

Assessing Entrepreneurial Behaviour of Vegetable Farmers in Bandarawela area, Sri Lanka

Running Title: Entrepreneurial Behaviour of Bandarawela Vegetable Farmers

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Abstract: This study aimed to explore the entrepreneurial behaviour of vegetable farmers in Bandarawela, Sri Lanka. It was conducted across three divisional secretariates, Kumbalwela, Ella and Halpe. The study applied a random sampling technique to select respondents, and a pre-tested structured questionnaire was used to collect data. The results of the descriptive analysis revealed that 64% of vegetable farmers are in the older age group. About 41% own medium-sized farmlands, and the majority (85%) are engaged in farming as their sole occupation. Most farmers (53%) earn a medium income level, and 80% have a medium level of mass media participation. Most of the farmers (66%) contact extension officers monthly, but their participation in extension programs is low. The results also revealed that the majority of vegetable farmers (76%) exhibit a medium level of entrepreneurial behaviour. As per the results of the regression analysis, there was a significant and positive relationship between entrepreneurial behaviour and independent variables such as occupation, annual income, mass media participation, financial literacy, and the shift to controlled environmental agriculture among the farmers. Based on the findings, improving the facilities will strengthen entrepreneurial capacity among vegetable farmers in Bandarawela. Proposed policy measures should be focused mainly on infrastructure development in protected agriculture, financial literacy, access to credit, extension services, training, education, and mass media participation. Addressing these key areas can contribute to sustainable agricultural development and improve the livelihoods of farmers in the study area.

Keywords: entrepreneurial behavior, multiple linear regression, decision-making ability, economic motivation, entrepreneurship

1. Introduction

Agriculture has long been recognized as one of the fundamental pillars of Sri Lanka's economy, contributing significantly to employment, rural livelihoods, food security, and sustainable economic development. Although its contribution to the national Gross Domestic Product (GDP) has gradually declined with the expansion of the industrial and service sectors, agriculture remains indispensable to the country's socio-economic well-being. According to the Department of Census and Statistics (DCS, 2023), the sector employs approximately 26.5% of the national labour force, while nearly 70% of the rural population depends directly or indirectly on agriculture for their livelihoods. Furthermore, about 44% of Sri Lanka's total land area is utilized for agricultural production, highlighting its continued importance in rural development and national food security (DCS, 2023).

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In the agricultural sector, fruit and vegetable cultivation has emerged as a promising avenue for transforming smallholder farming from subsistence-oriented production into commercially viable agribusiness. Compared with traditional cereal cultivation, horticultural crops generate higher economic returns per unit of land and offer greater opportunities for income diversification, employment generation, nutritional improvement, and market participation (Weerahewa et al., 2018; Rathnayaka et al., 2024). Sri Lanka's 46 agroecological regions, characterized by diverse climatic and soil conditions, provide favorable environments for cultivating a wide range of tropical and temperate fruits and vegetables year-round (Rathnayaka et al., 2024). Consequently, crops such as carrot, leek, cabbage, brinjal, banana, pineapple, and papaya have become important commercial commodities serving both domestic and export markets.

The importance of commercializing horticulture is particularly evident among Sri Lanka's smallholder farmers, who cultivate less than one hectare of land and contribute nearly 80% of the country's annual food production (Weerahewa et al., 2018). However, many continue to rely on low-value staple crops that generate limited financial returns and expose farm households to increasing production costs, market fluctuations, and climate-related risks (DCS, 2023). Previous studies have consistently shown that diversification into high-value fruit and vegetable production improves land productivity, household income, and farm resilience while creating greater opportunities for value addition and market integration (Weerahewa et al., 2018; Rathnayaka et al., 2024). National statistics further indicate that vegetable cultivation is practiced by approximately 12% of agricultural households, with productivity growing faster than traditional paddy cultivation, demonstrating the sector's considerable potential for commercializing agriculture (DCS, 2023).

Among Sri Lanka's agricultural regions, Uva Province possesses exceptional potential for expanding commercial horticulture. Agriculture remains the province's principal economic activity, engaging approximately 53% of its workforce and contributing about 13.2% to the national economy (Rosairo and Potts, 2016). The province encompasses 19 of Sri Lanka's 46 agroecological regions, enabling year-round cultivation of a wide variety of high-value fruits and vegetables under diverse climatic conditions (Rosairo and Potts, 2016). Within the province, the Bandarawela Agricultural Zone represents one of the country's leading vegetable-producing areas, comprising approximately 5,955 registered farmers and 4,963 farming households, with more than 414 acres dedicated to vegetable cultivation (Rosairo and Potts, 2016). These favourable agroecological conditions provide a strong foundation for expanding market-oriented horticultural production and increasing farmers' participation in domestic and export value chains.

Despite these comparative advantages, many vegetable farmers continue to base production decisions on traditional farming practices rather than market opportunities, innovation, or value addition. This

production-oriented approach often limits product quality, reduces competitiveness, and restricts farmers' participation in profitable markets. As agricultural markets become increasingly competitive and consumer demand shifts toward safe, traceable, and sustainably produced food, farmers must move beyond production-focused agriculture and adopt an entrepreneurial approach to farming (Kodithuwakku and Weerakoon, 2020; Rathnayaka et al., 2024). Entrepreneurship in agriculture involves opportunity recognition, innovation, market orientation, calculated risk-taking, resource mobilization, and strategic decision-making that enable farmers to respond effectively to changing market conditions (UNIDO, 1999; Jayaratne et al., 2019; Mulyana et al., 2022). Entrepreneurs drive wealth accumulation in modern economies by introducing new inventions and markets, acting as competitive forces that enhance productivity and sustainability (Kodithuwakku and Weerakoon, 2020). In the agricultural sector, entrepreneurship enables the production of value-added products, promotes innovation, and empowers farmers to build self-reliant, profitable ventures. Farmers equipped with entrepreneurial skills, such as resource acquisition, competence, and orientation, can adopt diversified practices like crop innovation and startups, leading to resilient food systems and gender-inclusive growth (Jayaratne et al., 2019). The rise of quality entrepreneurship also emphasizes upskilling aligned with business needs, particularly in agri-tech and sustainable practices, to address challenges like climate risks and market access (Kodithuwakku and Weerakoon, 2020; Mulyana et al., 2022).

For vegetable farmers in Uva Province, entrepreneurial behavioural change is therefore essential for achieving successful commercialization. Entrepreneurially oriented farmers are more likely to adopt Good Agricultural Practices (GAP), Integrated Pest Management (IPM), quality assurance systems, improved post-harvest handling, value addition, and contractual marketing arrangements that facilitate access to premium domestic and international markets (Rathnayaka et al., 2024; Export Development Board [EDB], 2013). Such behavioural transformation not only enhances farm profitability and market competitiveness but also contributes to improved food quality, reduced post-harvest losses, environmental sustainability, and long-term food security.

The province also benefits from institutional support through the In-Service Training Institute (ISTI) at Bindunuwewa, which provides training on modern production technologies, agribusiness management, and value addition (Rosairo and Potts, 2016). However, the success of these interventions ultimately depends on farmers' willingness and ability to transform their decision-making from traditional production practices to entrepreneurial, market-oriented business management. Understanding the behavioural factors that influence this transition is therefore essential for designing effective extension programmes and commercialization strategies.

Against this backdrop, assessing the entrepreneurial behavioral change of vegetable farmers in Uva Province is both timely and necessary. Such an assessment provides empirical evidence on farmers'

readiness to adopt innovation, exploit market opportunities, improve product quality, and integrate into competitive value chains. It also supports national efforts to strengthen fruit and vegetable commercialization, expand agricultural exports, improve rural livelihoods, and enhance sustainable food security. Furthermore, identifying the entrepreneurial capabilities and behavioral constraints of vegetable farmers will enable policymakers, extension agencies, and agricultural training institutions to design targeted interventions that foster resilient, competitive, and market-oriented farming systems. Therefore, this study seeks to examine the entrepreneurial behavioral change of vegetable farmers in Bandarawela Agricultural Zone, providing evidence to support the transition from traditional farming toward sustainable commercial horticulture in Sri Lanka.

The entrepreneurial behavior of vegetable farmers in Bandarawela area of Sri Lanka is vital for enhancing agricultural productivity, income, and sustainable livelihoods. Despite the region's significant potential for commercial horticulture, farmers encounter various challenges that limit their entrepreneurial decision-making and business growth. Research indicates that only 12% of agricultural households engage in vegetable cultivation, highlighting an opportunity gap that could be bridged by diversifying into high-value crops, thereby mitigating market fluctuations and production costs (DCS, 2023; Weerahewa et al., 2018).

Several key issues identified below impact entrepreneurial behaviors among vegetable farmers in Bandarawela.

Demographic Challenges: A substantial portion of the farming population (64%) is in the older age group, which may hinder their willingness to adopt innovative practices and pursue entrepreneurial endeavors. How does aging affect their capacity for risk-taking and business adaptation?

Economic Constraints: With 41% of farmers managing medium-sized landholdings and most relying solely on farming for income, economic pressure is significant. Understanding the financial barriers that prevent these farmers from pursuing entrepreneurial activities is crucial for developing effective support mechanisms.

Knowledge and Skill Gaps: Although 80% of farmers participate moderately in mass media, their low engagement in extension programs indicates a lack of necessary skills and knowledge for entrepreneurial success. Identifying the specific areas where these gaps exist can inform targeted training and support initiatives.

Extension Services and Support: While 66% of farmers contact extension officers monthly, their low participation in extension programs suggests that the support provided may not be adequate or relevant

to their entrepreneurial needs. Investigating how agricultural extension services can be improved to better assist farmers in developing entrepreneurial skills is essential.

Financial Literacy and Access to Credit: The study shows a significant relationship between entrepreneurial behavior and financial literacy. Enhancing financial literacy among farmers is crucial to improving their understanding of financial management and facilitating access to credit. What strategies can be implemented to achieve this goal?

Environmental Adaptation: The shift to controlled environmental agriculture presents both opportunities and complexities for farmers. Understanding how to support their transition to these practices is key to improving their entrepreneurial capacity and resilience to climate risks.

Addressing these issues will provide insights into the entrepreneurial behaviors of vegetable farmers in Bandarawela, leading to actionable policy recommendations. Such measures can enhance their entrepreneurial capabilities, promote sustainable agricultural practices, and ultimately improve their livelihoods, contributing to broader rural development goals in Sri Lanka.

Assessing entrepreneurial behavior among vegetable farmers in Bandarawela is essential given the region's unique economic and agricultural landscape. Understanding farmers' entrepreneurial knowledge and skills is critical for their adaptation and success in an evolving market characterized by rapid changes and competitive pressures. This study aims to identify gaps in areas such as market analysis, pricing strategies, and innovative practices, with a particular focus on previously identified deficiencies, including a notable 24% low score in proactiveness and risk-taking as highlighted by Mahindaratne and Gunaratne (2015).

By developing tailored training programs and workshops, the research seeks to equip farmers with the tools needed to enhance productivity, promote new farming techniques, and diversify income streams. This approach addresses vital issues of financial stability and resilience, particularly against the backdrop of fluctuating market conditions.

Additionally, mapping the existing support systems including financial services, NGO initiatives, and government programs will improve farmers' access to underutilized resources such as subsidies and extension training offered at the In-Service Training Institute (ISTI) Bindunuwewa. Such resource mapping is pivotal to improving decision-making and overcoming barriers to growth, such as limited access to credit and infrastructural challenges.

The study also investigates organizational and functional obstacles, informing targeted interventions to facilitate entrepreneurial transitions. By focusing on hands-on skill development, collaborations with

local institutions can institutionalize ongoing capacity building, ultimately fostering a supportive ecosystem for agricultural entrepreneurship. These efforts aim not only to alleviate immediate challenges, such as post-harvest losses, but also to position farmers to seize emerging opportunities in agritourism and organic markets. Thus, this research has significant implications for promoting inclusive growth and reducing rural poverty in Bandarawela.

2. Methodology

The authors developed the conceptual framework for this study following previous researchers who identified key pillars for assessing entrepreneurial behavior and provided the illustration shown below as such a framework (Figure 1).

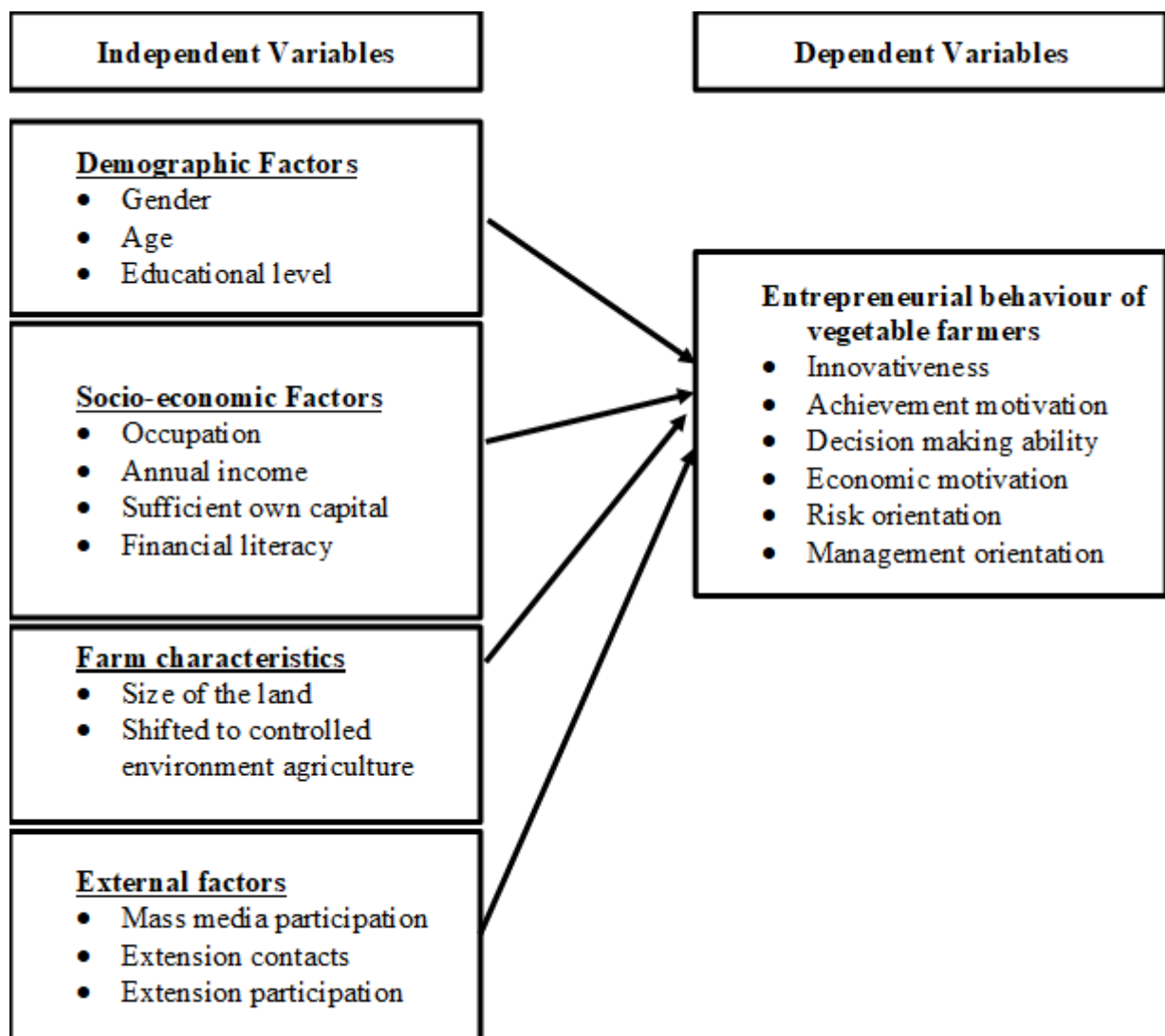


Figure 1: The Conceptual Framework

The identified key pillars influencing the entrepreneurial behavior of vegetable farmers were a variety of demographic, socioeconomic, farm characteristics, and external factors. Understanding these relationships helps in identifying the necessary support mechanisms to enhance entrepreneurial initiatives within agricultural communities.

2.1 Demographic Factors

Gender: Research indicates that gender plays a crucial role in shaping entrepreneurial behavior. Male and female farmers often exhibit different attitudes toward risk-taking and innovation, which can directly influence their entrepreneurial actions (Dollar and Gatti, 1999). For instance, men typically tend to engage more in entrepreneurial activities given cultural norms that encourage male participation in economic activities (Agarwal and Dhingra, 2019).

Age: Another determinant of entrepreneurial behavior. Younger farmers are generally found to be more adaptable to change and willing to adopt innovative practices, which can enhance their entrepreneurial efforts (Saha et al., 2016). Conversely, older farmers may rely on traditional practices, limiting their willingness to experiment with new techniques or markets.

Education Level: Education has consistently been identified as a critical factor influencing entrepreneurial behavior among farmers. Higher educational attainment correlates with improved decision-making skills, better market understanding, and increased engagement in entrepreneurial activities (Davis and Krueger, 2003). Educated farmers are more likely to adopt modern farming technologies and business practices, which can lead to higher productivity and profitability.

2.2 Socioeconomic Factors

Occupation and Annual Income: The primary occupation of farmers significantly impacts their entrepreneurial orientation. Farmers who engage in agriculture as their main occupation are more likely to pursue entrepreneurial strategies than those with secondary occupations (Bhaduri and Ranjan, 2016). Moreover, higher annual income provides farmers the necessary financial resources to invest in new ventures, enabling them to take calculated risks and expand their enterprises (Mohammed and Cheema, 2018).

Sufficient Own Capital and Financial Literacy: Access to sufficient own capital is critical for entrepreneurial endeavors. Farmers with adequate capital can invest in technology, quality inputs, and marketing initiatives (Akinola and Ojo, 2014). Similarly, financial literacy enhances a farmer's ability to make informed decisions regarding investments and risk management, fostering greater entrepreneurial behavior (Lusardi and Mitchell, 2014).

2.3 Farm Characteristics

Size of Land: The size of the land operated by farmers can affect their entrepreneurial capabilities. Larger farms may provide economies of scale, allowing farmers to produce and market their products more effectively, leading to higher profit margins (Rogers, 2003). However, smallholder farmers can thrive through niche markets and innovative practices if they are provided with the right support and resources (Stevenson and St-Onge, 2005).

Shift to Controlled Environment Agriculture: The transition to controlled environment agriculture (CEA) can significantly enhance the entrepreneurial behavior of farmers. CEA allows for year-round production, better quality control, and reduced dependence on climate conditions (Khalid et al., 2017). Farmers who adopt CEA may display greater entrepreneurial orientation due to increased yields and market opportunities.

2.4 External Factors

Mass Media Participation: Participation in mass media can improve farmers' exposure to new market trends and agricultural practices, thereby enhancing their entrepreneurial behavior (Okwoche et al., 2018). Media platforms can disseminate information on best practices, market demands, and innovations, fostering a more entrepreneurial mindset.

Extension Contacts and Participation: Access to extension services is critical in developing entrepreneurial competencies among farmers. Regular contact with extension officers provides farmers with valuable information about the latest agricultural technologies and market trends (Byrne et al., 2019). Farmers who actively participate in extension programs are more likely to engage in entrepreneurial activities as they acquire new skills and knowledge.

The study focused on several villages in three agricultural instructional areas (AI areas), namely Kumbalwela, Ella, and Halpe, in Bandarawela, Uva Province. The population of this study is the vegetable farmers in above selected AI regions. Random sampling technique was used in this study to ensure every farmer in the target population had an equal and independent chance of selection, promoting a representative sample. A sampling frame of all eligible vegetable farmers was created, from which 100 farmers were randomly chosen. This approach aimed to accurately capture the characteristics, practices, and perspectives of small farmers in the target area. Primary data was collected using pretested questionnaires and focused group discussions among the farmers. A pilot survey was conducted to ensure the feasibility and reliability of the questionnaire among a sample of 20 farmers. Based on the results of the Cronbach's alpha reliability test ($\alpha > 0.700$ at 5% significance level), it can be concluded that the internal consistency of the questionnaire was acceptable, indicating

that the research instrument was reliable and capable of providing credible results. This ensures confidence in the accuracy and consistency of the data collected for the study.

Table 1: Variables operationalization

Variables	Notation	Unit of Measurement	Scale of Measurement	Reference
Independent Variables				
Gender	X_1	Dummy	Male = 1, Female = 0	Yogendrarajah (2019)
Age	X_2	Categorical	Young (< 35) = 1, Mid (36-50) = 2, Old (>50) = 3	Sakharkar (1995)
Educational level	X_3	Numerical	Years	Yogendrarajah (2019)
Size of the land	X_4	Categorical	Small-scale = 1, Medium-scale = 2, Large-scale = 3	Yogendrarajah (2019)
Occupation	X_5	Categorical	Farming = 1, Farming + gvt. job = 2, Farming + pvt. job = 3	Yogendrarajah (2019)
Annual income	X_6	Categorical	<75,000 = 1, 75,001 – 200,000 = 2, >200,000 = 3	Silva (2022)
Mass media participation	X_7	Categorical	<Mean -1SD = 1 Mean +/-1SD = 2 >Mean + /-1SD = 3	Meti (1998)
Extension contacts	X_8	Categorical	When problem arises = 1 Once a month = 2 Once a week = 3	Sakharkar (1995)
Extension participation	X_9	Categorical	<Mean -1SD = 1 Mean +/-1SD = 2 >Mean + /-1SD = 3	Biradar (1997)
Sufficient own capital	X_{10}	Categorical	Yes = 1 No = 2	Wijesinghe (2021)
Financial literacy	X_{11}	Categorical	Yes = 1 No = 2	Wijesinghe (2021)
Shifted to controlled environment agriculture	X_{12}	Categorical	Yes = 1 No = 2	Wijesinghe (2021)
Dependent Variables				
Innovativeness	X_1^*	Categorical	<Mean -1SD = 1 Mean +/-1SD = 2 >Mean + /-1SD = 3	Chandrapaul (1998)
Achievement motivation	X_2^*	Categorical	<Mean -1SD = 1 Mean +/-1SD = 2 >Mean + /-1SD = 3	Chandrapaul (1998)
Decision making ability	X_3^*	Categorical	<Mean -1SD = 1 Mean +/-1SD = 2 >Mean + /-1SD = 3	Hair (2009)

Economic motivation	X_4^*	Categorical	<Mean -1SD = 1 Mean +/-1SD = 2 >Mean + /-1SD = 3	Pathirana and Nishantha (2014)
Risk orientation	X_5^*	Categorical	<Mean -1SD = 1 Mean +/-1SD = 2 >Mean + /-1SD = 3	Field (2024)
Management orientation	X_6^*	Categorical	<Mean -1SD = 1 Mean +/-1SD = 2 >Mean + /-1SD = 3	Field (2024)

Source: Authors' Design, 2025

3. Data analysis

Descriptive analysis, reliability analysis, and correlation and regression analyses were conducted to assess the degree of variation and relationships among the tested parameters using SPSS. The Multiple Linear Regression model was utilized to estimate the relationship between the entrepreneurial behaviour of vegetable farmers in Bandarawela and the set of independent variables.

$$Y = \beta_0 + \beta_1(X_1) + \beta_2(X_2) + \beta_3(X_3) + \beta_4(X_4) + \beta_5(X_5) + \beta_6(X_6) + \beta_7(X_7) + \beta_8(X_8) + \beta_9(X_9) + \beta_{10}(X_{10}) + \beta_{11}(X_{11}) + \beta_{12}(X_{12}) + \varepsilon \quad (01)$$

Where,

Y = Overall entrepreneurial behaviour

β_0 = Coefficient constant

β_n = Coefficient of independent variable

X_n = Independent variables

ε = Error term

In this study, a stepwise regression analysis was employed to predict the overall entrepreneurial behaviour of vegetable farmers in the Bandarawela area, offering a robust method to determine the relative importance of its components. The dependent variable, overall entrepreneurial behaviour (Y), was modelled by iteratively selecting from six key independent variables as stated in Table 1. This approach allowed for the systematic inclusion or exclusion of variables based on their statistical significance and contribution to the model's explanatory power, ensuring that only the most influential components were retained to predict (Y) (Nagesha, 2005, Mahindaratne and Gunaratne, 2015). By leveraging this technique, the study provides insights into how these entrepreneurial traits, individually and in combination, shape the farmers' overall behaviour, facilitating targeted interventions to enhance agricultural entrepreneurship in the region. Given the multidimensional nature of entrepreneurial behaviour, a sub-equation is introduced as in Equation 2;

$$Y = \beta_0^* + \beta_1^*(X_1^*) + \beta_2^*(X_2^*) + \beta_3^*(X_3^*) + \beta_4^*(X_4^*) + \beta_5^*(X_5^*) + \beta_6^*(X_6^*) + \varepsilon^*$$

Where,

Y = Overall entrepreneurial behaviour

β_0^* = Coefficient constant

β_n^* = Coefficient of independent variable

X_1^* = Independent variables

ε^* = Error term

4. Results and Discussion

The reliability test outcomes demonstrate good internal consistency across the variables, as indicated by Cronbach's Alpha coefficients exceeding the widely accepted threshold of 0.7. This implies that the items within each variable reliably measure their respective constructs.

Table 2: Results of the Reliability test

Parameter	No. of items	Cronbach's Alpha value
Innovativeness	5	0.753
Achievement motivation	6	0.782
Decision making ability	5	0.734
Economic motivation	5	0.919
Risk orientation	5	0.915
Management orientation	14	0.766
Overall	40	0.865

Source: Authors' estimation, 2025

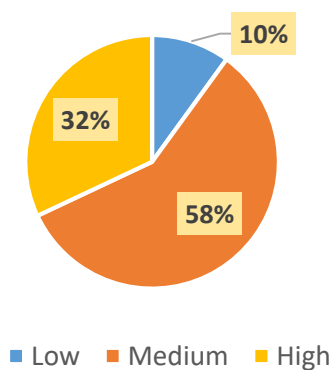


Figure 2: Distribution of Innovativeness

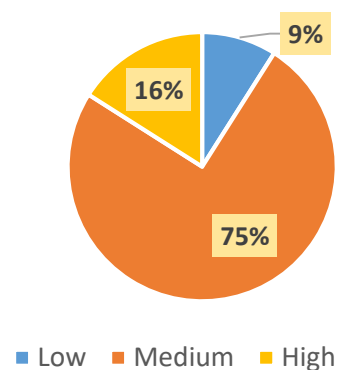


Figure 3: Distribution of Achievement Motivation

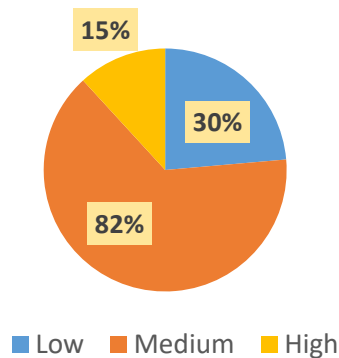


Figure 4: Distribution of Decision Making Ability

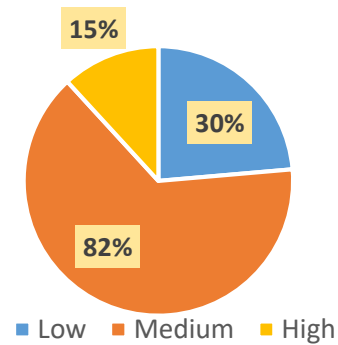


Figure 5: Distribution of Economic Motivation

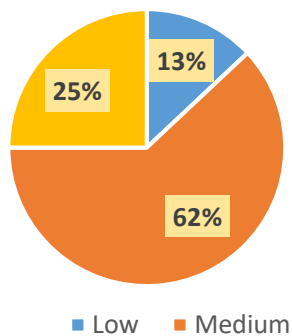


Figure 6: Distribution of Risk Orientation

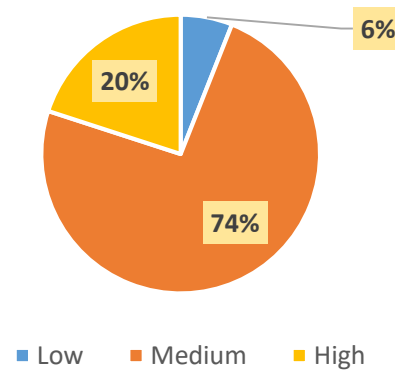


Figure 7: Distribution of Management Orientation

Source: Authors' Design, 2025

When innovativeness is considered, the majority (58%) of the respondents' medium levels of age, education, and income sources, for example, may be a factor in their moderate receptivity to new ideas because these characteristics are frequently correlated with resources and real-world experience that foster incremental innovation. This finding is also consistent with the findings by Bandara et al., (2022). Conversely, the 10% of farmers who score poorly on innovativeness could not have as much access to finance or financial literacy, which would hinder their capacity to use new technologies (Girma, 2022). According to the findings of achievement motivation among vegetable farmers, 75% of them exhibit medium levels of drive towards fulfilling their farming objectives. There may be several independent variables that are related to this medium level of motivation to achieve. For example, as these characteristics support a realistic and reachable goal-setting environment, the majority of respondents'

medium levels of education, age, and annual income may offer a solid basis for moderate achievement motivation (Nishantha and Pathirana, 2014).

The findings suggest a balanced approach to decision-making, with 59% of vegetable farmers indicating a medium level of decision-making ability. Factors that give a stable foundation for decision-making, like moderate income and educational attainment, are probably influencing this medium level (Mani et al., 2013). Of the respondents in a study on economic motivation among vegetable farmers in Bandarawela, 82% showed medium levels of motivation, affected by independent variables such as age, gender, and education that affect realistic financial outlooks. The size of the land and yearly income offer stability without encouraging high-risk investments, and participation in the mass media and extension contact provides moderate access to information that promotes rational decision-making. A farmer with adequate capital and financial literacy can also set goals that are achievable, which promotes medium motivation (Gunawardhana and Silva, 2021).

The findings on risk orientation in this study are highly consistent with Ganegoda (2023). Among Bandarawela vegetable farmers, 62% of the respondents showed a medium level of risk orientation, which can be influenced by independent variables such as age, education level, and land area. These factors help farmers balance cautious and bold decision-making. Annual income and sufficient equity capital provide a stable base, allowing for moderate risk-taking without excess (Ganegoda, 2023). Mass media participation and extended contacts provide farmers with relevant information, enabling them to make informed decisions about moderate risks (Adikari, 2014). In the findings on management orientation among Bandarawela vegetable farmers, 74% of the respondents indicated a medium level of management orientation. This will be influenced by factors such as age, education level and land size, which enable farmers to adopt balanced management practices that are not prone to over- or under-management (Nishantha and Pathirana, 2014). Annual income, adequate equity capital and moderate financial literacy provide the necessary stability for effective but cautious management. Extensive contacts and participation in mass media further enhance their ability to manage resources efficiently (Dissanayake et al., 2021).

The sample represents a majority of male farmers (69%), similar to many agriculture-related studies such as Singh et al. (2013) and Silva et al. (2024). This may be a reflection of the conventional gender roles in agriculture, where women are still less likely to participate in farming operations and men are typically the ones taking the lead (Samaraweera et al., 2022). With a mean age of 48 years, the age distribution indicates that 64% of farmers are older than 56 years. Only 5% of people are under 40 years old, while 31% are in the intermediate age range (40-56 years old). This suggests that older people do most farming, perhaps because younger generations move to cities or other sectors in search of

employment. Old age may affect the adoption of new technologies, innovations, and farming techniques (Samaraweera et al., 2022).

When education level is considered, a majority (60%) of farmers have a moderate level of basic education, suggesting they may have been provided with essential skills and knowledge for agricultural practices; this finding is similar to that of Yogendraraja (2019). According to land-size data, 41% of farmers own landholdings ranging from 0.11 to 1.15 acres, 37% own smaller plots of less than 0.12 acres, and 22% own larger plots of more than 1.15 acres. The average landholding is 0.64 hectares. This suggests that most farmers work on small to medium-sized farms, which may restrict their ability to produce at a large enough scale, grow a variety of crops, and remain financially viable in the long run (Pinnawala and Herath, 2014). The distribution highlights that while most farmers rely solely on agriculture, a small percentage diversify their income through additional employment, which can provide greater financial resilience and opportunities for economic growth (Senevirathne and Dharmadasa, 2021). According to the data, 85% of farmers are exclusively engaged in farming, indicating that agriculture is their primary occupation. This high percentage indicates that farming is their main source of income, and they focus only on agricultural activities. In contrast, 10% of farmers combine farming with a government job, which provides additional financial stability and a diversified income source. The remaining 5% of farmers' balance farming with private-sector employment, likely to supplement their earnings and increase their economic security. The findings are similar to those of a study conducted in India by Kapoor and Kapoor (2022).

The annual income data shows that 2% of the population is low-income, meaning that a very small percentage of people live on very little income. On the other hand, 53% of people are in the medium-income category, indicating that slightly more than half of people have a moderate income, which is probably enough to maintain a reasonable level of life but might not offer significant financial security, as concluded in past studies (Ranan-Eliya, 1999; Ranabahu, 2019; Wijesinghe, 2024). The income distribution indicates that only a small percentage of people have lower income levels, while most earners fall in the middle- to high-income range. Data on mass media participation indicates that 3% of the population engages with mass media less frequently, suggesting limited exposure to news, information, and media content. Due to their poor participation, they might not be as aware of opportunities and trends as they could be, which could have an impact on their decision-making and entrepreneurial behaviour (Adikari, 2024). On the other hand, 80% of people participate in mass media to a moderate extent, meaning they are regularly exposed to media at a moderate level. Since most are likely knowledgeable and engaged, giving them access to relevant data, market insights, and innovative opportunities can positively influence their entrepreneurial behavior.

According to data on extension participation, 41% of individuals show low involvement in extension programs, which limits their access to valuable training and support and may stunt their entrepreneurial growth (Wijerathna and Wanigasundera, 2020). Meanwhile, 39% participate at a medium level and derive moderate benefits from these programs, which can have a positive impact on their entrepreneurial behaviour by providing them with essential skills and knowledge. The remaining 20% are , actively engaged with extension services that enhance their entrepreneurial capabilities through continuous learning, innovation opportunities, and improved business practices. Regarding capital availability, only 37% of individuals have adequate capital to finance investments in entrepreneurial endeavors, develop their operations, and take reasonable risks. Their capacity to innovate and expand their firms is strengthened by this access to financial resources (Lussier, 2016). On the other hand, 63% lack sufficient capital, which limits their ability to pursue new ventures, grow, or overcome financial obstacles. This lack of capital may make it difficult for entrepreneurs to reach their full potential hindering the expansion and longevity of their businesses.

Interestingly, only 30% of individuals possess sufficient financial literacy to enable them to make informed decisions on financial management, investment and business growth, which are critical to successful entrepreneurial behaviour. These people are better equipped to handle financial risks, plan budgets, and take advantage of business opportunities as suggested by Gunawardhana and Silva (2021). In contrast, 70% lack financial literacy, which can significantly hamper their entrepreneurial abilities through poor financial management, ineffective investment strategies, and limited ability to maintain or expand their businesses. This gap in financial knowledge presents a major barrier to entrepreneurial success for the majority. Moreover, when the transition to controlled environment agriculture (CEA) is considered, 40% of people have adopted CEA practices, which allow for optimising the growing conditions, increasing yields and reducing environmental risks, fostering strong entrepreneurial behaviour through innovation and productivity (Dias, 2020). They can better control variables such as temperature, humidity, and light, increasing the efficiency and profitability of the agricultural ventures. On the other hand, 60% have not switched to CEA, which may limit their ability to adapt to changing conditions or maximize crop production, limiting their entrepreneurial growth and competitiveness in the agricultural sector.

Table 3: Results of the Correlation Analysis

Independent Variable	Pearson Correlation	p- value
Gender	-0.0709	0.4881
Age	-0.4807	0.0000***
Educational Level	0.5528	0.0000***
Land Size	0.6728	0.0000***

Occupation	0.0715	0.4796
Annual Income	0.9299	0.0000***
Mass media Participation	0.8875	0.0000***
Extension Contact	-0.4908	0.0000***
Extension Participation	-0.8082	0.0000***
Sufficient own capital	0.6947	0.0000***
Financial Literacy	0.8435	0.0000***
Shifted to controlled-environment agriculture	0.9246	0.0000***

Table 3 represents the results of Pearson's correlation analysis of the study. The age, extension contact and extension participation show a strong negative correlation at 1% significance level. Moreover, education level, land size, annual income, mass media participation, sufficient own capital, financial literacy and shifted controlled environment agriculture show a strong positive correlation at 1% significance level. Although gender and occupation have a positive correlation, the effect is insignificant.

Table 4: Results of the Multiple Linear Regression Analysis

Source	SS	Df	MS	Number of obs	=	98
Model	49161.427	12	4096.78558	F (12,85)	=	259.17
Residual	1343.60363	85	15.8071016	Prob > F	=	0.0000
Total	50505.0306	97	520.670419	R-squared	=	0.9734
				Adj R- squared	=	0.9696
				Root MSE	=	3.9758
Variable	Coef.		Std. Err.	T		P> t
Gender	-2.235082		1.012287	-2.21		0.030**
Age	0.1026995		0.072949	1.41		0.163
Educational Level	0.3005788		0.3401389	0.88		0.379
Land Size	-0.1808647		1.556869	-0.12		0.908
Occupation	1.485643		0.8910795	1.67		0.099*
Annual Income	0.133		90000.00	6.99		0.000***
Mass media Participation	1.014255		0.2798478	3.62		0.000***
Extension Contact	-0.5418382		1.084726	-0.50		0.619
Extension Participation	-0.5736607		0.5456724	-1.05		0.296
Sufficient own capital	0.1977407		1.23753	0.16		0.873
Financial Literacy	3.435027		1.636593	2.10		0.039**
Shifted to controlled environment Agriculture	18.5165		2.37683	7.79		0.000***
_Cons	75.82302		7.09958	10.68		0.000

Source: Authors' estimation, 2025

(*** Significant at 1%, ** Significant at 5% and * Significant at 10%)

According to the results of the Multiple Linear Regression as presented in Table 4, the annual income, mass media participation and shift to controlled environment agriculture have the most significant (at 1%) positive effects on the overall entrepreneurial behaviour. When annual income increases by 1%, the entrepreneurial behaviour is expected to increase by 13.3%. This indicates that higher annual income is associated with increased entrepreneurial behaviour, likely enabling farmers to invest in innovative practices, such as adopting controlled environment agriculture or value addition to products, which align with findings that financial resources enhance entrepreneurial orientation among Sri Lankan smallholders (Mahindaratne and Gunaratne, 2015). The small coefficient suggests a modest effect, implying that while income significantly influences entrepreneurial behaviour, its practical impact may be moderated by other factors like access to training or market dynamics in the Uva Province (Rosairo and Potts, 2016). These results underscore the importance of income diversification strategies and financial support mechanisms to bolster entrepreneurial capabilities among Bandarawela vegetable farmers.

The. Results further suggest that increase in mass media participation, such as moving from moderate to high engagement with agricultural programs or market information, enhances the entrepreneurial behaviour score by approximately 1.014 units, reflecting increased innovativeness and market orientation. This finding is consistent with prior research indicating that access to media information, such as radio or mobile phone-based market updates, fosters entrepreneurial skills by improving awareness of pricing strategies and consumer trends among smallholder farmers in Sri Lanka (Mahindaratne and Gunaratne, 2015). These results highlight the critical role of media exposure in strengthening entrepreneurial capabilities, suggesting that interventions promoting mass media engagement could enhance the commercialisation potential of vegetable farmers in the Uva Province.

The stepwise regression analysis revealed that shifting to controlled environment agriculture (CEA) is a highly significant predictor of overall entrepreneurial behaviour (Y) among vegetable farmers in Bandarawela, with a coefficient of 18.5165 ($t = 7.79$, $p < 0.001$). This substantial effect indicates that farmers adopting CEA, such as polytunnels or greenhouses, experience a marked increase in entrepreneurial behaviour, likely due to enhanced productivity, reduced climate-related risks, and improved market competitiveness through high-value crop production (Rathnayaka et al., 2024). This aligns with findings that CEA adoption in Sri Lanka's up-country regions fosters innovation and proactiveness, enabling farmers to diversify

into niche markets like organic exports (Amarathunga et al., 2023). However, contrasting studies suggest that high initial costs and limited technical training can hinder CEA's entrepreneurial benefits, particularly for low-income farmers, highlighting the need for supportive extension services (Senevirathne et al., 2020). These results underscore the transformative potential of CEA in enhancing entrepreneurial orientation, provided barriers like financial and technical constraints are addressed through targeted interventions in the Uva Province.

Gender significantly influences the overall entrepreneurial behaviour (Y) of vegetable farmers in Bandarawela, with a coefficient of -2.235 ($t = -2.21$, $p = 0.030$). This indicates that male farmers exhibit a lower entrepreneurial behaviour score by approximately 2.235 units compared to female farmers, suggesting that women in this region display stronger entrepreneurial traits, such as innovativeness and risk-taking, possibly due to their focus on high-value vegetable crops and market engagement (Weerahewa et al., 2018). However, contrasting research indicates that gender disparities in access to land and training can limit women's entrepreneurial potential, suggesting that the observed effect may be moderated by supportive interventions such as those at ISTI Bindunuwewa (Kodithuwakku and Weerakoon, 2020). These results underscore the need for gender-specific policies to leverage women's entrepreneurial contributions while addressing barriers to enhance overall agricultural development in Uva Province.

The substantial coefficient (3.435) for financial literacy underscores its critical role in enhancing entrepreneurial behaviour among Bandarawela's vegetable farmers, aligning with evidence that financial knowledge enables better decision-making and innovation, such as adopting high-value crops or market strategies (Amarathunga et al., 2023; Weerahewa et al., 2018). However, contrasting studies highlight that limited access to financial education programs and complementary resources like credit or extension services in Uva Province can restrict this effect, suggesting that finding may pertain to farmers with prior training exposure (Kodithuwakku and Weerakoon, 2020). This discrepancy indicates that while financial literacy significantly boosts entrepreneurial behaviour for those equipped with it, scaling its benefits across Bandarawela's 5,955 farmers requires broader access to training, potentially through institutions like ISTI Bindunuwewa, and integration with financial support mechanisms to address barriers like capital constraints (Rosairo and Potts, 2016). The findings advocate for policy interventions to expand financial literacy programs to enhance entrepreneurial orientation and support sustainable agricultural development in the region.

The non-significant results for age, educational level, land size, extension contact, extension participation, and sufficient own capital suggest that these factors have limited direct influence on entrepreneurial behaviour among Bandarawela vegetable farmers, aligning with studies highlighting systemic constraints like ineffective extension services and smallholder subsistence focus (Rosairo and Potts, 2016). However, contrasting findings indicate that education and capital can drive entrepreneurial outcomes in better-resourced contexts, suggesting that results may reflect Bandarawela unique challenges, such as low education levels (e.g., 60% of farmers with <10 years of schooling) or limited extension reach (only 25% coverage) (Weerahewa et al., 2018; Amarathunga et al., 2023). These findings highlight the dominance of other predictors like financial literacy and controlled environment agriculture in the model, emphasizing the need for targeted interventions, such as enhanced ISTI Bindunuwewa programs or land consolidation initiatives, to activate these factors' potential in fostering entrepreneurial behaviour in Uva Province.

Table 5 presents the results of a stepwise regression analysis, which identifies the relative importance of different components of entrepreneurial behaviour in determining the overall entrepreneurial behaviour of vegetable farmers. The dependent variable is "overall entrepreneurial behaviour," and the independent variables are specific components of entrepreneurial behaviour. Thus, all these six components, viz., innovativeness, management orientation, economic motivation, decision-making ability and achievement motivation, and risk orientation, individually and in combination, greatly contribute to the entrepreneurial behaviour of farmers.

Table 5: Results of the Stepwise Regression Analysis

Prob > F	= 0.0000	Adj R- squared	= 0.9967	
R- Squared	= 0.9977	Root MSE	= 1.1234	
Overall Entrepreneurial Behaviour	Coef.	Std. Err.	t	P> t
Innovativeness	1.022956	0.806375	12.69	0.000***
Achievement Motivation	0.956742	0.963218	11.94	0.000***
Decision-making ability	1.082166	0.989306	10.94	0.000***
Economic Motivation	1.46734	0.0886659	16.55	0.000***
Risk Taking Ability	0.9085881	0.1571051	5.78	0.000***
Management Orientation	1.182712	0.0432287	27.36	0.000***
Cons	-6.3333764	1.2357755	-5.13	0.000***

Source: Authors' estimation, 2025

(*** Significant at 1%, ** Significant at 5% and * Significant at 10%)

5. Conclusion

This stepwise regression analysis in the study reveals that annual income ($\beta = 0.133$, $p < 0.001$), mass media participation ($\beta = 1.014$, $p < 0.001$), shifting to controlled environment agriculture ($\beta = 18.517$, $p < 0.001$), financial literacy ($\beta = 3.435$, $p = 0.039$), and gender ($\beta = -2.235$, $p = 0.030$) significantly predict the overall entrepreneurial behavior of vegetable farmers in Bandarawela, Sri Lanka. In contrast, age, educational level, land size, extension contact, extension participation, and sufficient own capital showed no significant effects. These findings highlight that financial resources, access to information, technological adoption, and gender dynamics are critical drivers of entrepreneurial orientation, enabling farmers to innovate, diversify, and engage with markets. Notably, female farmers exhibited higher entrepreneurial behaviour, underscoring the potential of gender-inclusive interventions. However, the non-significance of extension services and capital suggests systemic barriers, such as limited outreach and resource constraints, which limit broader entrepreneurial impact. To enhance entrepreneurial behaviour, policymakers and stakeholders, including institutions like ISTI Bindunuwewa, should prioritize expanding financial literacy programs, promoting CEA adoption through subsidies, and strengthening extension services to provide market-oriented training. These interventions can empower Bandarawela 5,955 vegetable farmers to overcome economic and climatic challenges, fostering sustainable agricultural development and economic resilience in Uva Province.

The findings clearly indicate that improving these facilities will strengthen vegetable farmers' entrepreneurial capacity in Bandarawela. Proposed policy measures should focus primarily on infrastructure development in protected agriculture, as well as financial literacy, access to credit, extension services, training, education, and participation in mass media. By addressing these critical areas, we can support sustainable agricultural development and improve farmers' livelihoods in the region.

Declaration of Generative AI and AI-Assisted Technologies

The authors declare that no generative AI or AI-assisted technologies were used in the preparation, writing, or editing of this manuscript. The authors maintained complete responsibility and oversight throughout the research and writing process, and assume full accountability for the content of the published work.

Conflict of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

- Adikari, M. P. (2014). Usage of mass media by farmers in Sri Lanka. *Developing Country Studies*, 4(4), 1–4. ISSN 2225-0565 (Online)
- Agarwal, A., & Dhingra, A. (2019). Gender differences in entrepreneurship: A study of Punjab. *Journal of Business Research*, 103, 79-86.
- Akinola, S. O., & Ojo, I. O. (2014). Financing agricultural entrepreneurs: The role of capital in agricultural productivity. *International Journal of Agriculture and Rural Development*, 17(3), 1881-1886.
- Amarathunga, M. K. S. L. D., Prasad Mahindaratne, M., Senevirathna, M. R. M., Welhena, C., & AMC, A. A. (2023). The effectiveness of farmer field school extension approach for technology transfer to tea smallholders in Sri Lanka. *International Journal of Innovative Approaches in Agricultural Research*, 7(1), 85-103. <https://doi.org/10.29329/ijiaar.2023.536.6>
- Bandara, A. M. S. M. R. S. G., De Silva, D. A. M., Esham, M., Liyanage, C. L., & Carmichael, A. (2022). Responses of rural agricultural households to COVID-19 pandemic: A case study on food security of rural farmers in Belihuloya, Sri Lanka. *Proceedings of the 4th International Conference of Agricultural Sciences (AgInsight 2022)- “Empowering Research for Innovative and Sustainable Agriculture”*, Subragamuwa University, 2022, pp 170-173 <http://repo.lib.sab.ac.lk:8080/xmlui/handle/susl/2264>
- Bhaduri, A., & Ranjan, A. (2016). Agricultural entrepreneurship in India: Key challenges and the way forward. *Journal of Entrepreneurship*, 25(1), 47-67.
- Biradar, N. B. (1997). Effectiveness of teaching methods in communicating nutritional knowledge to rural women—An experimental study (Doctoral dissertation, Ph. D. Thesis). <https://www.scribd.com/document/167247835/research-journal-of-social-and-life-science-volume-14>.
- Byrne, N., Horst, B., & Schneider, U. (2019). Extension services and their impact on smallholder farmers' livelihoods. *Agricultural Systems*, 174, 70-76.

Chandra, P. K. (1998). A study on entrepreneurial behaviour of vegetable growers in Krishna district of Andhra Pradesh. M. Sc.(Agri.) Thesis ANGRAU.
https://scholar.google.com/scholar?hl=en&as_sdt=0,5&cluster=14938313627405630409

Davis, L. S., & Krueger, A. B. (2003). The role of education in agricultural innovation. *Journal of Agricultural Economics*, 54(2), 157-175.

Department of Census and Statistics. (2023). [Review of Sri Lanka Labour Force Statistics Quarterly Bulletin, Fourth Quarter 2023].
<http://www.statistics.gov.lk/LabourForce/StaticalInformation/Bulletins/4thQuarter2023>

Dias, N., Munaweera, T., & Bandara, S. (2020). Factors influencing farmers' adoption of protected agriculture: A case of vegetable farmers in dry zone Sri Lanka. *technology, Current Investigations in Agriculture and Current Research* 8(5), 1150-1156. DOI:[10.32474/CIACR.2020.08.000300](https://doi.org/10.32474/CIACR.2020.08.000300)

Dissanayake, S. P., Gunaratne, L. H. P., Sivananthawerl, T., & Ginigaddara, G. A. S. (2021). Is Agricultural Sustainability Positively Related to Technical Efficiency? A Case of Paddy-Cattle Integration Farming Systems, Anuradhapura District, Sri Lanka. *International Journal of Research and Innovation in Social Science (IJRISS)*, 5(12), 968–976. ISSN 2454–6186

Dollar, D., & Gatti, R. (1999). Gender inequality, income and growth: Are good times good for women, World Bank Policy Research Working Paper No. 2140. <http://www.worldbank.org/gender/prr>

Export Development Board. (2013). The Official Blog of Sri Lanka Export Development Board; Sri Lanka Export Development Board. <https://www.srilankabusiness.com/blog/2013/page2.html>

Export Development Board. (2016). The Official Blog of Sri Lanka Export Development Board; Sri Lanka Export Development Board. <https://www.srilankabusiness.com/blog/2016/>

Field, A. (2024). *Discovering statistics using IBM SPSS statistics*. Sage Publications Limited. University of Sussex UK, 6th edition, ISBN: 9781529668728

Ganegoda Hewage, I. A. (2023). Risk management by entrepreneurial and non-entrepreneurial micro and small-scale firms in the agriculture food-processing sector in Sri Lanka: a mixed method approach: a thesis presented in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Agribusiness at Massey University, Manawatu, New Zealand (Doctoral dissertation, Massey University).

- Girma, Y. (2022). Credit access and agricultural technology adoption nexus in Ethiopia: A systematic review and meta-analysis. *Journal of Agriculture and Food Research*, 10, 100362. <https://doi.org/10.1016/j.jafr.2022.100362>
- Gunawardhana, R. P. S. A., & Silva, K. N. N. (2021). An analysis of the impact of financial literacy on credit utilisation behaviour of the farmers in Kamburupitiya DS division. In *Proceedings of International Conference on Business Management (Vol. 18)*. Published on 2022-06-05, DOI: <https://doi.org/10.31357/icbm.v18>
- Hair, J., & Sabol, M. A. (2025). Overview of multivariate data analysis, An. In *International encyclopedia of statistical science* (pp. 1853-1856). Berlin, Heidelberg: Springer Berlin Heidelberg.
- Jaiswal, V., Singh, K.C., Jyoti Kurmi and Singh, S. (2020). Entrepreneurial behaviour of vegetable growers at Gangeo block of Rewa District (M.P.). *Journal of Pharmacognosy and Phytochemistry*, 9(3), pp.1688–1690. <https://doi.org/10.22271/phyto.2020.v9.i3ab.11556>
- Jayarathne, M., Sullivan Mort, G., & D’Souza, C. (2019). Sustainability entrepreneurship: From consumer concern towards entrepreneurial commitment. *Sustainability*, 11(24), 7076. <https://doi.org/10.3390/su11247076>
- Kapoor, S., & Kapoor, S. (2022). Effectiveness of non-farm diversification on rural household income—evidence and policy implications from India. *International Journal of Development Issues*, 21(1), 1-23. <https://doi.org/10.1108/IJDI-03-2021-0065>
- Khalid, K., Chen, Y., & Abdul-Muhmin, A. G. (2017). Controlled environment agriculture: Modeling and feasibility analysis of vertical farming systems. *Journal of Food Engineering*, 187, 23-32.
- Kodithuwakku, S. S., & Weerakoon, C. (2020). Embracing Entrepreneurship in Sri Lankan Agribusiness Research: A Review and a Research Agenda. *Agricultural Research for Sustainable Food Systems in Sri Lanka: A Pursuit for Advancements*, 2, 455-473. DOI:[10.1007/978-981-15-3673-1](https://doi.org/10.1007/978-981-15-3673-1)
- Lusardi, A., & Mitchell, O. S. (2014). The economic importance of financial literacy: Theory and evidence. *Journal of Economic Literature*, 52(1), 5-44. <https://doi.org/10.1257/jel.52.1.5>
- Lussier, R. N., Bandara, C., & Marom, S. (2016). Entrepreneurship success factors: an empirical investigation in Sri Lanka. *World Journal of Entrepreneurship, Management and Sustainable Development*, 12(2), 102-112. <https://doi.org/10.1108/WJEMSD-10-2015-0047>

- Mahindaratne, P. P., & Gunaratne, L. H. P. (2015). Entrepreneurial orientation of organic farmers: a case of organic vegetable farmers in the Badulla District of Sri Lanka. *Journal of International Food & Agribusiness Marketing*, 27(4), 324-336. <https://doi.org/10.1080/08974438.2014.940124>
- Mani, A., Mullainathan, S., Shafir, E., & Zhao, J. (2013). Poverty impedes cognitive function. *Science*, 341(6149), 976-980. <https://doi.org/10.1126/science.1238041>
- Meti, S.K., (1998), Technology reach, perception, knowledge, adoption and attitude towards improved agricultural technologies by small and marginal farmers in Tungabhadra command area. Ph. D. Thesis, Univ. Agric. Sci., Dharwad (India).
- Mohammed, M. K., & Cheema, T. A. (2018). Factors influencing entrepreneurial behavior among small-scale farmers: Evidence from Pakistan. *Agricultural Economics*, 49(2), 267-280.
- Mulyana, M., Harianto, H., Hakim, D.B., Hartoyo, S. and Mariyah, M., 2022. Analysis of Entrepreneurship Activities in Rice Farming. *International Journal of Progressive Sciences and Technologies (IJPSAT)*, 35(1), 12-24. ISSN: 2509-0119.
- Nagesha, P.N., 2005. Study on entrepreneurial behaviour of vegetable seed producing farmers in Haveri district of Karnataka. M. Sc.(Ag.) Thesis, Submitted to University of Agricultural Sciences, Dharwad, India.
- Nishantha, B., & Pathirana, K. P. J. M. (2014). Motivation, perceived success factors and problems of entrepreneurs: evidence from a developing country in Asia. *International Journal of Process Management and Benchmarking*, 4(3), 292-304. <https://doi.org/10.1504/IJPMB.2014.063236>
- Okwoche, V. A., Gbenga, A. O., & Adesina, J. K. (2018). The role of mass media in agricultural development: A study of farmers' perception in Nigeria. *Journal of Agricultural Extension*, 22(2), 153-164.
- Pathirana, K. P. J. M., & Nishantha, B. (2014). Motivation, perceived success factors and problems of entrepreneurs: evidence from a developing country in Asia. *Int. J. Process Management and Benchmarking*, 4(3), <https://doi.org/10.1504/IJPMB.2014.063236>
- Pinnawala, S., & Herath, H. M. W. A. (2014). Social factors influencing agricultural productivity in the non-plantation agriculture in Sri Lanka: A farm centered analysis. In *Proceedings of the 27th Annual Conference of the Organization of Professional Associations of Sri Lanka*, Colombo, Sri Lanka (pp. 27-28).

Ranabahu, R. A. S. P. (2019). Perceived Income Security Among Community-dwelling Elders of Sri Lanka. *Sri Lanka Journal of Population Studies*, 20(1).

Ranan-Eliya, R. P. (1999). Economic impacts of demographic ageing with special emphasis on Sri Lanka and old-age income security. Colombo, Institute of Policy Studies. IPS HPP Occasional Paper 11. <http://hpp-op11-Population-Ageing.pdf>

Rathnayaka, R. P. S., Gunathilaka, R. D., & Fleming, C. M. (2024). Crop diversification in perennial plantation systems of Sri Lanka: Patterns, determinants and challenges. *Agricultural Systems*, 218, 103969. <https://doi.org/10.1016/j.agsy.2024.103969>

Rogers, E. M. (2003). *Diffusion of Innovations*. 5th edition, Free Press, New York, NY (2003), 551 pages.

Rosairo, H. R., & Potts, D. J. (2016). A study on entrepreneurial attitudes of upcountry vegetable farmers in Sri Lanka. *Journal of Agribusiness in Developing and Emerging Economies*, 6(1), 39-58. <https://doi.org/10.1108/JADEE-07-2014-0024>

Saha, D., Dutta, R., & Sen, A. (2016). Assessing the impact of age on entrepreneurial intention among agriculture graduates. *International Journal of Entrepreneurship*, 20(1), 1-15.

Stevenson, L. A., & St-Onge, A. (2005). *Support for Growth-Oriented Women Entrepreneurs in Uganda*. International Labour Organization. ISBN 92-2-117820-X (web pdf).

Sakharkar, V. S. (1995). A study on knowledge, fertilizer use pattern and constraints in the cultivation of soybean by farmers of Nagpur district, Maharashtra (Doctoral dissertation, Ph. D. Thesis). University of Agricultural Sciences, Dharwad.

Samaraweera, W. G. R. L., Dharmadasa, R. A. P. I. S., Kumara, P., & Bandara, A. S. G. S. (2022). Are young rural women abandoning agriculture in Sri Lanka?. *Sri Lanka Statistical Review Department of Census and Statistics, Sri Lanka*, 1(1) March 2022. ISSN 2950-6743

Senevirathna, M. M. S. C., & Dharmadasa, R. A. P. I. S. (2021). Income diversification and household welfare in Sri Lanka. *Journal of Agriculture and Value Addition*, 4(1). 1-22 DOI: [10.4038/java.v4i1.87](https://doi.org/10.4038/java.v4i1.87)

Senevirathne, M. M. S. C., Dharmadasa, R. A. P. I. S., & Senaratne, A. (2020, July). Patterns of Livelihood Diversification in Sri Lanka. In *Proceedings of the International Research Conference of Uva Wellassa University*. Uva Wellassa University, July 29-30, 2020

Silva, K. N. (2022). Access to and use of agricultural information and technology in a sample of paddy farmers in the Hambantota district of Sri Lanka: a survey. *Sri Lanka Journal of Social Sciences*, 45(1). pp: 33-44. DOI: 10.4038/sljss.v45i1.8093

Silva, O. T. D., Jayatilleke, Y. D., & Withanachchi, R. K. (2024). Women's Role in Sri Lankan Agriculture: A Comprehensive Study on Socioeconomic Contributions, Challenges, and Opportunities for Gender-Inclusive Agricultural Development. *Pumithiri e-Journal of Gender Studies*, 1(01), 39-59. DOI:[10.31357/pumithiri.v1i01.7801](https://doi.org/10.31357/pumithiri.v1i01.7801)

Singh, K. M., Meena, M., Kumar, A., & Singh, R. (2013). An overview of gender issues in agriculture. Available at SSRN 2237993.

Weerahewa, J., Wijetunga, C. S., Babu, S. C., & Atapattu, N. (2018). Food policies and nutrition transition in Sri Lanka: historical trends, political regimes, and options for interventions. *International Food Policy Research Institute. IFPRI Discussion paper 1727*, pp 30-34

Wijerathna, M., & Wanigasundera, W. A. D. P. (2020). "Communication" in the Context of Agricultural Extension: Past, Present and Way Forward in Achieving Sustainable Food Systems in Sri Lanka. *Agricultural Research for Sustainable Food Systems in Sri Lanka: A Pursuit for Advancements*, 2, 389-411. DOI:[10.1007/978-981-15-3673-1_18](https://doi.org/10.1007/978-981-15-3673-1_18)

Wijesinghe, M. S. D., Karawita, U. G., Nissanka, N. A. K. A. I., Gunawardana, B. M. I., Weerasinghe, W. M. P. C., Supun, Y. A., ... & Batuwanthudawe, R. (2024). Improving dietary diversity and food security among low-income families during financial crisis using cash transfers and mHealth: experience from two selected districts in Sri Lanka. *BMC Nutrition*, 10(1), 150. <https://doi.org/10.1186/s40795-024-00958-3>

Wijesinghe, P., Wickramasinghe, W. R., & Kuruppu, V. (2021). Factors Influencing Vegetable Farmers' Decisions. Colombo: Hector Kobbekaduwa Agrarian Research and Training Institute. October 2021, 8-10.

Yogendrarajah, R. (2019). Exploring the factors on micro and small women entrepreneurs' success in Northern Province of Sri Lanka. *International Journal of Accounting and Financial Reporting*, 9(1), 257-278. <https://doi.org/10.5296/ijafr.v9i1.14221>