dairy shops producing high-quality dairy products for sale in Irbid and, to a smaller extent, in Amman and Azraq governorates. Locally-produced Irbid dairy products are preferred not only by Irbid residents but also by Jordanians in Amman. This presents the opportunity for Irbid to compete with large dairy companies in the larger Jordanian dairy market by selling niche dairy products to more urban areas.

Like Mafraq, for cultural reasons it is mostly men work on dairy farms and in dairy shops, however there are some women currently working in dairy shops. The presence of female employees in dairy shops could be because these businesses are family owned, and dairy processing (i.e. turning milk into yogurt)—a feminised production—is largely done at the small dairy shop in Irbid, whereas in Mafraq this work is done more often at larger industrialised processing plant.

While Irbid faces a unique challenge of increased urbanisation, limiting the amount of land available for large dairy farms, both areas are constrained by the high costs of feed and veterinary care for livestock and water shortages. Feed (processed concentrate with added vitamins) and fodder (cut grasses or agriculture waste products) are primarily imported. The government does provide subsidised fodder (barley) to registered farmers based on the number of sheep or goats owned. However, subsidized barely is frequently resold, although it is difficult to get any kind of reliable information on volumes or prices. In general, people still need to purchase additional feed/fodder from the market. In terms of veterinary care, many interviewed were concerned about drug quality. Vet drugs are generally available and affordable, but farmers perceive the quality to be inconsistent, and therefore are not always certain they are getting what they paid for. Water in the targeted areas generally comes from wells; however the energy costs to run the pumps can be very high.

MARKET SYSTEM MAP



The dairy industry in Jordan includes sheep/goat herders, small dairy farms (5-20 cows), medium dairy farms (20-500 cows), and large dairy farms (500+ cows). Large-scale farms are owned and operated by major Jordanian dairy companies, who employ over 900 staff in three daily shifts. In some factories, 90% of morning shifts workers were women.

Small- and medium-sized farms and sheep/goat herders may have an annual contract with major Jordanian dairy companies, but are more likely to have their own shop for processing and direct sales or an established relationship with a small dairy processor/shop. A typical medium-sized dairy in Amman might work with 75 farmers on contract. In addition, some small farmers and herders sell fresh milk at wholesale prices directly to home-based dairy processors.

CONSUMPTION & DEMAND ANALYSIS

Dairy products make up a significant part of the Jordanian diet, with Jordanians consuming approximately 65kgs of dairy products per capita each year. Dairy is an important and cheap source of protein for most families. Fresh milk makes up 16% of this consumption, and yogurt as much as 52% of dairy consumption¹⁶. Seasonal dairy products, such as those made from sheep and goat's milk, are sought-after when in available, and used to make specialty foods. In general, yogurt, cheese, *labaneh* (strained yogurt), and *jameed* (hard, dry yogurt) are more popular than fresh milk in Jordan.

¹⁶ WHO, found at: <https://extranet.who.int/nutrition/gina/sites/default/files/aNutrition%20in%20Jordan-Policy.pdf>

Seasonality impacts consumption patterns in Jordan. Cow milk products—such as yogurt—are available year round while shoat¹⁷ milk products—such as cheese and *jameed*—are available from the late spring through the summer (February through August). Shopkeepers report that demand is highest during Ramadan, which currently falls between May and June.

Both total dairy consumption and per capita dairy consumption have been rising since the 1980s. According to the 2010 Ministry of Agriculture (MOA) Annual Report, milk consumption in Jordan steadily increased from 1995-2010, from 310,879 tons in 1995 to 607,880 tons in 2010 - a 96% increase. In that period, per capita dairy consumption also rose, although not in equal ratios (see Table 1 below).

While demand figures from the early years of the crisis are not available, in 2015, 588,945 tons of milk were consumed, a 3% decrease from the previous year. Syrian culture and cuisine are similar to that of Jordan, so total milk consumption might have been expected to rise with the arrival of 1.25m Syrian refugees.

However, it is likely that production costs increased (especially with fodder no longer available from Syria), limiting the level of expansion by Jordanian farmers. This likely caused milk prices to increase, leading to a per capita consumption decline before consumption levels stabilized at 65-70kgs per capita in 2015 – matching early 2000 consumption figures. MOA reports generalised dairy consumption in the kingdom and

YEAR	TOTAL DEMAND (TONS)	PER CAPITA CONSUMPTION (KG/PERSON/YEAR)
1995	310879	74
1996	205421	69
1997	300271	65
1998	296563	62.5
1999	301133	61.4
2000	383459	74.4
2001	390858	76.6
2002	340262	63.6
2003	383914	62
2004	343437	61
2005	370009	66
2006	462023	78
2007	423242.3	76

¹⁷ “Shoat” refers to sheep and goats together in a group or as a combined product category.

2008	504103.4	84
2009	605637	92
2010	607880.1	92.5
2011	n/a	n/a
2012	n/a	n/a
2013	n/a	n/a
2014	563132	70
2015	588945	64.5

Table 1 | **Total dairy demand and per capita dairy consumption from 1995-2015. Source: Ministry of Agriculture Annual Reports 2010, 2014, and 2015.**

does not provide useful insight into regional dairy consumption trends. Such information would be useful in measuring the effect of the Syrian crisis in regions with large Syrian populations, particularly the northern regions of Mafraq and Irbid. Anecdotally, Mafraq and Irbid dairy shopkeepers reported an increase in the number of dairy shops in the region, suggesting that the demand for dairy is increasing. There is also research that the demand for milk in the Mafraq area has become more elastic at the retail level, due to the growing prevalence of substitute goods in the market and increased consumer price sensitivity.¹⁸

As indicated by the heavier arrows on the market map, Mafraq and Irbid residents prefer to purchase their dairy products from small dairy retail shops.

Typically, these dairy shops are run by one or two

employees who buy directly from a handful of local farmers and/or dairy processors. Small dairy shops are preferred for the perceived higher quality of their products, which is believed to influence both the taste and nutritional value. Although industrial-level Jordanian dairy companies also sell their products in small supermarkets throughout Mafraq and Irbid, residents purchase these dairy products out of convenience rather than preference. Home-based dairy producers, particularly women, are also important retail sources in these regions, particularly for sheep and goat products. However, due to social and geographic limitations, many home-based producers sell exclusively to family, friends, and neighbours.

In the Mafraq governorate, there are approximately 50 registered dairy retail shops, 15 of which are located within the main marketplace. These shops carry almost exclusively dairy products including yogurt, *labaneh*, *shaneenah*, *jameed*, cheese, and butter, though they may have a few other items such as olives and pickled vegetables. Shopkeepers sell around 50-90 kg of dairy products per month. However, small dairy shopkeepers do not keep rigorous ledgers, so these figures are estimates.

Both cow and sheep/goat dairy products are popular among Jordanians. Cow's milk is less dense than sheep/goat's milk and is mostly used for yogurt, while sheep and goat's milk is mostly used for hard cheeses and *jameed*. Cow's milk is cheaper and more widely available than sheep and goat's milk, since the latter is only available seasonally. Most dairy shops carry both types of products due to the high demand for sheep/goat products during the season.

¹⁸ http://www.journalrepository.org/media/journals/AJAEES_25/2015/Aug/Altarawneh732015AJAEES19662.pdf

SUPPLY ANALYSIS & PRODUCTION POTENTIAL

Since the 1980s, dairy farmers have been improving their production methods by importing high yield milk-producing breeds of cows, like the Holstein Friesian cow from the Netherlands, to replace local low yield cows. Local cow varieties mature later and have long calving intervals, low conception rates, and low milk yield¹⁹. However, local cow breeds are better adapted to the environment. Importing Holstein Friesian cows has increased milk production and incomes for dairy farmers. As of 2014, 87% of dairy cows in Jordan were Holstein Friesian.

Local dairy production now supplies the majority of the Jordanian dairy market. According to a 2015 Ministry of Agriculture report, local dairy production totalled 462,000 tons, which covered 78.5% of the market²⁰. This is significant given that from 1995-2010 Jordanian dairy production covered only 58% of the market on average, and never surpassed 64.8% market coverage²¹. Total Jordanian dairy production has increased significantly since the onset of the Syrian crisis. Local dairy production was 462,000 tons in 2015, compared to 345,035 tons in 2010, a 34% increase. In comparison, dairy imports fell from 345,035 tons in 2010 to 126,945 tons in 2015, a 63% decrease. Nevertheless, several farmers interviewed reported that production levels were half of last year.



Photo 2 | Milk processing equipment

Dairy production in Jordan is classified as small-scale production or medium/large production. In small-scale production, farms have 1-40 cows, or herders have a few dozen to a few hundred heads. Manual milking techniques are used and fresh milk is sold directly to small-scale processors and dairy retail shops. In medium and large-scale production, farms have two hundred to a few thousand cows, and the animals are mechanically milked. Fresh milk is sold through contracts with large-scale dairy factories. Dairy production in Irbid and Mafraq governorates includes both types.

As mentioned above, large-scale farms are most common in Mafraq Governorate. According to the 2014 Ministry of Agriculture Annual Report, there are 68 working farms in Mafraq Governorate with 606,517 sheep, 88,098 goats, and 691,295 cows. A medium-sized dairy farm in Mafraq has around 400 cows. One farm visited had processing facilities on site, producing around 30MT of cow's milk and 1MT of goat and sheep milk per day on average, but volumes this year were much lower than the previous year. Mafraq has a very dry climate with little available pasture, though smaller shoat farmers are able to put animals out to pasture on smaller lots. Larger Mafraq dairy farmers rely on imported feed in order to sustain their animals.

¹⁹ Alqaisi O, Ndambi O A and Hemme T 2009: Development of milk production and the dairy industry in Jordan. Livestock Research for Rural Development. Volume 21, Article #107. Retrieved March 5, 2017, from <http://www.lrrd.org/lrrd21/7/alqa21107.htm>

²⁰ 2015 Annual Statistical Report, Division of Agriculture Data and Statistics, Ministry of Agriculture, pg. 44

²¹ 2010 Annual Statistical Report, Division of Agriculture Data and Statistics, Ministry of Agriculture, pg. 172

In contrast to Mafraq dairy farmers, Irbid dairy farmers mostly practice small-scale farming. In 2014, there were 185,460 sheep, 55,800 goats, and 241,260 cows in Irbid. Large-scale dairy farming in Irbid is limited due to the high population density of the region. According to the same 2014 report, there are 200 working farms in Irbid with 6490 cows. A large-sized dairy farm is considered over 40 cows in Irbid.

The market in Irbid is well integrated—prices are generally consistent from one location to the next and farmers are free to sell to whomever they choose. Irbid dairy farmers may work with collectors, small dairy shops, or hold a contract with smaller dairy processing factories. Collectors tend to work as independent brokers between small farmers and processors. They rely on good relationships to do business and often do not have contracts with processors. Some farmers complain that they can take advantage of farmers because of the short shelf life of milk, but collectors typically have a tight profit margin, with a commission of just 3 piasters per kg of milk sold.

Due to the semi-arid climate and low annual precipitation rates, pasture is only available four months of the year in early spring. In general, sheep and goat farmers are better able to take advantage of pasture season than cow farmers. Thus, Jordanian dairy farmers rely on imported feed to sustain their livestock. Goat farmers rely on bran and barley while cow farmers use barley, corn, and soy.

The high cost of feed is a major barrier to growth in the Jordanian dairy value chain. According to the Ministry of Trade and Industry Storage Department, 95% of livestock feed is imported, mostly from the United States, Australia, Argentina, Russia, Ukraine, and Bulgaria. Larger farmers with greater economic resources are sometimes able to import feed themselves. Smaller and poorer farmers must purchase their feed from feed importers. The Ministry of Agriculture provides subsidised barley to sheep and goat herders for fodder. This is reportedly available to households regardless of the size of their flock or the farmer’s nationality, however many farmers report that it is not worth registering for a card unless one has 80-100 heads. Women-headed households reported that they struggle to obtain the required subsidy card due to travel time and cost constraints, and many complained of fodder transport problems once they received the card. The subsidised fodder must be collected from the Ministry of Agriculture governorate office. Other feed and fodder can be obtained from one of the 52 private feed centres in Jordan. The cost of subsidised barley is 175JD per MT. Some farmers commented that feed can often be obtained more cheaply on the market. However, others provided anecdotal stories of farmers selling their subsidised wheat to other farmers for a profit.

Type of Feed	Cost (JOD/Ton)
Barley	175 (govt)-200
Corn	250-350
Soy	300-700
Wheat Bran	160-200

Table 2 | Feed cost per ton in private market



Photo 3 | Farmer explains the economics of mixing feed

EXAMPLE FEED CALCULATIONS

VOLUME	NUMBER/ TYPE OF ANIMAL	COST	TYPE OF FARMER
70-85 MT mixed feed/mo	200 cows	23,000 JD/mo	Large Farm
25 MT barley feed	800 sheep	4300 JD/mo	Med Farm
3-4 MT barley/mo	130 goats	700JD/mo	Small farm
28 MT silage/mo	62 cows	800-1000JD/mo	Small farm
.5 MT mixed feed/mo	20 sheep	140JD/mo	Very small farm

Table 3 | **Example Feed Calculations**

Feed is already one of the largest expenditures for farmers and the price is going up, according to farmers and feed suppliers. Prices have risen 25% in the last year. This is partly due to Jordan's heavy reliance on imported grain or fodder, but it is exacerbated by the fact that five private distributors control 70% of the market. There is some locally produced feed that is good quality, but it is difficult to obtain consistently.

Given the high costs of feed and fodder, some medium-sized dairy farmers reported taking out loans to finance feed. Loans generally come from banks, who offer better rates (6.5-7%) than traders. This type of financing is likely unavailable to smaller farmers, particularly those who do not own land or buildings that could be used for collateral.

Water is another large expenditure item. A medium sized farm can pay 1000-3000 JD per month for water.

TRADE FLOWS

The volume of dairy imports to Jordan has decreased in recent years. Before the Syrian crisis, imported Syrian dairy products flooded the market and drove down the price of Jordanian made products. According to the 2015 MOA Annual Report, only 21.5% of dairy products in Jordan were imported in 2015. In comparison, 43% of dairy products were imported in 2010.

Jordanian dairy exports represent only a small fraction of total dairy production. According to the 2013 Department of Statistics Food Balance Sheet, only 7,867 tons out of the 201,292 tons of dairy products produced were exported, representing less than 4% of total production. These dairy exports included 45 tons of yogurt, 3,299 tons of cheese, 2,947 tons of *jameed*, 157 tons of dry whole milk, 2,370 tons of dry skim milk, and 5,229 tons of other dairy products. That same year, Jordan imported 55,968 tons of dairy products, mostly cheese (23,254 tons) and dry skim milk (17,651 tons).

Imported dry skim milk from Egypt has a profound impact on the Jordanian dairy market. Dry skim milk is much cheaper than fresh milk and Jordanian producers struggle to compete.

MARGINS ANALYSIS

Syrian refugee women running home-based dairy operations reported that they purchase fresh milk from local farms at 50 fils per kg of cow's milk and 75 fils per kg of sheep/goat's milk. After processing the fresh milk into yogurt, samna, butter, and *jameed*, the women sell their products at prices listed in Table 4.

Cow farmer's purchase imported feed for approximately 218 JD per cow per month. Shoaat farmers buy feed at a lower price through a feed subsidy provided by the Ministry of Agriculture. Cow dairy farmers sell their milk to dairy shops and processors for 0.41-0.45 JOD per kilogram. Cow farmers are able to sell their milk at a higher price during the low season (November through early February). Shoaat farmers sell their milk to dairy shops and processors for 0.55-0.60 JOD per kilogram. Dairy shops/producers sell their dairy products for 1-1.25 JOD per kilogram of yogurt, 3 JOD per kilogram of *labaneh*, 4 JOD per kilogram of sheep's cheese, 12 JOD per kilogram of *jameed*.

PRODUCT	JOD/KG
Yogurt	.75
Samna	12
Jameed	12
Butter	5-6

Table 4 | Prices of various dairy products

If an alternative feed business were to be supported in the future, a further margins analysis would be necessary. However this is beyond the scope of this report, as the cost model would include agricultural waste products (jift, crop residues, etc), which likely vary by producer. The volume of alternative feed that a potential SME is able to obtain would drive the overall costs of the product. Until the location of the potential SME partner(s) is known, this analysis cannot be carried out, but it should be an early program activity once a partner is identified.

SEASONAL CALENDAR

The seasonal Dairy Value Chain calendar is useful to understand what activities occur at different points during the year and when prices may be affected. It is also useful for developing future program activities to ensure ARC is not trying to engage private sector actors at times that are busy or inconvenient.

Cows produce milk year-round, but pasture is mostly available from February through May, meaning yield spikes during this time. Sheep and goats produce milk from February to August, peak production time for *jameed* and cheese. Lambing and calving takes place year-round, but is highest in November - February. Vaccination takes place year-round as needed, though there are set times when certain vaccines must be administered (i.e. smallpox).

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
COW		Milk High Season					Low season						
		Calving/Birthing											
FODDER/ FEED		Pasture				Imported Feed							
SHEEP/GOAT		Milk Season											
		Vaccinations				Insemination		Pregnancy		Birth			
DAIRY	Yogurt (Cow)												

PRODUCTS	Cheese (Cow)	
		Jameed (Goat/Sheep)
		Cheese (Goat/Sheep)
		Labaneh (Goat/Sheep)

Key: Dark colours indicate high season; Light colours indicate low season; white indicates no activity/unavailable

BUSINESS ENABLING ENVIRONMENT

REGISTRATION All dairy farms with more than 20 cows or 100 shoats must legally register with the Ministry of Agriculture. Registered dairy farms must have at least 150 square meters of open outdoor space as well as 100 square meters of inside space. Registration requires a small fee (approximately 10 JOD) and is renewed annually. According to the new Jordanian Investment Law, non-Jordanians may invest in and legally register businesses in Jordan, but foreign investment must not exceed 49% of the business. If the business is wholly owned by a non-Jordanian, capital must not fall below a specified threshold (based on the type of company). For example, capital for a private shareholding company should not fall below 50,000JOD. This can create barriers to entry for Syrian refugees interested in investing in a larger farm, since they would need significant investment capital or a Jordanian partner. Many Syrian refugees in Jordan have experience working on dairy farms, particularly those from Dara'a, yet legally owning and operating a medium or large scale farm in Jordan can be challenging.

HYGIENE STANDARDS/INSPECTIONS Dairy farms must meet certain hygiene standards developed by the Ministry of Agriculture and Ministry of Health. In addition, dairy farmers who have contracts with large dairy processors/factories must meet health standards set out by the processor. Adhering to health standards requires knowledge, skills, and, in some cases, extra equipment (i.e. bulldozers to remove cow waste from farms).

GENDERED WORK Women in Jordan have traditionally been involved in dairy production. Prior to the industrialisation of the industry, it was the women's responsibility to tend to the animals, milk them, and process the fresh milk into dairy products. Women in Jordan are still very much involved in dairy production, particularly at the micro- and home-based level. Many women, especially Syrian refugees, run home businesses processing fresh milk into dairy products to sell to their family, friends, and neighbours.

While women do work in the dairy sector, men make up the majority of labourers on medium- and large-scale farms. It is not clear why this is the case, but it is possible that social norms against women working with foreign men and women's household care burden prevent women from working on medium- and large-scale farms. There are some opportunities for women to work at large-scale dairy processing facilities. Some dairies have over 90% female-staffed production lines, particularly during the morning shifts.

SEASONALITY Milk, particularly shoat's milk, is highly seasonal. Shoats only produce milk from February through August. Once shoat's milk season is over, shoat farmers must seek other sources of income or rely on last year's profits.

LOW KNOWLEDGE OF RIGHTS Many small dairy farmers and producers, particularly Syrian refugees, do not know their legal rights to produce and sell dairy products. This makes them vulnerable to misinformation and exploitation. For example, many shoat farmers believe that they can only quality for the government

feed subsidy if they have a large number of shoats. However, this feed subsidy is open to everyone—even those with one goat. Small-scale shoat farmers may be purchasing expensive feed because they do not understand they are eligible for subsidized government feed. As another example, many Syrian refugees do not understand that they can legally operate an unregistered dairy farms so as long as their livestock herd does not exceed MOA standards (>20 cows or >100 shoats). Many Syrian refugees believe that since they cannot legally own land, they cannot legally operate a farm. However, this is not necessarily the case if Syrian refugees are able to rent farmland.

GOVERNMENT FEED SUBSIDY The Ministry of Agriculture provides shoat farmers with a feed subsidy. Shoat farmers of any nationality and with any number of shoats qualify for this subsidy. In practice, the government feed subsidy only benefits Jordanian farmers with information on the subsidy.

SWOT ANALYSIS (STRENGTHS, WEAKNESSES, OPPORTUNITIES, THREATS)

STRENGTHS Overall, the Jordan Dairy Value Chain is roughly in balance. Although the supply of milk is less than the market demand, prices are not unusually high, and there are no significant distortions in the market. Labour in larger production facilities is relatively easy to find for above minimum level wages, and many Egyptian and Syrian men are willing to work on dairy farms or in dairy shops. Dairy farmers do not complain of transportation issues.

- Milk is a key element in the diet of the local community and residents prefer locally-produced milk due to the trust between the producers and the consumers.
- The dairy sector is an important income source for a significant percentage of Irbid and Mafraq residents, which makes the actors willing to improve their capacities.
- Different social categories (men, women, and youth) are engaged in the dairy sector
- Extensive local traditional experiences in dairy production

WEAKNESSES Livestock feed is costly for dairy farmers. Due to the semi-arid climate, there is a very short pasture period, which only sheep/goat herders are able to take full advantage of. Mutually reinforcing livestock-crop systems are rarely used, and generally only by poorer farmers. Milk pricing is driven by the larger dairy companies due to high volume purchasing, thus disadvantaging smaller producers who must also buy and sell at this market rate.

- The actors often have poor accounting and finance systems, and limited resources are put into marketing and advertising
- Lack of product visibility (packaging, customer access), especially for home-based businesses
- Poor networking between the value chain actors
- Limited access to financing to improve the system.
- Poor extension services and a lack of competent authorities to address needs to strengthen the value chain
- Insufficient electricity to operate important equipment, particularly shredders

OPPORTUNITIES Investing in alternative fodder production presents an opportunity to improve dairy production and increase the incomes of poor farmers. Creating an alternative to expensive imported feed could help farmers better nourish their animals, producing higher quality milk, and reduce costs for farmers.

- Innovations in feed
- Closure of the Syrian border
- Increase in population

THREATS The MOA may need to be convinced of the benefits of alternative fodder production. ARC will need to find a technical partner to help develop the production model. Other threats farmers face include:

- High cost of production inputs (water, electricity, feed, vet care)
- Spread of diseases that affect animal productivity
- Decrease in pasture areas due to urbanisation and low annual precipitation



Chart 2 | **SWOT Analysis**

OTHER INITIATIVES

NCARE, ICARDA and FAO have been implementing agricultural programmes for many years in Jordan. Mercy Corps hopes to draw from their experience implementing feed block and alternative feed products in other countries, and has already been in contact to discuss potential collaboration. Mercy Corps also has an existing relationship with Jordanian research institutions on dairy activities for another EU funded program, and will identify opportunities to collaborate with them on the ARC project as well.

Agri-Jordan is a private sector company established to promote sustainable agriculture practices in Jordan. They are pursuing interesting research around hydroponic fodder that may be applicable to the interventions under this programme. Again, Mercy Corps has been in contact and is considering how their approaches may be applicable to the ARC project.

The Governmental Micro-fund under the Department for Agriculture has indicated that the GoJ has a two-year project to provide zero-interest loans to farmers for feed. The loan fund is 11M JOD and began in January 2017. So far, 495,000 JD has been distributed to 160 farmers in Mafraq. Although further exploration of the loan targeting process is needed, we feel that the GoJ loan fund is likely targeting large farmers (who have significant holdings that can be used as loan collateral), whereas the alternative feed activities we are targeting are focused on poor farmers. We believe these activities are complementary, rather than competing.

DAI is also implementing a programme called AWEF that is working in the dairy sector in Karnak and Jerash. It is similarly targeting women, but focuses primarily on better marketing for dairy products.

KEY FACTORS DRIVING CHANGE IN THE MARKET

The Syrian crisis has created several factors that have the potential to drive changes in the dairy market. First, the decrease in Syrian dairy imports has reduced competition for Jordanian producers and increased demand. The comparative advantage is unlikely to last once Syria is stable and people are able to return to rebuild their livelihoods. It is worthwhile for farmers to invest and build resilient businesses now while there are more funds available. Second, the conflict has disrupted trade patterns, decreasing the availability of fodder imports and increasing production costs, particularly for larger scale farmers.

The high cost of dairy farm inputs, such as livestock feed, water, and veterinary services, is also affecting the dairy market. High input costs hurt small and home-based dairy producers in particular. Livestock feed represents the largest cost for dairy farms. Due to the country's dry climate, Jordan has a short pasture season, which can only accommodate small-scale and shoat farmers. Water for livestock is also expensive. Cows in particular require large amounts of water for healthy milk production.

Dairy market growth has the potential to create opportunities for unemployed youth. If new business models are proven successful and can create new jobs, the regions excess labour supply could be absorbed. In particular, the promotion of youth employment in agriculture innovation has the potential to stabilise agricultural labour markets when Syrians return home to rebuild their country.

RECOMMENDATIONS & SUGGESTED INTERVENTIONS

LOW-COST FEED ALTERNATIVES

Poor dairy farmers--both cow farmers and sheep/goat farmers--have the greatest difficulty accessing affordable, high-quality livestock feed. One suggested intervention to address this issue is to develop lower-cost feed alternatives made of agriculture by-products. There is both anecdotal and documented evidence that farmers in Jordan are throwing away large amounts of vegetable produce due to be exported because

transport costs have skyrocketed²². There are simple, tested technologies²³ that could make use of this biomass and turn it into feed blocks that would provide an alternative to expensive imported feed for poor farmers. Experience shows that feed block production is rarely sustainable when farmers are trained to produce them for their own use. This is likely because of conflicting time demands on the farm.

However, this intervention would identify a small business, a women's group/cooperative, or a youth group who could produce and market the feed alternative, with support from Mercy Corps in the form of cost-shared grants, technical assistance, and business skills training. Ideally, this would be a new product line for an existing group, so that ARC could evaluate their current business successes and support the areas that needed improvement, rather than building a business from the ground up. The intent would be to create new jobs and benefit smallholder Jordanian farmers (through reduced production costs) and home-based dairy processors (through increased supply of milk and reduced cost of raw milk).

Alongside the development of a new line of businesses around semi-industrial feed block manufacturing, this intervention should explore small-scale hydroponic fodder production, which has been tested in other dry-land areas (such as Ethiopia) and is currently going through a commercial trial in Jordan. If potential is found for developing activity, it would likely involve similar support to that discussed above: cost-shared grants, technical assistance, and business skills training.

IMPROVED BUSINESS PRACTICE FOR YOUTH, MICRO-PRODUCERS, AND SMEs

Many small businesses suffer from poor business practices such as incomplete record keeping and minimal networking, which limits their potential income. ARC will work youth, micro-processors, and SMEs to improve these core business skills—through trainings or other technical support—in order to make them more competitive in the market. Where possible, Mercy Corps will identify and provide specific support to youth who play a role in family businesses that could benefit from exposure to new ideas, and help them understand how they may be able to access cost-shared grants to support innovations, creating jobs. This would not only strengthen the family business, but would also meaningfully engage the youth in business.

Syrian refugee women living in Jordanian host communities are already operating home-based dairy businesses making yogurt, cheese, labaneh, and jameed to sell locally. Many of these women have years of experience in the dairy industry in Syria. However, these home-producers' sales are geographically limited. One potential intervention is to build home-producers' basic business skills (in particular record keeping, calculating profit & loss, and basic marketing) and bring them up-to-date on the phyto-sanitary regulations of Jordan so that they can market their products to a wider audience. Once these steps have successfully been completed, ARC can help the women strengthen their market linkages beyond their immediate area and ensure their products earn appropriate margins, bringing additional income to the household.

INCREASED KNOWLEDGE OF ECONOMIC RIGHTS

Many Syrians are not aware of their rights in terms of business ownership and livelihoods. Some are under the impression that if they take a job, they will lose all UNHCR benefits. Others are unsure whether they are allowed to own animals or start businesses. Activities in this intervention would target specific economic rights messages to the appropriate audience, ensuring that refugees have access to opportunities to support themselves. These rights-awareness activities will likely be combined with other activities under the project.

²² <http://www.oxfordbusinessgroup.com/news/impact-syrian-refugees-jordan%E2%80%99s-economy>

²³ <http://drylandsystems.cgiar.org/content/improving-feed-increasing-smallholders-income>

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About Mercy Corps

Mercy Corps is a leading global organisation powered by the belief that a better world is possible. In disaster, in hardship, in more than 40 countries around the world, we partner to put bold solutions into action — helping people triumph over adversity and build stronger communities from within. Now, and for the future.



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