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## Enhancing the Dairy Processing Skills and Market Access of Rural Women in Jordan

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## Acknowledgements

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## Contents

1. Introduction.....	4
2. Methodology.....	4
3. The Communities.....	4
4. Perceptions of Risk and Risk Management.....	6
5. Dairy and Dairy Product Processing.....	6
6. Dairy and Dairy Product Marketing.....	7
7. Marketing Agents and Description of Marketing Channels.....	7
8. Quality Attribute-Price Relationship.....	8
9. Price-Transmission in the Dairy Value Chain.....	8
10. Conclusion.....	9
11. Appendixes.....	10

## Acronyms

ICARDA	International Center for Agricultural Research in the Dry Areas
IFAD	International Fund for Agricultural Development
MoA	Ministry of Agriculture
NCARE	National Center for Agriculture Research and Extension
RRA	Rapid rural appraisal

## Executive Summary

This report presents the findings of the socioeconomic, dairy processing and marketing conditions of women in four communities in the Karak Governorate of Jordan. It is part of a project targeting rural women that develops and pilot tests technological and institutional options for improving the small-scale processing and marketing of dairy products from sheep and goats. The four communities selected to participate in the study were Al-Jad'aa, Mhai, ADR, and Al-Rabba.

The review team conducted two rapid rural appraisals with focus groups and one individual interview with a key informant in each of the communities. Although both men and woman are involved in dairy processing, the majority of the work is undertaken by women. The vast majority of the dairy products are sold at markets, generating an additional source of household income.

The main recommendations that came out of this study are:

1. Any research for development effort needs to involve the target beneficiaries in problem identification and in designing solutions. This approach ensures that the technologies to be introduced are appropriate and attractive to the target population by incorporating their tastes, preferences and level of their comprehension;
2. While diversification of product lines is often important in reducing market related risks, the stable and reliable domestic and international demand for jameed, especially from the Karak governorate, along the higher net margin that it commands relative to all other product lines, makes jameed the product of choice for the women processors. Therefore, any dairy related technological, institutional and marketing intervention in the Karak governorate should include jameed in its target commodities.
3. The dairy processing technologies introduced through the project have proven to be effective in leading to higher quality products and also in cost saving. Therefore, NCARE needs to partner with other government and non-government organizations to out-scale the technologies and benefit more rural women in the region.

ICARDA is active in efforts to create opportunities for vulnerable women in other forums. For example, ICARDA is supporting an initiative targeting the improved production, processing, and export of wool and mohair in increasing employment and income opportunities for vulnerable women in Tajikistan, Kyrgyzstan, and Iran. The organization recognizes the importance of programs seeking to empower women and include them in household poverty reduction efforts, and will continue to engage in this important work.

## 1. Introduction

This report describes the findings of a baseline study of the socioeconomic, dairy processing and marketing conditions of women in four communities in the Karak Governorate of Jordan. It is part of a project targeting rural women which develops and pilot tests technological and institutional options for improving the small-scale processing and marketing of dairy products from sheep and goats.

Information collected from surveys in these communities was used to identify the major problems faced by women who draw their livelihoods from dairy processing and marketing, and identify and pilot-test appropriate and effective technological, institutional, and marketing interventions to enhance livelihoods.

Of the four communities, Al-Jad'aa and Mhai were selected because they have strong and well-organized women's cooperatives for dairy processing. Ahr and Al-Rabba were selected because they have large sheep/goat populations, but no cooperatives. As a result, they provide the opportunity to work with individual women who process milk at home.

They are also part of the IFAD-funded project Improving the food security and climate change adaptability of livestock producers using the rainfed barley-based system in Iraq and Jordan, which works on many aspects of sheep/goat production, feed, and dairy production and marketing. There is the possibility of synergies between the two projects. The inclusion of these four communities demonstrates what is working and what is not, and measures the value added by interventions targeting animal production and feed, and dairy processing and marketing.

## 2. Methodology

Two rapid rural appraisals (RRAs) with focus groups and one individual interview with a key informant were carried out in each of the four communities. Representative groups of local men, women, elders, traders, and government officials participated. The main objective of these surveys was to establish an understanding of the conditions, problems, and characteristics of the target communities. The information collected was used as the basis for identifying the major problems faced by women who draw their livelihoods from dairy processing and marketing, and for identifying and pilot-testing appropriate and effective technological, institutional, and marketing interventions to enhance livelihoods. Three information collection checklists were designed for this purpose. A key informant survey was used to collect secondary socioeconomic and bio-physical data. A community focus group RRA was used to collect detailed information about dairy processing and marketing practices, problems, options, risks, and priorities. A market agent focus group RRA was used to collect specific information on marketing, supply chain, and patterns of supply and demand.

All checklists were completed for each of the four villages using a combination of semi-structured questionnaires and checklists. Informal discussions between technical staff, pioneer farmers, and the heads of the municipalities were also conducted during the meetings. The results of these exercises are presented in this report.

### Notes

- JOD 1 = USD 1.41
- 1 dunum = 1,000 m<sup>2</sup>; 10,763.9 feet<sup>2</sup>; or 0.25 acres
- Jameed is a dairy product made from processing and drying yogurt
- Ghee is a clarified butter
- Labaneh (sometimes spelled labneh) is strained yogurt

### 3. The Communities

The four communities studied are relatively small, ranging from 4500 to 9000 people. The major sources of household income were agriculture, trade and government jobs, including positions within the military. Average household incomes ranged from 2400 to 6000 JODs and the average size of landholdings was as low as six dunum in Al-Jad'aa and as high as 15 dunum in Al-Rabaa. Agricultural activities also varied: although wheat and barley were grown in every community, there were also distinct preferences for alternative crops, including chickpeas, lentils, fruit and olive trees, and vegetables. In Al-Jad'aa and Mhai, around 70% of households owned livestock (mainly sheep and goats) but this number was much lower in Al-Rabba and Adr where only 20% and 2% of households, respectively, owned livestock.

Agricultural production systems have to contend with dry area conditions. None of the villages investigated received more than 300 mm of rainfall each year - and in the case of Mhai, this amount was even lower (110 mm). Average temperatures range between the low to mid 30s (measured in degrees Celsius) in most of the villages, but could reach up to 38°C in Al-Rabba.

All four communities can be accessed by asphalt roads and each contains feeder roads that facilitate access to farms and the region's wider road network. Household mobile phone usage is relatively high, ranging from 80% coverage in Mhai to 99% in Al-Rabba, and every community is served by government-run educational and health facilities. Every house in each of the four communities is connected to a piped water supply provided by the water supply and irrigation authority, and during water shortages households are forced to buy water from private vendors at a high cost. Veterinary and extension services are delivered by Jordan's Ministry of Agriculture and the National Center for Agricultural Research and Extension (NCARE).

### 4. Perceptions of risk and risk management

Poverty, unemployment, and weak government services are a common feature of all four communities. Farming is constrained by increasingly erratic rainfall, degraded land, and the high price, poor quality nature of agricultural inputs, including livestock feed and milk for dairy processing. In two communities, the limited availability of skilled labor is also an impediment to improved productivity. Limited access to credit is a further constraint that may prevent the introduction of modern agricultural inputs – although loans may be available through the Agricultural Credit Association and private credit institutions.

When consulted on the strategies needed to address these challenges and constraints, communities provided a range of options: the provision of fodder at reasonable prices, training on improved methods of animal production, and the introduction of advanced inputs such as drought-resistant crop varieties. Further support was voiced for diversification strategies, such as the creation of small businesses, and improvements to dairy product processing and marketing, which were already being initiated in some instances through the establishment of cooperatives and a dairy factory.

## 5. Dairy and dairy product processing

Manual milking is the only method used to extract milk from livestock, and the vast majority of milk is reserved for processing rather than consumption. Jameed, ghee, and labaneh are the main types of dairy products produced in the four communities - although limited amounts of yogurt and white cheese are also produced. These products are mostly processed within households and women's cooperatives. Although both men and women are involved in dairy processing, the bulk of the work is undertaken by women: men mostly buy milk, while women are responsible for processing and marketing dairy products. These activities can take up a significant amount of time during the milking season – up to 75 percent of women's time in Adr and Al-Rabeh, and at least 25 per cent in the other two communities.

Only limited amounts of dairy products are consumed at home. The vast majority of products are sold at markets, generating an additional source of household income. In all four villages, farmers decide on how much of the surplus milk to sell fresh or process into other dairy products – the decisions are based on market price, household consumption demands, the availability of skilled labour, and the need for cash. In Mhai, the cooperative administration also makes decisions on how much of the milk supplied should be processed into the different dairy products, taking into consideration market demand and supply.

The Ministry of Agriculture and the National Center for Agricultural Research and Extension (NCARE) provide extension and capacity building activities in every village, including the delivery of training on dairy processing, and the provision of animal feed and animal health services.

## 6. Dairy and Dairy Product Marketing

Most of the fresh milk produced in the villages is bought by cooperatives, although families who do not own animals also consume limited amounts. In three of the four communities milk supply does not always meet demand, often the result of a lack of pastureland, high feed prices, and a reduction in the number of livestock owners. In these cases, traders are forced to buy milk from outside the village – the prices are set according to availability and demand.

Given the high national and international demand, Jameed is the most common dairy product in the area, but the quality and quantity of this product could be improved. Processors identified two main ways that production could be improved: better packaging and sterilization, although the latter would require more training opportunities to equip producers and processors with the knowledge and skills to apply simple methods of pasteurization and sterilization.

Milk processors - private and cooperatives - are responsible for selling dairy products and as a result receive the proceeds. Benefits are then distributed among the individual producers, cooperative members, and hired workers (mainly women). No formal market systems exist in any of the villages. Farmers get information about prices from processors, traders, and other members of the local community, an information asymmetry that could put farmers at a distinct disadvantage. There are no commission agents in the area, and it is not known whether this is an advantage or disadvantage.

At the farm-level there are no significant losses of milk due to storage, transportation, processing, or market-related problems. Farmers usually transport milk and milk products to buyers using their own vehicles. The average distances travelled to deliver milk vary –ranging from 12 km in Al-Jad'aa to 30 km in Mhai.



## 7. Market Agents and Descriptions of Marketing channels

Processors sell products to consumers inside and outside their communities, both within the region and further afield. In the case of Mhai's processors, the main market for dairy products is Amman, the Jordanian capital. Products are mostly sold to traders, and rather than formal contracts, exchanges are determined by oral agreements. Prices are determined by negotiations between producers and traders in each village, and traders gather information about supply, demand, and market prices for milk and milk products through telephone calls to their market outlets.

Traders mostly purchase jameed, ghee, labaneh, and yogurt – although butter is also purchased in Adr – and tend to sell these products quickly to avoid the need for storage. Traders also express a preference for white cheese but this product is not available in any of the villages studied – the result of a shortage of fresh milk, absence of pressing equipment, lack of experience, and low-profit potential. In Al-Jad'aa, however, the women's cooperative is being encouraged to establish a sheep farm in order to secure an adequate supply of fresh milk.

## 8. Quality attribute-price relationship

Two surveys on price-transmission and the quality-price relationship were subsequently developed and completed by all stakeholders in the dairy value chain. It became clear, through informal discussions in each of the villages, that personal relationships between buyer and seller, as well as their negotiation skills and bargaining powers, were extremely important in determining prices.

The surveys also demonstrated that the quality attributes of the product were important determinants of price. The attributes included in the survey were taste, smell, color, cleanliness, yeast and mold development, packaging, labeling, and texture (see appendix 10.1). For the main products processed and marketed in the region - milk, butter, ghee, and jameed - consumers agreed unanimously on the desired standards for certain quality attributes. The products have to have the following attributes:

- Be very clean.
- Be white in color (with the exception of ghee which is preferred to be yellow).
- Be without any yeast and/or mould.
- Be free from impurities.
- Have no smell (with the exception of ghee where a strong smell is preferred).
- Have a simple or more detailed label along with an official seal.

## 9. Price-Transmission in the dairy value chain

Fresh milk is sold in plastic containers at a cost of JOD 1 per kg in all four villages. Herd owners sell fresh milk to farm households who process milk at home and to local cooperatives – although in Mhai the milk is sold only to the local cooperative. Individual households and cooperatives process the milk into other dairy products – mostly yogurt, jameed, or ghee.

In all four communities, jameed is sold both inside and outside the cooperative to traders and consumers. It is usually sold in nylon bags and the prices vary slightly from community to community – it reaches JOD 10.7 per kg in Al-Jad'aa, JOD 10 per kg in Al-Rabba and Adr, and up to JOD 11 per kg in Mhai.

Ghee and butter are produced as by-products of Jameed – although the production of butter tends to be rare in all four communities. Ghee is always sold in 8 kg metal cans and usually fetches JOD 10 per kg – although this figure can rise to JOD 12 in Mhai. Yogurt is also sold to consumers inside and outside cooperatives for an average price of JOD 1.5 per kg. Although cheese is rarely produced, and mostly consumed at home, it is capable of fetching JOD 5 per kg in Mhai and JOD 6.5 per kg in Al-Jad’aa.

A detailed analysis of the costs and benefits of producing the different types of dairy products reveals that Jameed – with ghee as a by-product - is the most profitable across all four villages. The net margin per kg of milk processed ranges from JOD 0.51 in Adr to 0.64 in Jad’aa, with an average over all four villages of JOD 0.6 per kg. The second most profitable product is yogurt, which is capable of generating an average net margin of JOD 0.42 per kg of milk processed – although limited local demand and the costs of transporting yogurt to other markets undermine any potential returns. As a consequence, the Project recommends training women on the production of high-quality Jameed, and purchasing processing equipment that could generate higher yields and profits and improve time and cost-efficiency.

Appendix 10.2 shows the price transmission analysis for all four communities.

## 10. Conclusion

The main findings of this study are that problem identification using a participatory approach leads to building the confidence and involvement of the beneficiaries in project activities. While a project can introduce new and proven technologies that address important production constraints among rural communities, its success in terms of achieving high adoption rates for the new technologies very much depends on whether the technologies were tested and adapted to the local conditions with full involvement of the beneficiaries. This project succeeded in developing an innovative way of linking research to development that has proven to be effective in winning the confidence of the target beneficiaries as well as local, regional and national administrations. This also led to good achievements in terms of the adoption of the new processing technologies among the women processors. The cost savings and increased quality of dairy products have also led to higher income for the beneficiaries.

The study found that manual milking was the only method used to extract milk from livestock and the vast majority of milk is reserved for processing rather than consumption. Jameed, ghee, and labaneh are the main dairy products produced, and the bulk of the work is undertaken by women. Jameed is the most common product in the area, and improvement of the quality and quantity is possible. Regardless, Jameed is the most profitable product across all four villages.

The vast majority of the products are sold at markets, generating an additional source of household income. Most of the milk is bought by cooperatives, which are responsible for selling the dairy and distributing the profits among the individual producers, cooperative members, and hired workers (mainly women). None of the villages had a formal market system. Products are sold mostly to traders with prices being determined through oral agreements. Additional surveys reflected that the personal relationships between the buyer and seller, as well as their negotiations skills and bargaining powers, heavily impacted the price determination.

Recommendations stemming from this study include the following:

1. If research is to succeed in bringing about impacts, it has to be systematically linked to development efforts in the study area.
2. Any research for development effort needs to involve the target beneficiaries in problem identification and in designing solutions. This approach ensures that the introduced technologies are appropriate and attractive to the target population by incorporating their tastes, preferences and level of their comprehension.
3. While diversification of product lines is often important in reducing market related risks, the stable and reliable domestic and international demand for jameed, especially from the Karak governorate, along the higher net margin that it commands relative to all other product lines, makes jameed the product of choice for the women processors. Therefore, any dairy related technological, institutional and marketing intervention in the Karak governorate should include jameed in its target commodities.
4. The dairy processing technologies introduced through the project have proven to be effective in leading to higher quality products and cost savings. Therefore, NCARE needs to partner with other government and non-government organizations to out-scale the technologies and benefit more rural women in the region.
5. Further analysis needs to be done to identify which quality attributes of the different dairy products lead to the highest price premium and then trainings will have to be organized to help the women tap into those premium prices.

## 11. Appendixes

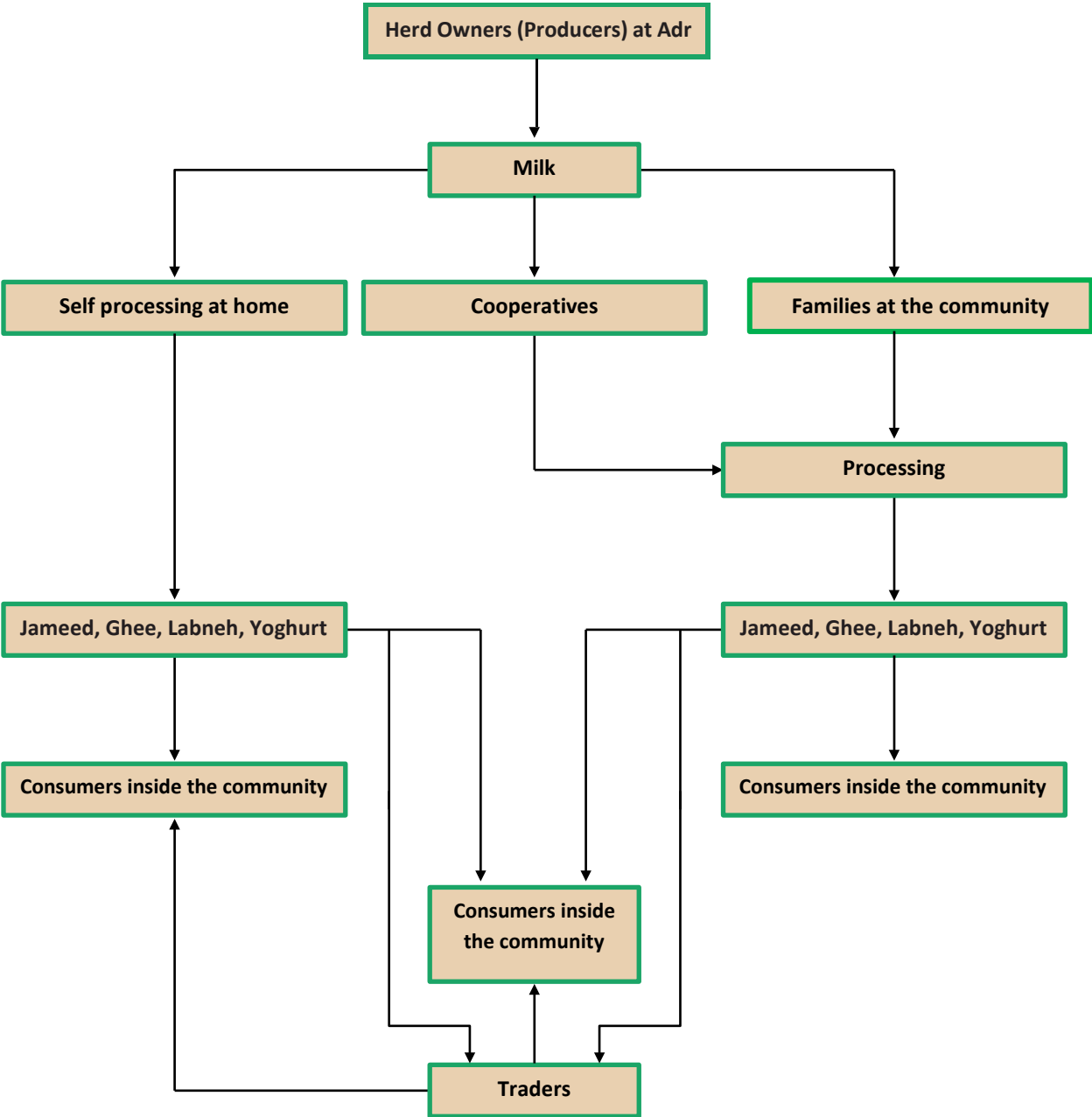
### Appendix 10.1: Quality attribute-Price Relationship Analysis (summary for all 4 villages)

Attribute	Most preferred quality attributes (attributes that lead to premium prices)						
	Milk	White cheese	Laban	Labneh	butter	ghee	Jameed
Taste	Not sour	Not sour	Not sour	Not sour	Not sour	Not sour	sour or moderately sour
Smell	No smell	No smell	No smell	No smell	No smell	Strong	No smell
Color	White	White	White	White	White	Yellow	White
Cleanliness	Clean and pure	Clean and pure	Clean and pure	Clean and pure	Clean and pure	Clean and pure	Clean and pure
Yeast and mold development	No mold or yield	No mold or yield	No mold or yield	No mold or yield	No mold or yield	No mold or yield	No mold or yield
Packaging	No preference	Plastic bags or metal cans	Plastic bags	Plastic containers	Plastic bags or plastic	Plastic bags or plastic	Plastic bags
Label	Simple or detailed with official seal	Simple or detailed with official seal	Simple or detailed with official seal	Simple or detailed with official seal	Simple or detailed with official seal	Simple or detailed with official seal	Simple or detailed with official seal and trade mark
Texture	Liquid	Firm	Firm	Firm	Firm	Firm	Firm, no cracks, no breakage

Appendix 10.2: Price transmission analysis table (Summary for all 4 villages)

Item	Milk	Yogurt	Cheese	Jameed with Ghee as byproduct
Purchase( or sales) price (JD/kg)	1			
Average amount of fresh milk needed to produce 1 Kg of:	1	1	4.625	9.545
Amount of byproduct produced from processing the above amount of milk	0	0	0	0.56
<b>Total value fresh milk needed (JD/kg):</b>	<b>1</b>	<b>1</b>	<b>4.625</b>	<b>9.545</b>
Number of labor hours spent to process 100 kg of milk into:	0	7	6	6.5
Number of labor hours spent to process 1 kg of milk into:	0	0.07	0.06	0.065
Wage rate JD/hr	1	1	1	1
<b>Total value of labor input (JD/kg)</b>	<b>0</b>	<b>0.07</b>	<b>0.2775</b>	<b>0.620425</b>
Cost of gas		0.01	0.01	0.1
Cost of salt			0.01	0.01
Cost of spices				
<b>Total cost excluding the cost of fresh milk</b>	<b>0</b>	<b>0.08</b>	<b>0.3</b>	<b>1.29</b>
<b>Total cost of producing the above amount of byproduct excluding the cost of fresh milk</b>				<b>0.56</b>
<b>Total cost including cost of producing the above amount of byproduct</b>	<b>1</b>	<b>1.08</b>	<b>4.92</b>	<b>10.84</b>
<b>Selling price JD/kg of main products</b>	<b>1</b>	<b>1.5</b>	<b>5.625</b>	<b>10.425</b>
<b>Selling price JD/kg of byproducts</b>				<b>11</b>
<b>Net value added (JD/kg of fresh milk processed):</b>	<b>0</b>	<b>0.42</b>	<b>0.15</b>	<b>0.6</b>
<b>Rank (form highest to lowest) of net margins</b>	<b>4</b>	<b>2</b>	<b>3</b>	<b>1</b>

Chart 1: Representative Market Channels for Dairy Products in the four Communities:



# About ICARDA and the CGIAR



Established in 1977, ICARDA is one of the 15 centers supported by the CGIAR. ICARDA's mission is to improve the livelihoods of the resource-poor in dry areas through research and partnerships dedicated to achieving sustainable increases in agricultural productivity and income, while ensuring efficient and more equitable use and conservation of natural resources.

ICARDA has a global mandate for the improvement of barley, lentil and faba bean, and serves the non-tropical dry areas for the improvement of on-farm water use efficiency, rangeland and small ruminant production. In Central Asia, West Asia, South Asia, and North Africa regions, ICARDA contributes to the improvement of bread and durum wheats, kabuli chickpea, pasture and forage legumes, and associated farming systems. It also works on improved land management, diversification of production systems, and value-added crop and livestock products. Social, economic and policy research is an integral component of ICARDA's research to better target poverty and to enhance the uptake and maximize impact of research outputs.



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