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MARKET SYSTEM ASSESSMENT OF THE OLIVE OIL VALUE CHAIN

Irbid & Mafraq Governorates, Jordan

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Executive Summary

Jordan is home to over one million dunums of olive trees. Small and medium sized farms dominate Irbid, where traditional farming techniques are still used, while Mafraq hosts larger commercial farms. This diversity is a strength for the area, and provides an interesting space to consider different business development models for the olive-related sector. The olive industry is considered the most important agri-business activity in Jordan, with a value of over one billion JD¹. The sector has been slowly growing over the last ten years; cultivated land acreage has increased by 4% since 2008. Current production has grown by 200% since the early 1990s, though recent growth has been more modest. Jordan is the second largest exporter of fresh olives in the world, after Portugal, and Israel is its most important trade partner.

Although Irbid plays a large role in the Jordanian olive oil sector, current production methods on farms and in mills are out-dated, compared with those used in European countries. Farmers are not maximizing yield due to out-dated harvesting technologies and processes. The ARC project proposes to work with farmers to upgrade their harvest and post-harvest processes and improve market linkages.

Furthermore, the waste products from the olive oil production process are not being used, representing a missed market opportunity. Mill waste, such as the pulp that remains after pressing olives (jift), and liquid waste from the production process have the potential to be re-used in ways that not only create new products, but also help resolve the environmental issues mills are facing. These new products can provide employment opportunities, particularly for youth, and help them to gain skills that can be used now and or in Syria if they were to return home. In addition, because olive harvesting traditionally requires the whole family's labour, there are many opportunities to involve women in the harvest and post-harvest upgrading activities recommended under this set of interventions.

Methodology

This assessment, along with the earlier rapid market assessment, used Mercy Corps' Market Analysis Guide and Resources as the primary tools. The process started with a desk review and identification of a broad set of sectors with the potential for further consideration. These 15 sectors were then narrowed down to 7 through scoring on a set of criteria—growth potential, feasibility, and relevance for target groups². Once these seven markets were identified, more research was done to identify existing market information and analyses. This was done to ensure that the 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. It is important to note that the team relied heavily on the value chain assessment and market strategy completed by ILO, which significantly reduced the amount of field time required for the analysis. Other sources on the econometrics of oil production were also reviewed, as their analysis utilized larger samples than it was possible to gather during this assessment. The use of secondary data was also important in guiding interview questions, allowing for deeper follow-up and minimizing the amount of new data gathered.

¹<https://www.researchgate.net/publication/281030415>

² see the "ARC Rapid Market Assessment Report" for more detail

Market maps were created both as an analysis tool and to help visualise the information available. To some extent these maps provide stakeholder mapping information as well, with more detailed information available in the Stakeholder Matrix below.

Target Population

At the start of the assessment, it was assumed that many women and youth did not want to work in the agriculture industry due to the low status traditionally afforded to farm and agricultural workers. However, the assessment revealed that most Jordanians do not pursue agriculture jobs because producers offer low wages and poor working conditions. ARC may be able to make some jobs in the sector more attractive, particularly if new technologies are introduced which increase productivity and wages.

Most of the olive fieldwork is carried out by families, who divide the work along to traditional gendered lines. Young men climb up in the trees to harvest olives on the top branches while women work on the ground to gather olives on the lower branches. In Mafrq in particular, women play an important role in the olive harvest. This holistic hiring practice means that ARC activities in the sector should easily be able to target women and youth.

Youth often work in olive mills in addition to helping with the harvest. However, mill owners tend to hire family members first when looking for new staff. The activities recommended in this report are likely to be of particular interest to youth as they involve new innovations within a familiar setting. ARC is poised to help youth gain experience and knowledge in good business practices, helping them think more creatively about business opportunities and setting them up to be strong business leaders in the future.

Justification for Market Selection

After reviewing the selection criteria, the team felt that the olive oil sector—and more specifically the waste products from olive oil processing—provided a unique opportunity to work within a well-established sector in a new and innovative way. The olive oil sector has the potential to expand production with traditional upgrading and improved post-harvest techniques, but also provides the opportunity to transform the way waste products are used post-production. The market itself seems to be stable, and more importantly the sector is easily accessible to poor Jordanians, Syrian refugees, youth, and women – thus all ARC’s target populations have the potential to be included in olive sector interventions. Finally, the sector is listed as a priority in the Local Economic Development plans for Irbid and Mafrq.

Area Overview

The World Bank considers Jordan an "upper middle income country" and an emerging knowledge economy. Trade is a critical component of Jordan’s economy – exports and imports together make up 98% of GDP³. However, regional conflicts and the subsequent flow of refugees have disrupted trade routes and reduced both trade and investment. Therefore despite some positive economic progress, there is widespread frustration over the country’s high unemployment rates, which reached 15.8% at the end of 2016 (a two-

³ Index of Economic Freedom, found at <http://www.heritage.org/index/country/jordan>

point increase from the previous year). Women's unemployment rates are even higher at 25.2%⁴. The World Bank puts youth (15-24) unemployment at 28.8%. However, overall labour participation rates in Jordan are quite low. Only 42% of the total population over age 15 is working (world average is 63.5%)⁵, meaning that functional unemployment is much higher. Women's participation rates are even lower at 16%⁶.

High youth unemployment rates, combined with the influx of 655,000 refugees in Jordan since 2011 (equal to 9% of the population)⁷, have meant sharp competition for available jobs. This has put further pressure on other foreign workers (Egyptians play a large role in agricultural work, and Southeast Asians are frequently hired for textile factory jobs).

In the past, Jordan had a relatively high birth rate and there were concerns that the population was growing much faster than the economy, ultimately leading to persistent high unemployment. However, since 2010, the fertility rate has been dropping, and was 3.168 in 2016. Though this is higher than replacement, it is significantly lower than past rates.

The poverty rate in Jordan is 14.4%, according to 2010 World Bank figures. However the same study found that 18.6% of Jordan's population experienced transient poverty for at least one quarter of the year, including lower-middle and middle income households. This means that about a third of Jordanians are living in poverty at any given point during the year⁸. In rural areas, poverty levels are higher than the national average—around 19%. For women-headed households, gender inequalities compound poverty challenges, as men are twice as likely as women to be able to access agricultural loans.

Just over 10% of the country's land is arable, though farm output is limited by inefficient farming technologies, scarce of water, and small farm size (inheritance laws further exacerbate these issues). Principal crops include citrus, tomatoes, cucumbers, grains, lentils, and olives.⁹ Irbid contributes 32% of Jordan's overall production of olives and olive oil, while Mafraq contributes 6-7%.¹⁰

In contrast, the rapid privatisation of formerly state-controlled industries and the liberalisation of the economy is spurring growth in urban centres such as Amman and Aqaba. In addition, Jordan has six special economic zones attracting large-scale investment: Aqaba, Mafraq, Ma'an, Ajloun, the Dead Sea, and Irbid¹¹. Theoretically, this should provide an enabling environment that supports the growth of all sized businesses.

⁴ Jordanian Dept of Statistics, found at <http://www.tradingeconomics.com/jordan/unemployment-rate>

⁵ ILO, found at <http://data.worldbank.org/indicator/SL.TLF.CACT.ZS>

⁶ World Bank, found at <http://data.worldbank.org/indicator/SL.TLF.CACT.FE.ZS>

⁷ UNHCR, found at <http://www.unhcr.org/uk/partners/donors/589497237/2017-2018-regional-refugee-resilience-plan-response-syria-crisis-12-december.html?query=number%20of%20refugees%20in%20jordan>. This is the number of registered refugees, some estimates put the number of refugees at 1.4 million.

⁸ Borgen Project, found at <https://borgenproject.org/transient-poverty-in-jordan/>. The poverty line is set at 817.7 JD per person per year.

⁹ FAO, found at <http://www.fao.org/ag/agp/agpc/doc/counprof/jordan/jordan.htm>

¹⁰ Govt of Jordan, found at http://dos.gov.jo/new_site/dos_home_a/main/archive/news/2016/olive_oil.pdf

¹¹ Economy of Jordan Wikipedia, found at https://en.wikipedia.org/wiki/Economy_of_Jordan

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. However, MSMEs receive only 13% of commercial loans¹². A large share of this business activity is informal, therefore there are no official figures, but estimates put the MSME contribution to the Jordanian economy at 40-45%. Nevertheless, despite large investments in vocational training and higher education over the last few years, employers remain frustrated by the mismatch between education and market needs. Skills mismatches are often linked to soft skills (e.g. time-management), rather than technical skills that can be taught on the job¹³.

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 187 countries surveyed. Data from the Central Bank of Jordan shows that women's access to formal financing (via commercial banks) is low compared to men. Men have four times more access to credit than women, although women's make one third of all bank deposits. In addition, the mean value of men's loans is 18% greater than the mean value of women's loans¹⁴. Women's access to financing is impacted by traditional property arrangements, because although women are legally allowed to own property, in practice, property titles are likely in their husband's name. As a result, women often do not have the collateral required to access commercial loans, resulting in lower levels of debt financing for women. These lending practices create institutional barriers to credit, for although bankers argue their credit policies are gender neutral, Jordanian business women claim that their male counterparts receive more favourable treatment¹⁵. Interestingly, some research finds that being married has a positive effect on women's business success, while being single has no effect¹⁶.

Informal employment makes up 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 labourers¹⁷.

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

¹² 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>

¹³ Jordan Education for Employment (JEFE), found at <http://www.wise-qatar.org/edhub/jordan-career-education-foundation>

¹⁴ GoJ Dept of Statistics, found at https://unstats.un.org/unsd/gender/Finland_Oct2016/Documents/Jordan_paper.pdf

¹⁵ Ibid

¹⁶ British Journal of Marketing Studies, found at <http://www.eajournals.org/wp-content/uploads/The-effect-of-sex-Gender-on-the-success-of-businesswomen-in-the-business-environment-in-marketing-in-Jordan.pdf>

¹⁷ UNDP, found at <http://www.undp.org/content/dam/jordan/docs/Publications/Gov/The%20Informal%20Sector%20in%20the%20Jordanian%20Economy-jo.pdf>

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.”

Mafraq & Irbid

Irbid governorate hosts the second largest number of businesses in the country after Amman, housing 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. Mafraq is considered one of the key agricultural areas of Jordan, representing 19% of all cultivated area in Jordan. Mafraq Governorate contributes 27% of Jordan’s total field crops (by cultivated area), 17% of Jordan’s total fruit trees, and 5% of Jordan’s total vegetables.

The governorates of Irbid and Mafraq are also hosts to the largest populations of Syrian refugees in Jordan. The number of Syrians in Jordan has risen over the last six years, with 134,900 (52% of the population) living in Mafraq, and 240,250 (12% of the population) living in Irbid¹⁸¹⁹. This influx has strained already limited water and electricity resources and overburdened public education, healthcare, and sanitation services.

The poverty rate in both governorates exceeds the national poverty rate, according to the ILO. The poverty rate in Mafraq is 19.2% and in Irbid 15%. Six districts in Mafraq (Ruweished, Salhieh, Deir Al Kahef, Um Al Qutain, Um Al Jmal, and Sabha) and three provinces in Irbid (Koura, Northern Mazar, and Northern Shouneh) have deep poverty pockets. The inflation rate in both governorates exceeded the national inflation rate of Jordan in 2016.

The average household in Mafraq spends about 7675 JD per year, while Irbid households spend approximately 8639 JD. Both figures are lower than the national household expenditure rate of 9626 JD. Household expenditure break down can be seen below in Chart 1²⁰:

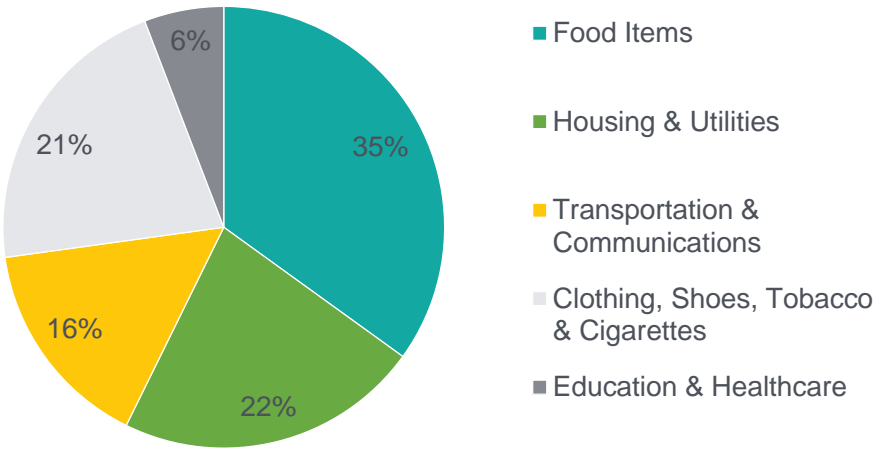


Chart 1 | Household Expenditures in Irbid & Mafraq

¹⁸ ILO, Local Economic Development Plans for Mafraq and Irbid
¹⁹ ILO and FAFO, Impact of Syrian Refugees on the Jordanian Labour Market, Svein Erik Stave and Solveig Hillesund
²⁰ ILO, Local Economic Development Plans for Mafraq and Irbid

While some claim that Syrians have been crowding out Jordanians workers in the hospitality, retail, and construction sectors, this problem is less severe in the agriculture sector, primarily because Jordanians are less interested in working here. In fact, agriculture was one of a few sectors opened to migrant workers in April 2016, when the GoJ decided to award 200,000 work permit opportunities to Syrians and waived the application fee. Growth in the agriculture sector has been limited by a lack of labour, a situation potentially remedied by the influx of Syrian refugees. However, Egyptian workers are still perceived to be more skilled and efficient agriculture labourers, though Syrian workers seem to be preferred in the harvesting and post-harvest handling stages. The ILO has also done a pilot program working with agricultural cooperatives, where the cooperative holds the work permits for Syrians instead of individual employers. Up to 11,000 work permits in 2016 were held through agricultural cooperatives.

Market Structures in Mafraq and Irbid

There are several types of olive trees growing in Jordan, the most common of which are Baladi (33%) and Nabali (26%)²¹. These types of trees produce better quality olives with a higher oil content than other varieties, and are often used for extra virgin oil. The “Italian” olive tree, which was imported into Jordan in the 1990’s, has a longer growing cycle and a short life cycle than the Baladi trees, and they also are believed to host bacteria more easily.



Photo 1 | Olive Orchard in Irbid

Irbid Governorate has over 20 million olive trees growing on 300,000 dunams of land, with most farms in the 20-50 dunam range. According to our calculations, using information from other research and our own interviews, production costs for a 20 dunam farm are around 196/JD per dunam and net profits are 253JD/per dunam²². However, Mafraq farms are larger in size. In Mafraq the most economical size farm is around 450 dunams. Farms there are more likely to be irrigated. Average production costs for Mafraq are 142 JD/dunam, with net returns ranging from 42-127/dunam.²³ The production cost differential between governorates is likely attributed to the fact that Mafraq farms are larger and industrialised, while Irbid farms are primarily family run. Large industrial farms have

more incentive to reduce production costs to increase profit margins.

The cost of olive farm-land up-keep increases every season due to a lack of skilled labour (for pruning, spraying, tractor hire, general off-season maintenance of trees) and increased demand for available labourers. Farmers often express frustration at the lack of support from the MoA. In addition to the costs of maintaining the trees, during harvest time farmers with larger farms must hire our labour. Farmers can hire a Jordanian family to work the field in exchange for 1/3 of whatever is pressed in the mill. Egyptian workers are paid 6 JD/day with lunch and Syrians workers demand 12JD per sack of olives harvested, essentially double the price of the Egyptian labour.

²¹ https://www.researchgate.net/publication/305995824_Environmental_efficiency_of_olive_oil_production_by_small_and_micro-scale_farmers_in_northern_Jordan_Life_cycle_assessment

²² Assumes production per tree is around 25kg. Actual production can range from 9-50kg per tree, depending on the age, variety, and fertilization of the tree.

²³ <http://journals.ju.edu.jo/old/index.php/DirasatAgr/article/view/722>

Olive production is seasonal (see Seasonal Calendar below), with harvest season from October to December. Agricultural workers are often hired in family groups, who live and work on a grove until the harvest is completed. Once harvested, farmers pay for transportation to send the olives to the mills. Farmers often wait at the mills with their harvest (to the annoyance of the mills), to ensure their crop does not lose its place in the processing line. The longer the olives sit after harvest, the lower the quality of their oil. When the olives enter the production line, they are washed, their leaves are removed, and they are pressed to extract the oil. The oil is then filtered and the waste is removed (*jift* and *zebar* (waste water)). The oil is then stored in vats until an order is received, then packaged into 16L containers for individual consumers or larger buyers. The mill takes 10-12% of what is produced or charges an equivalent flat fee (paid in cash, 0.48-0.6JD/kg) for processing. Some larger farmers are able to export directly out of Jordan.

There are 134 oil mills in Jordan, with 46 in Irbid and 10 in Mafraq. For the mills, the largest expense is the initial equipment costs, which can range from 100,000- 350,000 JD. Once this investment is made, overhead and labour are relatively cheap, but the seasonal nature of the work can make finding labourers difficult. The average running costs of a mill are 61,000JD and total returns are 78,000 JD, leaving a net profit of 17,000JD per season.²⁴

There is a lack of adequate by-product management, and given the costs incurred by mill owners to dispose of by-products, we believe that there is an opportunity in this part of the value chain. *Jift*, the olive residue that remains after the oil pressing, can be used for fertiliser, feed, or as a source of heating. Some mills have machines that compress the *jift* and resell it for 55JD/MT. *Jift* must be stored carefully, since it is highly flammable. Other mills sell the uncompressed by-product for 30JD/MT to people who then compress it and resell it. There is no bio-fuel factory in Jordan that could make use of the *jift*, although these factories are found in other countries.



Photo 2 | Unprocessed *jift*

The Agricultural Credit Corporation (ACC) performs agricultural lending in Jordan. However, few loans are given to olive farms due to the long maturation time of the trees, usually three years. Although the time from investment to production is naturally less for mills, they also seem to have trouble borrowing. The ACC sees investments under this market sector as very risky, although demand is steady and increasing. The risk stems from the average borrowers' lack of expertise, for many from outside the sector come in and want to invest in the market because "they hear it is successful." Interest rates for agricultural loans typically range from 5-6%. In addition, the government offers subsidised loans, for which they pay the interest accrued, but these loans are only available for farms/projects that have an operational irrigation system. In order to obtain a loan, borrowers must present their Jordanian national ID, proof of land-ownership, land/farm map, and a sponsor with a stable source of income.

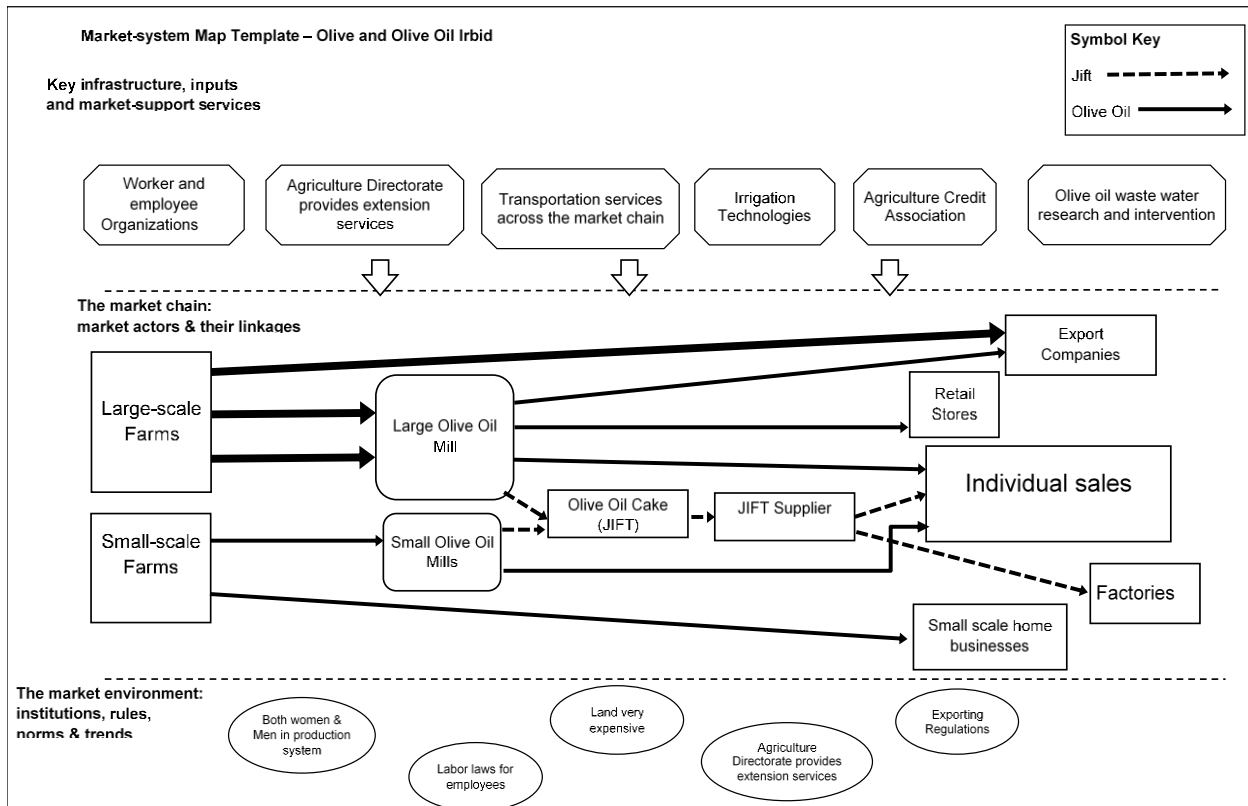
The Ministry of Agriculture provides farmers with various support services, such as preferred prices for saplings, guidance on fertilisation, irrigation and clipping/pruning, and agricultural tools and equipment rentals for ploughing or cultivation. The agriculture engineers at the directorate believe they play a crucial

²⁴ http://prod.kau.edu.sa/centers/spc/jkau/Data/Review_Artical.aspx?No=3316#Abstract

role in the olive sector. However farmers surveyed disagreed; they felt that the government provides costly and time-consuming services. If one decides to utilise the directorate’s services, they often wait for months to receive assistance.

Domestic olive oil prices are determined annually by the Jordan Olive Oil Producer Association’s board, but generally range from 60-100JD per tank. The price of olives ranges from 0.50- 2.00 JD, depending on the quality.

Market Map



Consumption and Demand Analysis

Only 1% of the olives produced in Jordan are used as table olives; the remaining 99% are pressed into olive oil²⁵. The average Jordanian consumes 4-6 kilos of olive oil per year, putting national consumption at 24,283 MT per year²⁶. Jordanian families tend to buy their yearly supply of olive oil during pressing season, usually in large 16L tanks. Retailers sell olive oil in smaller quantities, targeting urban consumers and tourists, as a typical family would buy directly from a mill or farmer they have long-standing relationship with. Jordanians prefer local products, which they view as more authentic and of higher quality. Mill owners indicated that a

²⁵ https://www.researchgate.net/publication/305995824_Environmental_efficiency_of_olive_oil_production_by_small_and_micro-scale_farmers_in_northern_Jordan_Life_cycle_assessment

²⁶ ILO Market Study, found at: http://www.ilo.org/wcmsp5/groups/public/---arabstates/---ro-beirut/documents/genericdocument/wcms_319825.pdf

large percentage of local consumers purchase olive oil directly from the mills, due to the lack of trust in large industrial producers.

According to the ILO, domestic olive oil consumption roughly matched domestic production levels from 2007-2012. This means that while Jordan is self-sufficient in terms of olive oil, export growth is constrained by high domestic consumption. Consumption as a percentage of production has remained above 91% since 2007. A similar trend is present in the table olive market; increased local consumption demand has resulted in decreased export potential²⁷.

Even within these constraints, Jordan is the world's 2nd largest exporter of fresh olives after Portugal. Nearly all fresh olive exports go to Israel, which is both a transit point for Jordanian olive exports and an end market for approximately 8,142 tons of olives²⁸.

Locals believe Ajloun and Irbid produce the best olives. However, in terms of export standards and acidity levels (pH levels), Irbid actually produces lower quality olives. Local perceptions possibly stem from the fact that these areas have the largest number of trees in the region and receive more rain, producing denser olives. As a result, consumers pay a premium on oil from Irbid, compared with oil from Mafraq and other eastern parts of Jordan.



Photo 3 | Jift Log, with 20 kg bags

Jift—olive pulp or ‘cake’—is a waste product from olive pressing, and can be used for heating or as a supplement in animal feed. Recent statistics are difficult to obtain, but in 2005 about 27,000MT of jift was produced in Jordan. This is equivalent to 157,000 tons of oil, or 84% of Jordan's local crude oil and natural gas production. However, this figure only represents 2-10% of local energy consumption²⁹. The dispersed nature of farms and olive mills around the country makes industrial-scale collection expensive. Therefore, a centralized plant for olive waste energy recovery would have low economic merit, though clear environmental benefits³⁰. Localised collection and processing of jift is the most economically efficient and environmentally friendly way to handle olive pulp waste.

Many households have stoves designed specifically for jift logs. Households can purchase jift logs from mills or jift suppliers (hardware stores or similar small shops) in bags of 28-30 logs (20kg) for 2-3JD, or these bags can be delivered in bulk to the household. One log will burn for 60 to 90 minutes, and an average household will use up to 1MT a month, costing 60-100JD. At the industrial level, some local factories purchase jift in large quantities (one mill used 400MT on average) as a cost effective alternative to diesel fuel. Olive mill owners often convert their boilers to biomass equipment, allowing them to run their mills entirely on jift.

²⁷ ILO Market Study, found at: http://www.ilo.org/wcmsp5/groups/public/---arabstates/---ro-beirut/documents/genericdocument/wcms_319825.pdf

²⁸ ILO Market Study, found at: http://www.ilo.org/wcmsp5/groups/public/---arabstates/---ro-beirut/documents/genericdocument/wcms_319825.pdf

²⁹ <http://www.sciencedirect.com/science/article/pii/S0196890413005852>

³⁰ <http://www.sciencedirect.com/science/article/pii/S1364032110000560>

There is little demand for jift as animal feed due to past misuse by farmers, leading to misperceptions. Farmers interviewed told stories of animals getting sick after being fed jift. It is true that untreated jift, given to animals as a sole food source, does not provide adequate nutrition. However, research in Spain³¹ has shown that when treated with additives and mixed with other crop residues, jift can provide appropriate nutrition for animals. This line of inquiry could support activities being considered around feed block production in the dairy value chain under ARC.

Supply Analysis and Production Potential

Olive Oil

Jordan produced 32,000 MT of olive oil in 2015, but production dropped to 24,000 MT in 2016. The drop could be attributed to drought conditions in 2016, but this type of variation is relatively normal for the olive oil industry. Production fluctuates from one year to the next, particularly in areas where trees are rain-fed, common in Northern Jordan. As a result, productivity figures often use two-year averages.

In Irbid, most farms range in size from 20 to 50 dunams and are considered medium-sized. A farm of 20 dunams can produce from 3333 litres of olive oil, or 208 tanks. However, volume can drop by as much as 50% in drier seasons. Mafrq tends to have larger, more industrialised farms. Farms there are also more likely to be irrigated. The illustration below shows average production for a twenty-dunam farm in Irbid:

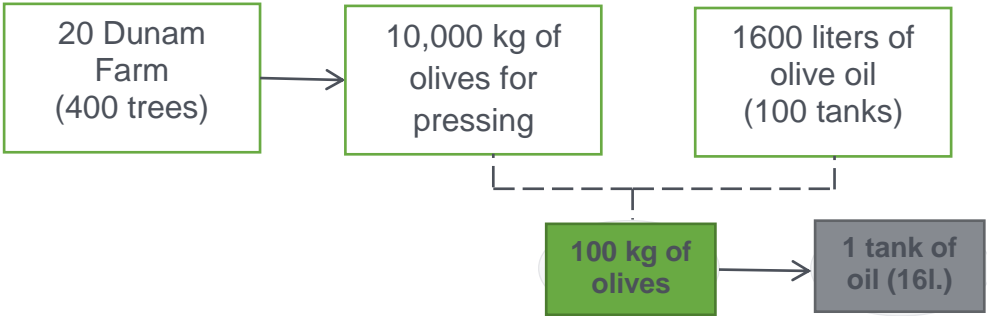


Chart 2 | Production of a 20 dunam farm in Irbid

Organic Olive Oil

In order to claim that olive oil is “organic,” farms and mills must be certified by the Institute for Marketecology–Organic (IMO). According to various Jordanian exporting associations, only five large-scale farms that are certified to produce organic olive oil in Jordan. Domestic demand for organic olive oil is limited, and products are typically only found in Amman in high-profile supermarkets, due to its higher price point. However, exporters recognise the growing international market for organic olive oil, and buy up any that is available.

³¹ <http://www.feedipedia.org/node/32>

Most extra virgin olive oil, used for export, is produced in Mafrq. Mafrq farms are larger and commercial, and thus more concerned with exporting. As a result, they use better farming and harvesting practices. In Irbid, farms are more family oriented and dependent on local consumption. During the harvest in Mafrq, farmers hire extra workers and provide them with special post-harvest handling equipment. In comparison, during harvest in Irbid, family members take vacation days from other work and fewer agricultural workers are hired.

Some of the improved farming practices used in Mafrq are less reliance on rain for irrigation and more frequent tree pruning. In addition, they use special harvesting baskets to collect the olives to protect them from squishing, a practice which prevents pH level increase in the pressed oil.

Olive Oil Waste (Jift)

Jift is currently processed by large mills and contractors into jift logs. The jift market is dominated by large mills that have the machinery and space to process and store jift at their mills. However in Irbid, the team met a number of smaller mills that were paying to get rid of jift. Contractors take their machines and equipment to unequipped mills and process the jift, selling jift logs directly to end consumers. The olive oil production process creates approximately 350 kg of waste for each ton of olives pressed³². Jordan's National Energy Research Centre has estimated a total jift supply of 15,991 MT in Irbid and 3687MT in Mafrq³³.

As mentioned above, jift can be used for either fuel or feed. Jift is already being compressed into "logs" for sale. It also can be a source of nutrients for livestock—countries such as Turkey and Tunisia they are adopting the use of jift into feed. Special processing units are being developed that transform jift into feed pellets³⁴. In Jordan, these technologies have not yet been adopted; however the market assessment revealed that some small scale herders are buying raw jift for their livestock to graze on instead of grass in the dry seasons.

Producers in Spain, Italy, and Tunisia are using improved olive cakes, significantly decreasing the environmental and waste disposal issues that previously plagued olive oil producers by integrating solutions into the agricultural and energy sectors.³⁵

Olive Oil Wastewater

There are two types of olive pressing. The first one uses a three-phase process (separating the pressed olive into a relatively dry solid olive-cake, wastewater, and oil) and the second uses a two-phase process (solid and the waste water exit together, with the oil separated). The majority of mills in Jordan use the three-phase process, producing jift, olive oil, and wastewater separately. 20,000 cubic meters (about 1.59m³ per ton of olives) of olive oil wastewater is produced annually, which is transported from mills to waste dumps. Mills pay an annual membership fee of 140JD for the waste dump, and transportation costs total

³² http://prod.kau.edu.sa/centers/spc/jkau/Data/Review_Artical.aspx?No=3316#Abstract

³³ <http://jera.psut.edu.jo/NetworkingEvent/Biomass%20Potential%20in%20Jordan%20and%20Future%20Research%20Prospects%20by%20Eng.%20Ahmad%20AI-Rousan.pptx.pdf>

³⁴ <http://www.pelletizermill.com/using-oil-cake-making-pellets.htm>

³⁵ <http://olivebiomass.blogspot.co.uk/>

100JD per trip. Depending on the pressing methods used, 85-175 kgs of wastewater are produced for every 100kgs of olives pressed. Traditional olive presses, which use only mechanical power to crush and press the olives, produce the least amount of liquid residue. In contrast, both the two-phase and three-phase production methods use added water and heat to facilitate oil extraction, and therefore produce a higher volume of wastewater residue³⁶.

A recent National Centre of Agricultural Research and Extension (NCARE) pilot project studied the use of olive oil wastewater on olive groves³⁷. The study indicates that measured amounts of wastewater used at certain times in the growing process can act as an organic fertiliser. The pilot took place over three years on a rain-fed olive orchard in Al-Karak governorate. The use of wastewater resulted in an increase in seasonal shoot growth and higher fruit sets. Moreover, the use of the wastewater did not affect the quality of olive oil produced; pH levels remained within the standard limit. Marketing olive oil wastewater as an organic fertiliser presents an opportunity to develop a new value chain that solves an environmental issue (if not handled correctly this wastewater contaminates soil and ground water). Similar research done in Tunisia also found beneficial impacts of wastewater on tomato, chickpea, fava bean and wheat plant growth (seed biomass, spike number, and plant growth).³⁸

Trade Flows

Exports

Jordan's trade agreement with Israel allows it to export 9,000 kilos of olives annually. Jordan also exports a small amount of olives to Saudi Arabia in bulk. There is an Asian market for organic and extra virgin olive oil, but production is small scale and olive oil is sold in small boutique bottles.

Exported olive oil is mainly produced in Mafraq and Karak. Farms in these areas work on a commercial scale with more advanced technologies, paying greater attention to post-harvest techniques that prevent damage to the olives. A Jordanian exporting association and certain large mills have bottling production lines. Field interviews with key export actors revealed that Irbid farmers are not able to produce extra virgin oil for export, due to their conventional harvesting techniques that often damage or crush the olive, causing it to degrade as it waits for pressing and increasing the acidity of the oil produced. Irbid farmers are also less likely to prune their trees regularly, which affects yield, and do not normally water their trees unless there is a lack of rain.



Photo 4 | Olive oil exporting company

³⁶ <http://olivebiomass.blogspot.co.uk/>

³⁷ https://www.researchgate.net/publication/263768757_1-_Ayoub_S_AI-Absi_K_AI-Shdiefat_S_AI-Majali_D_Hijazean_D_2014_Effect_of_olive_mill_wastewater_land-spreading_on_soil_properties_olive_tree_performance_and_oil_quality_Scientia_Horticulturae_175_160-1

³⁸ https://www.academia.edu/12775970/Olive_wastewater_as_an_ecological_fertiliser

Imports

As stated earlier, local production of olive oil is sufficient to meet local demand, therefore there is no need to import olive oil. Consumer preference for local products is strengthened by a Ministry of Agriculture ban on olive oil imports, a policy that was extended in 2015.³⁹

Margins Analysis

The price of olive oil produced in the north is fixed, regardless of the quality, and ranges between 80-100JD per 16L tank depending on production levels that season. The Jordan Olive Oil Producers Syndicate sets the price for oil pressing at 0.48-0.6 JD per kilo of olive oil produced, or mills can charge 10-12% of the total oil production. Harvesting expenses make up the highest cost in the production cycle for farmers. The cost of water and irrigation is not considered in the analysis, as Northern farmers depend on rainwater. The following table summarises key expenses for farmers in Irbid:

Example Production Costs in Irbid

ACTIVITY	UNIT COST	REMARKS
Pruning	1 JD/tree	Necessary for improved tree production
Tilling	8 JD/ Dunam	Northern farms perform land tilling twice per year
Harvesting	0.25 JD/Kilo	Farmers pay workers in cash or give them one third of their total harvest
Pressing	0.6 JD/kg olive oil	Mills have two ways of charging for pressing service: cash or 10-12% of the oil produced
TOTAL production cost for 20 dunam farm	197JD/dunam	20 Dunam farm → 10,000kg olives → 1600 l. oil → 100 tanks x 90JD per tank = 9000JD (profit) 9000JD – 3936JD (production costs) = 5064JD net profit

In other drier parts of Jordan, such as Mafrq, olive trees require regular irrigation every two days. The consumer price of olive oil ranges from 50-70 JDs per tank. There is a consumer perception that oil from the North (Irbid) is denser and therefore better quality (because it is rain-fed), and prices are often higher as a result. Olive oil exporters do not share this belief.

³⁹ <http://www.jordantimes.com/news/local/ban-olive-oil-imports-remain-place>

Seasonal Calendar

Seasonal Calendar for Mills and Farm												
Months	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Farms												
Tilling the land												
Harvesting olive oil												
Pruning olives												
Pressing olives												
Mills												
Pressing olive oil												
Sealing olive oil and storage												
Working in jift and selling it												
Maintenance for machines												

SWOT Analysis – Strengths, Weaknesses, Opportunities, Threats

Strengths

The greatest strength of the olive oil market is that over 90% of production is consumed locally. This is an indicator of high demand for the product, and shows that any improvement in volume, especially of high quality oil, is likely to result in increased exports. Strong existing trade arrangements with Israel and other countries is also a strength, ensuring that incomes from trade will remain stable.

Different production approaches present an opportunity to improve harvest and post-harvest practices and the quality of the oil produced. Mafraq’s commercial farms could be used as ‘demonstration plots’ for improved practices and peer-to-peer conversations with other olive farmers, helping family farms adopt more productive practices.

Weaknesses

The olive oil market is not well-integrated across Jordan—Northern Jordan functions like a separate market with different prices. This segregation means that farmers are less open to approaches used in other locations because they do not feel any pressure to change or improve practices. In addition, because the two markets are not linked, farmers do not share their experiences or best practice.

Sector wide, there is low desire to improve practices and optimize output, as prices for pressing and retail are fixed. Increased production still leads to increased income for farmers, but olive production is notoriously variable, and the investment required for productivity gains may not be economically feasible for smaller farmers.

Opportunity

Further developing waste product value chains presents a promising opportunity in the olive market, including use for feed, bio-fuel, and organic fertiliser. Irbid also has potential for harvest and post-harvest handling improvements, which could be driven by interventions at the mill-level if a price premium can be obtained when new techniques are used. Improving farmer practices could increase export potential for both organic and standard oil, leading to profit growth at multiple points in the value chain.

Threats

Improved harvest and post-harvest practices rely on changing agricultural labourers' behaviour. It may be difficult to encourage and train these groups to adopt new techniques. Therefore, interventions should focus on making an economic case for the desired change.

There are currently no guidelines for proper use of olive oil wastewater as a fertiliser. Wastewater can thus only be used in unofficial capacities until the Ministry of Agriculture develops these guidelines. NCARE has submitted their study to the Ministry of Environment and are waiting for a response. Due to concerns of soil contamination related to the improper handling of agricultural chemicals, wastewater fertilizer use requires further exploration to determine where it can be applied safely.

Key Factors Driving Change in the Market

There is room for growth in the olive market, evidenced by high domestic consumption and low export volume. This presents an opportunity to not only improve farm productivity but also develop new businesses built around supply chain waste products.

The influx of Syrian refugees does not seem to be affecting supply and demand in the olive value chain, as prices are set by Jordan Olive Oil Producer Association's board and oil is a fairly elastic product. Our assessment indicates that increased consumption due to the refugee influx simply reduced exports (which are already small and variable) and/or increase alternative oil imports. Refugee presence has not significantly influenced the domestic market, although slight price increases were seen in some areas.

An additional key driver is the underutilized potential of "recycled" waste products. These inputs are ideal for a new business, since they currently hold little economic value. Development of these new products results in value added for producers and decreased costs for the processors. Waste product development also has positive environmental impacts for Jordan.

Recommendations & Suggested Interventions

Recommendation #1: Work with small and medium farmers to upgrade harvest and post-harvest handling practices

Small and medium sized farms, particularly in Irbid Governorate, stand to benefit from improved harvest and post-harvest practices. Currently, farmers provide little training for agriculture workers (who are frequently Syrian refugees), and use traditional harvesting practices that bruise the fruit, resulting in lower quality oil. Improved techniques could increase access to organic and niche export markets.

By replacing the large sacks currently used for olive collection with sturdy boxes, farmers could prevent fruit bruising. But boxes are expensive, disincentivizing farmer adoption. The key may be intervening at the mill and exporter level. If processors refuse to buy olives that are not delivered in boxes, farmers would be forced to adopt them. Mills could provide farmers with boxes for a deposit fee, which is returned upon crop delivery. Mills and exporters are more likely to have the capital required to purchase of the boxes and understand the potential profit to be made from better crop handling. If mid-value chain market actors see value in upgrading, and successful farmers share experiences with actors from other areas, it is possible that smaller farmers will shift their current practices, helping them reach new markets. This work could be complimented by efforts to help smaller farms obtain organic certification, thereby expanding their access to new markets.

Recommendation #2: Identify models for increased local production and sale of jift as a bio-fuel

Although there are some businesses using jift as an alternative energy source, few mills use it effectively. Developing improved business models for jift bio-fuel at the household and industrial levels would likely create new jobs for youth in an established, secure market, but within a relatively new area. Given the importance of olive products in the Syrian agricultural economy, the introduction of these new technologies would give Syrians transferable skills that could be used after the conflict ends and they return home.

Recommendation #3: Coordinate with Dairy Value Chain team to develop a business model for feed blocks, as a substitute for imported feed/fodder

Jift has the potential to be used as an alternative to expensive local animal feed by poor farmers. In coordination with the work being done on feed/fodder alternatives as part of the dairy value chain, olive waste could be used as an additive to feed blocks, in addition to its use as a bio-fuel. Activities would focus on identifying business models, production processes, and marketing structures needed to launch a new product on the market.

Although this business would potentially compete with the businesses using jift as bio-fuel, we believe there is room for further exploration of both models given the high volume of jift produced each year. These business models will require further refinement as activities develop and market opportunities arise.

Recommendation #4: Work with NCARE to further develop a business model, production structures, and marketing plan for using olive waste water as an organic agro-chemical.

NCARE has conducted research on the use of mill wastewater as an herbicide, and additional research has been done on wastewater as a fertiliser, using different application timing and strength. This research was piloted on farms in Ramtha and Irbid for 3 years and proved largely successful. If a production and business model can be created around this waste product, it will not only solve a serious environmental issue but will also create new jobs. Wastewater product development has the potential to reduce costs for mill owners and possibly increase organic olive oil production. Like all agro-chemicals, this product would require appropriate handling and necessitates working closely with the government to ensure environmental policies are followed. The ARC team could work with new businesses on capacity building to ensure firms establish clear and appropriate environmental protocols. This business model is also transportable to Syria if refugees were to participate in the development of the business model.

Recommendation #5: Networking events that connect key value chain actors in Mafraq and Irbid

Mercy Corps plans to work with a Jordanian exporting association to host networking events for MSME owners to improve market linkages, especially for new products. We hope to create a more diverse, integrated network of stakeholders who can share experiences on different phases of production and marketing.

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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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