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RESEARCH ARTICLE

Entrepreneurship and Rural Development in Morocco: A Comparative Analysis of Female and Male Entrepreneurs in the Fes-Meknes Region

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ABSTRACT

Rural entrepreneurship is a growing field of research, with a focus on understanding and promoting entrepreneurial activities in rural areas. It is important to examine the differences between male and female entrepreneurs in these rural settings. This study explores the relationship between entrepreneurship and rural development in Morocco, focusing on the differences between male and female entrepreneurs. The Fes-Meknes region conducted the research, surveying 200 individuals, including 120 male and 80 female entrepreneurs, using econometric analysis. The study aimed to compare male and female entrepreneurs' socioeconomic characteristics, business attributes, technological factors, and entrepreneurial behaviors, as well as their impact on rural development. Key variables included education, household income, family situation, financial resources, investment grants, business sector, revenue, legal structure, target market, digital technology usage, and management style. The results of the anal-

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ysis showed significant differences between male and female entrepreneurs in various aspects, such as education level, household income, family situation, access to financial resources, business sector involvement, legal structure, years in operation, and target market preferences. Additionally, the study found that male entrepreneurs tended to utilize digital technologies more extensively and benefit more from entrepreneurship training compared to their female counterparts. However, female entrepreneurs demonstrated a higher propensity for contributing to rural development initiatives through their businesses, particularly in agribusiness-related activities. The study emphasizes the need for tailored policy interventions to address gender-specific entrepreneurship dynamics in rural areas, thereby promoting sustainable development and economic growth.

Keywords: Entrepreneurial Behavior; Entrepreneurship; Female Entrepreneurs; Gender Analysis; Morocco; Rural Development

1. Introduction

Entrepreneurship has emerged as a pivotal force driving rural development initiatives worldwide. In rural areas, where traditional economic activities often face challenges such as limited infrastructure and resources, entrepreneurship serves as a catalyst for economic growth, job creation, and community empowerment [1]. Fostering innovation and creativity enables rural entrepreneurs to recognize and seize unique opportunities within their communities [2]. Through their ventures, they not only generate income for themselves but also play a significant role in uplifting the overall socioeconomic fabric of rural areas [3]. With the right support and resources, these entrepreneurs have the potential to transform rural economies and create sustainable, long-term impact [4] through their dedication and hard work, rural entrepreneurs are able to not only improve their own lives but also contribute to the development of their communities. Creating businesses that cater to local needs stimulates economic activity and fosters a sense of pride and self-sufficiency within the community [5]. With access to training, funding, and mentorship, these entrepreneurs can continue to thrive and make a lasting difference in rural areas [6].

In the Moroccan context, entrepreneurship plays a particularly important role in integrating young people into economic activities in rural areas [7]. By fostering a conducive environment for entrepreneurial endeavors, policymakers seek to unleash the creative potential of the youth, catalyzing a virtuous cycle of economic dynamism and social progress [7]. The "Generation Green 2020–2030" strategy places a significant emphasis on the youth demographic, with a specific focus on nurturing a new cohort of young agricultural entrepreneurs [7] This initiative aims to foster professional integration and self-employment among young individuals, thereby empowering them to become active participants in the agricultural sector. Through targeted support and resources, the strategy seeks to cultivate a generation of innovative and resilient young entrepreneurs who can contribute to the sustainable development of rural communities and the agricultural industry as a whole. Despite concerted efforts, rural entrepreneurship continues to face challenges stemming from the misalignment between implemented programs and the practical realities on the ground. In response to this situation, the Department of Agriculture is prepared to launch the youth entrepreneurship program in the field of agriculture-related services [7]. This initiative, as a pivotal element of the Program for revitalizing rural areas through employment and entrepreneurship in the agricultural and para-agricultural sector (TREEA), aims to invigorate rural economies by fostering entrepreneurial activities among young individuals. To facilitate the implementation of this program, the department will enlist external technical assistance. This support will play a crucial role in navigating the implementation process, ensuring its efficacy and success. The Regional Center for Young Agricultural and Agri-Food Entrepreneurs (CRJEA) and its branches will specifically channel the technical assistance, acting as a vital resource hub for aspiring young entrepreneurs in the agricultural sector [7]. Through targeted guidance and support, this collaborative effort endeavors to em-

power youth and catalyze sustainable economic growth within rural communities.

However, the impact of entrepreneurship on rural development is not uniform across genders, with significant variations in the experiences and contributions of female and male entrepreneurs[1].This research addresses the problem of understanding rural entrepreneurship dynamics through a gender lens and its implications for rural development. Some researchers have concentrated on transaction costs as a constraint to the development of agricultural projects[1, 8]. Despite the importance of rural entrepreneurship, there is a lack of research focusing on gender-specific factors that influence entrepreneurial projects in rural areas[9]. This knowledge gap hampers efforts to design targeted policies and programs that effectively support female and male entrepreneurs in rural contexts. Moreover, understanding the differential impact of entrepreneurship on rural development outcomes between genders is essential for fostering inclusive and sustainable economic development in rural communities. Therefore, this research aims to investigate the comparative analysis of female and male entrepreneurs in the Fes-Meknes region, shedding light on their socio-economic characteristics, business dynamics, technological adoption, and entrepreneurial behavior, and examining their implications for rural development. Understanding the gender-specific dynamics of entrepreneurship is essential for designing effective policies and interventions that promote inclusive and sustainable rural development. By examining the unique challenges and opportunities faced by female and male entrepreneurs, this research seeks to inform policy discourse and decision-making processes aimed at enhancing the socio-economic fabric of rural communities in Morocco and beyond. The Fes-Meknes region of Morocco, renowned for its rich natural resources and vibrant rural communities, provides an ideal backdrop for exploring the intersection of entrepreneurship and rural development from a gender perspective. This study aims to delve into the comparative analysis of female and male entrepreneurs in the region, shedding light on the socio-economic characteristics, business attributes, technological factors, and entrepreneurial behaviors that shape their roles in fostering rural development. Through econometric analysis using binary logistic regression, we analyze the factors influencing rural entrepreneurship and explore their implications for rural development outcomes. In pursuit of our primary objective, this study seeks to conduct a comparative analysis of socio-economic characteristics between male and female entrepreneurs in rural areas, examining business attributes, investigating the influence of technological factors on entrepreneurial activities, and assessing entrepreneurial behaviors within rural regions.

2. Overview of Rural Entrepreneurship

Research on entrepreneurship has historically favored urban entrepreneurship over rural entrepreneurship, primarily due to the concentration of industrial and commercial activities in urban centers[2]. While urban entrepreneurship continues to dominate scholarly discourse, the emergence of sustainable entrepreneurship in rural areas heralds a paradigm shift towards more inclusive and environmentally conscious economic development[10]. As researchers delve deeper into this evolving landscape, there is a growing recognition of the pivotal role that rural entrepreneurs play in shaping the sustainable future of communities and ecosystems alike[3, 11]. On the other hand, the agricultural sector often overshadows the activities of rural businesses[10]. However, scholars such as Ogorodnikova et al.[3] contend that one of the salient features of rural areas in developing nations is the burgeoning growth of wage employment in non-agricultural activities. This shift in focus highlights the potential for rural entrepreneurship to contribute significantly to economic development and job creation in these regions. This broader perspective on entrepreneurship can lead to more inclusive and sustainable development strategies that benefit a wider range of communities and industries[11].

Research on rural entrepreneurship encompasses various dimensions, each shedding light on different aspects crucial for understanding and promoting entrepreneurial activities in rural areas[12]. One area of focus is the creation of supportive ecosystems for rural

entrepreneurship. This includes examining the importance of access to financing, infrastructure, and networking opportunities for rural entrepreneurs to thrive [13]. Understanding how these factors interact and influence entrepreneurial success is essential for policymakers and stakeholders aiming to foster an enabling environment for rural businesses [14]. These challenges may include limited access to markets and resources, as well as infrastructural constraints [15]. Researchers delve into strategies and interventions that can address these barriers, such as targeted initiatives to improve market access or enhance resource availability in rural areas [16]. Furthermore, studies frequently highlight examples of successful rural entrepreneurship initiatives on a global scale. Examining these examples provides valuable insights for policymakers and practitioners seeking to replicate successful models in their own rural contexts [17].

Education and training programs also play a crucial role in rural entrepreneurship research. Scholars investigate the effectiveness of such programs in equipping individuals in rural areas with the skills and knowledge necessary to initiate and sustain their own businesses [18]. By understanding the impact of educational interventions, policymakers can design targeted programs to enhance rural populations' entrepreneurial capabilities. Moreover, researchers explore the role of government and political power in fostering rural entrepreneurship. This includes analyzing how government policies and interventions can incentivize entrepreneurial activity in rural regions. Strategies may involve supporting small business development, establishing innovation hubs, or promoting technology adoption to catalyze entrepreneurship and economic growth in rural areas [19–21].

Overall, research on rural entrepreneurship encompasses a diverse array of topics, ranging from ecosystem support and challenges to successful initiatives, education, and government interventions [22]. By addressing these dimensions comprehensively, scholars contribute to a deeper understanding of rural entrepreneurship dynamics and inform evidence-based policies and strategies to promote rural economic development [23, 24]. The issue of sustainable entrepreneurship has garnered attention from various researchers, with a focus on the challenges of persisting in such endeavors. Scholars like [25, 26] have underscored the importance of sustainable entrepreneurship, particularly in rural areas, where it plays a vital role in creating wealth through the responsible and sustainable use of natural resources. This approach not only benefits the environment but also enhances the long-term economic sustainability of rural communities. By incorporating sustainable practices into their business models, entrepreneurs can ensure the preservation of ecosystems while meeting the needs of current and future generations. Sustainable entrepreneurship in rural settings has the potential to drive inclusive growth and development, fostering a more resilient and prosperous future for all stakeholders. Through innovative solutions and conscientious decision-making, sustainable entrepreneurs can address the challenges posed by climate change and promote environmental stewardship.

The shift towards sustainable entrepreneurship highlights the changing dynamics of rural economies, as a gradual diversification of economic activities gradually complements the traditional focus on agriculture [27]. By embracing sustainable practices, rural entrepreneurs not only contribute to economic prosperity but also play a pivotal role in preserving environmental integrity and fostering long-term resilience [28, 29]. Pioneering theoretical contributions, exemplified by Wortman's seminal work in 1990, underscore the pivotal role of rural entrepreneurship. Unlike their counterparts in urban settings, rural entrepreneurs exhibit a distinctive approach, characterized by their adeptness at leveraging local resources and actively contributing to their development, thereby fostering local economic growth [30]. This unique approach allows rural entrepreneurs to not only create jobs and generate income within their communities but also to establish sustainable businesses that address local needs and challenges. By focusing on utilizing local resources and engaging with the community, rural entrepreneurs are able to build strong relationships and networks that further support economic development in rural areas. Overall, the contributions of rural entrepreneurship play a crucial role in driving economic growth and prosperity in rural communities.

According to Korsgaard, Müller and Tanvig[31], rural entrepreneurship encompasses the creation of new organizations that introduce novel products, services, or technologies, thereby stimulating economic activity within rural environments. Similarly, Candelario-Moreno and Sánchez-Hernández[32] define the rural entrepreneur as an individual who operates a business within a rural setting. However, scholars such as Pato and Teixeira[33] contend that true rural entrepreneurship transcends physical location, stressing the significance of immersing oneself in the rural social milieu and actively contributing to the local community. They believe that a true rural entrepreneur not only runs a business in a rural area, but also engages with the community, understands its needs, and actively participates in its development. This involvement allows the entrepreneur to create sustainable businesses that benefit both the individual and the community as a whole. By fostering a strong connection to the rural social milieu, rural entrepreneurs can drive economic growth, create employment opportunities, and improve the overall quality of life in rural areas[34].

The study sought to compare the socioeconomic characteristics, business attributes, technological factors, and entrepreneurial behaviors of male and female entrepreneurs and assess their respective impacts on rural development. We formulated our hypotheses by integrating findings from various literatures and theoretical frameworks. Specifically, we conducted a comparative analysis of female and male entrepreneurs in the context of entrepreneurship and rural development. Based on this synthesis, we outline our hypotheses as follows.

H1. *There is a significant difference in the characteristics of male and female entrepreneurs in rural areas.*

H2. *Male and female entrepreneurs have different impacts on rural development.*

H3. *Socio-economic factors such as education level, household income, and family situation have differential effects on male and female entrepreneurship in rural areas.*

Rural entrepreneurs navigate the diverse microenvironments of the economic, competitive, legal, and cultural landscape; they not only create businesses but also serve as agents of change, generating employment opportunities and fostering local development[5]. In principle, rural entrepreneurship emerges as a dynamic force driving economic vibrancy and social cohesion within rural landscapes, underscoring its significance as a potent instrument for sustainable rural development. Chatterjee et al.[35] and Bouichou et al.[36], emphasized the need for comprehensive exploration of rural youth entrepreneurship, covering aspects ranging from entrepreneurial intent to project realization within rural contexts. The unique challenges and opportunities that rural youth face as they navigate the entrepreneurial journey serve as the foundation for this call for deeper examination. The unique challenges and opportunities that rural youth face as they navigate the entrepreneurial journey serve as the foundation for this call for deeper examination[37]. To gain insight into the challenges faced by rural entrepreneurs, we posit the following hypotheses:

H4. *Business characteristics, including business sector, annual revenue, and legal structure, influence the likelihood of male and female entrepreneurship differently in rural settings.*

H5. *Technological factors, such as access to digital technologies and entrepreneurship training, have varying impacts on male and female entrepreneurship in rural areas.*

Understanding the intricacies of rural youth entrepreneurship holds immense importance for several reasons. Firstly, rural areas often encounter distinct socioeconomic dynamics compared to their urban counterparts, influencing the entrepreneurial landscape[2]. Researching rural youth entrepreneurship allows for a nuanced understanding of these dynamics, shedding light on factors such as limited access to resources, market constraints, and unique cultural contexts[23]. By clarifying these aspects, research can inform tailored interventions and policies aimed at fostering entrepreneurial activity among rural youth. Secondly, rural youth entrepreneurship plays a crucial role in revitalizing rural economies and communities[3]. As young individuals en-

gage in entrepreneurial ventures, they contribute to job creation, economic diversification, and community development. Exploring entrepreneurial behaviors, challenges, and success factors offers valuable insights into enhancing local economic resilience and sustainability. In this context, our hypotheses are as follows:

H6. *Entrepreneurial behavior traits, including management style, risk-taking propensity, and type of entrepreneurship, affect male and female entrepreneurship differently in rural contexts.*

H7. *The entrepreneurial activities of males and females in rural areas have a different impact on rural development outcomes.*

These hypotheses aim to investigate gender-based differences in entrepreneurial characteristics and their respective impacts on rural development.

3. Materials and Methods

3.1. Selection of Study Area

The choice of conducting the study in the Fès-Meknès region is strategically significant due to several key factors. Situated in the heart of Morocco, the Fès-Meknès region encompasses a vast area of 40,423 km^2, comprising approximately 5.7% of the total land area of the country (**Figure 1**). This sizable expanse provides ample room for diverse agricultural activities and entrepreneurial ventures, making it an ideal focal point for examining and fostering rural entrepreneurship. Firstly, the region boasts a rich agricultural heritage and a favorable climate conducive to various forms of farming and agribusiness. With fertile lands, abundant water resources, and a longstanding tradition of agriculture, Fès-Meknès, presents a fertile ground for nurturing agricultural entrepreneurship among the youth. Moreover, the region's demographic composition includes a substantial population of young individuals eager to explore opportunities for economic advancement. By directing attention to rural entrepreneurship, particularly among the youth, the study aims to harness this demographic dividend and channel it towards sustainable development and job creation within the agricultural sector.

Furthermore, the establishment of the Regional Youth Entrepreneurship Commission (RYEC) underscores the region's commitment to supporting and empowering aspiring entrepreneurs. The CRE serves as a pivotal institution for coordinating, guiding, and facilitating entrepreneurial initiatives, thereby amplifying the impact of the study's findings and recommendations. Additionally, the ambitious targets outlined in the Generation Green 2020–2030 program underscore the region's proactive stance towards promoting agricultural innovation and youth engagement in rural development. By aligning the study with the program's objectives, stakeholders can leverage synergies and resources to maximize the socioeconomic benefits derived from entrepreneurial endeavors in the agricultural domain. Fès-Meknès region emerges as an ideal study area for exploring and advancing rural entrepreneurship due to its agrarian potential, youthful demographic profile, institutional support structures, and alignment with national development priorities.

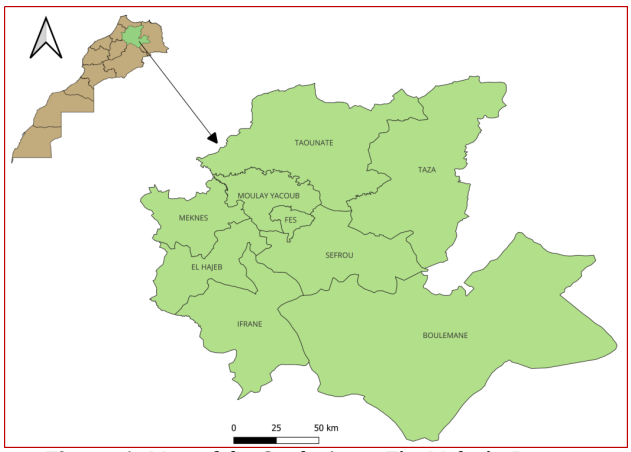

Figure 1. Map of the Study Area: Fès-Meknès Region.

3.2. Data Collection

3.2.1. Sample Description

The sample for this study consisted of rural entrepreneurs from the Fès-Meknès region, selected using a stratified random sampling technique. The sampling frame included registered male and female entrepreneurs involved in rural entrepreneurship activities within the region. A total of 200 rural entrepreneurs participated in the study, with 120 male (60%) and 80

female (40%) respondents. This gender distribution was intentionally chosen to ensure a balanced representation of male and female perspectives, facilitating a thorough comparison of socioeconomic characteristics, business attributes, technological factors, and entrepreneurial behaviors.

The survey's composition of 60% male and 40% female entrepreneurs reflects the reality of rural entrepreneurship in Morocco, where men predominantly lead entrepreneurial activities. This imbalance is due to systemic barriers that limit female participation. Despite efforts, it was challenging to find a proportional number of female entrepreneurs in rural areas. This sampling choice allows the survey to accurately represent the current entrepreneurial landscape and address the difficulties faced by women in these regions.

The participants were randomly selected from nine rural communities within the Fès-Meknès region (**Figure 1**). The sample size and composition were deemed appropriate to provide a representative cross-section of rural entrepreneurs in the study area. Data collection was conducted using a structured questionnaire and complemented by direct observation, ensuring comprehensive insights. The data collection took place in 2023, providing the most current understanding of rural entrepreneurship practices in the region.

3.2.2. Selection of Variables and Their Description

The focus of this study lies in comprehending the traits of rural entrepreneurship through a gender lens, with a specific aim to assess its influence on rural development. We chose both dependent and independent variables in alignment with the study objectives, and conducted their measurement using standardized tools, either previously developed by researchers or drawn from specific schedules tailored for this study's purpose. **Table 1** details the variables under investigation and their respective measurement methods. Understanding the impact of socio-economic characteristics, particularly through an education lens, household income, and family situation, is crucial in the context of rural entrepreneurship [35]. Education level can greatly influence an individual's ability to succeed as an entrepreneur in a rural setting [14]. In addition, studies have demonstrated that women who are educated, have their own source of income, are knowledgeable about their legal rights, and come from relatively wealthy homes are more likely to have enhanced decision-making authority and empowerment through rural entrepreneurship [38].

Research has shown that household income is pivotal, as it directly influences access to resources and entrepreneurial opportunities. Additionally, diversifying income sources beyond the business itself can enhance sustainability, mitigating the risk of early failure [39]. Studies have found that personal attributes and family situation play a significant role in women's participation in microentrepreneurship in rural areas [40]. Additionally, researchers identified access to financial resources and grants for investments as influential factors [1]. Women with divorced status and previous experience in business were more likely to engage in microentrepreneurship [1] Conversely, those with limited access to financial resources and a lack of support from family members were less likely to start their own businesses in rural areas [41].

Regarding business characteristics, studies have found that factors such as business sector, annual revenue, legal structure, years in operation, and target market play a significant role in people's participation in entrepreneurship in rural areas [42–44]. The significant impact of business variables on a company's goal attainment and strategic direction justifies their selection. Several studies have demonstrated that the company sector is critical because it directly impacts its regulatory framework, market competitiveness, and special obstacles or prospects [45, 46]. Thus, previous studies show that female entrepreneurs in rural areas are more likely to be involved in agribusinesses, have lower annual revenues compared to their male counterparts, operate as service entrepreneurs, have been in operation for fewer years, and target local or niche markets. Overall, understanding rural entrepreneurs' specific business characteristics is critical for designing effective policies and programs to support their success and economic development in rural areas. By recognizing the distinct differences between rural entrepreneurs and their urban counterparts, policymakers can tailor initiatives to address the specific needs of these individuals [33].

Table 1. Variables Description.

Dependent Variable	Nature of the Variable	Response/Variable Value	Expected Sign
Rural entrepreneurship	Dichotomous	0 = Female entrepreneur 1 = Male entrepreneur	
Socio-economic characteristics			
Education	Numeric	0 = Less than 7 years 1 = More than 8 years	−
Household income	Dichotomous	0 = Enterprise is the only source of income 1 = Otherwise	+
Family situation	Dichotomous	0 = No 1 = Married	+
Access to financial resources		0 = Autofinancing 1 = Backed by credit	+
Grants for investments	Dichotomous	0 = No 1 = Yes	−
Business characteristics			
Business sector	Dichotomous	0 = No 1 = Agribusness	+
Annual revenue	Numeric	0 = Less than 40 k dollars 1 = More than 40 k dollars	+
Legal structure	Dichotomous	0 = Cooperative 1 = self-entrepreneur	−
Years in operation	Dichotomous	0 = Less than 5 years 1 = More than 5 years	+
Target market	Dichotomous	0 = Local market 1 = Otherwise	−
Technological factors			
Digital technologies	Dichotomous	0 = No 1 = Yes	+
Benefit entrepreneurship training	Dichotomous	0 = No 1 = Yes	+
Entrepreneurial behavior			
Management style	Dichotomous	0 = Participative management style 1 = Otherwise	+
Taking risks	Dichotomous	0 = No 1 = Yes	−
Rural development impact	Dichotomous	0 = No 1 = Yes	+
Type of entrepreneurship	Dichotomous	0 = Necessity 1 = Opportunity	+

Studies have shown that technological factors, including access to technology and entrepreneurial training, significantly impact rural entrepreneurship [14, 47]. Indeed, studies conducted by researchers have demonstrated that rural entrepreneurs who have access to technology are more likely to succeed in their ventures and expand their businesses [41]. According to Kobba et al. [48], these technological factors play a crucial role in fostering a thriving entrepreneurial ecosystem in rural areas.

Studies have shown that entrepreneurial behavior variables, including management style, risk-taking propensity, and type of entrepreneurship, significantly influence people's participation in entrepreneurship in rural areas [49]. For instance, Kallmuenzer and Peters [50] demonstrate that individuals with a proactive management style are more likely to engage in entrepreneurship in rural areas compared to those with a reactive management style. Additionally, individuals with a higher risk-taking propensity are more inclined to start their own business ventures in rural settings [51]. The type of entrepreneurship, whether it be opportunity-driven or necessity-driven, also plays a crucial role in determining an individual's likelihood of participating in entrepreneurship in rural areas [52, 53].

According to Mathebula [54], rural development is

a significant objective of rural entrepreneurship, as it serves as a critical driver with the potential to create employment opportunities, alleviate poverty, and stimulate economic growth in rural areas. The empowerment of rural women through the growth of microentrepreneurship has been identified as a major approach for furthering rural development, according to surveys such as the one that was carried out by Banerjee, Alok and George [38]. Furthermore, encouraging women to start their own businesses, particularly those from lower socioeconomic strata, will not only help alleviate poverty, but also remove gender bias and empower women living in rural areas who are disadvantaged [55]. Empowering rural entrepreneurs can have a multitude of positive effects on rural development. This includes fostering economic growth among rural youth, contributing to the overall expansion of the economy, preserving social stability, and generating new employment opportunities [54]. Given the multifaceted impact of rural development, integrating this variable as a determinant in our study adds depth and relevance to our analysis.

3.3. Econometric Model

This study uses an econometric model that employs logistic regression to analyze rural entrepreneurship and identify the probability factors associated with female and male entrepreneurs. Logistic regression is a statistical technique that models the probability of a binary outcome, making it ideal for analyzing the likelihood of being a female or male entrepreneur based on various independent variables. The symbol π represents the probability of an event occurring. The symbol $1-\pi$ represents the probability that the event will not occur (Equation (1)). Therefore, we can calculate the event's probability as follows:

$$\text{adds} = \frac{\pi}{1-\pi} \tag{1}$$

Equation (2) specifies that the logit function relies on a single predictor variable:

$$\log\left(\frac{\pi}{1-\pi}\right) = \beta 0 + \beta 1 x \tag{2}$$

The formulation of the generic linear logistic model (Equation (3)) is as follows:

$$\log \text{ it } \pi j = \log\left(\frac{\pi}{1-\pi j}\right) = X \underset{J}{T} \beta \tag{3}$$

Equation (4) presents the logistic model as follows:

$$\log_e\left(\frac{p_i}{1-p_i}\right) = \alpha + \beta x i = P(Y = 1/\dot{X}) \tag{4}$$

Where:

Xi is a set of measures that represent the factors' levels, as well as dummy variables that stand in for the covariates. All two types of independent variables are continuous and dichotomous. In order to get the values of the parameters πj and β, the log-likelihood function is maximized nature, i.e., to estimate P (Y = 1/ $\dot{X}$). Y is the binary dependent variable indicating gender (1 for male entrepreneurs, 0 for female entrepreneurs). $\dot{X}$ represents the independent variables influencing the probability of being a male or female entrepreneur.

This study employs a binary logistic regression model to assess the likelihood of individuals engaging in rural entrepreneurship, specifically focusing on the distinction between female and male entrepreneurs. We run the logistic regression analysis in this study using IBM SPSS Statistics 22 software.

4. Results and Discussion

4.1. Descriptive Statistics

Table 2 provides descriptive statistics for the explanatory variables used in the logistic regression analysis. The data reveals that 40% of entrepreneurs in rural areas are female, while the majority, comprising 60%, are male. This suggests a significant presence of male entrepreneurs compared to their female counterparts. This descriptive analysis provides a snapshot of the distribution of variables within the dataset, offering insights into the socio-economic characteristics. The majority of entrepreneurs (63.68%) have received less than 7 years of formal education; while a smaller proportion (36.32%) have obtained 8 or more years of education. This highlights the prevalence of entrepreneurs with limited formal education in rural areas. Approxi-

mately 41.5% of entrepreneurs rely solely on their enterprises as a source of income, indicating a significant dependency on entrepreneurial activities for livelihood. Conversely, 58.5% of entrepreneurs have additional sources of income, suggesting a diversification of income streams among rural entrepreneurs. A slight majority of entrepreneurs (54%) are married, while the remaining 46% are not married. This reflects the diverse familial circumstances of rural entrepreneurs, with a significant portion balancing entrepreneurial endeavors alongside marital commitments. A majority of entrepreneurs (59.5%) rely on autofinancing for their business activities, indicating self-reliance and limited dependence on external financial support. However, 40.5% of entrepreneurs have accessed credit to support their ventures, highlighting the importance of financial assistance in enabling entrepreneurship in rural areas. The data shows that 43% of entrepreneurs have received grants for investments; while the majority (57%) have not. This suggests varying levels of access to financial support and resources among rural entrepreneurs, with a notable portion benefiting from external funding sources.

The descriptive analysis of the provided results regarding business characteristics sheds light on various aspects of rural entrepreneurship. The agribusiness sector has approximately 53.16% of entrepreneurs; while the remaining 46.84% engage in agribusiness activities. This indicates a relatively balanced distribution of entrepreneurs across different sectors. The majority of entrepreneurs (61.5%) generate annual revenues less than $40,000; while a smaller proportion (38.5%) earns more than $40,000 annually. This suggests that a significant portion of rural entrepreneurs operate at a smaller scale in terms of revenue generation. Nearly half of the entrepreneurs (45.5%) operate under a cooperative legal structure, while the remaining 54.5% function as self-entrepreneurs. This indicates a diverse range of legal structures adopted by rural entrepreneurs to manage their businesses.

Approximately 53.5% of entrepreneurs have been in operation for less than 5 years; while the remaining 46.5% have operated for 5 years or more. This highlights a relatively balanced distribution of entrepreneurs across different stages of business maturity. A majority of entrepreneurs (57%) target the local market, while 43% serve markets beyond the local region. This suggests a significant focus on local customers and markets among rural entrepreneurs. The data shows that 57.5% of entrepreneurs do not utilize digital technologies in their business operations, while 42.5% leverage digital tools. This indicates a substantial portion of rural entrepreneurs still operate without significant digital technology integration. A majority of entrepreneurs (56%) have not received entrepreneurship training, while 44% have benefited from such training. This suggests a potential gap in access to entrepreneurship education and training among rural entrepreneurs.

Regarding technological factors, the results reveal that the 115 respondents, accounting for 57.5% of the total, do not utilize digital technologies in their entrepreneurial activities. 85 respondents, representing 42.5% of the total, incorporate digital technologies into their business operations. Out of the total respondents, 112 individuals (56%) have not received entrepreneurship training. On the other hand, 88 individuals (44%) have benefited from entrepreneurship training. These findings highlight the varying degrees of technological adoption and access to entrepreneurship training among rural entrepreneurs. While a significant portion of entrepreneurs still operate without digital technologies, there is a notable presence of individuals who have received entrepreneurship training, indicating potential opportunities for enhancing technological capabilities and entrepreneurial skills within rural communities. Concerning entrepreneurial behavior, the results indicate that 44.5% of respondents exhibit a participative management style, while 55.5% adopt other management styles. 53.5% of respondents do not take risks, while 46.5% are willing to take risks in their entrepreneurial pursuits. 52% of respondents' entrepreneurial activities do not have a significant impact on rural development; whereas 48% contribute. The majority of respondents (61.5%) engage in necessity-driven entrepreneurship, while 38.5% pursue opportunity-driven entrepreneurship. These findings shed light on rural entrepreneurs' entrepreneurial behavior, highlighting their management styles, risk

Table 2. Descriptive Statistics of the Binary Variables Included in the Logistic Regression Model n = 200.

Variable	Category	f	(%)
Rural entrepreneurship	0 = Female entrepreneurs	92	40
	1 = Male entrepreneurs	138	60
	Socio-economic characteristics		
Education	0 = Less than 7 years	147	63.68
	1 = 8 or more years	83	36.32
Household income	0 = Enterprise is the only source	96	41.5
	1 = Otherwise	134	58.5
Family situation	0 = No	106	46
	1 = Married	124	54
	Access to financial resources		
Financing	0 = Autofinancing	137	59.5
	1 = Backed by credit	93	40.5
Grants for investments	0 = No	131	57
	1 = Yes	99	43
	Business characteristics		
Business sector	0 = No	122	53.16
	1 = Agribusiness	108	46.84
Annual revenue	0 = Less than 40K dollars	141	61.5
	1 = More than 40K dollars	89	38.5
Legal structure	0 = Cooperative	104	45.5
	1 = Self-entrepreneur	126	54.5
Years in operation	0 = Less than 5 years	122	53.5
	1 = 5 or More years	106	46.5
Target market	0 = Local market	130	57
	1 = Otherwise	100	43
	Technological factors		
Digital technologies	0 = No	115	57.5
	1 = Yes	85	42.5
Benefit from entrepreneurship training	0 = No	112	56
	1 = Yes	88	44
	Entrepreneurial behavior		
Management style	0 = Participative management style	100	44.5
	1 = Otherwise	125	55.5
Taking risks	0 = No	120	53.5
	1 = Yes	104	46.5
Rural development impact	0 = No	117	52
	1 = Yes	107	48
Type of entrepreneurship	0 = Necessity	141	61.5
	1 = Opportunity	89	38.5

Note: f refers to the frequency.
Source: Authors' own estimations, field survey (2023).

propensity, impact on rural development, and the nature of their entrepreneurial endeavors. Understanding these aspects is crucial for devising strategies to support and promote rural entrepreneurship, thereby contributing to rural development and economic growth.

4.2. Econometric Analysis

The binary logistic regression model's results provide valuable insights into the factors influencing rural entrepreneurship and the likelihood of individuals being female or male entrepreneurs (**Table 3**). **Table 4** presents a summary of the logistic regression model, which sheds light on its predictive quality in this study. The model's significance level of 0.000 indicates its overall statistical significance. The −2-log likelihood value of 7.646 indicates the model's goodness of fit, with lower values indicating a better fit. The model explains variance as measured by the Cox & Snell R square value of 0.730 and the Nagelkerke R square value of 0.986. The Nagelkerke R square provides an adjusted measure of the same variance, while the Cox & Snell R square measures the proportion of variance the model explains compared to a model without predictors is case, the high values of both R square statistics suggest that the model

has a strong predictive quality, explaining a significant amount of the variance in the dependent variable (rural entrepreneurship). Based on the selected independent variables, we deem the model to have good predictive power in determining the likelihood of an individual being a male entrepreneur.

4.2.1. Socio-Economic Characteristics

The study highlights several key factors influencing male entrepreneurship. It finds that higher education levels and increased household income significantly enhance the likelihood of being a male entrepreneur, with odds ratios of 10.82 and 7.54, respectively. Conversely, certain family situations, such as being single, notably decrease this likelihood, with an odds ratio of 0.08. Additionally, limited access to financial resources and grants for investments considerably reduces the likelihood of male entrepreneurship, with odds ratios of 0.15 and 0.30, respectively. These results are consistent with previous research on the role of education and financial resources in entrepreneurship but diverge regarding business longevity, suggesting that rural contexts may influence these factors differently. Understanding these nuances is essential for developing targeted policies and interventions to support rural entrepreneurial development. The findings of this study underscore the significant role that education and household income play in fostering male entrepreneurship. The positive association between higher education levels and male entrepreneurship, indicated by an odds ratio of 10.82, aligns with existing literature suggesting that education equips individuals with the skills and knowledge necessary for successful entrepreneurial ventures[14]. Similarly, the substantial effect of household income on entrepreneurship, with an odds ratio of 7.54, supports prior research highlighting the crucial role of financial resources in enabling entrepreneurial activities[56]. The study also reveals that certain family situations, such as being single, are associated with a decreased likelihood of being a male entrepreneur, with an odds ratio of 0.08. This finding suggests that family dynamics and support systems may influence entrepreneurial participation, echoing earlier studies on the impact of family and social networks on entrepreneurship[57]. The negative coefficients for access to financial resources and investment grants further emphasize the pivotal role of financial support in entrepreneurial success, with odds ratios of 0.15 and 0.30, respectively. This finding aligns with research on the importance of financial inclusion and support programs for entrepreneurial activities[58]. However, the study's divergence from previous research regarding the effect of business longevity on male entrepreneurship is noteworthy. The negative coefficient for years in operation contradicts expectations that longer-operating businesses are more likely to be male-led[59]. This discrepancy may be attributed to the unique challenges and opportunities present in rural contexts, where market dynamics and resource access can differ significantly from urban settings[60]. Overall, while this study corroborates established findings on socioeconomic determinants of entrepreneurship, it also highlights the importance of considering contextual factors, particularly in rural areas. Understanding these nuances is crucial for developing targeted interventions and policies that effectively support entrepreneurial development in diverse settings. Future research should explore these contextual differences further to refine strategies for fostering entrepreneurship across various environments.

4.2.2. Business Characteristics

The econometric analysis reveals several significant relationships between business characteristics and male entrepreneurship. Specifically, individuals in certain sectors are less likely to be male entrepreneurs, with odds decreasing by approximately 0.17. Lower annual revenue also correlates with a decreased likelihood of male entrepreneurship, with odds decreasing by about 0.18. Conversely, those operating under specific legal structures, such as self-entrepreneurship, are significantly more likely to be male entrepreneurs, with odds increasing by approximately 7.73. Additionally, fewer years in operation are associated with a reduced likelihood of male entrepreneurship, with odds decreasing by about 0.23. Targeting specific markets similarly correlates with a decreased likelihood of being a male entrepreneur, with odds decreasing by approximately 0.03. These findings provide valuable insights into how business characteristics influence male entrepreneurship. The negative association with certain

Table 3. The Results of the Econometric Analysis (n = 200).

Dependent Variable (Rural Entrepreneurship)	**0 = Female Entrepreneur 1 = Male Eentrepreneur**		
		β	Odds ratio
Socio-economic characteristics	Education	2.381***	10.82
	Household income	2.02***	7.54
	Family situation	−2.54***	0.08
	Access to financial resources	−1.92**	0.15
	Grants for investments	−1.20**	0.30
Business characteristics	Business sector	−1.76**	0.17
	Annual revenue	−1.718**	0.18
	Legal structure	2.05***	7.73
	Years in operation	−1.49**	0.23
	Target market	−3.51***	0.03
Technological factors	Digital technologies	1.41**	4.10
	Benefit entrepreneurship training	3.05***	21.03
Entrepreneurial behavior	Management style	−1.175**	0.31
	Taking risks	−1.035*	0.36
	Rural development impact	2.76***	15.93
	Type of entrepreneurship	3.32***	27.66
	(Constant)	4.49***	89.12

Note: *, **, and *** indicate statistical significance at 10%, 5%, and 1%, respectively. β and odds ratio are parameter coefficients and measure of association.

Table 4. Models Summary (Significance 0.000).

Model Summary			
Step	−2 Log likelihood	Cox et Snell R Square	Nagelkerke R Square
1	7.646	0.73	0.986

sectors and lower annual revenue underscores the role of financial performance and sectorial preferences in entrepreneurial activity, aligning with existing research on the importance of financial resources and sector-specific dynamics in entrepreneurship [60, 61]. The positive effect of specific legal structures on male entrepreneurship highlights the potential role of legal frameworks in shaping entrepreneurial opportunities, though it diverges from prior studies suggesting that certain legal forms may be more conducive to female entrepreneurship [62]. This discrepancy indicates a need for further exploration into how different legal structures impact entrepreneurship, particularly in varying contexts such as rural areas where regulatory environments might differ. The negative relationship between years in operation and male entrepreneurship contrasts with research suggesting that longer-operating businesses are more likely to be male-led [63]. This inconsistency may be attributed to the unique conditions and market dynamics in rural settings, where entrepreneurial challenges and opportunities differ from urban environments. Similarly, the negative impact of targeting specific markets on male entrepreneurship points to the influence of market segmentation on entrepreneurial participation, which may vary based on regional and sectorial contexts. Overall, while the study's findings resonate with certain aspects of previous research, they also highlight the complexities of entrepreneurial dynamics and the need for nuanced analyses that account for diverse contexts. Understanding these contextual differences is crucial for developing targeted policies and interventions to support entrepreneurship, particularly in rural areas. Future research should continue to investigate these contextual factors to enhance our understanding of entrepreneurial behavior and improve support strategies.

Table 5 provides a summary of key findings and correlations. The summary shows that higher education, income, legal structure, digital technology use, training, rural impact, and opportunity-driven entrepreneurship positively influence male entrepreneurship. In contrast, factors like specific family situations, limited financial resources, certain business sectors, lower revenue, and risk aversion negatively affect it.

Table 5. Summary of Key Findings and Correlations.

Variable	Direction of Correlation	Interpretation
Education	Positive	Higher education level increases the likelihood of being a male entrepreneur.
Household income	Positive	Higher income levels increase the likelihood of being a male entrepreneur.
Family situation (single)	Negative	Certain family situations decrease the likelihood of being a male entrepreneur.
Access to financial resources	Negative	Limited access to financial resources decreases male entrepreneurship.
Grants for investments	Negative	Absence of grants decreases male entrepreneurship likelihood.
Business sector	Negative	Certain sectors decrease the likelihood of being a male entrepreneur.
Annual revenue	Negative	Lower revenue decreases the likelihood of being a male entrepreneur.
Legal structure (Self-entrepreneurship)	Positive	Certain legal structures increase the likelihood of male entrepreneurship.
Years in operation	Negative	Fewer years in operation decrease the likelihood of being a male entrepreneur.
Target market	Negative	Targeting specific markets decreases male entrepreneurship likelihood.
Digital technologies usage	Positive	Use of digital technologies increases male entrepreneurship likelihood.
Entrepreneurship training	Positive	Entrepreneurship training significantly increases male entrepreneurship.
Management style (participative)	Negative	Participative management style decreases male entrepreneurship likelihood.
Risk-taking propensity	Negative	Risk aversion decreases the likelihood of being a male entrepreneur.
Rural development impact	Positive	Projects with rural development impact are more likely to be male led.
Type of entrepreneurship (opportunity-driven)	Positive	Opportunity-driven entrepreneurship significantly favors male entrepreneurs.

Note: Authors' own estimations, field survey (2023).

4.2.3. Technological Factors

The study highlights the impact of technological factors and entrepreneurial behavior on male entrepreneurship. Individuals who use digital technologies are approximately 4.10 times more likely to be male entrepreneurs, emphasizing the role of digitalization in facilitating entrepreneurial activity in rural areas. Those who have received entrepreneurship training are about 21.03 times more likely to be male entrepreneurs, underscoring the significance of education and skill development. Conversely, participative management style and risk aversion are negatively associated with male entrepreneurship, with individuals showing lower likelihoods of being male entrepreneurs under these conditions. Projects with a rural development impact increase the likelihood of male entrepreneurship by nearly 15.93 times, and opportunity-driven entrepreneurship are associated with a 27.66 times higher probability of being male-led. The study's findings reinforce the importance of technological and educational factors in fostering male entrepreneurship. The strong association between digital technology use and male entrepreneurship aligns with existing literature that underscores the role of technology in enhancing entrepreneurial opportunities, especially in resource-limited rural areas [64–66]. Similarly, the substantial impact of entrepreneurship training supports previous research that highlights the positive effects of such programs on entrepreneurial success [67, 68]. In terms of entrepreneurial behavior, the study's results reflect the nuanced role of management style and risk propensity in shaping entrepreneurial participation. The negative association with participative management and risk aversion suggests that these traits might influence male entrepreneurship differently compared to other settings, which is consistent with findings in rural contexts [69]. The significant impact of projects on rural development and the preference for opportunity-driven entrepreneurship further illustrate how aligning entrepreneurial activities with local needs and growth potential can enhance male entrepreneurial engagement [70]. While these results are consistent with much of the existing research, they also highlight the need for deeper exploration into how contextual factors influence these relationships. Understanding the specific mechanisms through which technological and behavioral factors interact with local contexts can help tailor more effective policies and support programs. Future research should focus on these contextual nuances to better support rural entrepreneurs and promote sustainable economic development.

Our study highlights the key factors driving technology access for male and female entrepreneurs, emphasiz-

ing the significant impact of economic resources, education, infrastructure, cultural norms, and policy support. Economic resources are crucial, as financial capacity determines the ability to afford and utilize advanced technologies, often resulting in women facing greater barriers due to lower financial capital. Education and training in digital skills empower entrepreneurs, though women may encounter additional obstacles. Infrastructure and connectivity issues, particularly in rural areas, disproportionately affect women. Cultural norms and gender roles can restrict women's access to technology, while supportive government policies and programs can help bridge these gaps.

4.2.4. Entrepreneurship and Rural Development

The study highlights the significant role of entrepreneurship in rural development, particularly noting that male-led entrepreneurial activities substantially contribute to rural economic growth. This is consistent with existing research that views entrepreneurship as a key driver of rural development [37]. Additionally, the positive impact of entrepreneurship training emphasizes its importance in equipping individuals with skills to foster successful ventures, thereby enhancing local economic outcomes and job creation [19]. However, the results also indicate that not all business sectors contribute equally to rural development, as suggested by the negative coefficient for certain sectors. The focus of female entrepreneurs on activities impacting the agricultural sector suggests opportunities for targeted gender-responsive policies to maximize the sector's potential for rural development. The study confirms the pivotal role of entrepreneurship in stimulating rural development, especially through male-led ventures. The alignment with previous research underscores the broad recognition of entrepreneurship as a driver of economic growth in rural areas [37]. The significant positive impact of entrepreneurship training further highlights the value of capacity-building initiatives in empowering entrepreneurs and boosting local economic development [19]. These findings suggest that investing in training programs can have substantial benefits for rural economies by fostering the growth of successful businesses. However, the variation in impact across different business sectors points to the need for targeted support. Not all entrepreneurial activities are equally beneficial for rural development, which suggests that policymakers should focus on identifying and nurturing sectors with high growth potential and significant positive impacts on local communities. Furthermore, the emphasis on agricultural activities by female entrepreneurs presents a unique opportunity for gender-responsive policies. Supporting female entrepreneurs in agribusiness can enhance food security, promote sustainable agricultural practices, and drive economic growth in rural areas [36]. Overall, while the study corroborates the general benefits of entrepreneurship for rural development, it also highlights the necessity of contextual and gender-responsive approaches to maximize these benefits. Future research should explore how different sectors and entrepreneurial activities influence rural development outcomes and develop targeted strategies to support effective and equitable economic growth in rural regions.

4.2.5. Policy Implications

The findings from this study underscore the need for targeted policy interventions to enhance the impact of entrepreneurship on rural development. Given the significant positive contribution of male-led entrepreneurial activities to rural economic growth, policies should prioritize support for ventures in high-growth sectors that offer substantial benefits to local communities. Investing in entrepreneurship training is crucial, as it empowers individuals with the skills and knowledge necessary to drive successful ventures and stimulate job creation. Additionally, the observed focus of female entrepreneurs on the agricultural sector highlights the potential for gender-responsive policies. Policymakers should develop initiatives that specifically support female entrepreneurs in agribusiness, leveraging their contributions to improve food security, promote sustainable agricultural practices, and boost rural economies. By aligning support mechanisms with sectorial and gender-specific needs, policymakers can optimize the effectiveness of entrepreneurship in fostering sustainable economic development in rural areas. Future strategies should incorporate these insights to create a more inclusive and impactful approach to rural en-

trepreneurship.

5. Conclusions

In conclusion, our study provides valuable insights into the gender-specific dynamics of entrepreneurship and their implications for rural development in the Fes-Meknes region of Morocco. Through a comparative analysis of female and male entrepreneurs, we have identified key socio-economic characteristics, business attributes, technological factors, and entrepreneurial behaviors that shape their roles in fostering rural development.

Our findings highlight the importance of addressing gender disparities in access to financial resources, entrepreneurial training, and market opportunities. Female entrepreneurs, despite facing unique challenges, contribute significantly to rural development through their innovative approaches, community engagement, and focus on sustainability. However, barriers such as limited access to finance and support networks continue to hinder their full participation and impact. Therefore, it is crucial for policymakers and development organizations to prioritize initiatives that specifically target and support female entrepreneurs in rural areas. By providing them with the necessary resources and opportunities, we can empower these women to further drive economic growth, create employment opportunities, and improve the overall quality of life in their communities. Ultimately, fostering gender equality in entrepreneurship will not only benefit individual female entrepreneurs but also contribute to the broader goal of sustainable rural development. By investing in female entrepreneurs in rural areas, we can help bridge the gender gap in entrepreneurship and ensure that women have equal access to resources and opportunities. This will not only boost the local economy but also lead to more inclusive and sustainable development in these communities. It is essential for policymakers to recognize the importance of supporting female entrepreneurs and take concrete steps to address the challenges they face in starting and growing their businesses.

On the other hand, male entrepreneurs often benefit from greater access to financial resources and market opportunities, but they may face challenges related to risk-taking. By recognizing and addressing these gender-specific dynamics, policymakers and stakeholders can develop more targeted interventions to support inclusive and sustainable rural development. Moving forward, it is essential to adopt a gender-sensitive approach in designing policies, programs, and initiatives aimed at promoting entrepreneurship and rural development. This includes fostering an enabling environment that empowers women entrepreneurs, promoting gender-responsive financing mechanisms, and enhancing access to entrepreneurial training and mentorship. Additionally, it is crucial to prioritize the collection and analysis of gender-disaggregated data to better understand the specific challenges and opportunities faced by women in rural areas. By incorporating a gender perspective into decision-making processes, policymakers can ensure that policies and programs effectively promote gender equality and empower women to fully participate in economic activities. Ultimately, by taking these steps, we can create a more inclusive and sustainable rural economy that benefits everyone. Ensuring women have access to resources and support is essential for closing the gender gap in rural entrepreneurship. By providing training and mentorship tailored to their needs, women can build the skills and confidence necessary to succeed in business. Collecting and analyzing gender-disaggregated data will help identify areas where women are falling behind and guide efforts to address these disparities. Integrating a gender perspective into policymaking can create a more equitable and thriving rural economy, benefiting the entire community. Promoting gender equality in entrepreneurship will unlock the full potential of rural economies by tapping into the talents and ideas of women. This approach not only benefits individual women but also enhances community productivity and innovation. Prioritizing gender equality in rural entrepreneurship creates a more inclusive and diverse economy, empowering everyone to thrive. Our study highlights entrepreneurship's crucial role in rural development and the need for gender equity to unlock its full potential. Leveraging the talents of both female and male entrepreneurs leads to vibrant, resilient rural economies that promote social inclusion and sus-

tainable development for future generations.

Author Contributions

For research articles with several authors, a short paragraph specifying their individual contributions must be provided. The following statements should be used "Conceptualization, E.H.B. and F.Z.B.; methodology, E.H.B. and A.F.; software, E.H.B.; validation, E.H.B., F.Z.B. and A.F.; formal analysis, E.H.B.; investigation, E.H.B. and A.F.; resources, E.H.B.; data curation, E.H.B.; writing—original draft preparation, E.H.B.; writing—review and editing, E.H.B.; visualization, E.H.B.; supervision, A.F.; project administration, E.H.B.; All authors have read and agreed to the published version of the manuscript." Authorship must be limited to those who have contributed substantially to the work reported.

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Conflicts of Interest

The authors declare no conflict of interest.

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