Farm-Level Economic Assessment of Watermelon Production in Nangarhar Province

Abdul Wahid Sultani[1,] Muhammad Hassan Mohammadi[2], Mirwais Rasoli[3]

[1, 2]Agricultural Economics and Extension Department, Agriculture Faculty, Sayed Jamaluddin Afghani University, Kunar, Afghanistan
[3]Animal Science Department, Agriculture Faculty Sayed Jamaluddin Afghani University, Kunar, Afghanistan
✉E-mail: abdulwahid.sultaniaws@gmail.com

ABSTRACT

Watermelon is a significant cash crop that provides a good source of income and contributes to employment generation in Nangarhar province. This research aims to analyze the socio-economic characteristics and cost and return of watermelon. This study was carried out in Nangarhar province. The research is quantitative in nature, utilizing both primary and secondary data A purposive sampling design was used to select a sample of 130 respondents for the survey. Primary data were collected through a well-structured questionnaire. Descriptive statistics and cost and return analysis were used for data analysis. The results revealed that the average age of the selected farms was 39 years, and the percentage of respondents was educated, which fortunately included a percentage of bachelor's degree holders. The majority of the respondents, 59.76 percent, are living in households. At the same time, 42.62 percent of the farmers had between 5 and 10 years of watermelon production experience, with an average of 7 years. Furthermore, approximately 78 percent of respondents have annual incomes exceeding $100,000. The cost and return analysis showed that the average per jerib cost for large-scale farmers (17,274 AF) is lower than that for medium-scale farmers (18,057 AF) and small-scale farmers (19,307 AF). Moreover, fertilizer costs constitute the highest proportion of total production costs across all categories. Based on per-jerib costs, the expenses associated with the *Black Master* variety amount to 22,505 AF, which is approximately 6,000 AF higher than the *Extreme F_1* variety. The average per-jerib yield in Nangarhar province is 855 *man* (7 Kg), generating a gross income of 40,117 AF and a net income of 21,904 AF. The study recommended the extreme F_1 variety as it is more profitable in the study area.

INTRODUCTION

Afghanistan's economy remains largely dependent on the agriculture sector (Ahmadzai and Kaur, 2022). The agricultural sector plays a crucial role in driving economic growth,

generating employment, reducing poverty, ensuring food security, and maintaining the overall financial stability of society (World Bank, 2014). In 2022, the agricultural sector contributed 33.77% to the country's Gross Domestic Product (GDP), employing approximately 42.35% of the labor force (NSIA, 2022). The sector's estimated annual growth rate is 3.6%, highlighting its significant role in providing essential livelihood resources (Khaliq & Boz, 2018). Given Afghanistan's diverse microclimatic conditions, the country offers favorable conditions for cultivating a variety of crops, including cereals, fruits, and vegetables (Jabar, 2021). Most farmers, in addition to cultivating cereals, are also engaged in fruit and vegetable farming (Tabe & Aba, 2023). Since fruits and vegetables are perishable and can be rapidly converted into cash, they provide employment opportunities and generate higher income per unit area as compared to cereal crops (Joshi *et al.,* 2006). As a result, farmers increasingly prefer cultivating fruits and vegetables, which are now being exported to neighboring countries alongside domestic consumption.

Watermelon is an important horticultural crop belonging to the Cucurbitaceae family (Reetu & Tomar, 2017). Among the various species within this family, watermelon is one of the most widely consumed by humans. It originates from the Kalahari Desert in Africa and is extensively cultivated in tropical and subtropical regions (Mujaju, 2009). Due to its sweet and juicy nature, watermelon has gained commercial significance worldwide (Prohens & Nuez, 2008). Watermelon is a rich source of vitamins A and C, contributing to the prevention of night blindness, eye and ear disorders, and skin-related diseases. (Ngbede *et al.,* 2014).

According to the Food and Agriculture Organization (FAO) report of 2003, watermelon is one of the most widely growing crops globally, with an estimated production of approximately 89.9 million tons (FAOSTAT, 2003). By 2020, the total global production of watermelon reached 101.62 million tons. China was the leading producer, accounting for 13.59% of the world's total production. Other major watermelon-producing countries include Turkey, India, Iran, Algeria, the United States, Senegal, Russia, and Egypt. Afghanistan ranked 16th in terms of production, while Pakistan held the 21st position with a 0.56 per cent share in global production (FAOSTAT, 2020).

Watermelon production in Afghanistan increased significantly between 2000 and 2017. In 2016, production increased from 134,000 tons to 862,000 tons. Watermelon and melon are considered key commercial crops in some areas of the country. In 2020, watermelon was cultivated on approximately 69,457 hectares, yielding a total production of 938,993 tons, with an average yield of 51.13 tons per hectare (Statistical Yearbook, 2020). Field reports indicate a 40 per cent increase in watermelon production in Farah province as compared to previous years (Anonymous, 2019). According to the Ministry of Agriculture, Irrigation, and Livestock (MAIL) statistics of 2021, watermelon ranked second in fruit production after grapes. The central producing provinces included Nimroz, Farah, and Badghis, with production levels of 150.89 thousand tons, 137.20 thousand tons, and 113.05 thousand tons, respectively. In the eastern region, Nangarhar, Laghman, and Kunar provinces are known for their watermelon cultivation. In 2022, Nangarhar province cultivated watermelon on 1,995 hectares, producing

72,000 tons, while Kunar province yielded 32,000 tons from 400 hectares, and Laghman province produced 420 tons from 28 hectares (MAIL, 2021). It is noteworthy that watermelon is commercially cultivated in several districts, including Kama, Bati Kot, Goshta, Lal Pur, and Behsud in Nangarhar province.

However, farmers in this province face several challenges, including low productivity per unit area and rising production costs. The primary factors contributing to these challenges include limited access to improved seeds, high prices of chemical fertilizers, the absence of a well-managed irrigation system, plant diseases and pests, lack of sufficient knowledge regarding the appropriate application of agrochemicals, and financial constraints. These issues have significantly increased the cost of watermelon production per unit area. Most of these challenges are closely linked to the economic and social characteristics of farmers. If farmers have better financial conditions, they would be able to access the necessary inputs promptly. Additionally, the social dynamics of farming communities play a crucial role in ensuring that all agricultural practices are carried out efficiently and on time. Considering these challenges, this research aims to study the farm-level economic assessment of watermelon production in Nangarhar Province with the following objectives.

- To study the socio-economic characteristics of watermelon growers

- To estimate the cost and net return from watermelon cultivation in the study area.

METHODS AND MATERIALS

This study was conducted in Nangarhar Province, located in the eastern region of Afghanistan. Nangarhar is one of the most famous provinces for watermelon production among all the provinces in the country. The research design was descriptive, and the survey method was used to conduct this research. Primary data was collected from watermelon farmers using a questionnaire. Initially, a pre-survey was conducted to check the reliability and validity of the questionnaire. Reliability checks apply only if Likert-scale questions or similar repeated items were used. A reliability check is not applicable in the usual sense for socioeconomic characteristics and cost analysis. The validity test results indicated that the questions appear logically valid for assessing socio-economic status and cost, and cover all essential aspects of socio-economics. It is suggested to include landholding to strengthen the assessment. After identifying and addressing the shortcomings, the final survey was carried out. The questionnaire included various parts, such as socio-economic characteristics of respondents, cost of cultivation, and return, aligning with the research objectives, and was administered to farmers in the study area. Secondary data, such as watermelon production volume, cultivated area, and other relevant information, were obtained from various published and unpublished sources. These include the Ministry of Agriculture, Irrigation, and Livestock (MAIL), statistical yearbooks, the Food and Agriculture Organization (FAO) website, research articles, and technical reports from social media and other relevant platforms.

A purposive sampling design was employed to select the targeted districts in Nangarhar Province. The Taro Yamane formula, no = (Z²pq)/e², was applied to determine the sample size. This formula is used for populations with an unknown total size. In this study, an error margin of 5% was considered, and the target population was assumed to constitute 10% of the total population composition. The sample selection included 138 farmers from Nangarhar province. Interviews were conducted with the selected farmers individually. However, eight questionnaires were excluded due to incomplete or duplicate information, leaving a total of 130 valid questionnaires for analysis. The sampled farmers were classified into three categories based on their cultivated land size for watermelon production.

1. Small-scale farmers – owning less than three jeribs of land
2. Medium-scale farmers – cultivating between 3 to 6 jeribs
3. Large-scale farmers – cultivating more than six jeribs

To analyse the socioeconomic characteristics of watermelon farmers (age, farming experience, watermelon cultivation experience, education level, household size, family type, marital status, annual income, and monthly expenses), descriptive statistical methods such as mean and percentage were used.

The net income from watermelon production was calculated by subtracting total costs from total revenue using the following formulas:

1. **Total Revenue (TR):**

$$TR= =Q×P$$

Where:
   TR = Total revenue from watermelon production (AF)
   Q = Total watermelon production (Man =7 Kg)
   P = Price per **Man** of watermelon (AF)

2. **Total Cost (TC):**

$$TC=TFC+TVC$$

Where:
*   **TC** = Total cost per **Jerib** of watermelon production (AF)
*   **TFC = Total fixed cost per Jerib** (AF), which includes **land rent**
*   **TVC = Total variable cost per Jerib (**AF), including **expenses on seeds, fertilizers, irrigation, labor, and machinery rentals.**

3. **Net Revenue (NR):**

$$NR= TR–TC$$

Where:
*   **NR** = **Net revenue** (AF), representing the profit earned from watermelon production after deducting all costs. *(Toluwase & Owoeye, 2017).*

RESULTS AND DISCUSSION

The results showed that about 53.23 per cent of watermelon farmers are between 30 and 50 years, while almost 23 per cent of respondents were less than 30 years. These results align with

Adeoye et al. (2020), who reported that the presence of young and middle-aged farmers, known to be active and innovative, is beneficial. Furthermore, approximately 71 percent of watermelon farmers in the surveyed area cannot read and write; they perform agricultural practices as a traditional occupation, as watermelon cultivation has a long history in the study area. The authors Aremu & Olugbire (2015) also reported that more than 50 percent of respondents were literate. The results revealed that 29 per cent of respondents were educated, which fortunately includes 5 per cent of bachelor degree holders, 3 per cent with 14 years' education, and 20 per cent with 12 years' education, which could help in accepting and adopting new technology easily and can increase the adaptation level of other farmers in the study area. Almost a similar result was reported by Aremu & Olugbire (2015), which indicates less than 50 per cent of farmers were educated, while Mohammed (2011) emphasizes that education is considered an investment in human capital, as it enhances skills, improves quality, reduces information gaps, and increases allocative efficiency, ultimately leading to higher productivity. As a result, the introduction of new ideas and the adoption of innovative technologies in the study area will be more feasible. This, in turn, will contribute to increased yields, higher income, and overall growth in agricultural production.

The study also revealed that the majority of respondents (59.24%) live in joint families, while 40.76% of the surveyed farmers live in individual families. This suggests that in joint families, the increasing number of family members allows engagement in various occupations beyond farming, such as civil service, education, and skilled trades like mechanics, carpentry, and tailoring. Instead of reinvesting all their farming income back into agriculture, farmers often use additional earnings from other businesses to support farming, as they perceive agriculture as a long-term investment rather than a quick-return occupation. Moreover, during difficult years, the time gap between planting and harvesting is utilized for alternative businesses, providing a stable source of income. This strategy helps ensure financial security, diversifies income sources, and mitigates the risks and uncertainties associated with agriculture. The same result was reported by Toluawse & Owoeye (2017).

The average family size among the 130 respondents was found to be 11 heads. This finding is consistent with that of Toluawse & Owoeye (2017), who reported that the average family size was 12 heads per family. Further, approximately 46.15 percent of watermelon farmers have a family size of 10-15 persons, followed by 32.31 percent who have 5-10 family members. This implies that the farmer will have to be responsible for the feeding, sheltering, education, health care, and other living expenses of their dependents. These expenses contribute to low savings at the end of each harvest season.

Additionally, family size often influences the amount of land cultivated and the available labor force, which can, in turn, affect crop yield and net farm income. The findings further indicate that most farmers have between 5 and 10 years of experience in watermelon production, with an average of 7 years of experience. This suggests that the majority of them are skilled and knowledgeable in watermelon farming. Furthermore, since experience is acquired over time and farming is the primary occupation for most respondents, a farmer's

years of experience are closely linked to age. Generally, older farmers tend to have more experience and a deeper understanding of agricultural practices. These findings align with a previous study by Adeoye et al. (2020), which reported that farmers had 1 to 5 years of experience in watermelon cultivation. About 48.46% of the respondents were large holders having more than 6 jeribs with an average farm size of 5 jeribs per household. This finding implies that farmers in this category may incur high costs of production in terms of hired labour costs, transportation costs, and untimely scheduling of labour resulting from the non-consolidation of farms and the use of primitive tools. This may likely slow down the pace of farm management, which will, in turn, hurt output. The total farm size of the respondents is 1673 jeribs. The annual income enables farmers to finance agricultural activities and purchase all essential production factors on time and at a reasonable price, such as improved seeds, chemical fertilizers, pesticides, and more. The data in the table also shows that about 78 percent of respondents have an annual income of more than 100 thousand AF, while almost 29 percent have an annual income of 50 thousand AF. The average annual income of watermelon growers was 158,462 AF, which indicates that farmers can purchase all required inputs on time and afford their family expenses.

Table 1. Socioeconomic characteristics of watermelon farmers

Characteristics	Frequency	Percent (%)
Age (years)		
<30	30	23.07
30-50	77	59.23
>50	23	17.69
Total	130	100
Education		
No education	93	71.54
12 years	26	20.00
14 years	4	3.08
16 years	7	5.38
Total	130	100
Family type		
Individual	53	40.76
Join	77	59.24
Total	130	100
Family members		
<5	2	1.54
5-10	42	32.31
10-15	60	46.15
>15	26	20.00
Total	130	100.00
land distribution		
<3	22	16.92
3-6	45	34.62
>6	63	48.46
Total	130	100
Farming Experience		
<5	38	29.23

5—10	58	44.62
>10	34	26.15
Total	130	100
Income per year		
50000	25	19.23
100000	3	2.30
>100000	101	77.69
>200000	1	0.76
Total	**130**	**100**

2: *Cost and Return Analysis of Watermelon Production*

The cost of cultivation indicates the investment in the variable inputs used in the cultivation and the services rendered by fixed assets. The cost input used by farmers in the cultivation of watermelon was calculated for the contribution of each input to the total costs in all three different size farmer categories. The cost of cultivation of watermelon on the sample farms is worked out in AFN/jerib. The cost of watermelon cultivation per jerib in Nangarhar province, including land preparation, seeds, irrigation, fertilizers, chemical pesticides, labor expenses, and land rent, is presented in Table 2based on different farmer categories. The data indicate that the average per-rib cost for large-scale farmers (17,274 AFN) is lower than that for medium-scale farmers (18,057 AFN) and small-scale farmers (19,307 AFN). Moreover, fertilizer expenses constitute the highest proportion of total production costs across all categories. Specifically, for large-scale farmers, fertilizer expenses account for 45.77 per cent of the total costs, followed by medium-scale farmers at 38.97% and small-scale farmers at 37.15 per cent.

Additionally, the figures suggest that labor costs for small- and medium-scale farmers are higher than the costs of seeds and other production inputs. In contrast, for large-scale farmers, seed expenses (17.43%) represent the most significant cost component, surpassing labor and other associated expenditures. The above results were in controversy with Ahmad et al. (2017) ,who reported that the per-hectare cost was 47321 INR, which is almost more than the per-hectare expenses of our research, because the watermelon seeds and other inputs are imported from other countries.

Table 2. *Cost of cultivation of watermelon on different farmer categories (AFN/ jerib)*

Factor of production	Small	Medium	Large
	Inputs (variable and fixed) (AFN)		
Land preparation	1327 (6.88)	1623 (8.99)	1166 (6.75)
Seed	2928 (15.17)	2991 (16.56)	3011 (17.43)
Irrigation	707 (3.66)	476 (2.64)	409 (2.37)
Fertilizer	7173 (37.15)	7037 (38.97)	7907 (45.77)
Chemical	753 (3.90)	783 (4.33)	744 (4.31)
Labour	4740 (24.55)	3594 (19.90)	2390 (13.84)

Land rent	1678 (8.69)	1554 (8.61)	1647 (9.54)
Average per jerib	19307 (100)	18057 (100)	17274 (100)

Note: *Figures in the parentheses are percentages of the total cost of cultivation of watermelon based on the farmer scale*

The cost of watermelon cultivation per jerib in Nangarhar province, including land preparation, seeds, irrigation, fertilizers, chemical pesticides, labor expenses, and land rent, has been presented in Table 3 based on the cultivated watermelon varieties. The data indicate that two watermelon varieties are grown in Nangarhar province: *Extreme F₁* and *Black Master*. Based on per-jerib costs, the expenses associated with the *Black Master* variety amount to 22,505 AF, which is approximately 6,000 AF higher than those of the *Extreme F1* variety. Furthermore, there are variations in the cost distribution of production inputs between these varieties. The expenditure on seeds accounts for approximately 18% of the total cost for *Extreme F₁* and 14.53% for *Black Master*. However, fertilizer costs are the most significant expenditure for both varieties. Additionally, for the *Extreme F₁* variety, seed costs are the second highest expenditure after fertilizers, followed by labor costs, collectively accounting for nearly 77 per cent of the total expenses. Similarly, these three production factors — fertilizers, seeds, and labor — constitute more than 75 percent of the total costs for the *Black Master* variety.

Table 3. *Cost of Cultivation of Watermelon on Different Varieties (AFN/ jerib)*

Factor of production	Black master	Extreme F₁
	Inputs (variable and fixed) (AFN)	
Land preparation	1798 (7.99)	1212 (7.31)
Seed	3269 (14.53)	2934 (17.70)
Irrigation	457 (2.03)	455 (2.75)
Fertilizer	10017 (44.51)	7001 (42.24)
Chemical	1134 (5.04)	669 (4.04)
Labour	3673 (16.32)	2808 (16.94)
Land rent	2157 (9.58)	1496 (9.03)
Average per jerib	22505 (100.00)	16576 (100.00)

Note: Figures in parentheses are percentages of the total cost of cultivation of watermelon based on the variety

The per-rib yield, production costs, gross income, and net income of watermelon cultivation in Nangarhar province, categorized based on farmer groups, are presented in Table 4. The data indicate that the average per-rib yield in Nangarhar province is 855 *man* (7

Kg), generating a gross income of 40,117 AFN and a net income of 21,904 AFN. Based on farmer categories, medium-scale farmers achieve a higher per-hectare yield compared to both large- and small-scale farmers. Their production costs are higher than those of small-scale farmers but lower than those of large-scale farmers. In terms of net income, medium-scale farmers earn more than small-scale farmers but less than large-scale farmers, that earned the highest net income in the province, amounting to 23,038 AFN The per hector gross income was 79329 INR   Ahmad et al. (2017) which less than per hector gross income in Nangarhar province, because in Nangarhar province per hector yield was higher than above mention results.

Table4. *Gross and Net Income of Watermelon Farmers in Nangarhar Province Based on Farmer Categories*

Farmers categories	Production (man)	Cost (AFN)	Gross return (AFN)	Net return (AFN)
Large farmers	856	17274	40312	23038
Medium farmers	858	18057	40229	22172
Small farmer	850	19307	39809	20502
Average per jerib	855	18213	40117	21904

Note: one man is equal to 7 kg.

The per-jerib yield, production, total cost, gross income, and net income of watermelon cultivation in Nangarhar province, based on cultivated varieties, are presented in Table 5. The data revealed that the average per-rib yield of the Extreme F_1 variety was 861 *man*, which generated a gross income of 40,454 AF and a net income of 23878 AF. In contrast, the total cost per jerib was 16576 AF. On the other hand, the black master variety produced 834 men per jerib, which is less than that of Extreme F1. However, the total cost of Black Master is higher, which significantly affects the gross and net income of the Black Master variety. The study recommends the extreme F_1 variety as it is more profitable in Nangarhar province.

Table 5: *Gross and Net Income of Watermelon in Nangarhar Province Based on Cultivated Varieties*

Varieties	Production (man)	Total cost (AFN)	Gross income (AFN)	Net return (AFN)
Extreme F_1	861	16576	40454	23878
Black master	834	22505	38869	16364

CONCLUSION

Despite certain limitations, the study confirms that watermelon cultivation can yield a positive net return for farmers. In terms of income generation and poverty alleviation, watermelon production can play a significant role in meeting farmers' financial needs. To enhance watermelon farming in the study area, several institutional recommendations have been proposed. Based on the study's analysis and observations, watermelon is identified as a promising crop; however, special initiatives are required to improve its production. Efforts should be made to enhance farmers' knowledge of modern cultivation techniques and encourage them to adopt new technologies for increased productivity. Additionally, the government should ensure the availability of fertilizers and pesticides at affordable prices, making them accessible to all farmers. Furthermore, financial subsidies should be provided to farmers during natural disasters to support agricultural sustainability.

AUTHORS CONTRIBUTIONS

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CONFLICT OF INTEREST STATEMENT

The authors declare that they have no conflict of interest.

DATA AVAILABILITY STATEMENT

This study is mainly based on primary data, which was collected through a well-structured questionnaire from watermelon growers in Nangarhar province. The data will be available upon request from the corresponding author, subject to ethical approval.

REFERENCES

Ahmad, A., Prasad, R. L., Kumar, D., Singh, N., Prasad, V. M., & Paul, A. (2017). An economic analysis of production of watermelon in Allahabad District, Uttar Pradesh, India. *International Journal of Advanced Education and Research, 2*(4), 206–210. Link

Ahmadzai, M. Y., & Kaur, G. (2022). A comparative study on growth of agriculture sector: A case of Afghanistan. *Brazilian Journal of Poultry Science*, 24(2), 1–8. https://doi.org/10.1590/1806-9061-2020-1412.

Food and Agriculture Organization of the United Nations. (2003). *World agriculture: Towards 2015/2030: Summary report* (J. Bruinsma, Ed.). Earthscan Publications Limited. Link

FAOSTAT. (2020, January 20). *Watermelon production by country*. Food and Agriculture Organization of the United Nations. Link

Jabar, A. F. J. I. A. (2021). An overview on impacts of agriculture–horticulture sub sector in Afghanistan's economy. *Academic Research in Educational Sciences, 2*(10), 428–435. https://doi.org/10.24412/2181-1385-2021-10-428-435

Joshi, P. K., Joshi, L., & Birthal, P. S. (2006). Diversification and its impact on smallholders: Evidence from a study on vegetable production. *Agricultural Economics Research Review*, 19(2), 219–236. https://doi.org/10.22004/ag.econ.57759

Khaliq, A. J. A., & Boz, I. (2018). The role of agriculture in the economy of Afghanistan. In *Proceedings of the 2nd International Conference on Food and Agricultural Economics*

(pp. 192–198). https://doi.org/10.18535/ijsrm/v6i10.em04

Ministry of Agriculture, Irrigation & Livestock (MAIL). (2021). *Watermelon: Second fruit in terms of more production* [Report]. Kabul, Afghanistan.

Mohammed, B. T. (2011). Socio-economic analysis of melon production in Ifelodun Local Government Area, Kwara State, Nigeria. *Journal of Development and Agricultural Economics*, 3(8), 362–367. Link

Mujaju, C. (2009). *Diversity of landraces and wild forms of watermelon (Citrullus lanatus) in Southern Africa* (Introductory Paper No. 2009:3). Faculty of Landscape Planning, *Horticulture and Agricultural Science*.Link

National Statistics and Information Authority (NSIA). (2022). *Afghanistan statistics yearbook (1401).* Kabul, Afghanistan.

Ngbede, S. O., Nwanguma, E. I., Ibekwe, H. N., Onyegble, U. N., Okpara, S. C., & Uwalaka, O. A. (2014). Melon production in Nigeria. *International Journal of Scientific and Technology Research, 3*(9), 16–20. https://doi.org/10.59331/jasd.v4i4.257

Prohens, J., & Nuez, F. (2008). Vegetables. In *Handbook of plant breeding* (1st ed., pp. 381–385). Springer. https://doi.org/10.1007/978-0-387-30440-3_17

Reetu, V., & Tomar, M. (2017). Watermelon: A valuable horticultural crop with nutritional benefits. *Popular Kheti, 5*(2), 5–9. http://www.popularkheti.com

Tabe Ojong Jr, M. P., & Abay, K. A. (2023). Smallholder farmers' participation in profitable value chains and contract farming: Evidence from irrigated agriculture in Egypt (Vol. 42). International Food Policy Research Institute. https://doi.org/10.2499/p15738coll2.136548

Toluwase, S. O. W., & Owoeye, R. S. (2017). Cost benefit analysis of watermelon production in Ekiti State, Nigeria. *Russian Journal of Agricultural and Socio-Economic Sciences, 66*(6), 307–314. https://doi.org/10.18551/rjoas.2017-06.36

World Bank. (2014). *Islamic Republic of Afghanistan agricultural sector review: Revitalizing agriculture for economic growth, job creation and food security.* World Bank.