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INSTITUTIONAL SUPPORT FOR REMOVING BARRIERS TO SUSTAINABLE AGRICULTURAL ENTREPRENEURSHIP

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ABSTRACT

Currents study aims to investigate Institutional support for removing of barriers to sustainable agricultural entrepreneurship in Tehsil Jhang, Punjab, Pakistan. A total of 134 agricultural entrepreneurs were selected through a convenience sampling technique. Descriptive analysis revealed a gap in the implementation of innovation, education and training for these agricultural entrepreneurs. Spearman's correlation analysis revealed that institutional support, such as training and the implementation of innovation from public extension, improved sustainable agricultural entrepreneurship. The Spearman's correlation analysis also shows that support from private companies, NGOs, and cooperatives improved access to the marketing channels significantly. On the other hand, the lack of training and education reduced the sustainability of agricultural entrepreneurship, and the lack of innovation had an adverse impact on market conditions. The current findings filled the research gap on this topic and proposed institutional support for the implementation of innovation, education, and training to promote agricultural entrepreneurship. Moreover, we suggest that accurate market information should be provided to agricultural entrepreneurs. Agricultural extension should therefore arrange agricultural entrepreneurship training and workshops at the local level.

***Keywords*:** Agriculture, Sustainable, Entrepreneurship, Pakistan

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1. INTRODUCTION

In the new paradigm, there has been an agreement that the identification, valuation, and pursuit of entrepreneurial opportunities is a unique aspect of entrepreneurship, including in the agricultural sector (Lans et al. 2020). Some authors have perceived that the agricultural entrepreneurship is the development of non-agricultural businesses by progressive farmers, while other authors perceived that agricultural activities offered entrepreneurial opportunities in order to develop new products and bring modernizations in the business process, distribution and marketing as well (Pindado & Sánchez, 2017). All kinds of entrepreneurship, such as manufacturing have a spatial dimension (Hudson 2010) but agricultural entrepreneurship proposes innovative and business-oriented methods to manage and accomplish agricultural enterprises. Agricultural entrepreneurships transform farming system into a new economic development to rural areas (Alsos et al. 2011). The implementation of principles of entrepreneurship in the field of agriculture established agricultural entrepreneurship which produce new products and improve profitability of agricultural businesses (Pan et al. 2024). Entrepreneurs in the agricultural sector usually deal with the farming community and various stakeholders to provide services and products to fulfill the market demands, such as access to financing, training, and market information (Pan et al. 2024). Although agriculture differ from the manufacturing sector and high technology (Vermeire 2009), farmers can be judged as entrepreneurs and as decision-makers who intend to improve profit.

Recent studies have revealed that agricultural entrepreneurship is not only a new concept: It played a vital role in entrepreneurial development (Lans et al. 2011; Verhees et al. 2011). Although rural communities achieved local economic development by adopting agricultural entrepreneurship, one could question the sustainability of entrepreneurial practices (Kassem et al. 2018). According to Strange and Bayley (2008) sustainability is the general agreement to retain a balanced relationship between socio-economic and environmental factors in an appropriate way to current demands without affecting the needs of future generations.

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Sustainable agricultural entrepreneurship mainly focuses on maintaining or improving current agricultural enterprises (Mupfasoni et al. 2018). According to Belz and Binder (2017) Sustainable entrepreneurship is a recognition, development and exploitation of opportunities by individuals to develop future goods and services to gain socio-economic and ecological benefits. According to the old theories proposed by Knight (1921), stated that the financial advantages direct entrepreneurial activity; entrepreneurs can be considered as money-driven, growth and production-orientated individuals who purely try to gain economic benefits (Lans et al. 2014). With the rapid increase in environmental and climate challenges, there is a dire need for achieving sustainable entrepreneurship (Cohen & Winn, 2007; Dean & McMullen, 2007; Hockerts & Wüstenhagen, 2010; Pacheco et al. 2010; Patzelt & Shepherd, 2011; Belz & Binder, 2017).

Pakistan is an agricultural country, holds a significant position among countries in South Asia. Approximately 22 million hectares out of a total of 80 million hectares are under cultivation in Pakistan (Aslam 2016). About 70% of the rural population is directly or indirectly linked with the agriculture sector for their food demands and livelihoods (Chandio et al. 2016). Government of Pakistan potentially collected 60% of foreign exchange through agricultural system, which has been contributing approximately 20% to the national GDP in the recent years.

Sustainable agricultural entrepreneurship has not gained much attention in Pakistan, especially in the current study area. Although a few studies have focused on agricultural entrepreneurship in Pakistan, but studies related to the sustainability in agricultural entrepreneurship are rather scarce. One could question the importance of the current study area or why researcher selected this area and population for current study. According to the researcher's observation, it was the first attempt to investigate institutional support for sustainable agricultural entrepreneurship. Moreover, highlighting key barriers to sustainable agricultural entrepreneurship. The current study area is prone to annual flood risk and climate change that is continuously damaging sustainable agricultural entrepreneurship. Despite climate change, Muhammad et al. (2017) identified that the infrastructural issues, weak marketing channels, lack of industrial development and financial support inhibited sustainable development. But the deep investigation on institutional support from public extension, private companies, NGOs and cooperatives has not been studied in the study area yet. The government of Punjab launched various projects to enhance agricultural productivity, but the segment of sustainable agricultural entrepreneurship is not there (District Jhang, nd).

At the end of the 20th century, agricultural entrepreneurship showed significant growth. In mid-90s, the agricultural system was initiated based on liberalization and sustainability. Agricultural entrepreneurship improves farmers' capacity and transforms the agricultural system from an old to a modern phase. Schumpeter explained about the innovation process of creative destruction, whether it be climate change, biodiversity, or water scarcity, in which entrepreneurs are continuously transforming based on ecological challenges (Hare & Quinn, 1971; Schaltegger & Wagner, 2011; Fong et al. 2014; Alhaddi 2015; Majid et al. 2017). Sustainable agricultural entrepreneurship can be improved through institutional support. Moreover, barriers should be eradicated that hinder sustainability in agricultural entrepreneurship.

Urban (2019) Stated that entrepreneurial development in any sector is highly dependent on institutional support. Osei and Zhuang (2024) Revealed that institutional support played a vital role in sustaining agricultural entrepreneurship by providing new opportunities. Farm enterprises could be strengthened through innovation, risk-taking, and opportunity identification. Anríquez et al. (2020), Vozarova and Kotulic (2016), suggested that entrepreneurs who received institutional support sustained their enterprises and improved their profits. Thephavanh et al. (2023) Found that entrepreneurs sustained their agricultural enterprise through institutional support such as infrastructure, logistics, and innovative methods of communication, banking and marketing. However, agricultural entrepreneurs identified barriers that hamper sustainable growth of agricultural entrepreneurship, such as weak extension services, low access to loans, poor policies, and so on Thephavanh et al. (2023). Zivkovic et al. (2009) Stated that agricultural extension develops agricultural enterprises for rural communities and harmonizes the allocation of natural resources and production according to market demands. Awareness of innovation, marketing channels, and government policies regarding agricultural products among agricultural entrepreneurs may achieve sustainability (Muddassir & Alotaibi, 2023). Agricultural extension offices, NGOs and cooperatives could play a vital role to filling existing gaps in developing countries. Khanna and Palepu (2010) and Puffer et al. (2016) argued that economic development could be possible if institutional support, such as the functioning of markets, was provided, but developing countries are facing challenges in marketing characterized by institutional voids. Christoplos (2010) Stated that the sustainable entrepreneurship among farmers is an important component of agricultural extension. Agricultural extension services have developed a strong linkage between entrepreneurs and other farming communities through institutional support such as training and education relevant to agriculture. The current literature review highlights the importance of institutional support for sustainable agricultural entrepreneurship. Moreover, disadvantages of barriers such as less engagement with innovation, marketing issues, and poor policies are mentioned (Alnafissa et al. 2024).

Adobor (2020) and Putsenteilo et al. (2020) found that agricultural entrepreneurship mostly failed due to poor institutional support. The institutional support from various organizations such as NGOs, agricultural cooperatives,

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and extension offices could improve entrepreneurial opportunities and growth. Nara et al. (2020) Stated that the less tendency to engage in innovation, uncertainty and avoidance entrepreneurship is common in many societies and cultures which may degrade sustainability. It might be the consequences of poor institutional support and several other barriers. The same can be expected for agricultural entrepreneurship if poor extension services, weak market channels, and less engagement with innovation exist in society. Khanna and Palepu (2010) Argued that institutional voids reduce entrepreneurial opportunities and increase difficulties in getting market information.

Therefore, the study was planned to achieve several goals. The findings of the study may have several implications for policy makers regarding creating a suitable environment for sustainable agricultural entrepreneurship. Based on the findings, the government can take action to promote agricultural entrepreneurship by sharing accurate market information, applying innovations, and providing training to agricultural entrepreneurs. These actions could help farmers to build an understanding of agricultural entrepreneurship and to identify potential advantages of sustainable agricultural entrepreneurship. Current study intended to analyze institutional support for removing barriers to sustainable agricultural entrepreneurship and determined the relationship between institutional support and sustainable agricultural entrepreneurship. Moreover, the relationship between barriers and sustainable agricultural entrepreneurship was measured.

1.2. Conceptual Model of the Study

As shown in Fig. 1, independent and dependent variables were categorized to define the Spearman correlation. The barriers, including lack of innovation, lack of education, training, and institutional support from various organizations such as public extension, private companies, NGOs, and cooperatives, were taken as independent variables, and sustainable agricultural entrepreneurship and access to marketing channels were taken as dependent variables for analysis. Furthermore, the study explained the positive and negative linear correlation between barriers, institutional support, and the sustainability of agricultural entrepreneurship. The correlation between barriers, institutional support, and access to marketing channels confirmed the positive or negative relationship. The increase in institutional support confirmed the improvement in sustainable agricultural entrepreneurship and access to marketing channels. The decrease in barriers confirmed the improvement in sustainable agricultural entrepreneurship and the situation.

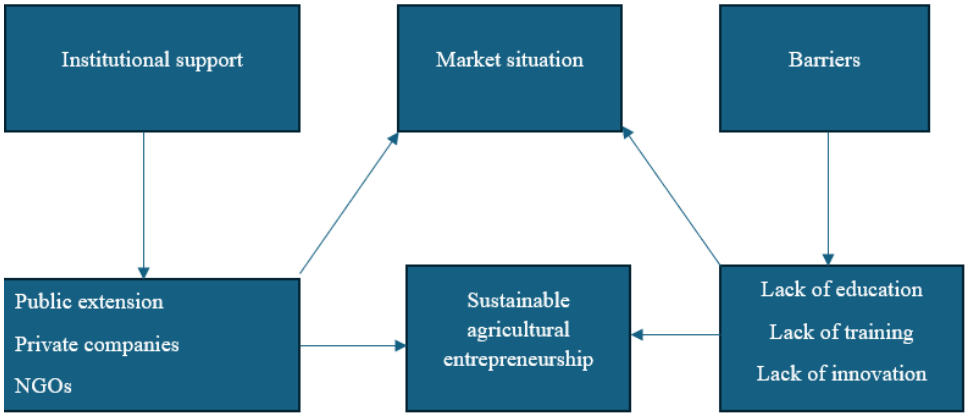

Fig. 1: Conceptual model of the study

2. MATERIALS AND METHODS

Quantitative research was conducted to identify barriers and supports to agricultural entrepreneurship in Tehsil Jhang, Punjab, Pakistan. The population of the study was farmers involved in agricultural entrepreneurship. The inclusion criteria were as follows: the respondent should be a farmer, belong to Tehsil Jhang, and be experienced in farming and agricultural entrepreneurship. A convenience sampling technique was used to collect data. The farmers were informed of the aim of the research and consented to participate in the survey. The survey was translated into their local language (Urdu). Each question of the survey was briefly explained to the respondents to reduce response error. Initially, the survey was distributed to 200 respondents, and 134 respondents completed their survey (response rate of 67%). Barriers (such as the lack of education and training among entrepreneurs and lack of innovation) and external institutional supports (Public Extension, private companies, NGOs, and cooperatives) to agricultural development and access to marketing channels were taken as independent variables. Sustainable agricultural entrepreneurship and current access to marketing channels were taken as dependent variables.

The questionnaire consisted of many sections. The first section contained questions regarding the respondents' socio-economic characteristics, such as age, education, farming experience, income, family size, etc. The second section consisted of many questions about their source of information. The third section was divided into many sub-sections. These sub-sections included questions about the farmers' entrepreneurial activities, their marketing

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strategies, their financial support, and the barriers they face. The next section was about the institutional support that they obtained. The survey questions were validated for their face and content validity by a panel of experts. The pilot study was conducted on 30 agricultural entrepreneurs to measure the reliability of the survey. The pretested questionnaire was not included in the final analysis. The value of Cronbach's α was 0.72.

Data were analyzed using the Statistical Package for Social Sciences (SPSS. V 27.0) program. Descriptive statistics such as frequencies and percentages were used to address the research objective. The Spearman correlation was used to check the correlation between independent and dependent variables. So, the Spearman correlation was used to check the correlation between independent and dependent variables. The Spearman correlation does not assume a normal distribution in the data. It approves and disapproves correlation between variables. Moreover, it permits further analysis, if required the findings of the spearman correlation show the significance of the data.

3. RESULTS

3.1. Socio-economic Characteristics

The socio-economic characteristics of agricultural entrepreneurs regarding gender, age, education, land area farming experience and source of income are presented in Table 1. Out of the total surveyed respondents, 88.1% of agricultural entrepreneurs were men and 11.9% were women. This is quite common in the Pakistani context, where agricultural entrepreneurship is generally undertaken by male counterparts whereas females are generally restricted to housekeeping and bringing up kids. There is, however, a minority of females who are linked with actual entrepreneurial activities due to various reasons. In terms of age brackets, the percentages of agricultural entrepreneurs belonging to the age groups 25-30, 31-40, 41-50, or 51-60 years were 20.9, 25.4, 28.4, and 25.4%, respectively Results showed that the percentages of agricultural entrepreneurs with an education level of below primary, primary, secondary, intermediate, or college were 3.7, 26.9, 36.6, 6.0 and 26.9%, respectively. A large number of agricultural entrepreneurs (66.4%) owned 20 or more than 20 acres of land. The percentages of agricultural entrepreneurs who owned 7 or fewer acres, 8-11 acres, 12-15 acres and 16-19 acres of land, were 16.4, 7.5, 8.2, and 1.5%, respectively. Similarly, 40.3% of agricultural entrepreneurs had more than 20 years of experience in agricultural entrepreneurship, while 38.8% had 6 to 10 years of experience in agricultural entrepreneurship. Only 12.7% had less than 5 years of experience, and 8.2% had 11-20 years of experience in agricultural entrepreneurship. Moreover, the percentage of agricultural entrepreneurs who earned their income from agriculture or a combination of agriculture and other businesses were 56% and 44%, respectively.

Table 1: Descriptive summary of the surveyed agricultural entrepreneurs

Characteristics	Frequency	Percent
Gender	118	88.1
Male	16	11.9
Female		
Age	28	20.9
25-30 years	34	25.4
31-40 years	38	28.4
41-50 years	34	25.4
51-60 years		
Education	5	3.7
Less than primary	36	26.9
Primary	49	36.6
Secondary	8	6.0
Intermediate	36	26.9
College education		
Land area	10	7.5
8-11acres	11	8.2
12-15 acres	2	1.5
16-19 acres	89	66.4
20 acres or more		
Farming experience	17	12.7
less than 5 years	52	38.8
6-10 years	11	8.2
11-20 years	54	40.3
More than 20 years		
Source of income	75	56
Agriculture	0	0
Other business	59	44
Agriculture and other business		

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3.2. Barriers to Agricultural Entrepreneurship

Barriers to sustainable agricultural entrepreneurship in the study area are given in Fig. 2, and the results show that 38.8% of the entrepreneurs lack education and training and 60.4% lack innovation, and 61.9% lack public-private partnerships. However, 61.20% of the entrepreneurs had received sufficient education and training, 39.6% were sufficiently innovative, and 38.1% had public-private partnerships.

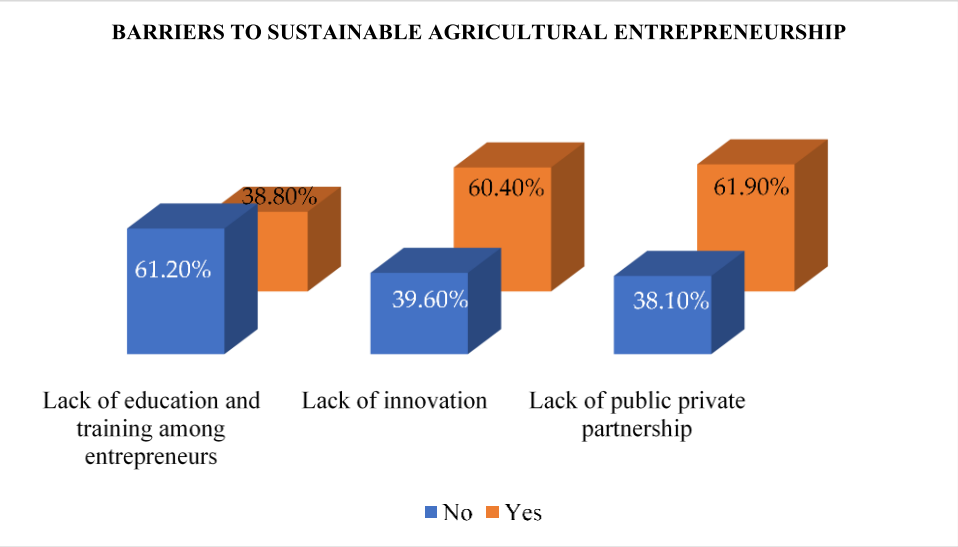

Fig. 2: Barriers to sustainable agricultural entrepreneurship

3.3. Institutional Support Provided to Agricultural Entrepreneurs

The data presented in Table 2 revealed that the agricultural entrepreneurs received a variety of services related to agricultural entrepreneurship from the public agricultural extension department, including agricultural trainings (45.5%), agricultural exhibitions (18.7%), and assistance with making access to markets easier (1.5%), and field services (34.3%). Other organizations such as private companies, NGOs, and cooperatives deliver various agricultural-based services. According to the data, the agricultural entrepreneurs received a variety of services related to entrepreneurship from private companies, including training (15.7%), agricultural exhibitions (6%), agricultural management and marketing support (9%) disseminating information on and knowledge of market supply and demand, assistance in making access to markets easier (13.4%), and applications of innovative agricultural technologies (56%).

The agricultural entrepreneurs also received a variety of services related to entrepreneurship from NGOs, such as training (26.9%), agricultural management and marketing support (4.5%), assistance in making access to markets easier (13.4%), and application of innovative agricultural technologies (55.2%).

Similarly, the agricultural entrepreneurs received a variety of services related to entrepreneurship from cooperatives, such as training (12.7%), agricultural management and marketing services (20.9%), assistance in making access to markets easier (8.2%), field services (4.5%), and application of innovative agricultural technologies (53.7%). According to the data given in Table 2. Most of the agricultural entrepreneurs received some combination of training and application of innovative technologies from the public agricultural extension department, private companies, NGOs, and cooperatives.

Table 1: Institutional support provided to agricultural entrepreneurs (n=134)

Institutional support	Public Agricultural Extension department		Private Companies		NGO's		Cooperatives	
	F	%	F	%	F	%	F	%
Agricultural training	61	45.5	21	15.7	36	26.9	17	12.7
Agricultural exhibitions	25	18.7	8	6	_	_	_	
Agricultural management and marketing support	_	_	12	9	6	4.5	28	20.9
Making access to markets easier	2	1.5	18	13.4	18	13.4	11	8.2
Field services	46	34.3	_		_		6	4.5
Application of innovative farm technologies	_	_	75	56	74	55.2	72	53.7

3.4. Correlation between Institutional Support to Sustainable Agricultural Entrepreneurship and Access to Marketing Channels

The results of the Spearman correlation between institutional support for agricultural entrepreneurship, the sustainability of agricultural entrepreneurship and the current market situation are summarized in Table 3. Four

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institutions, including the public extension department, NGOs, private companies, and cooperatives, were correlated with sustainable agricultural entrepreneurship and the current marketing situation in Punjab, Pakistan. The public extension department showed a highly significant relationship with sustainable agricultural entrepreneurship as the correlation coefficient reached 0.222 with a P-value of 0.01, and it was a weak positive correlation. This means support from the public extension department increased the sustainability of agricultural entrepreneurship.

Private companies showed a highly significant relationship with the current market situation in Punjab, Pakistan. The value of the correlation coefficient was 0.295 with a P-value of 0.01 and it was a weak positive correlation. It means an increase in institutional support from private companies improved their current marketing channels. NGOs and cooperatives showed a highly significant relationship with the market situation.

NGOs showed a significant relationship with market situations, the value of correlation was 0.362 with a P-value of 0.01, and it was a moderately positive correlation. This means increased institutional support from NGOs improved the current market situation. Cooperatives showed a significant relationship with market situation, the value of correlation was 0.236 with a P-value of 0.01 and it was a weak positive correlation. This means increased institutional support from cooperatives improved the current market situation.

Table 2: Correlation between institutional-support to sustainable agricultural entrepreneurship and market situation

Number of Agricultural Entrepreneurs = 134								
Support	Public Extension support		Private company support		NGO's Support		Cooperation	
	r	P value	r	P value	r	P value	r	P value
The sustainability of agricultural entrepreneurship	0.222**	0.01	0.032	0.71	0.006	0.945	0.081	0.349
Market situation	0.098	0.258	0.295**	0.001	0.362**	0.001	0.236**	0.006

** Correlation is significant at the level of 0.01; * Correlation is significant at the level of 0.05

5.5. Correlation between Barriers to the Sustainable Agricultural Entrepreneurship and Market Situation

The results of the Spearman correlation between barriers to agricultural entrepreneurship and the sustainability of agricultural entrepreneurship and the current access to marketing channels revealed in Table 4. Three barriers, lack of training, lack of education, and lack of innovation, were correlated with the sustainability of agricultural entrepreneurship and the current access to marketing channels. The lack of training and education among entrepreneurs showed a weak and inverse relationship with the sustainability of agricultural entrepreneurship. It means a decrease in untrained and uneducated entrepreneurs could improve the sustainability of agricultural entrepreneurship, as the correlation coefficient reached -0.017.

The lack of innovation showed a highly significant, weak and inverse correlation with the sustainability of agricultural entrepreneurship. It means a decrease in the lack of innovation improved the sustainability of agricultural entrepreneurship as the correlation coefficient reached -0.234 with a P-value of 0.01. Similarly, lack of innovation showed a highly significant, weak and inverse correlation with the current market situation. It means the decrease in lack of innovation improved the current market situation as the correlation coefficient reached -0.279 with a P-value of 0.01.

Table 4: Correlation (r) between barriers to the sustainable agricultural entrepreneurship and market situation

Barriers	The sustainability of agricultural entrepreneurship (r)	Current market situation (r)
Lack of education and training among entrepreneurs	-0.017	
Lack of innovation	-0.234**	
Lack of innovation		-0.279**

** Correlation is significant at the level of 0.01; * Correlation is significant at the level of 0.05.

4. DISCUSSION

The current study aims to identify institutional support for removing barriers to sustainable agricultural entrepreneurship. Our findings revealed that support from the agricultural extension office has a significant relationship with sustainable agricultural entrepreneurship. The current findings are aligned with Gebresilasse (2023) who found that agricultural extension develops agricultural enterprises for rural communities. It harmonizes the allocation of natural resources and production according to market demands. The findings of the current study are aligned with Christoplos (2010), who stated that the sustainable development of entrepreneurship among farmers is an important component of agricultural extension. Extension services developed a strong linkage between entrepreneurs and other farming communities through training and education relevant to agriculture. Although, agricultural extension departments around the world are improving sustainable agricultural entrepreneurship. But sustainable agricultural entrepreneurship has not been achieved in Pakistan. Therefore, it is suggested that the

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government should provide institutional support to agricultural entrepreneurs through extension services. Extension programs and training sessions should be arranged to overcome challenges facing by entrepreneurs (Ashraf et al. 2019). Furthermore, strong communication channels should be provided to entrepreneurs and stakeholders. Communication between entrepreneurs and stakeholders can allow the sharing of goals, experiences and feedback with each other.

Findings of the study revealed that support from private companies improved the market situation. Pray and Fuglie (2015) Found that private companies triggered sustainable agricultural entrepreneurship through advanced agriculture research and development. Private companies are faster than those from the public agriculture sector in terms of innovative agricultural marketing techniques and producing compatible commercial products.

Private companies enable the marketing of farm production and encourage contracts between smallholders and buyers that could be beneficial for them. Abbas et al. (2024) found that private companies increased maize, rice, and soya production in Ghana through the application of quality agricultural inputs and innovative agricultural techniques. Moreover, they provided marketing services. In Pakistan, private companies engage in agriculture enterprises and intensively render extension services to farmers and entrepreneurs. Private companies are involved in providing opportunities and tranferring innovative techniques to agricultural entrepreneurs. But they mostly reach medium and large entrepreneurs to achieve their annual targets and they usually ignore small-scale agricultural entrepreneurs. The National gricultural research centre should start its own program in which priorities should be given to small to large entrepreneurs. Innovative agricultural techniques should be tranferred through the public sector could transform entrepreneurship in the agriculture sector (Shahbaz & Ata, 2014).

Our results showed that institutional support from NGOs upgraded access to marketing channels. The current findings are aligned with Davis and Terblanche (2016) who found that local NGOs organized farmers in self-help groups and maintained the association of producers and extension agents. Furthermore, support from NGOs improved the relationship between brokers, scientific research, agricultural innovators, and markets. Strong farmers-stakeholder linkage ensured market engagement and stability as reported by Hidayat et al. (2015) that various progressive farmers are trained by NGOs. After training, farmers were able to sustain their agricultural entrepreneurship through better communication with other stakeholders including companies and agricultural input suppliers.

In the move towards privatization in Pakistan, NGOs are largely working in the agricultural extension. But the less extension agents to farmer ratio, weak incentive policy, poor training and dearth of modern knowledge, monitoring and evaluation systems hinder the sustainability in the agriculture sector (Shahbaz & Ata, 2014). These barriers negatively affect marketing channels and hamper sustainability in agricultural entrepreneurship. Therefore, the governement of Punjab, agriculture department should provide a good incentive policy, training and modern knowledge, ueutral monitoring and evaluation system to promote agricultural entrepreneurship.

According to our findings, agricultural cooperatives also improved access to the market and reduced market constraints. The findings of the current study supported by Shahbaz et al. (2023) who described that the cooperatives offered institutional support through which entrepreneurs could control production and market activities. The control of production and market activities means entrepreneurs can get access to innovative technologies and market information, and thus better understand entrepreneurial functioning (Gebremedhin et al. 2009). Agricultural cooperatives mainly focused on supporting agricultural entrepreneurship by developing bargaining power which reduces market risks and improves access to the market (Waheed et al. 2023). Cooperatives stimulates farmers to grow industrial crops and strengthened their relationships with international markets (Gebremariam et al. 2023). Our findings also aligned with (Wossen et al. 2017), who reported that agricultural cooperatives in developing countries were accustomed to developing agricultural services, sustainable agricultural activities, and marketing of farm products. In Pakistan, agricultural cooperatives are not widely working on sustainable agricultural entrepreneurship. The dearth of literature regarding the role of cooperatives in the field of agricultural entrepreneurship still exists which may hinder entrepreneurial developments. Therefore, research and development departments and agricultural cooperatives such as farm organizations should provide institutional support to sustainable agricultural entrepreneurship and existing barriers should be removed to sustain entrepreneurship in the agriculture sector.

Our findings revealed that the lack of training and education among agricultural entrepreneurs adversely affects sustainable agricultural entrepreneurship. The results of (Hosseini et al. 2012) are similar to our findings, they argued that entrepreneurial education could enhance the management of sustainable agricultural entrepreneurship. As Rathore (2023) have claimed traineeship and educational programs are significant and powerful predictors of farmers' involvement in the business. According to Vik and McElwee (2011), agricultural entrepreneurs might be owners, leaseholders, supervisors, or a combination of these roles. Agricultural entrepreneurship faces new challenges arising from complicated market regulations (Dias et al. 2019). The environment in which agricultural entrepreneurs run their enterprises is continuously changing, with fluctuating markets, consumer behaviors and improvements to environmental procedures, etc. (Ndirangu & Bwisa, 2016).

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The biggest challenge in the agricultural sector is to facilitate farmers access to training and education to increase their entrepreneurial skills (Vesala et al. 2007). The sustainability of agricultural entrepreneurship means that farmers should become an entrepreneur through education (McElwee 2008). The findings of Liedholm (2001), similarly demonstrated that training and skills among entrepreneurs had impacts on the sustainability of entrepreneurship. Trained and skilled entrepreneurs grew their businesses faster than others. Osamwonyi and Tafamel (2010) found that higher levels of training and education have a higher level of entrepreneurial performance than those with lower training and education.

Our findings are also consistent with Bowen et al. (2009), which revealed that less educated entrepreneurs mostly suffered in terms of their enterprises. The lack of training and skills was considered one of the major barriers to the sustainability of agricultural entrepreneurship (Samson et al. 2017). The government should start education programs in formal and informal ways. Universities should train the students for entrepreneurship in future. The provisional government should start short courses and vocational training for students and farmers who are interested in starting their own agricultural enterprise at small, medium and large scale.

Our findings showed that the lack of innovation adversely affects the sustainability of agricultural entrepreneurship and the market situation. In a similar context, Ataei et al. (2020) supported our findings that the application of innovative technologies is crucial for modern and sustainable agricultural entrepreneurship and further emphasized the adoption of innovation. Moreover, Kucher et al. (2023) confirmed our findings that the application of innovation in agricultural entrepreneurial operations reduced technological issues and enhanced innovative market development and economic growth. Anthopoulou (2010) argued that participatory training and educational sessions should be conducted to improve the application of innovative technologies in entrepreneurship. Innovative investment could be promoted by the provision of an innovative business environment for entrepreneurs such as scientific and strategic development and formation of market competitive advantages. Ayub Research Center should deliver research-based outcomes to the agricultural entrepreneurs through organizing training, workshops and exhibitions.

The findings of our study are aligned those Morkovkin et al. (2019), who predicted that the formation of innovative agricultural technologies would permit modern industrial businesses and agricultural entrepreneurship to produce new products and ensure their availability in the markets. Devaux et al. (2009) presented that the Papa Andina network in the Andes created links between potato producers, market agents, and farm service providers through market innovation and showed that the linkage between various stakeholders and market information and improved new entrepreneurial opportunities.

Conclusion

This study explored the importance of institutional support, education, training and application of innovation in improving sustainable agricultural entrepreneurship. The results showed that agricultural entrepreneurs are facing various challenges, such as a lack of entrepreneurial educational training and the lack of innovation. At the same time, the institutional support of public extension, private companies, NGOs and cooperatives improved sustainable agricultural entrepreneurship and access to marketing channels.

The outcomes of the current study may have several implications. First, it is imperative that policy makers understand the barriers to sustainable agricultural entrepreneurship. The role of extension department, innovation, private companies and cooperatives in sustaining agricultural entrepreneurship suggests that the government could effectively utilize institutions to achieve national targets. Agricultural entrepreneurs can be educated about market situations, innovation and potential advantages of sustainability in agricultural entrepreneurship. Furthermore, the government should take serious steps to facilitate institutional support for removing barriers to sustainable agricultural entrepreneurship. Overall, with the right market information for entrepreneurs, training and innovation would be beneficial for both the agricultural entrepreneurs as well as the government, as sustainable agricultural entrepreneurship has the potential to increase incomes and minimize challenges.

The current study was limited to Tehsil Jhang, Punjab, Pakistan. The results of the study may not be generalized to entrepreneurs who are living in other areas. Therefore, a similar study is recommended for the other areas of Punjab to recognize the context of agricultural entrepreneurs to enhance sustainable agricultural entrepreneurial capacities among entrepreneurs.

Conflicts of Interest: The authors declare no conflict of interest.

Author's Contribution

Muhammad Muddassir; data collection, Emad s. Aljohani; survey development, Bader Alhafi Alotaibi; final review, Abdulmalek Alsanhani; data analysis, Nageeb Aldawdahi; data curation and Muhammad Muddassir; results and discussion.

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