

## Role of Household Agro-Industries on Enhancement of Household Food Security in Afghanistan

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### ABSTRACT

Food security has been a primary goal of the United Nations under the Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs) since 1992. Household food insecurity remains a significant challenge for developing nations, including Afghanistan. Agro-industrial institutions can be crucial in mitigating food insecurity, with household agro-industry closely related to household food security. This study explores the relationship between agro-industry, particularly household-based agro-industry, and household food security in Afghanistan. For this study, three districts and the center of Kandahar City were selected. Non-probability sampling methods, specifically convenience random sampling, were applied, with a sample size 300. Primary data were collected through questionnaires and surveys conducted by four trained fourth-year university students. For data analysis, SPSS version 26 was used. This study revealed that approximately 56% of vulnerable individuals were women, and 33% were children. The results indicated that 54.66% of respondents sourced processed and preserved foods from household industries. The study found that 54% of agro-industrial products were used in winter and identified a positive relationship between agro-industry and food security. Families that processed and dried fruits, vegetables, and dairy products were found to be less vulnerable than those that did not. The study recommends promoting household industries as a viable solution to alleviate poverty and food insecurity, particularly for households with gardens and small dairy farms.

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### Introduction

With the rising environmental, economic, cultural, and social challenges and the growing global population, agro-industrial institutions play a fundamental role in developing nations, particularly in countries like Afghanistan. Over recent decades, agro-industry activities have significantly increased in developing countries. Agricultural-based industries encompass activities that add value to agricultural products (both plant- and animal-based) and involve various processes such as physical and chemical transformations, storage, packaging, and

distribution (Austin, 1992). Agro-based industries are essentially activities focused on processing products derived primarily from the agricultural sector, with key components that define their importance not only in the quantity but also in the quality and characteristics of the products (Sukardi, 2011).

Investments in agro-industries present at least four major economic opportunities. First, agro-industry and agribusiness serve as valuable solutions for enhancing plant and livestock products. A large portion of agricultural outputs require some level of value addition to reach desired market value. Second, agro-based industries are seen as a foundational driver for the industrial sector, emphasizing the critical need for agricultural resources in the initial stages of industrialization. This role generates employment opportunities, enhances production and marketing, and strengthens financial and service organizations. Third, agro-industry contributes to foreign exchange by meeting the global demand for agricultural products—whether in raw, semi-processed, or finished forms—that require processing to meet consumer expectations. Lastly, agro-industries address critical nutritional needs, as they can supply essential food items to meet local and national dietary requirements. Hence, agro-industries strengthen the agricultural sector and offer key solutions for advancing Afghanistan's development.

Agro-based industries can be classified based on their size: (1) Household Industry (HI), characterized by low capital requirements and local input usage; (2) Small-Scale Industry (SSI), which demands more capital investment and operates semi-automatically, though still with simple management; (3) Medium-Scale Industry (MSI), requiring higher investments in both machinery and resources, with largely automated and technical operations and structured management; and (4) Large-Scale Industry (LSI), involving substantial investment and high levels of automation, managed systematically through intertwined functional departments (Fadhil, 2017). Agro-industries significantly enhance economic growth and improve social welfare in developing nations.

In Afghanistan and other developing countries, food security is closely tied to agro-industry status. Food security is defined as a situation in which all individuals, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their dietary needs for a healthy, active life (FAO, 2003; Uzma and Mohammad, 2004; Zalilah Mohd and Khor, 2008; FAO, 2009). Family food security is defined as "access by all people at all times to sufficient food for an active, healthy life" (World Bank, 1986; Maxwell et al., 1999). Food insecurity, or the lack of these conditions, can lead to malnutrition and have adverse effects on mental and physical development (FAO, 2009; Hala et al., 2015). Afghan households, both rural and urban, face different risks of food insecurity: urban households are more prone to financial shocks, while rural households encounter challenges related to natural disasters and security. Afghan households allocate between 56% and 77% of their total income to food. Women and children are especially vulnerable; approximately 60% of those affected by hunger worldwide are women (FAO, 2017).

For Afghanistan, the development of agro-industries is a key economic opportunity that bolsters household income and contributes to gross domestic product (GDP). Food insecurity is a pressing global issue, but it is particularly severe in Afghanistan. This study incorporates a comprehensive review of related scientific literature to provide additional insight. Ensuring food availability and household food security is a critical challenge for many developing countries. Considering Afghanistan's circumstances, the agro-processing industry has shown promising growth (FAO, 2018). Furthermore, kitchen gardens present a significant opportunity to improve nutrition, food security, and women's economic empowerment, particularly when combined with training in horticulture, food processing, and nutrition. Given Afghan women's limited mobility and restricted access to resources, kitchen gardening is especially beneficial (Ahmadzai et al., 2020).

This research paper is structured around two primary elements: agro-industries and food security. Within the scope of agro-industries, the focus is on the household industry (HI), while the food security component emphasizes household-level food security. The study aims to explore the relationship between household agro-industry and household food security and assess agro-industrial food production's role in enhancing food security.

### **Problem Statement**

Afghanistan has faced food shortages for many years; limited access to food sources exacerbates food insecurity, making household food insecurity a severe challenge. The agricultural sector, especially agro-industries, can play a significant role. Despite agricultural production, Afghanistan's residents still do not experience acceptable food security.

### **Research Questions**

#### ***Main question***

- 1- Is there any relationship between agro-industries and food security in Afghanistan?

#### ***Sub-main questions***

- 1- Is there a positive or negative relationship between agro-industries and food security?
- 2- How can agro-industrial food institutions help food security?
- 3- Is there a relationship between household industry (HI) and household food security?
- 4- Which category of family members are more vulnerable to food insecurity?
- 5- Lack of which food security dimension is more common?

### **Hypothesis**

1. Alternative hypothesis: A positive relationship exists between household agro-industry and household food security.
2. Null hypothesis: No relationship exists between household agro-industry and household food security.

## **Literature Review**

In 2014, a study titled “Empowering Women to Improve Family Food Security in Afghanistan” examined factors affecting women’s food security and agricultural opportunities. The study details key project activities and approaches, discusses successes and challenges, and explores sustainability implications for future programs (Wilcox et al., 2014). Fruit processing and drying represent the fastest-growing sectors for processed foods in Afghanistan, with the potential to establish Afghanistan as a leader in juices, nectars, and concentrates. The market value for juices in Afghanistan is approximately USD 20 million, with an annual growth rate of about 15%. Afghanistan imports all processed food products, including fruit juices and canned tomato products, primarily from Iran and Pakistan, which account for 75% of this trade and are rapidly increasing (Finetto, 2011).

Afghanistan is a male-dominated society where men are considered responsible for providing for family needs, including food, education, healthcare, clothing, and shelter. Research indicates that 60% of children under five suffer from chronic malnutrition, and 8% from acute malnutrition in Afghanistan. The study also found that 60.9% of household heads are illiterate, and households with heads lacking formal education are more vulnerable to food insecurity, facing greater challenges in food expenditure and consumption (Ahmadzai et al., 2020).

Innovation is essential in agricultural and food production, particularly in implementing and developing technology to maintain product quality. The quality of human resources in the agriculture and food sectors enhances the capacity to innovate, including in off-farm industries. A study conducted in 2020 found that practices suited to local conditions increase competitiveness, allowing the Afghan government to manage regional resources, implement location-specific management, and develop economic strategies to produce superior products (Rachman et al., 2020).

The optimal pricing ratio across agro-industrial sectors is crucial for effective operations within Afghanistan’s agricultural network (Khojayarovich, 2022). Improved food safety and security, high product quality, timely delivery, and better order-fill rates are essential for competitiveness in the food supply chain (Mor et al., 2018). Economic development is positively associated with foreign direct investment (FDI) in developing countries but has a negative association in developed countries (Makki et al., 2004).

## **Methods & Materials**

Kandahar is one of Afghanistan’s most historic and populous cities, second only to Kabul. It experiences a boiling and dry spring and summer. The province spans an area of 250 km<sup>2</sup> in southern Afghanistan, with its capital city at an altitude of 1,005 meters above sea level (MRRD, 2006). Kandahar has 18 districts; three districts and the city center were selected as study areas for this study.

### ***Study Design***

This study was conducted on a finite population, with respondents selected from the center of Kandahar and three other districts: Daman (n=50), Arghandab (n=50), Dand (n=50), and the 4th and 5th districts of Kandahar City (n=50). These sites were chosen due to the availability of primary data. The study design aligns with a larger research framework, with a total sample size of 300 (n=300). A non-probability sampling method, specifically convenience sampling, was used for part of the study, while simple random sampling was implemented in other parts. Due to Kandahar's current situation, most respondents (92.3%) were male, while only 7.7% were female residents of Kandahar. The researcher completed one hundred schedules, with respondents randomly selected from the 13th and 2nd districts of Kandahar.

### ***Data Collection***

Data collection was conducted via questionnaires and schedules by four trained individuals. The enumerators received a two-day training workshop conducted by the researcher at the Agricultural Economics and Extension Faculty of ANASTU University on August 23rd-24th, 2023. Enumerators were introduced to the study's purpose, sampling techniques, primary data collection methods, and data collection tools during this workshop. Resident student surveyors collected data from each district, while primary data from the 2nd and 13th districts was collected by the researcher.

Socio-demographic data, including age, gender, education level, family size, economic situation, and residence, was gathered through a pre-designed questionnaire. The questionnaires focused specifically on food security, while the schedules centered on agro-industrial products that residents used. Residents of Kandahar City partially consume agro-industrial products.

### ***Data Analysis***

The raw data collected was processed through cleaning, classification, and quality control before being entered into Excel. Given the study's nature, only descriptive analysis was necessary and conducted using SPSS version 26.

### ***Results***

Agro-industry institutions are divided into four groups based on their volume of activities and production levels. Each category can directly and indirectly impact food industries, which, in turn, contributes to improved food security across the country. Afghanistan lacks sufficient agro-industry institutions to meet food demands, although households have been processing agricultural products over the past two decades. These small-scale household industries process and dry tomatoes, apricots, grapes, apples, figs, mint, and dairy products. Additionally, some medium- and large-scale agro-industries produce preserved and processed foods.

Table1. Socio-demographic statistics of respondents

		Employment					Total
		Student	university student	Govern-employee	Self-Employee	Jobless	Total
Education level	illiterate	0	0	20	16	35	71
	School	73	0	4	47	26	149
	bachelor	0	4	13	44	9	70
	master	0	0	9	1	0	10
Total		10	67	46	107	70	300

Table2. Socio-demographic of income and family size

		Family Size					Total
		2-4 people	5-7 people	8-10 people	11-13 people	14 or above	Total
Income	0-10000 Afs	15	5	28	6	0	54
	10001-20000 Afs	22	36	46	0	0	104
	20001-30000 Afs	0	36	24	11	10	81
	30001-40000 Afs	0	0	6	38	4	48
	40001 or above	0	0	0	13	0	13
Total		37	77	104	68	14	300

Table3. Gender of respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	male	277	92.3	92.3	92.3
	female	23	7.7	7.7	100.0
	Total	300	100.0	100.0	

The results of the primary data show that the majority of respondents (92, 3%) are male, and the minority (7, 7%) of them are female. Most of the respondents 104 had an income between intervals of 10000 up to 20000 Afs. Almost (50%) of the respondents had at least the ability of reading and writing education. About (35%) of respondents were self-employed.

Table 4 below indicates that people have been consuming different agro-industry products. Dried fruits such as figs, dried apricots, and raisins ranked first with 23,33% percent, and dairy ranked second. People also use tomato paste, sauce, cereal, jam, and pickles. Fruit juice is also used regularly by people in high-income categories.

Table4. Types of processed food which is utilized by households

No	Categories	Frequency	Percentage (%)
1	Fruits juice	30	10%
2	Pickle	25	8,33%
3	Dairy	60	20%
4	Cereal	24	8%
5	Ketchup and tomato paste	45	15%
6	Dried fruits	70	23,33%
7	Jam	20	6,66%
8	Other	26	8,66%
<b>Total</b>		<b>300</b>	<b>100</b>

Table 5 below reveals that household industries play an important role in providing processed food products for the people of Afghanistan. Almost 55% of respondents fulfill their basic needs for processed food products from household industries. 21,33% of people buy dried fruits and jam from the supermarket, which is processed and packed by households and small-scale industries.

Table5. Main sources of processed food products

No	Source	Frequency (Fi)	Percent %
1	Household industries	164	54,66%
2	Small scale industries	24	8%
3	Supermarket	64	21,33%
4	Wholesaler	28	9,33%
5	Retailer	20	6,66%
<b>Total</b>		<b>300</b>	<b>100</b>

Primary data in Table 6 below expresses that the most vulnerable category of family members are women in households, which make up almost 57% of the whole. Children in the second rank suffer more food insecurity than other members.

Table6. Vulnerable family members from food insecurity

No	Family members	Frequency / Fi	Percent %
1	Men	30	10%
2	Women	170	56,66%
3	Children	100	33,33%
<b>Total</b>		<b>300</b>	<b>100</b>

Table 7 below shows that processed and dried vegetables and fruits were consumed during the four seasons. But, the percentage and frequency of utilization vary from season to season. Over half of people use food industrial products during winter, while 10,66 % use less than in other fall seasons. The main reason is that in this season, most fruits and vegetables have been harvested, and fresh vegetables and fruits are double and triple cheaper than processed products.

Table 7. Season utilization of processed and dried vegetables and fruits

No	Season	Frequency	Percent %
1	Spring	56	18,66%
2	Summer	50	16,66%
3	Fall	32	10,66%
4	Winter	162	54%
<b>Total</b>		<b>200</b>	<b>100</b>

The results of the primary data analysis in Table 8 below indicate that the main cause of food insecurity is economic limitations; it refers to people's income source. Around 70% of respondents have been suffering from food insecurity due to a lack of economic dimension of food security. After economic limitations, physical limitations ranked second, and 25% of people did not have physical access to food. This gap of 25% in food inaccessibility can compensate for agro-industrial institutions. In addition, these institutions indirectly affect food security because agro-industrial institutions create job opportunities for people to access income sources and can provide nutritious food for their family members quickly.

Table 8. Reasons for food insecurity in households

No	Reasons	Frequency	Percent %
1	Economic limitations	210	70%
2	Physical limitations	75	25%
3	Cultural limitations	4	1,33%
4	Social limitations	5	1,66
5	Technological limitations	2	0,66%
6	Utilization limitations	4	1,33%
<b>Total</b>		<b>300</b>	<b>100</b>

Correlation between the four aspects of food security shows that not only economic accessibility but also physical, cultural, and social accessibility are dependent on economic accessibility. By increasing economic accessibility, all three others increase, too.

Table 9: Correlations between dimensions of food security

		Physical	Economical	Social	Cultural _
Physical accessibility	Pearson Correlation	1	.692**	.723**	.726**
	Sig. (2-tailed)		.000	.000	.000
	N	300	300	300	300
Economical accessibility	Pearson Correlation	.692**	1	.641**	.702**
	Sig. (2-tailed)	.000		.000	.000
	N	300	300	300	300
Social accessibility	Pearson Correlation	.723**	.641**	1	.614**
	Sig. (2-tailed)	.000	.000		.000
	N	300	300	300	300
Cultural accessibility	Pearson Correlation	.726**	.702**	.614**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	300	300	300	300

\*\* . Correlation is significant at the 0.01 level (2-tailed).



## **Discussion**

This research reveals a positive relationship between agro-industries and food security. The existence of agro-industries has both direct and indirect effects on food security. By providing processed products and creating employment opportunities, agro-industries support and improve food security. They directly support food security and contribute indirectly by adding time utility and form utility to agricultural products. This study found that people have limited access to vegetables and fruits during the winter and spring; agro-industrial institutions can help address this shortage.

There are four types of agro-industrial institutions, with household industries being the most economical and feasible. Household industries require minimal budget and equipment, making them manageable within individual homes. Farmers in Afghanistan typically lack access to financial resources, and their farming systems are integrated; thus, household and small-scale industries are particularly suitable for social and economic development. Additionally, most Afghan farmers are smallholders, working on less than one hectare of land and lacking sufficient bargaining power in the market. For these reasons, this study recommends household industries as a significant means to enhance household food security.

Afghanistan's households use various processed, preserved, and dried agricultural products, much of which are processed at the household level. Many families harvest different types of fruits and vegetables that, during harvest season, have low market prices. To avoid waste and maintain food availability, families process, dry, and preserve these products for consumption during winter and spring. Women and children are particularly vulnerable to food insecurity in Afghanistan, a fact supported by previous studies. For religious and cultural reasons, many Afghan women have limited access to education or employment outside the home (Wilcox et al., 2014). This research indicates that most households process fruits, vegetables, and dairy products, aligning with other studies that suggest small farmers can begin agro-food industries in horticulture and dairy (Reardon et al., 2009).

Two hypotheses were tested in this study, with the null hypothesis rejected and the alternative hypothesis accepted. The final data interpretation supports that household agro-industries directly and indirectly impact household food security.

## **Conclusion**

Food security, a global challenge, affects a significant percentage of Afghan households, with women and children being the most vulnerable groups. Limited access to economic resources is the primary cause of food insecurity in Afghanistan, although physical inaccessibility also plays a role. However, food security improvement is possible in developing countries, including Afghanistan. The agricultural sector can be a key factor in reducing food insecurity. Agro-industries, particularly household industries (HI) and small-scale industries, can directly and indirectly support food security. In summary, household agro-industry is recommended as an effective approach for alleviating household food insecurity.

**Conflict of Interest:** The author(s) declared no conflict of interest.

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