

Dairy Processing Training for Vulnerable Refugee and Host-community Women in Irbid - Jordan

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Introduction

Seeking innovative ways of linking refugees to local markets is at the core of UNHCR's Global Strategy for Livelihoods for 2014-2018 which emphasizes the need to support access to local markets, preserve and protect refugees' productive assets, and develop economic self-reliance in order to meet their consumption needs¹. In addition, both the Regional Refugee and Resilience Plan (3RP) and the Jordan Response Plan (JRP) call for interventions that stimulate businesses and provide support to micro, small & medium enterprises (MSMEs) including market analysis and value chain development. The 2016-2017 3RP Food Security Sector Strategy specifically calls for "Strengthening capacities of food and agricultural production systems to better respond to the food and livelihood needs of the populations affected by the crisis".

This training project is in line with the UNHCR's global strategy and contributes to the achievement of 3RP and JRP livelihood goals by promoting economic self-reliance of Syrian refugees and vulnerable Jordanians to enable them to meet their essential needs, lead active and productive lives, and be able to build strong social and economic ties. It aims to achieve this through promoting refugees' and Jordanians' employability in the home-based dairy processing sector as skilled workers and home-based business owners. The main project outcome is to focus on enabling Syrian refugee and vulnerable Jordanian women in Irbid Governorate to have sustained income and improved livelihood through engagement in the dairy sector.

Dairy processing in Jordan is practiced by women at home to support their families. However, the quality of produced products is questionable from the hygienic point of view. They frequently face problems like souring of yogurt and blowing of cheese, yogurt zeiosis and bubbling and molding of jameed.

Through training and follow up activities the project achieved its goals and planned outputs that include: 1) increasing knowledge and skills by implementing a variety of capacity building trainings and on-the-job coaching and supervising; 2) improving infrastructure and market access by providing tools and equipment, and infrastructure upgrades; 3) increasing access to employment opportunities of 30 women who participated in the dairy processing training through building and expanding a referral network that women can use to access potential employers; and 4) increasing access to basic services of 60 targeted women and the members of their households through referral to essential services provided by Caritas-Jordan (CAJO).

¹ UNHCR, 2014

The initial design of the project is based on a market assessment and a value chain analysis of the Irbid Governorate (Irbid, Jordan Valley, and Ramtha) that were conducted in 2017 by the International Centre for Agricultural Research in the Dry Areas (ICARDA) and Caritas Switzerland (CACH).

The training project targeted families in five villages (El-Hosen, Katemm Shatana, El-Sarih and El-Naimeh) in the Bani Obaid district, Irbid governorate. and provided training for a total of 60 households. The project implementation was done by ICARDA and CAJO in collaboration with the Young Women Christian Association (YWCA).

The training

An in-class training course was developed by ICARDA and then conducted by ICARDA supported by CAJO. In total three courses were conducted within the period from 3 to 21 March 2019. Each course took five continuative days, four to five hours per day, where homogenous groups of 20 Jordanian and Syrian women were attending. In total 60 women who are involved or would like to be involved in dairy processing were trained, 30 Syrian refugee women and 30 Jordanian women from the hosting community attended the training. The course took place at YMCA in El Hossen city.

The course was divided into 3 different parts.

- The first part of the course was focusing on issues related to milk production and hygiene in milk handling and processing with focus on human health and women comfort.
- The second part of the training focused on modern processing pathways to produce dairy products that are important in Jordan like white cheese brining processes yogurt, butter ghee and dried dairy products like Jameed.
- The third part of the course is to develop the understanding and linkages of organoleptic properties of the product with product marketing.

The course started with a general discussion on dairy processing focusing on problems faced. After the discussion a theoretical presentations and explanations related to the constraints faced by small scale household processors reflecting what was discussed and presented by the participants. The theoretical sessions were followed by an interactive practical training where all trainees participated in the work. A detailed program of the course is presented in Annex 1.

The training provided the essential knowledge to produce good quality products focusing on hygienic processing.

Yogurt is a base product for some traditional dairy products such as Jameed and Shanineh. Traditionally, these products have specific characteristics that affect their acceptance and marketability. Contaminations, milk quality and processing method affect the final product quality. The use of a good dairy culture is essential to produce high quality products. Producers often do not use a dairy culture and depend on spontaneous fermentation of raw milk. In the training yogurt was produced using a selected set of different commercial dairy cultures that cover a range of characteristics from very mild to strong flavor.

White and brined cheese is another traditional product that is challenged by different problems like blowing and eye formation. Cheese smearing is a often faced problem and affects cheese marketability. The trainees were exposed to new processing methods to meet regulations and standards. Pasteurization technique and the use of dairy culture for cheese were introduced.

The trainees were also exposed to consumer preferences and marketing issues. In this regard the processed products, particularly yogurt and cheese, were evaluated by sensorial and organoleptic properties. The trainees were trained to evaluate the yogurt on a 1-5 ranking scale, where 5 is the best and 1 in the worst. In total 6 different dairy cultures were used to produce yogurts with different characteristics. These yogurts were evaluated by the trainees for four characteristics that are important for marketing. These are texture, acidity, taste and appearance of yogurt. The results of the sensorial evaluation are presented in Figure 1. The results can be used to select the proper dairy culture to produce yogurt that can be sold at a better price in the market as it meets consumer preferences.

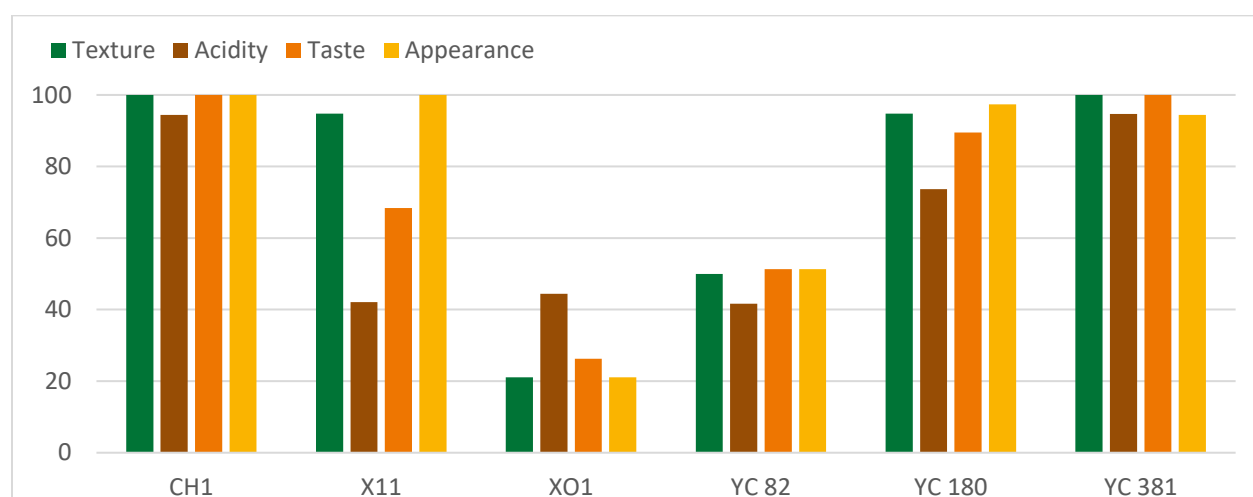


Figure 1. Organoleptic and sensorial evaluation of the tested dairy culture (accumulation of frequency percentage of the highest-ranking scores 4 and 5).

Moreover, the knowledge in dairy processing was assessed for each trainee prior to and after the course. To this end, a set of questions (Annex 2) was answered before and after the training. On average 21% of knowledge gain was achieved (Table 1).

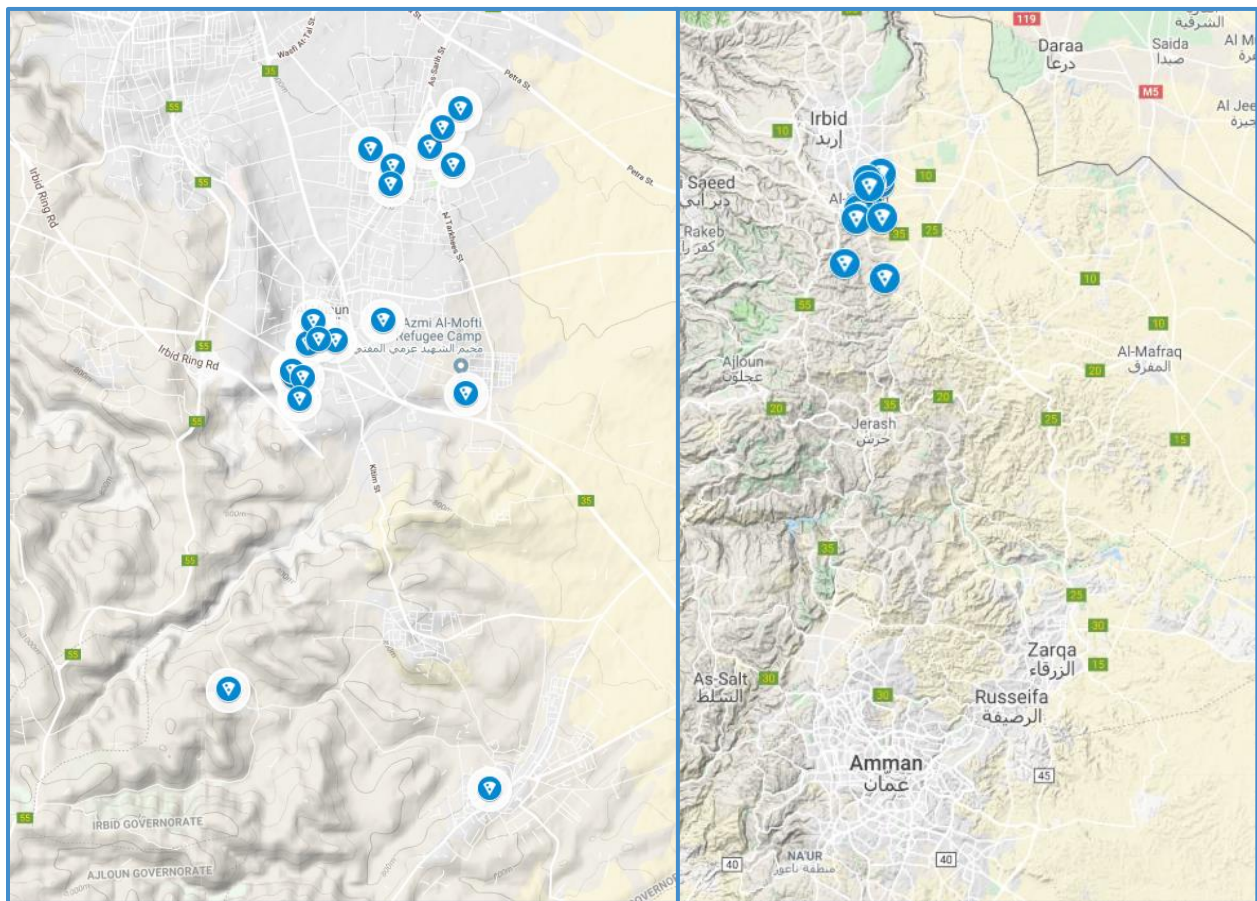
Table 1. Results of the trainee's assessment

Group	Before training	After training	Improvement (%)
1	39.88	55.00	15.12
2	38.13	66.88	28.75
3	41.25	61.25	20.00
Average	39.75	61.04	21.29

Post training follow up

In accordance with the planned activities, a post training follow-up of the dairy processors was conducted. The aim of the follow up was to support the development of dairy processing businesses. In total 30 out of the 60 trained women were selected by CAJO in the region of El Hosson, Jordan (Figure 2). The selected women were supported by CAJO with equipment which is listed in annex 3 to establish a functioning home-based business. Out of 30 women, 10 women did not have any dairy business before and were supported with the full set to start their business. A regular visit schedule was planned by ICARDA and CAJO to collect information on the progress and improvements in product quality after training, and to understand and solve individual problems faced in relation to processing. The dairy processing units (Figure 2) were visited during the period from May till August 2019.

Figure 2. Geographical distribution of followed up dairy processing workshops.



Source: Google Maps ©2019².

² <https://www.google.com/maps/@32.4734926,35.7872393,11z>, 14-9-2019.

The follow up visits started after the equipment distribution by CAJO. As a result of the training a jump in butter yield was observed in most dairy workshops. An increase of up to 25 % was estimated by the women, which in consequence means that the ghee yield and economical benefit will be increased by the same rate. Most women mentioned that their work became easier after the training due to the training, knowledge gain and the use of new equipment. However, many problems were still observed in many cases and were followed up and solved.

Weak texture of yogurt was reported as a problem in two cases which was due to improper incubation conditions; elevated acidity was also reported due to improper culture and culturing condition. In one case yogurt and cheese flavor and aroma changed due to the improper storage condition, because the products were stored in the fridge but with vegetables and peppermint. White cheese was produced without pasteurization but was boiled later. A re contamination was observed due to salt quality used which was a reason of cheese smearing and presence of pigments. The distributed thermometers were used mainly in yogurt processing to check the proper time for adding the yogurt culture. Contamination with yeast was observed almost in all visited places (Figure 3). The contamination was observed on walls and on yogurt bags prepared for product concentration like labneh and Jameed.



Figure 3. Contamination during processing

Cleaning of equipment and building was lacking in some places. In this regard suggestions and advices were given that enhanced the hygienic situation after the visit. Problems mentioned were discussed on the spot explaining the reasons and ways to overcome them. In all interactions the importance of cleaning and hygiene procedures was emphasized. All visited workshops have overcome their constraints related to quality and processing.

Unfortunately, all workshops do not keep processing records and records of inputs and output costs and do not do any economic calculations, therefore they do not know the yields of processed products. In this regard, a daily recording sheet will be developed for the next season.

Annexes

Annex 1. Training program

Day 1		
9:00 – 9:30	Registration	Knowledge
9:30 – 10:00	Milk production and animal milking	Theory
10:00 – 10:30	Milk Microbiology and milk hygiene	Theory
10:30 – 11:00	Milk fat separation	Theory
11:00 – 11:30	Yogurt	Theory
11:30 – 12:00	Break	
12:00 – 13:00	Milk fat separation practical	Practical
13:00 – 14:00	Yogurt Processing	Practical
Day 2		
9:00 – 9:30	Milk composition	Theory
9:30 – 10:00	Dairy culture	Theory
10:00 – 10:30	Yogurt sensory evaluation	Practical
10:30 – 11:00	Labneh	Theory
11:00 – 11:30	Jameed	Theory
11:30 – 12:00	Break	
12:00 – 13:00	Labneh processing	Practical
13:00 – 14:00	Jameed processing	Practical
Day 3		
9:00 – 9:30	Cheese	Theory
9:30 – 11:30	Cheese processing	Practical
11:30 – 12:00	Break	
12:00 – 13:00	Cheese processing, follow up	Practical
13:00 – 14:00	Jameed, follow up	Practical
Day 4		
9:00 – 9:30	Butter	Theory
9:30 – 10:00	Processing of whey and other dairy processing by products	Theory
10:00 – 10:30	Cheese processing, follow up	Practical
10:30 – 11:30	Processing of ricotta	Practical
11:30 – 12:00	Break	
12:00 – 13:00	Butter processing	Practical
13:00 – 13:30	Jameed, follow up	Practical
Day 5		
9:00- 10:00	Ghee processing	Practical
10:00 – 10:30	Jameed, follow up	Practical
10:00 – 11:00	General discussion	
11:00 – 11:30	Evaluation	

Annex 2. Pre and post assessment of knowledge in dairy processing

تقييم معلومات السيدات المتدربات في دورة تصنيع منتجات الحليب

أجيب عن الأسئلة التالية وعددها ثمانية بوضع دائرة حول رمز الإجابة الصحيحة:

1. هل يمكن عمل الجبنة من الحليب المغلي؟
أ. نعم
ب. لا
ت. يمكن بعد التبريد
2. ما هي عملية بسترة الحليب؟
أ. تبريد الحليب إلى 8 درجات مئوية
ب. رفع حرارة الحليب إلى 65 درجة مئوية لمدة 20 دقيقة
ت. غلي الحليب
3. ما هي أهمية الحليب للشيوخ؟
أ. غني الحليب بالدهن
ب. غني الحليب بالبروتين
ت. غني الحليب بالعناصر المعدنية
4. ما هي أسباب حموضة الحليب؟
أ. تخمر السكر
ب. نوعية العلف
ت. الحرارة
5. لماذا يتكتل الحليب أحياناً؟
أ. بسبب التهاب الضرع
ب. بسبب استخدام أواني غير نظيفة
ت. بسبب الحلاوة البطيئة
6. لماذا تنتفخ الجبنة أحياناً؟
أ. بسبب التلوث وعدم مراعاة الشروط الصحية
ب. استخدام منفحة زائدة
ت. بسبب الجو الحار
7. لماذا لا يتخثر الحليب إلى لبن رائب أحياناً؟
أ. بسبب وجود المضادات الحيوية
ب. بسبب الغلي الزائد للحليب
ت. بسبب التلوث وعدم مراعاة الشروط الصحية أثناء التصنيع
8. لماذا يتسطح الجميد أحياناً؟
أ. بسبب الرطوبة الزائدة
ب. بسبب الرطوبة القليلة
ت. بسبب عدم العجن



Annex 3. List of equipment distributed to xxx women

قائمة المواد والأدوات لتصنيع منتجات الحليب Dairy processing tools and equipment check list

Pictures الصورة	Notes ملاحظات	Description الوصف	Tool or equipment المادة/ الأداة
	عدد 1 لكل مستفيدة	Stainless steel (30 – 30) / المنيوم يفضل 60 لتر	طنجرة قدر Big pots (30-60L)
	عدد 1 لكل مستفيدة	-	موقد غاز كبير (رأس واحد) Cooker
	يمكن إيجاد شبيهه في اريد	-	مكبس للجبن Cheese press
	على الأغلب لا يتواجد منه في الأردن وقد تم شراؤه من تركيا	-	جهاز فصل دسم الحليب - Fat separator
	أن يكون الماتور من الأسفل وليس من الأعلى	معدنية (50 لتر)	خضاضة زبدة - Churner

Pictures الصورة	Notes ملاحظات	Description الوصف	Tool or equipment المادة/ الأداة
	عادة تأتي مع رفوف عدد 5	م2 ارتفاع * 60 سم عمق * 180 سم عرض	براد كبير مثل براد عرض المنتجات - Refrigerator
	- عدد 1 لكل مستفيدة	(110 درجة مئوية) ميزان كحولي	ميزان حرارة - Thermometer
	عدد 1 لكل مستفيدة	من المواد المخبرية	جهاز تقدير كثافة الملح - Salt meter
	عدد 1 لكل مستفيدة	من المواد المخبرية	جهاز تقدير الحموضة - pH meter
	عدد 1 لكل مستفيدة	من المواد المخبرية	جهاز تقدير الكثافة للحليب Density meter
	عدد 1 لكل مستفيدة قد تكون متوفرة	Stainless steel	مجموعة ملاعق كبيرة
	عدد 1 لكل مستفيدة	Stainless steel	Large Knife - سكين طويلة
	قد تكون متوفرة	Stainless steel	Spoons ملاعق -
	قد تكون متوفرة	Stainless steel	Knives سكاكين -

Pictures الصورة	Notes ملاحظات	Description الوصف	Tool or equipment المادة/ الأداة
	عدد 2 لكل مستفيدة	120 لتر	برميل بلاستيك للحليب - Barrels
	عدد 1 لكل مستفيدة	قطر 50-60 سم + Stainless steel ، فتحات 1 مم	Seep مصفاية - (حجم المصفاة + حجم التخريم)
		رول (على الأقل 25 م)	قماش قطني للتصفية - Cheese cloth
	من 10 - 15 سطل للمستفيدة	بلاستيك 1-3 كغ	سطل لتعبئة اللبن - Buckets
		30 سم × 40 سم	جهاز تغليف بالتفريغ - Vacuum packager
			Dairy culture بادئ اللبن -

Pictures الصورة	Notes ملاحظات	Description الوصف	Tool or equipment المادة/ الأداة
			Rennet منفحة -
		من المواد المخبرية	Ca Cl ₂