

# Assessing the Impacts of Agricultural Loans on Agricultural Sustainability in Jordan

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## Abstract:

**Background:** The agricultural sector is pivotal in economies that rely heavily on agriculture, providing employment opportunities in various rural areas. Agricultural loans are critical to support, but their successful implementation is essential. In Jordan, where agriculture is a major economic contributor, these loans play a significant role in enhancing farm productivity and income.

**Materials and Methods:** Statistical models were used to analyze data from the Jordan Agricultural Credit Corporation (2004-2021) in three main regions. Classifying loans based on investments, agricultural possessions, loan types, and loan size. This analysis was conducted to assess agricultural loans, identify influencing factors, and estimate annual growth rates in Jordan.

**Results:** This research reveals significant disparities in loan distribution. Agricultural loans are more prevalent in the central and northern regions, with a focus on water resource development. Small landowners tend to favor medium-term loans, and in general, there is a positive annual growth in the demand for agricultural loans.

**Conclusion:** This research emphasizes the importance of agricultural loans in the agricultural sector in Jordan and calls for equitable distribution, tailored products, and enhanced technical support. Policymakers should focus on strengthening farmers' capacities, rural infrastructure, and loan conditions to achieve sustainable agricultural productivity. It provides valuable insights into the role of agricultural loans in developing economies and their challenges.

**Keywords:** Agricultural Loans; Farm Productivity; Loan Distribution; Rural Development.

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## I. Introduction

The agricultural sector plays a pivotal role in economies that rely heavily on agriculture. This sector generates job opportunities in various agricultural regions. However, farmers often suffer from insufficient funds for their agricultural projects. Agricultural loans are considered one of the most feasible and effective solutions to support the agricultural sector<sup>1</sup>. However, loan implementation is a crucial component of agricultural policy, and may not always lead to positive results<sup>2</sup>.

Deploying agricultural loans is an essential stride towards enabling farmers to invest in the agricultural domain, thereby enhancing productivity, especially in crop cultivation. These loans provide the financial means necessary for farmers to develop essential agricultural resources and equipment, ensuring the uninterrupted flow of agricultural activities<sup>3</sup>. Simultaneously, effective collaboration between government bodies and non-governmental organizations (NGOs) is crucial in offering advisory support for farmer-driven projects. Financial backing should extend to workshops, extension initiatives, and informative publications containing technical insights. Special consideration must be given to small farmers and the cooperative sector in the dispensation of agricultural extension services<sup>4</sup>.

The wise use of agricultural credit contributes to the advancement of the national economy, especially in less developed countries. This reflects its importance in enhancing productivity in the agricultural sector<sup>5</sup>. Many studies have explored the role of credit facilities in promoting agricultural sector growth, with a particular focus on the implications of agricultural loans<sup>6</sup>.

In Jordan, the government is taking decisive measures to address the stressors affecting the local agricultural sector, to facilitate food production and provision<sup>7</sup>. Formulating an agricultural policy framework to address challenges, particularly those arising from climate change stands out as a top priority. Thus, regulations governing the agricultural sector must be developed to protect food production and supplies within Jordan<sup>8</sup>.

**Contextual review**

This literature review aims to clarify the importance of agricultural credit within developing countries and to examine the various obstacles associated with accessing credit.

**The Significance of Agricultural Loans in Emerging Economies**

Agriculture plays a pivotal role in the growth of developing economies, but farmers encounter challenges in accessing credit. Agricultural loans facilitate the adoption of technology and boost income. Customized loans and financial education are indispensable. Collaborative efforts between financial institutions and governments are essential to enhance access in developing nations<sup>9, 10, 11, and 12</sup>.

**The Importance of Agricultural Loans in Jordan**

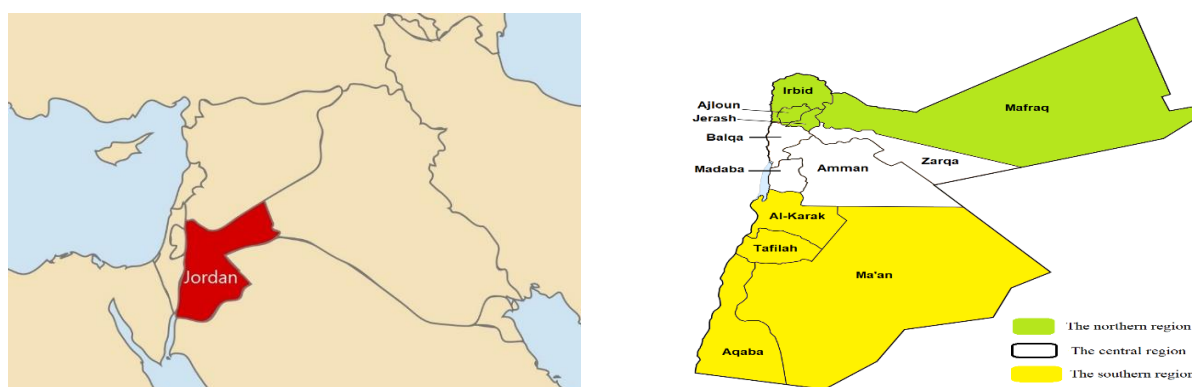
Agricultural loans are crucial for Jordan's agricultural sector, helping farmers adopt new methods, boost yields, and increase income<sup>13</sup>. They support development by enabling farmers to invest in modern technologies and inputs, enhancing yields and productivity, and mitigating risk<sup>14</sup>.

Jordanian farmers face challenges securing agricultural financing due to inadequate collateral, high-interest rates, and lack of financial literacy<sup>15</sup>. Jordanian government initiatives enhance agricultural credit accessibility, with the Agricultural Credit Corporation (ACC) serving as a cornerstone by offering low-interest loans, technical guidance, and training to improve farming methods and increase productivity<sup>16</sup>. The Jordanian government provides subsidized loans to small-scale farmers, enabling them to secure essential agricultural inputs. Agricultural loans hold a vital role in catalyzing the growth and progress of Jordan's agricultural sector, but farmers still face barriers to accessing these loans<sup>17</sup>.

**II. Material and Methods**

**Data sources**

This study analyzed data obtained from the Jordanian Agricultural Credit Corporation<sup>18</sup> from 2004 to 2021 in Jordan. The study included three regions: the northern region, which encompasses Irbid, Jerash, Ajloun, and Mafrqa; the central region, comprising Amman, Madaba, Zarqa, and Balqa; and the southern region, encompassing Karak, Ma'an, Tafila, and Aqaba, (Figure 1).



**Figure (1):** depicts two primary components: a map of Jordan within the Middle Eastern context on the left, and the three main regions of Jordan on the right<sup>19</sup>.

Agricultural loans were classified into five investments: land development, water resources, agricultural industrialization, livestock and poultry development, and production inputs. Loans were also allocated based on agricultural possessions: less than 30 dunams, 31-60 dunams, 61-120 dunams, and more than 120 dunams (1 dunam = 1,000 square meters). Loans were categorized into four types: seasonal, short-term, medium-term, and long-term. Loan amounts were divided into four size ranges: up to 5,000; 5,001-10,000; 10,001-20,000 and over 20,000 JOD.

**Statistical analysis**

After reviewing data from the Agricultural Credit Corporation, a statistical analysis was performed using<sup>20</sup>. The data was converted into a logarithmic formula to achieve a normal distribution, and the linear models following were used to analyze the data.

$$\text{Log } X_{jklm} = \mu + Y_j + Z_k + V_l + YV_{jl} + ZV_{kl} + \text{error}_{jklm} \quad (\text{Model 1})$$

$$\text{Log } X_{jklm} = \mu + Y_j + Z_k + H_l + YH_{jl} + ZH_{kl} + \text{error}_{jklm} \quad (\text{Model 2})$$

$$\text{Log } X_{jklm} = \mu + Y_j + Z_k + T_l + YT_{jl} + ZT_{kl} + \text{error}_{jklm} \quad (\text{Model 3})$$

$$\text{Log } X_{jklm} = \mu + Y_j + Z_k + S_l + YS_{jl} + ZS_{kl} + \text{error}_{jklm} \quad (\text{Model 4})$$

Where,  $\log X_{jklm}$  = Logarithm agricultural loan amounts of the  $jklm^{th}$  records.  $\mu$  = overall mean.  $Y_j$  = Effect of  $j^{th}$  year coded ( $j=1, 2, \text{ and } 18$ , for the years 2004-2021, respectively).  $Z_k$  = Effect of  $k^{th}$  region coded ( $k=1, 2, \text{ and } 3$  for the Central, North, and South, respectively).  $V_l$  = Effect of  $l^{th}$  agricultural investment coded ( $l=1, 2 \dots \text{ and } 5$ ) for Agricultural land development, Water resources development, Agricultural industrialization, Livestock and poultry development, and Agricultural production inputs, respectively.  $YV_{jl} + ZV_{kl}$  = The interaction of year and region with agricultural investment.  $H_l$  = effect of  $l^{th}$  agricultural possession coded ( $l=1, 2 \dots \text{ and } 4$ ) for the less than 30, 31-60, 61-120, and more than 120 dunums (a dunam=1000 square-meter), respectively.  $YH_{jl} + ZH_{kl}$  = The interaction of year and region with agricultural possession.  $T_l$  = effect of  $l^{th}$  type of loans coded ( $l=1, 2 \dots \text{ and } 4$ ) for seasonality, short, medium, and long terms, respectively.  $YT_{jk} + ZT_{jl}$  = The interaction of year and region with type of loans.  $S_l$  = effect of  $l^{th}$  size of loans coded ( $l=1, 2 \dots \text{ and } 4$ ) for up to 5,000; 5,001-10,000; 10,001-20,000; more than 20,000 /JOD, respectively.  $YS_{jk} + ZS_{jl}$  = The interaction of year and region with the size of loans.  $error_{jklm}$  = Random error term associated with the  $X_{jklm}$  observations with mean = zero and variance =  $\sigma^2$ . Duncan's test was employed to differentiate the means of the influential variables<sup>21</sup>.

The linear exponential function was employed to estimate the loan amount growth rate. The function is expressed as follows:

$$\log Y_i = \log a + b \times X_i \text{ (Model 5)}$$

Where,  $Y_i$  = Logarithm averages of annual loan amounts,  $X_i$  = year of a loan, coded as 1, 2, and 18 for 2004-2021 years, respectively. (a) = Logarithm intercept of annual loan amounts, while (b) = annual rate of increase in loan amounts. The Model (5) was used to predict the amount of agricultural loans during the study period.

### III. Result

#### Evaluation of loan amounts

The average agricultural loan values during the study period were JOD 699,006.211 for investments and JOD 514,011.028 for possessions. Table (1) shows that agricultural possession loans displayed the highest variance, while investments had the lowest variance based on F values.

**Table (1):** Analyze the variance of logarithmic transformations of agricultural loan amounts across years, regions, investments, possessions, loan type, and loan size in Jordanian Dinars (JOD).

Models	Source of Variation	DF	Mean Square	F Value	Pr > F	CV
<b>First</b>	Year (2004-2021)	17	6.491	32.11	0.0001	3.21
	Region	2	11.341	56.09	0.0001	
	Agricultural investment	4	19.939	98.61	0.0001	
	Year×Agricultural investment	68	3.029	14.98	0.0001	
	Region×Agricultural investment	8	1.682	8.32	0.0001	
	Residual	170	0.202			
<b>Second</b>	Year (2004-2021)	17	1.569	12.58	0.0001	2.68
	Region	2	7.367	59.06	0.0001	
	Agricultural possession	3	199.803	1601.57	0.0001	
	Year×Agricultural possession	51	0.645	5.17	0.0001	
	Region×Agricultural possession	6	0.251	2.01	0.0678	
	Residual	136	0.124			
<b>Third</b>	Year (2004-2021)	17	1.710	2.75	0.0006	6.18
	Region	2	27.347	44.02	0.0001	
	Type of loans	3	221.677	356.79	0.0001	
	Year×Type of loans	51	3.000	4.83	0.0001	
	Region×Type of loans	6	8.749	14.08	0.0001	
	Residual	136	0.621			
<b>Fourth</b>	Year (2004-2021)	17	2.962	52.94	0.0001	1.65
	Region	2	10.903	194.87	0.0001	
	Size of loans	3	37.662	673.12	0.0001	
	Year×Size of loans	51	0.201	3.59	0.0001	
	Region×Size of loans	6	1.897	33.92	0.0001	
	Residual	136	0.055	52.94		

Region = central, north, south; Agricultural investment = agricultural land development, developing water resources, agricultural industrialization, development of livestock and poultry, agricultural production inputs; Agricultural possessions = (less than 30), (30-60), (61-120), (more than 120) dunums, a dunam=1000 square-meter; Type of loans = seasonality, short term, medium term, long term; Size of loans = (up to 5,000), (5,001-10,000), (10,001-20,000), (More than 20,000)/JOD.

Years, regions, agricultural investments, agricultural possessions, loan types, and sizes all influenced agricultural loan amounts. The interactions between years or regions with investments, possessions, loan types, and sizes were highly significant, except for the interaction between possessions and regions, which showed no significant effect (Table 1).

Table (2) shows that agricultural loans are more common in the central and northern regions than in the southern according to investments and possessions. On the other hand, the highest amounts of loans were in the center region and lowest in the southern according to types and sizes of loans.

**Table (2):** Least-square means and standard errors of the logarithm of agricultural loan amounts across years, regions, investments, agricultural possessions, type, and size of loans /JOD.

Models	Factors	No.	Least-Square means ± SE	
First	Region	Central	90	14.258±0.047 <sup>a</sup>
		North	90	14.181±0.047 <sup>a</sup>
		South	90	13.608±0.047 <sup>b</sup>
	Agricultural investment	1 <sup>st</sup>	54	13.969±0.061 <sup>b</sup>
		2 <sup>nd</sup>	54	15.014±0.061 <sup>a</sup>
		3 <sup>th</sup>	54	13.461±0.061 <sup>c</sup>
4 <sup>th</sup>		54	13.602±0.061 <sup>c</sup>	
5 <sup>th</sup>		54	14.032±0.061 <sup>b</sup>	
Second	Region	Central	72	13.330±0.041 <sup>a</sup>
		North	72	13.352±0.041 <sup>a</sup>
		South	72	12.781±0.042 <sup>b</sup>
	Agricultural possession	1 <sup>st</sup>	54	15.978±0.048 <sup>a</sup>
		2 <sup>nd</sup>	54	12.291±0.048 <sup>c</sup>
		3 <sup>th</sup>	54	11.670±0.048 <sup>d</sup>
4 <sup>th</sup>		54	12.679±0.048 <sup>b</sup>	
Third	Region	Central	72	13.316±0.092 <sup>a</sup>
		North	72	12.860±0.092 <sup>b</sup>
		South	72	12.086±0.094 <sup>c</sup>
	Type of loans	1 <sup>st</sup>	54	12.369±0.107 <sup>b</sup>
		2 <sup>nd</sup>	54	11.588±0.108 <sup>c</sup>
		3 <sup>th</sup>	54	15.741±0.108 <sup>a</sup>
4 <sup>th</sup>		54	11.318±0.108 <sup>c</sup>	
Fourth	Region	Central	72	14.677±0.027 <sup>a</sup>
		North	72	14.489±0.027 <sup>b</sup>
		South	72	13.929±0.027 <sup>c</sup>
	Size of loans	1 <sup>st</sup>	54	15.506±0.032 <sup>a</sup>
		2 <sup>nd</sup>	54	14.469±0.032 <sup>b</sup>
		3 <sup>th</sup>	54	13.793±0.032 <sup>c</sup>
4 <sup>th</sup>		54	13.692±0.032 <sup>d</sup>	

Agricultural investment = (1<sup>st</sup>=agricultural land development), (2<sup>nd</sup>= water resources development), (3<sup>th</sup>=agricultural industrialization), (4<sup>th</sup>= livestock and poultry development), and (5<sup>th</sup>=agricultural production inputs). Agricultural possessions = (1<sup>st</sup>=less than 30), (2<sup>nd</sup>=31-60), (3<sup>th</sup>=61-120), and (4<sup>th</sup>=more than 120) dunums, a dunam= 1000 square-meter. Type of loans = (1<sup>st</sup>=seasonality), (2<sup>nd</sup>=short), (3<sup>th</sup>= medium), and (4<sup>th</sup>= long) terms. Size of loans = (1<sup>st</sup>=up to 5,000), (2<sup>nd</sup>=5,001-10,000), (3<sup>th</sup>=10,001-20,000), (4<sup>th</sup>= more than 20,000) /JOD.

Loans to agricultural investments were mainly directed to water resources development, which received the highest percentage, followed by land development and agricultural production inputs. On the other hand, minimal loans were directed towards agricultural industrialization and livestock and poultry development. Agricultural possessions with an area of less than 30 dunums received the highest amounts of agricultural loans compared to other possessions (A dunam = 1,000 square meters). Most agricultural loans were medium-term and received the largest amounts compared to other agricultural loans (seasonal, short-term, and long-term). The lowest-value agricultural loans (up to a maximum of 5,000 JOD) received the highest amounts compared to other loans (Table 2).

**Annual growth of loans**

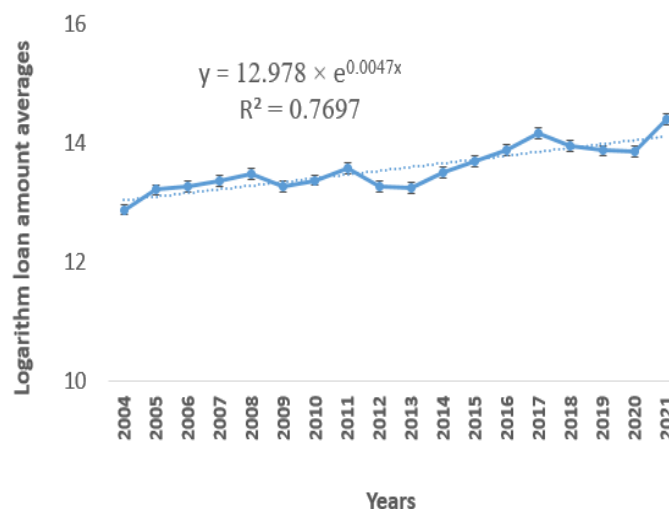
Table (3) presents the annual growth rates of agricultural loans that were highly statistically significant for overall mean, investments, agriculture possessions, and loan sizes, except for types of loans. The average annual growth rate of total agricultural loans reached 6%. The growth rates of agricultural loans according to investments, loan sizes, and agricultural possessions were about 11%, 8%, and 5%, respectively.

**Table (3):** Shows the annual rates of increase (b) in agricultural loans over the years of study (Model 5).

Agricultural Loan	Parameter Estimates (b)	Standard error	F Value	Pr > F	CV
Agricultural investment	0.1141	0.0138	68.22	0.0001	8.41
Agricultural possession	0.0507	0.0235	4.63	0.0325	13.55
Type of loans	0.0006	0.0293	0.001	0.9836	17.40
Size of loans	0.0852	0.0117	52.54	0.0001	6.24
Overall mean	0.0636	0.0168	14.32	0.0003	5.46

Figure (2) displays the curve illustrating changes in the least-square means of agricultural loan amounts over the years of study. An increasing trend was observed in annual agricultural loans, as described by the following formula:

$$\text{Log } Y_i = \text{Log} (12.978) + 0.0047 X_i \text{ (Model 5)}$$



**Figure (2):** Shows curve of annual agricultural loan growth rate (least-square means) during the study period.

Table (4) presents the average estimated and expected agricultural loan amounts amounting to 784,655.46 JOD. The correlation rate between these values reached 88%, with high statistical significance.

**Table (4):** Shows indicators of estimated and predicted logarithmic loan amounts in JOD, along with the correlation between them.

Variable	Mean	Std Dev	Sum	Min.	Max.
Log <u>estimated</u> agricultural loan amounts	13.57277	0.38805	244.30991	12.87980	14.40804
Log <u>predicted</u> agricultural loan amounts	13.57315	0.34006	244.31670	13.03170	14.11460
Pearson correlation coefficients = <b>0.876</b> with (P<0.01).					

**IV. Discussion**

Variability in agricultural loans can be attributed to a variety of factors. These factors include loan terms, geographic location, type of production, government support, risks, returns, needs, economic development, infrastructure, and the institutional environment. Additionally, changes in policies, climate, prices, credit availability, and farmer demand play a significant role<sup>22, 23, 24 and 25</sup>.

Agricultural loans varied significantly due to factors like investments, possessions, loan types, and regions, influenced by social and cultural factors. On the other hand, the relationship between possessions and regions remained consistent, influenced by factors such as property size, production type, credit availability, and government policies<sup>26</sup>. Micro entrepreneurs seeking loans also faced potential barriers related to religious beliefs, social obligations, microfinance awareness, and financial factors<sup>17</sup>.

Agricultural loans are less common in southern regions due to disparities in resources and varying agricultural needs, potentially resulting in an unequal distribution as interest in agriculture grows in these areas. The allocation of agricultural loans varies significantly across different investments. Water resource development receives the highest number of loans, followed by land development and production inputs. In contrast, agricultural industrialization, livestock, and poultry development receive the least funding. Investments in water resource development reflect their crucial importance in areas facing water scarcity. Jordan is also committed to improving its agricultural sector and productivity, as evidenced by its support for land development and agricultural production inputs. Insufficient financing for agricultural product processing, livestock, and poultry development may indicate that these sectors require more funding than Jordan's budget allows. Agricultural loans promote technology adoption, mechanization, increased productivity, improved living standards, and poverty reduction. However, accessing credit poses challenges, including loan regulations, high-interest rates, guarantee issues, and a lack of protection against disasters. Agricultural land investment is preferred in Indonesia, while credit is crucial for Pakistan's agricultural economy<sup>27, 28</sup>.

Smaller agricultural possessions (less than 30 dunums) in Jordan receive higher loan amounts due to their significant impact on the agricultural sector. Government agencies allocate a larger share of loans to these landholders, as individuals with smaller plots often struggle to secure funding from commercial banks, relying primarily on government institutions for financial assistance. Agricultural land under 30 dunams affects food production, rural employment, and socio-economic significance. Government agencies are drawn to these smaller possessions, supporting sustainable production efforts. Securing credit is a challenge for Slovak farms, especially those with low agricultural production<sup>29</sup>. Improving smallholders' access to credit can enhance productivity per unit area in Pakistan<sup>30</sup>. Agricultural credit in India tends to favor affluent regions and more prosperous farm households within those areas<sup>31</sup>.

Farmers, owing to their financial viability, tend to prefer medium-term loans. These loans offer more flexibility compared to the stricter conditions of longer-term loans and are commonly used to support agricultural ventures such as equipment purchases and land development. Smaller amounts are frequently designated for seasonal and short-term loans, typically employed to fund pressing agricultural requirements like acquiring seeds, fertilizers, pesticides, and other indispensable farming essentials. In contrast, medium-term loans prove ideal for farmers aiming to finance agricultural ventures, while long-term loans may be less favored due to the stringent prerequisites for obtaining them<sup>32, 33</sup>.

Agricultural loans in Jordan vary based on size, with smaller loans (up to 5,000 JOD) receiving more attention. This differs significantly from larger loan categories (5001-10,000; 10,001-20,000; over 20,000 JOD), which are less prioritized. Financial institutions prefer smaller agricultural loans because they help farmers manage financial risks, while larger loans involve greater disbursement risks. Furthermore, issuing small agricultural loans promotes sustainability through improved accountability in repayment, benefiting agriculture. These loans also serve as a valuable starting point for new farmers by offering essential startup financing. It is worth noting that factors like interest rates, loan terms, and repayment schedules greatly influence the range of loan amounts in agriculture<sup>34</sup>. Significantly increased agricultural loans stimulated agricultural growth in Slovakia<sup>29</sup>, while agricultural credit agencies in Jordan introduced measures to reduce excessive lending<sup>16</sup>.

Microcredit depends on the borrower's ability to repay, with larger loans going to those who accept higher interest rates and own significant assets. Jordanian social obligations seem to have little influence on loan decisions<sup>17</sup>. In Jordan, annual agricultural loan growth owes its rise to increased government support, better loan conditions, higher sector demand, and a favorable economy. The greatest annual increase was seen in agricultural investments, outpacing both Agricultural possessions and loan size. This phenomenon may be due to farmers' preference for loans to finance agricultural projects due to economic opportunities, as high growth rates reflect the demand for increased production<sup>35, 36</sup>.

Improved loan terms, government support, and favorable agricultural conditions drive higher agricultural loan amounts, fostering sector growth. Punjab saw a substantial increase in agricultural credit, aligned with the government's ongoing sector focus, while Bihar also experienced a credit rise driven by the success of annual credit schemes and total loans<sup>37</sup>.

A rising trend in annual agricultural loans in Jordan has been linked to a positive relationship between agricultural credit and production, as credit drives agricultural growth, vital for safeguarding livelihoods, income, and food security in Bihar<sup>38</sup>. Hungary experienced an annual credit increase of 24.486 billion Hungarian forints, approximately equivalent to 76.76 million US dollars, which bolstered its agricultural sector growth<sup>39</sup>. For rural growth in Pakistan, a collaborative approach involving financial institutions, government, non-governmental

organizations, and rural development organizations is essential to empower farmers, foster growth, and enhance the agricultural sector's contribution to GDP<sup>5</sup>.

A high correlation coefficient indicates a strong positive linear relationship between estimated and expected farm loan amounts. This confirms that the exponential equation (Model 5) can be used to predict the size of agricultural loan amounts in Jordan.

## V. Conclusion

This research concludes that the largest agricultural loan amounts were driven by investments and that the overall annual growth rate of agricultural loan amounts was 6%. Agricultural loans were primarily allocated to improve water resources in agricultural lands with an area of less than 30,000 square meters. These loans were medium-term duration and had a maximum limit of 5,000 JOD.

Additionally, this research confirms that loans are necessary to support the agricultural sector in increasing productivity, thus improving farmers' livelihoods. Agricultural policies should prioritize strengthening farmers' technical capacities, supporting rural infrastructure, and providing favorable loan terms to enhance sustainability. It recommends adopting a fair distribution of loans, tracking loan growth, and diversifying loan options to improve the efficiency of agricultural lending and the sustainability of the sector in Jordan.

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## Conflict of interest

The authors have indicated that there are no potential conflicts of interest.

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## References

- [1]. OECD, Agricultural Policies And Rural Development. Agricultural Policies And Rural Development – A Synthesis Of Recent OECD Work. (Organization For Economic Co-Operation And Development). 2010. <https://www.oecd.org/greengrowth/sustainable-agriculture/44668202.pdf>
- [2]. FAO, The Future Of Food And Agriculture. Trends And Challenges. Food And Agriculture Organization Of The United Nations Rome. 2017. <https://www.fao.org/3/I6583e/I6583e.pdf>
- [3]. IFC, Annual Report 2019. Investing For Impact. International Finance Corporation. 2019. <https://www.ifc.org/wps/wcm/connect/4ffd985d-c160-4b5b-8fbc-3ad2d642bbad/IFC-AR19-Full-Report.pdf?MOD=AJPERES&CVID=Mv2uyfU>
- [4]. Tarawneh, R.A., Tarawneh, M. S., And Al-Najjar, K.A. Agricultural Policies Among Advisory And Cooperative Indicators In Jordan. International Journal Of Research – GRANTHAALAYAH. 2022. 10(2), 10–1717. <https://doi.org/10.29121/granthaalayah.v10.i2.2022.4489>
- [5]. Yasir, M., Mukhtar, A., & Muhammad, B.A. Factors Affecting Delay In Repayments Of Agricultural Credit; A Case Study Of District Kasur Of Punjab Province. World Applied Sciences Journal. 2012. 17(4), 447-451. [http://idosi.org/Wasj/Wasj17\(4\)12/6.pdf](http://idosi.org/Wasj/Wasj17(4)12/6.pdf)
- [6]. FAO, Rural Informal Credit Markets And The Effectiveness Of Policy Reform. Economic And Social Markets And Social Development, (Food And Agricultural Organization). Rome (P. 134). 1995. <https://digitallibrary.un.org/record/250433?ln=en>
- [7]. Tarawneh R.A. The Role Of Agricultural Policies In Jordan To Mitigate The Effects Of COVID-19 On The Agricultural Sector. Journal Of Agricultural Science. 2021a. Vol. 13, No. 9. <https://doi.org/10.5539/jas.v13n9p171>
- [8]. Tarawneh R.A. The Role Of Jordanian Agricultural Policies In Climate Change Responding Affecting Agricultural Production. Journal Of Agricultural Science. 2021b. Vol. 13, No. 6. <https://doi.org/10.5539/jas.v13n6p90>
- [9]. Evans Sackey Teye & Philip Tetteh Quarshie. Impact Of Agricultural Finance On Technology Adoption, Agricultural Productivity And Rural Household Economic Wellbeing In Ghana: A Case Study Of Rice Farmers In Shai-Osudoku District, South African Geographical Journal. 2022. 104:2, 231-250, <https://doi.org/10.1080/03736245.2021.1962395>
- [10]. Balana, B. B., & Oyeyemi, M. A. Agricultural Credit Constraints In Smallholder Farming In Developing Countries: Evidence From Nigeria. World Development Sustainability. 2021. 1, 100012. <https://doi.org/10.1016/j.wds.2022.100012>
- [11]. Sixt, G. N., Klerkx, L., & Griffin, T. S. Transitions In Water Harvesting Practices In Jordan's Rainfed Agricultural Systems: Systemic Problems And Blocking Mechanisms In An Emerging Technological Innovation System. Environmental Science & Policy. 2018. 84, 235-249. <https://doi.org/10.1016/j.envsci.2017.08.010>
- [12]. Sarthak Gaurav & Ashish Singh Ashish. An Inquiry Into The Financial Literacy And Cognitive Ability Of Farmers: Evidence From Rural India, Oxford Development Studies. 2012. 40:3, 358-380. <https://doi.org/10.1080/13600818.2012.703319>
- [13]. Harrigan, J., El-Said, H. & Wang, C. The IMF And The World Bank In Jordan: A Case Of Over Optimism And Elusive Growth. Rev Int Org. 2006. 1, 263–292. <https://doi.org/10.1007/S11558-006-9490-8>
- [14]. Mashnik, D., Jacobus, H., Barghouth, A., Jiayu Wang, E., Blanchard, J., & Shelby, R. Increasing Productivity Through Irrigation: Problems And Solutions Implemented In Africa And Asia. Sustainable Energy Technologies And Assessments. 2017. 22, 220-227. <https://doi.org/10.1016/j.seta.2017.02.005>
- [15]. Masnat Al-Hiary Masnat, Bashir Al-Zu'bi And Amer Jabarin. Assessing Porter's Framework For National Advantage: The Case Of Jordanian Agricultural Sector. Jordan Journal Of Agricultural Sciences. 2010. Volume 6, No.1. [https://www.academia.edu/66583780/Assessing\\_Porter\\_S\\_Framework\\_For\\_National\\_Advantage\\_The\\_Case\\_Of\\_Jordanian\\_Agricultural\\_Sector](https://www.academia.edu/66583780/Assessing_Porter_S_Framework_For_National_Advantage_The_Case_Of_Jordanian_Agricultural_Sector)

- [16]. Al-Sharafat Ali, Tala Qtaishat & Mohammed I. Majdalawi. Loan Repayment Performance Of Public Agricultural Credit Agencies: Evidence From Jordan. *Journal Of Agricultural Science*. 2013. Vol. 5, No. 6. <https://www.ccsenet.org/journal/index.php/jas/article/view/23474>
- [17]. Dilip Dutta & Ihab Magableh. A Socio-Economic Study Of The Borrowing Process: The Case Of Micro Entrepreneurs In Jordan, *Applied Economics*. 2006. 38:14, 1627-1640. <https://doi.org/10.1080/00036840500427148>
- [18]. ACC, Agricultural Credit Corporation. 2023. <https://www.acc.gov.jo/en/reports>
- [19]. Wikipedia, Joran In Wikipedia. 2023. <https://en.wikipedia.org/wiki/Jordan>
- [20]. SAS, Institute Inc.: SAS/STAT User's Guide: Version 9.3, SAS Institute Inc., And Cary, NC, USA. 2012. <https://support.sas.com/en/books/html>
- [21]. Duncan, DB. Multiple Range And Multiple F Tests. *Biometrics*, 1955. 11.1. <https://www.jstor.org/stable/3001478.7>
- [22]. Denis Samygin, Nikolaj Baryshnikov, Sergey Imyarekov And Lyudmila Ponimatkina. Regional Allocation Methodology For Agricultural Support. *BIO Web Conf*. 2020. 27: 00016. <https://doi.org/10.1051/bioconf/20202700016>
- [23]. Henning, Johannes I. F., Dominique A. Bougard, Henry Jordaan, And Nicolette Matthews. Factors Affecting Successful Agricultural Loan Applications: The Case Of A South African Credit Provider. *Agriculture*. 2019. 9, No. 11: 243. <https://doi.org/10.3390/agriculture9110243>
- [24]. Sagbo, NICAISE S. M. Effects Of Agricultural Loans In Developing Countries – Benin Case Study. *Theses And Dissertations--Agricultural Economics*. 72. 2019. [https://uknowledge.uky.edu/agecon\\_etds/72](https://uknowledge.uky.edu/agecon_etds/72)
- [25]. Stekla J., Grycova M. The Relationship Between Profitability And Capital Structure Of The Agricultural Holdings In The Czech Republic. *Agric. Econ. – Czech*. 2016. 62: 421-428. <https://doi.org/10.17221/232/2015-AGRICECON>
- [26]. Limantol, A.M., Keith, B.E., Azabre, B.A. Et Al. Farmers' Perception And Adaptation Practice To Climate Variability And Change: A Case Study Of The Vea Catchment In Ghana. *Springer Plus*. 2016. 5, 830. <https://doi.org/10.1186/s40064-016-2433-9>
- [27]. Raden Aswin Rahadi, Dwi Rahmawati, Saldy Fitrianda, Alfita Puspa Handayani. Millennials Residential Preferences In Indonesia During The Covid-19 Pandemic. *South East Asia Journal Of Contemporary Business, Economics And Law*. 2021. Vol. 24, Issue 2 (April). [http://seajbel.com/wp-content/uploads/2021/03/SEAJBEL24\\_548.Pdf](http://seajbel.com/wp-content/uploads/2021/03/SEAJBEL24_548.Pdf)
- [28]. Abdullah, Deyi Zhou, Sher Ali Khan, Khalil Jebbran, Asad Ali. Agricultural Credit In Pakistan: Past Trends And Future Prospects. *Journal Of Applied Environmental And Biological Sciences*. 2015. 5(12)178-188. [https://www.textroad.com/pdf/JAEBS/J.20Appl.%20Environ.%20Biol.%20Sci.%205\(12\)178-188,%202015.Pdf](https://www.textroad.com/pdf/JAEBS/J.20Appl.%20Environ.%20Biol.%20Sci.%205(12)178-188,%202015.Pdf)
- [29]. Marian Toth, Tomas Rabek And Zuzana Strapekova. Impact Of Integration And Globalization On Business Risk And Loans In Slovak Agriculture. *SHS Web Of Conferences*. 2020. 74, 05027. <https://doi.org/10.1051/shsconf/20207405027>
- [30]. Naushad K., Inayatullah Jan, Mujibur Rehman, Anwar Mehmood And Akhtar Ali. The Effects Of Short Term Agricultural Loans Scheme Of Zarai Taraqqiati Bank On Increase In Farm Production In District Karak. *Sarhad J. Agric*. 2007. Vol. 23, No. 4. [https://www.aup.edu.pk/Sj\\_Pdf/THE%20EFFECTS%20OF%20SHORT%20TERM%20AGRICULTURAL.Pdf](https://www.aup.edu.pk/Sj_Pdf/THE%20EFFECTS%20OF%20SHORT%20TERM%20AGRICULTURAL.Pdf)
- [31]. Vinod Kumar, DGM. Trends And Patterns In Agriculture Credit In India: A District Level Analysis Of Uttar Pradesh. Department Of Economic Analysis And Research Head Office, Mumbai. 2021. <https://www.nabard.org/auth/writereaddata/Tender/2501235626trends-And-Patterns-In-Agriculture-Credit-In-India.Pdf>
- [32]. Adams, Charles And Ferrarini, Benno And Park, Donghyun. Fiscal Sustainability In Developing Asia (June 1, 2010). Asian Development Bank Economics Working Paper Series. 2010. No. 205. <http://dx.doi.org/10.2139/ssrn.1640264>
- [33]. Schiavo-Campo, S. Potemkin Villages: "The" Medium-Term Expenditure Framework In Developing Countries. *Public Budgeting & Finance*. 2009. 29(2), 1-26. <https://doi.org/10.1111/j.1540-5850.2009.00926.x>
- [34]. Vine Mutyasira, Dana Hoag & Pendell. The Adoption Of Sustainable Agricultural Practices By Smallholder Farmers In Ethiopian Highlands: An Integrative Approach, *Cogent Food & Agriculture*. 2018. 4:1. <https://doi.org/10.1080/23311932.2018.1552439>
- [35]. Gurnovich T G, L Yu Piterskaya, L V Agarkova, E V Buraeva And M K Chistyakova. *IOP Conf. Ser.: Earth Environ. Sci*. 2021. 745 012013. <https://doi.org/10.1088/1755-1315/745/1/012013>
- [36]. Onyiriuba, L., Okoro, E.U.O. And Ibe, G.I. Strategic Government Policies On Agricultural Financing In African Emerging Markets, *Agricultural Finance Review*. 2020. Vol. 80 No. 4, Pp. 563-588. <https://doi.org/10.1108/AFR-01-2020-0013>
- [37]. Kamal Vatta, Arjinder Kaur, Baljinder Kaur Sidana, Preet Kamal Singh Bhangu, And Amandeep Kaur. Agricultural Credit In Punjab: Trends And Potential. *Agricultural Economics Research Review*. 2022. 35 (Conference Number), 61-73. <https://doi.org/10.5958/0974-0279.2022.00019.2>
- [38]. Rashmi Sinha, Tulika Kumari And Ritambhara Singh. Assessing The Role Of Credit On Agricultural Growth In Bihar. *Economic Affairs*. 2022. Vol. 67, No. 04, Pp. 511-517. <https://ndpublisher.in/admin/issues/eav67n4q.pdf>
- [39]. Zsuzsanna Szeles, Zoltán Zéman, Sándor J. Zsarnóczai. The Developing Trends Of Hungarian Agricultural Loans In The Term Of 1995 And 2012. *Agric. Econ. – Czech*. 2014. 60, (7): 323–331. <https://www.agriculturejournals.cz/pdfs/age/2014/07/05.pdf>