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Szkoła Główna Gospodarstwa Wiejskiego w Warszawie

**Profesor Jan Górecki – wspomnienie o Mentorze, Uczonym,
Dyplomacie i Wychowawcy**

**Professor Jan Górecki – a Memory of a Mentor, Scholar,
Diplomat and Educator**



**Prof. dr hab. Jan Górecki, dr h.c.
18.08.1934 – 6.07.2025**

¹ dr hab., prof. SGGW, Katedra Ekonomii Międzynarodowej i Agrobiznesu SGGW w Warszawie,
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Synopsis. Profesor Jan Górecki był wybitnym uczonym, rektorem Szkoły Głównej Gospodarstwa Wiejskiego w Warszawie i ambasadorem RP w Danii, którego działalność stanowiła wzór harmonijnego połączenia nauki, służby publicznej i mentoringu. Jako rektor dokonał kluczowych strategicznych decyzji dla rozwoju materialnego uczelni. Jego dorobek naukowy koncentrował się wokół czynnika ludzkiego w rolnictwie, oświaty rolniczej oraz międzynarodowych badań porównawczych, w których stworzył własną szkołę naukową. Działal również jako ekspert międzynarodowy i doradca władz państwowych. Najgłębiej zapisał się jednak jako mentor – wychowawca wielu pokoleń studentów, który inspirował do samodzielności i rzetelności. Jego dziedzictwo to trwałe wzór przywództwa opartego na mądrości, autorytecie i zaangażowaniu w rozwój innych.

Abstract. Professor Jan Górecki was an outstanding scholar, rector of the Warsaw University of Life Sciences (SGGW), and ambassador of the Republic of Poland to Denmark, whose work exemplified a harmonious combination of science, public service, and mentoring. As rector, he made key strategic decisions for the university's material development. His scholarly work focused on the human factor in agriculture, agricultural education, and international comparative studies, establishing his own scientific school. He also served as a global expert and advisor to state authorities. However, he is most profoundly remembered as a mentor—an educator of many generations of students, who inspired them toward independence and integrity. His legacy is an enduring model of leadership, grounded in wisdom, authority, and a commitment to the development of others.

Wspomnienie o Mentorze – uczonym, dyplomacie i wychowawcy

Wspominając postać Profesora Jana Góreckiego, sięgamy do wzoru człowieka, który swoim życiem udowodnił, że ogromne osiągnięcia zawodowe mogą iść w parze z głęboką, osobistą troską o drugiego człowieka. Jego sylwetka naukowca, organizatora życia akademickiego, dyplomaty i – przede wszystkim – mentora, pozostaje źródłem inspiracji dla kolejnych pokoleń. Był człowiekiem, który potrafił łączyć świat nauki z praktyką rolniczą, a lokalne problemy polskiej wsi z globalną perspektywą organizacji międzynarodowych.

Droga od rawskiej wsi do świata nauki i dyplomacji

Profesor Jan Górecki urodził się 18 sierpnia 1934 roku w chłopskiej rodzinie na ziemi rawskiej. Wychowanie w tradycji pracy i odpowiedzialności, wyniesione z domu rodzinnego, ukształtowało jego charakter i późniejszą drogę życiową. Jego ojciec, Piotr, był światłym rolnikiem i społecznikiem, którego postawa mimo prześladowań w latach 50. pozostawała dla syna wzorem zaangażowania obywatelskiego. Edukację średnią odbył w Gimnazjum i Liceum im. Mikołaja Kopernika w Łodzi, by w 1956 roku ukończyć studia w Szkole Głównej Gospodarstwa Wiejskiego w Warszawie. Z tą uczelnią związał się na stałe, rozpoczynając pracę jeszcze jako student w Katedrze Ekonomiki i Organizacji Gospodarskich Rolniczych.

Na swojej macierzystej uczelni przeszedł wszystkie szczeble kariery akademickiej: od asystenta, przez kierownika Katedry Rolnictwa Światowego (później Katedry Ekonomiki Rolnictwa i Międzynarodowych Stosunków Gospodarczych), Prorektora ds. Rozwoju i Współpracy z Zagranicą (1984-1987), aż po funkcję Rektora SGGW, którą pełnił przez dwie kadencje (1990-1996). Stopień doktora uzyskał w 1963 roku, habilitację w 1969, tytuł profesora nadzwyczajnego w 1983, a profesora zwyczajnego w 1990 roku. W 2004 roku Senat SGGW uhonorował go tytułem doktora honoris causa.



Zdjęcie 1. Prof. dr hab. Jan Górecki – rektor SGGW

Jego rektorstwo to okres kluczowych, dalekowzrocznych decyzji. To dzięki Jego determinacji i wizji SGGW stała się formalnym i prawnym właścicielem gruntów w Ursynowie, Wilanowie, Natolinie i Wolicy. Uwłaszczenie tych terenów i ich późniejsza sprzedaż zapewniły uczelni fundusze inwestycyjne, które umożliwiły dynamiczny rozwój infrastruktury i stworzyły materialne podstawy jej dzisiejszej działalności w latach 1995-2005. Profesor przywiązywał ogromną wagę do wieloletniej wizji rozwoju Uczelni,

koncentrując jej infrastrukturę na Ursynowie, reformując programy nauczania i tworząc nowe, międzywydziałowe kierunki studiów.

Działalność naukowa

Dorobek naukowy Profesora jest imponujący – obejmuje ponad 250 publikacji, w tym książki, podręczniki i skrypty. Jednak to nie liczba, lecz waga podejmowanych tematów decyduje o randze tego dorobku. Od początku swojej działalności badawczej koncentrował się na problematyce czynnika ludzkiego w rolnictwie, dostrzegając jego kluczowe znaczenie dla rozwoju gospodarstw rodzinnych i całej gospodarki żywnościowej. Jego praca habilitacyjna „Kierownictwo w gospodarstwie indywidualnym” (1968) była pionierska. Przez ponad dekadę aktywnie uczestniczył w pracach Sekcji Agronomii Społecznej Komitetu Ekonomiki Rolnictwa PAN, blisko współpracując z prof. Juliuszem Poniatowskim, inicjując i koordynując badania nad społecznym wymiarem rolnictwa.



Zdjęcie 2. Konferencja naukowa „Aktualne tendencje w międzynarodowych stosunkach gospodarczych w rolnictwie i gospodarce żywnościowej” z okazji jubileuszu prof. Jana Góreckiego (Warszawa 26-27 listopada 2004 r.)

Równoległym nurtem Jego zainteresowań była oświata rolnicza. Jego praca doktorska „Analiza organizacji oraz metod upowszechniania wiedzy rolniczej w Polsce” oraz „Raport o stanie oświaty” przygotowany w ramach prac sekcji, zawierały wnioski, które niestety

często ignorowane, pozostają nadal aktualne w kontekście błędów popełnianych w doradztwie rolniczym.

Trzecim, niezwykle istotnym obszarem Jego aktywności były międzynarodowe badania porównawcze. Profesor położył fundamenty pod rozwój tej nowej wówczas w Polsce dziedziny wiedzy. To pod Jego kierunkiem w Katedrze Rolnictwa Światowego powstał pierwszy w Polsce skrypt *Gospodarka rolno-żywnościowa świata*. Stworzył prawdziwą szkołę naukową, wypracowując specyficzne metodologie badawcze. Przez pięć lat koordynował resortowy temat „Tendencje rozwojowe rolnictwa na świecie i ich związek z gospodarką rolno-żywnościową Polski”, angażując około 150 badaczy z kilkunastu placówek naukowych.

Ambasador wiedzy i Polski na świecie

Doświadczenie Profesora Góreckiego wykraczało daleko poza mury akademii. W latach 1974–1979 pracował w Sekretariacie Organizacji Narodów Zjednoczonych ds. Wyżywienia i Rolnictwa (FAO) w Rzymie, w Departamencie Polityki Społeczno-Ekonomicznej, a przez kolejną dekadę był konsultantem i kierownikiem projektów FAO realizowanych w różnych krajach. Opracowywał programy mające na celu włączenie problematyki czynnika ludzkiego do działalności szkół i uczelni rolniczych na świecie. Dzięki tej pracy poznał programy i działalność ponad 50 uniwersytetów na różnych kontynentach.



Zdjęcie 3. Wizyta Jej Królewskiej Mości Małgorzaty II Królowej Danii w SGGW - 6 lipca 1993 r.

Jego międzynarodowy autorytet zaowocował członkostwem w prestiżowych gremiach, w tym powołaniem na członka zagranicznego Królewskiej Szwedzkiej Akademii Nauk Rolniczych i Leśnych (1988) oraz członkiem kolegium redakcyjnego "Agricultural Economics" – organu International Association of Agricultural Economists (IAAE) w latach 1985-1990.

W latach 1997-2001, w kluczowym dla Polski okresie przygotowań do akcesji do NATO i Unii Europejskiej, Profesor Górecki pełnił zaszczytną funkcję Ambasadora Rzeczypospolitej Polskiej w Królestwie Danii. Jego kompetencje, doświadczenie i kultura osobista, wypracowane podczas lat pracy w środowisku międzynarodowym, idealnie odpowiadały wymaganiom tej delikatnej i ważnej misji dyplomatycznej.

Nauczyciel i mentor

Mimo licznych obowiązków na arenie krajowej i międzynarodowej, rola nauczyciela i wychowawcy była dla Profesora nadrzędna. Wypromował 7 doktorów i ponad stu magistrantów, tworząc specjalizację magisterską z zakresu Ekonomiki Rolnictwa Światowego. Wspomnienia Jego wychowanków są w tym względzie zbieżne i niezwykle wymowne.



Zdjęcie 4. Konferencja z okazji Jubileuszu Profesora Jana Góreckiego – 21 października 2014 r. Aula Kryształowa

Seminaria naukowe prowadzone przez Profesora w Katedrze Rolnictwa Światowego nie były zwykłymi zajęciami. Stawały się forami otwartej, krytycznej dyskusji, które integrowały studentów, doktorantów i pracowników nauki. „Profesor nigdy nie podnosił głosu, a mimo to Jego obecność wyczuwało się w sposób szczególny. Gdy zabierał głos, na sali natychmiast zapadała cisza” – wspomina jeden z doktorantów. Jego wypowiedzi były precyzyjne, przemyślane i głęboko inspirujące. Potrafił jednym zdaniem otworzyć nowe perspektywy, ukierunkować dyskusję, przypomnieć o rzetelności, nie tłamsząc przy tym twórczej swady młodych badaczy. Te spotkania gromadziły zarówno początkujących adeptów nauki, jak i uznane autorytety.

„Profesor umiał stworzyć atmosferę zaufania, w której czuliśmy, że nasz rozwój i nasze badania są dla Niego równie ważne jak wielkie sprawy, którymi zajmował się na forum uczelni czy w przestrzeni międzynarodowej” – podkreślają Jego uczniowie. Ta umiejętność łączenia wielkiej odpowiedzialności z indywidualną troską o młodych ludzi była jedną z Jego najcenniejszych cech. Był wymagający, ale zawsze życzliwy. Nie dawał gotowych odpowiedzi, lecz zachęcał do samodzielnych poszukiwań i brania odpowiedzialności za własne sądy. Uczył tym samym pokory wobec wiedzy i cierpliwości w dochodzeniu do prawdy.

Zaangażowanie publiczne i doradztwo najwyższych szczebli

Równoległe do działalności naukowej i dyplomatycznej, Profesor Górecki odgrywał znaczącą rolę w życiu publicznym Polski. W latach 1991–1996 był przewodniczącym Rady ds. Wsi i Rolnictwa przy Kancelarii Prezydenta RP Lecha Wałęsy, a później członkiem Rady przy Prezydencie RP Lechu Kaczyńskim (2009-2010). Zasiadał w Radzie Gospodarki Żywnościowej, kierując zespołami opracowującymi Program Osadnictwa Rolniczego i Program Oświaty i Nauki Rolniczej.

Jego głos był słyszalny także w gremiach związanych z Kościołem – był członkiem Kościelnego Komitetu Rolnego przy Sekretariacie Episkopatu Polski (1985-1995) oraz Rady Nadzorczej Kościelnej Fundacji Pomocy Zaopatrzenia Wsi w Wodę. Jego kompetencje były cenione w tak różnych instytucjach, jak Rada Nadzorcza Telewizji Polskiej, Polsko-Amerykańska Komisja Fulbrighta (której był także przewodniczącym) czy Fundacja na rzecz Rozwoju Polskiego Rolnictwa (FDPA). Przez wiele lat był redaktorem i wieloletnim współpracownikiem kwartalnika *Wieś i Rolnictwo*, przyczyniając się do jego wysokiej pozycji w środowisku naukowym.

Życie w harmonii

Intensywną pracę zawodową Profesora wspierała Jego małżonka, Ulla Margareta Górecka, filolog i lektorka języka szwedzkiego na Uniwersytecie Warszawskim. Wnosząc do związku skandynawską kulturę i szacunek dla wiedzy, stworzyli wraz z Profesorem dom pełen ciepła, wzajemnego wsparcia i otwartości. Wychowali trójkę dzieci, doczekali się dziewięciorga wnucząt i dwojga prawnucząt. Rodzina była dla Niego ostoją, źródłem siły i równowagi, miejscem odpoczynku i radości.



Zdjęcie 5. Rodzina prof. Jana Góreckiego podczas Konferencji Naukowej pt.: „Aktualne zagadnienia w rozwoju międzynarodowych stosunków gospodarczych” zorganizowanej z okazji Jubileuszu 80-lecia Urodzin Profesor w dniu 21.10.2014 r. w Warszawie

Za swoją wieloaspektową działalność Profesor otrzymał wiele wysokich odznaczeń polskich i zagranicznych, w tym Krzyż Komandorski Orderu Odrodzenia Polski, Krzyż Komandorski Królestwa Danii oraz Prymasowski Złoty Medal „Zasłużonemu dla Kościoła i Narodu”.

Autorytet i dziedzictwo

Profesor Jan Górecki pozostaje w pamięci wszystkich, którzy mieli zaszczyt Go znać, jako człowiek wielkiego formatu – uczony, rektor, dyplomata. Lecz nade wszystko zapamiętany został jako mentor i wychowawca. Jego życie i dorobek są świadectwem rzadkiej harmonii między nauką, służbą publiczną a troską o kolejne pokolenia. Jego spokój, kultura osobista i naturalny autorytet, który nie potrzebował podniesionego głosu, uczą, że prawdziwa siła lidera i nauczyciela płynie z mądrości, życzliwości i autentycznego zaangażowania w rozwój innych. Wspominając Go, czujemy nie tylko wdzięczność za wiedzę, mądrość i dobroć, których byliśmy świadkami, ale także głębokie zobowiązanie, by kontynuować dzieło, które rozpoczął. Jego postawa ucieleśniała ideę, że nauka to nie tylko publikacje, ale także służba – społeczeństwu, państwu i młodym ludziom powierzonym opiece mistrza.

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Missy B. Gal¹, Kathlene Mae B. Baculpo², Desirie C. Dacara³, Maureen Mhel A. Davines⁴, Angelica G. Gabane⁵, Hanna Joyce B. Macawili⁶, Leomarich F. Casinillo⁷

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Understanding the Knowledge, Practices, and Production Levels of Rice Farmers in Samar, Philippines

Abstract. This paper aims to evaluate the knowledge, practices, and production levels of rice farmers and identify their significant factors using statistical models. The study involved 84 rice farmers in Barangay Barobaybay, Calbiga, Samar, Philippines, with the aid of complete enumeration sampling. Primary and cross-sectional data were gathered using the researchers' developed questionnaire based on the current literature. Using a quantitative research design, the data were analysed using descriptive statistical measures, correlation analysis, and ordinal regression modelling. Results suggested that, on average, rice farmers' perceived level of knowledge ($M=4.37$; $SD=0.39$), practices ($M=4.32$; $SD=0.41$), and production ($M=4.29$; $SD=0.39$) in farming are considered very high. This implies that rice farmers display strong knowledge, effective farming practices, and efficient production processes. The correlation analysis revealed that farmers' knowledge, practices, and production levels are highly correlated with each other. This indicates that farmers' knowledge is vital to their farming practices by adopting technologies that positively influence their productivity. Moreover, the ordinal regression revealed that tenure status (being a tenant farmer) is a significant (at a 10% level) predictor of farmers' knowledge, practices, and production activities. Notably, to support rice farmers who lease land, the government should promote policies that provide more secure land tenure, encouraging long-term investment in farming. Moreover, the study suggests that future interventions and support programs should promote innovative and advanced techniques to ensure the continued growth and success of rice farming in the region.

Keywords: rice farming, knowledge and practices, rice production level, regression models, Philippines

JEL Classification: Q12, Q13, Q16

Introduction

In the Philippines, millions of Filipinos live in rural areas, and agriculture is one of their main sources of livelihood and income to sustain economic activities. In fact, rice farming is an important asset in the Philippines, wherein the economy and food supply of many impoverished Filipino households are realised (Bollido, 2019; Casinillo & Serino, 2022). In the study by Casinillo (2020), it is portrayed that rice farming provides employment, food security, and national income in the country. However, rural areas in the Philippines primarily rely on elderly farmers with limited education on farming activities and are still using

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traditional techniques (Red et al., 2021). Additionally, the knowledge, practices, and agricultural production levels in the Philippines are relatively low compared to other progressive countries (Cuaton & Delina, 2022). According to the literature, production levels in rice farming in the Philippines refer to the quantity of output and farming activities, which are influenced by several factors that include farm size, management, access to resources, labour, capital, and the adoption of innovative technologies (Casinillo, 2023; Dait, 2023). Therefore, the production level in rice farming is dependent on the knowledge, practices, and resources of the farmers, which need to be enhanced (Ntawuruhunga et al., 2020). Hence, these farmers require assistance from the government and other agencies concerning the support of modern farming knowledge and practices, up-to-date advancements and innovative technologies, agricultural inputs, financial support, and essential resources for the rice production process, among others, to increase the agricultural production level (Okwuokenye & Okoedo-Okojie, 2014; Jones, 2024). In particular, Samar, Philippines has significant agricultural activity, with the region's topography and climate being conducive to rice production activities. In the area of Samar, farmers normally practice wet rice cultivation, taking advantage of the region's abundant rainfall and water irrigation. They commonly use traditional methods combined with modern planting, irrigation, and harvesting techniques (Bollido, 2019).

The town of Calbiga, located in the province of Samar, contributes significantly to the region's rice production. The area is known for its lush rice paddies and favourable climate for agriculture, in which farming activities and practices are notably active (Robedizo, 2015). Farmers engage in both rain-fed and irrigated rice farming methods. They typically grow rice varieties such as the popular IR (International Rice) varieties or hybrid strains, using traditional planting techniques and modern farming practices. The community's livelihood is deeply rooted in agriculture, with rice farming being a primary occupation, contributing significantly to the local income and economy (Bollido, 2019). However, these rural farmers are still using traditional techniques in farming, which are not suitable for the current climate and situation. Accordingly, it is vital to investigate farmers' knowledge, practices, and production to gather information on how to improve their agricultural activities, as well as their economic profitability (Red et al., 2021). While there are numerous studies that examine the knowledge and practices of farmers, there is a lack of local literature exploring this matter, despite Calbiga, Samar, Philippines, being one of the significant contributors to rice production in the province. Additionally, most studies on rice farming knowledge, practices, and production that have been undertaken do not employ statistical models to capture significant predictors (Zossou et al., 2020; Omar et al., 2022; Sarma et al., 2022). Although there are a few international research papers that account for the relationship of the same variables, there is no guarantee that the result obtained from the study could be the same as that of the local community of Calbiga, Samar. Therefore, this research paper was conducted to address this gap.

Generally, our main objective in this study is to determine rice farmers' knowledge, practices, and production levels in the lowland areas in Samar, Philippines. Specifically, the paper sought to answer the following: (1) to assess their socio-demographic and economic profile; (2) to evaluate the level of rice farmers' knowledge in farming, examine the farming practices they employ, and find out their perceived level of rice production; and (3) to develop a statistical model that captures the predictors of farmers' knowledge, practices, and production. The study of rice farming knowledge, practices, and production levels of lowland farmers in Samar, Philippines, can provide numerous benefits, such as learning new strategies

and enhancing existing methods, and farmers may boost their output and earnings, as well as improve their living standards. In addition, the results of the study may provide details on how to enhance food security that will benefit the entire community and improve rice farming efficiency, increase food production, reduce import dependence, and bolster local market stability. Moreover, agencies like the Department of Agriculture (DA) and Local Government Units (LGU) may derive significant value from this study, and the insights gained can underpin policies and initiatives that foster regional agricultural growth. Furthermore, researchers specialising in agriculture and rural development can utilise the data gathered from the study to conduct further research, create models, and contribute to the field's knowledge base.

Methods

The Research Design

The aim of this study is to describe the level of knowledge, practices, and production of rice farmers and to determine the significant factors affecting it. Accordingly, this research paper employed quantitative research called a descriptive-correlational design, which calculates some standard descriptive measures and uses a statistical inference, particularly, regression analysis. The purpose of the said research design is to provide an explanation and a detailed snapshot of the situation regarding the rice farmers' knowledge, practices, and production levels, as well as to examine their relationship to socioeconomic profiles.

The Respondents, Sampling, and Ethics

Barobaybay is a barangay in the municipality of Calbiga, in the province of Samar, Philippines. The Barobaybay Farmers Association is an association of 84 farmers in the isolated town of Barangay Barobaybay; they have a total farmland of 104.87 hectares, according to the recent official data (as of 2013) from the local administration office of Barangay Barobaybay. This barangay currently ranks among the province's top rice producers; hence, this study focused on the Barangay Barobaybay, Calbiga, Samar, to learn lowland farmers' rice farming knowledge, practices, and knowledge. As Barangay Barobaybay has a small population, the researchers decided to include all 84 farmers as participants. The decision to include all 84 rice farmers in Barangay Barobaybay was based on the unique characteristics of the population, precisely its relatively small size. Complete enumeration ensures that every individual within the population is represented in the study, eliminating sampling variability and allowing for a comprehensive understanding of rice farming knowledge, practices, and production among all members. This approach is particularly beneficial when dealing with a homogenous and manageable population, as is the case in Barangay Barobaybay, where the aim is to capture the entirety of the rice farming community and provide a thorough analysis of the factors influencing their agricultural activities. To secure prior consent from the community, the researchers wrote a formal communication letter to the barangay chief of the selected site. Upon provision of consent, the researchers immediately administered the questionnaire to the target respondents. Rice farmers involved in the survey were informed that their participation in the research is voluntary, and the data gathered from them is confidential and will be used solely for this current study.

The Research Instrument and Data Collection

This study employed a developed structured questionnaire based on the current studies in the literature (Robedizo, 2015; Red et al., 2021; Casinillo et al., 2023). The research instrument has four (4) sections, such as (i) profile of rice farmers, (ii) knowledge of rice farming, (iii) practices of technologies, and (iv) production level. The actual gathering of data is a face-to-face interview in which the dialect of rice farmers was considered so that they could comprehend and answer accordingly. As for the profile, rice farmers were asked about the following: (a) age (actual number of years), (b) sex (male or female), (c) educational attainment, (d) years in farming, (e) tenurial status. The second section is the knowledge of farmers in rice farming, wherein they were asked 14 questions (5-point rating scale). The third section is the practices of farmers in adopting agricultural techniques, which consists of 10 structured questions (5-point rating scale). The last section is the production level of farmers, which consists of 13 structured questions (5-point rating scale). Table 1 shows the range of farmers' perceived knowledge, practices, and production scores, and their responses and interpretations.

Table 1. Farmers' perceived knowledge, practices, and production scores, and their corresponding responses and interpretations

Scale	Range	Response	Level of Knowledge	Level of Practices	Level of Production
5	4.20-5.00	Strongly Agree	Very High Knowledge	Very High Practices	Very High Production
4	3.40-4.19	Agree	High Knowledge	High Practices	High Production
3	2.60-3.39	Neutral	Moderate Knowledge	Moderate Practices	Moderate Production
2	1.80-2.59	Disagree	Low Knowledge	Low Practices	Low Production
1	1.00-1.79	Strongly Disagree	Very Low Knowledge	Very Low Practices	Very Low Production

Source: Authors' guide (2025).

Some experts (at least master's degree holders) have evaluated the research instrument for validity testing and found that it is valid in that it is a good questionnaire that captures farmers' experiences and well-being. To ensure our research instrument was well-grounded, the researchers conducted a pilot test with people similar to our primary respondents to check if the questionnaire was reliable. The researchers used Cronbach's Alpha (Cronbach, 1951) to analyse the results. Our data had an alpha (reliability coefficient) of 0.77-0.85, indicating the reliability was good (Table 2).

Table 2. Reliability test for the questionnaire

Questionnaire	No. of items	Reliability
Knowledge	14	0.85
Practices	10	0.77
Production	13	0.82

Source: Authors' calculation, 2025.

Data Management and Empirical Models

In describing the gathered data, appropriate statistical measures were computed, such as percentages (%), mean (M), and standard deviation (SD). Additionally, bar graphs were constructed to easily understand and compare the variables. Moreover, the Spearman rho correlation was employed to explain the relationship between knowledge, practices, and production levels of rice farmers. Table 3 depicts the intervals of the Spearman correlation coefficient in which they might fall and their linguistic interpretation (Casinillo & Guarte, 2018).

Table 3. Intervals of the Spearman correlation coefficients and their linguistic interpretation

Spearman Correlation Coefficient (r_s)	Linguistic interpretation
$0.0 \leq r \leq 0.3$	Weak association
$0.3 < r \leq 0.7$	Moderate association
$0.7 < r \leq 1.0$	Strong association

Source: Casinillo and Guarte, 2018.

In determining the possible factors affecting the knowledge, practices, and production level of rice farmers, ordered logit regression modelling was constructed. Necessary diagnostic tests were performed to ensure sound statistical results. All computations are aided with Microsoft Excel and STATA version 14.0 software, and tested for a standard level of significance. Hence, the empirical and statistical models are as follows:

$$Knowledge_i = a_0 + a_1Age_i + a_2Male_i + a_3College_i + a_4YFarming_i + a_5Owner_i + e_j \quad (1)$$

$$Practices_i = b_0 + b_1Age_i + b_2Male_i + b_3College_i + b_4YFarming_i + b_5Owner_i + u_j \quad (2)$$

$$Production_i = c_0 + c_1Age_i + c_2Male_i + c_3College_i + c_4YFarming_i + c_5Owner_i + \varepsilon_j \quad (3)$$

where $Knowledge_i$, $Practices_i$, and $Production_i$ are dependent variables in the regression model that refer to farmers' perceived level of knowledge, practices, and production in rice farming, respectively, where $i \in \{1, 2, \dots, 84\}$, which refers to the i^{th} rice farmer. In addition, a_i , b_i , and c_i are the coefficients of the regression models ((1), (2), and (3), respectively) that are to be estimated and subject to interpretation. Moreover, Age_i refers to the actual age in years of rice farmers, $Male_i$ refers to an indicator (dummy) variable that captures a male farmer (0-female, 1-male), $College_i$ refers to an indicator (dummy) variable that captures a rice farmer with college-level education (0-not college level, 1-college level), $YFarming_i$ refers to an indicator (dummy) variable that captures a rice farmer who has 16 or more years in farming (0-below 16 years, 1-16 or more years), $Owner_i$ refers to an indicator (dummy) variable that captures a rice farmer who has owned their rice paddy farm (0-not an owner, 1-owner), and e_j , u_j and ε_j refers to the remaining errors in the models (1), (2), and (3), respectively.

Results and Discussion

Profile of Rice Farmers

Table 4 depicts the profile of rice farmers in Barangay Barobaybay, Calbiga, Samar, Philippines. On average, the age of the rice farmers is close to 55.07 (SD=13.83). This implies that most of the farmers are of mature working age, and this result is consistent with the findings in the study by Casinillo & Serino (2022), which indicates that rice farmers are mostly older farmers. Table 4 presents that the majority, or 47.61%, belonged to the prime working ages (25 to 54 years old), about 23.80% of the rice farmers are of mature working age (55 to 64 years old), and 28.57% are elderly (65 years old or more). As younger generations pursue alternative career paths or move to urban areas looking for decent work, there is a risk of a labour shortage in the near future and a decline in agricultural knowledge transfer.

Table 4. Rice farmers' profile

Profile	Frequency	Percentage (%)
Age		
25-54 years old	40	47.61
55-64 years old	20	23.80
65+ years old	24	28.57
Total	84	100.00
Sex		
Male	62	73.80
Female	22	26.19
Total	84	100.00
Years in Farming		
Less than 1 year	2	2.38
1 to 5 years	8	9.52
6 to 10 years	11	13.09
11 to 15 years	0	0.00
16 years or more	63	75.00
Total	84	100.00
Educational Attainment		
No formal education	2	2.38
Elementary	43	51.19
High school	29	34.52
College	10	11.90
Total	84	100.00
Tenurial Status		
Own	19	22.61
Lease	61	72.61
Own and Lease	4	4.76
Total	84	100.00

Source: Authors' calculation, 2025.

Table 4 shows that among all respondents, 73.80% were male, and 26.19% were female. Based on the result, it is evident that farming is primarily undertaken by men. The basis for this is that men usually perform most rice farming activities, which are heavy or masculine types of work (Saugeres, 2002; Casinillo, 2022). There were 2.38% of the farmers who had farming experience of less than a year, 9.52% of them had 1 to 5 years, 13.09% of them had 10 years, and 75.00% had 16 years or more (Table 4). A rice farmer with more experience tends to achieve better production outcomes and profitability, which means that an experienced farmer often has more effective farming techniques, improved decision-making skills, and a profound understanding of farming practices (Mandal & Singh, 2020). Table 4 depicts that there are 2.38% with no formal education, 51.19% with elementary education, 34.52% with high school education, 21.1% are high school graduates, 24.0% are college undergraduates, and 11.90% have college education. Limited education can hinder farmers in their ability to improve productivity, adapt to new challenges, and enhance their overall living conditions. Hence, in the study by Nakano et al. (2018), it is necessary that farmers have training in new technologies to improve their production levels, as well as their economic profitability. Among rice farmers, 72.61% have leased farmland, 22.61% own their farmland, and 4.76% of them have both owned and leased land (Table 4). In the study by Kumari and Nakano (2016), it is stated that it is better for a farmer to own their land since they do not have to pay rent, which affects the production financial budget, and they also discovered that tenant-status farmers have lower production activities due to higher costs.

Knowledge, Practices, and Production

Table 5 shows that rice farmers strongly agree with all the knowledge questions, which indicates that they are knowledgeable in farming activities. On average, farmers' perceived knowledge scores are close to 4.37 (SD=0.39), which can be interpreted as having a "very high knowledge" of farming skills. Figure 1 shows that no farmers have very low or low knowledge of rice farming. This implies that at least they have already gained some agricultural techniques from their experiences. Only 1.19% of the rice farmers have a moderate knowledge of farming, 32.14% of them have high knowledge, and 66.67% of them have very high knowledge. This implies that rice farmers in Barangay Barobaybay, Calbiga, Samar, are knowledgeable and equipped about the farming system and production activities. In the paper by Zossou et al. (2020), it is portrayed that farmers with a good understanding and adequate knowledge of modern rice production activities have a greater possibility of achieving high crop yields.

Table 5. Level of knowledge of rice farmers

	Statement	Mean	SD	Description	Interpretation*
1.	I am well-versed in the importance of soil health for successful rice production.	4.55	0.57	Strongly Agree	Very High Knowledge
2.	I actively seek out and stay informed about the latest advancements in rice cultivation.	4.44	0.61	Strongly Agree	Very High Knowledge
3.	Pest and disease management in rice fields is an area where I feel confident in my knowledge.	4.29	0.74	Strongly Agree	Very High Knowledge
4.	I regularly participate in training programs to enhance my rice farming knowledge.	4.37	0.72	Strongly Agree	Very High Knowledge
5.	I am familiar with and utilise the latest technologies in modern rice farming.	4.40	0.60	Strongly Agree	Very High Knowledge
6.	Following recommended guidelines for water management in rice paddies is second nature to me.	4.29	0.77	Strongly Agree	Very High Knowledge
7.	I am aware of the impacts of climate change on rice farming and adjust my practices accordingly.	4.26	0.73	Strongly Agree	Very High Knowledge
8.	I can easily identify different rice varieties and understand their suitable growing conditions.	4.31	0.69	Strongly Agree	Very High Knowledge
9.	Sustainable farming practices that enhance rice production are well within my knowledge base.	4.48	0.63	Strongly Agree	Very High Knowledge
10.	I keep myself updated on government policies and support available for rice farmers.	4.30	0.60	Strongly Agree	Very High Knowledge
11.	Crop rotation's importance in rice farming is a concept I thoroughly understand.	4.29	0.63	Strongly Agree	Very High Knowledge
12.	I am aware of the benefits of crop diversification in rice farming.	4.38	0.64	Strongly Agree	Very High Knowledge
13.	My knowledge extends to the use of technology for precise irrigation in rice fields.	4.33	0.67	Strongly Agree	Very High Knowledge
14.	I believe that staying informed about farming trends is crucial for successful rice farming.	4.49	0.67	Strongly Agree	Very High Knowledge
	Overall Mean	4.37	0.39	Strongly Agree	Knowledgeable

* - see Table 1.

Source: Authors' calculation, 2025.

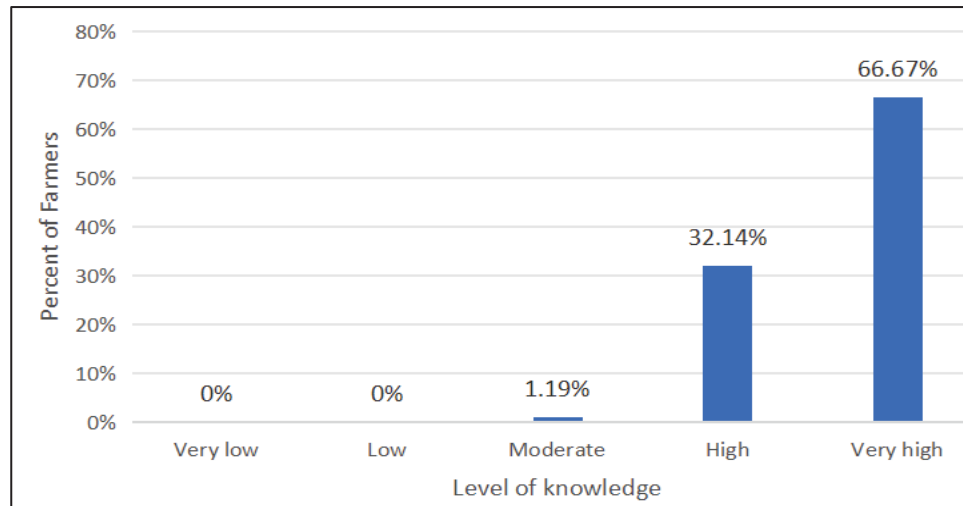


Fig. 1. Rice farmers' level of knowledge

Source: Authors' construction, 2025.

Table 6 shows that all questions about the practices of rice farmers are marked as "strongly agree" except for the integration of irrigation systems. This means that they have "very high practices" of agricultural techniques in improving their farming activities. On average, farmers' perceived practice scores are close to 4.32 (SD=0.41), which can be interpreted as having "very high practices" in farming techniques. In other words, new technologies in agriculture were fully adopted in their farming process. It is depicted in Figure 2 that no farmers have very low or low perceived practice scores in agricultural techniques. On the other hand, only 2.38% of the rice farmers have a moderate level of practice, about 38.10% of them have a high level of practice, and most (59.52%) of them have a very high level of practice in applying innovative agricultural technologies. It is worth noting that, due to the fact that most of them have a very high knowledge of farming activities, they are more likely to apply what they have learned. In fact, advances in agricultural technologies, better varieties of rice, sustainable methods and techniques, precise and efficient farming, and easier access to markets have all helped to improve the production activities of farmers, as well as improve their well-being (Mandal & Singh, 2020; Connor et al., 2021).

Table 6. Farming practices being adopted by farmers

	Statement	Mean	SD	Description	Interpretation*
1.	I follow recommended planting and harvesting schedules for optimal yield.	4.39	0.54	Strongly Agree	Very High Practices
2.	Cover cropping is a part of my rice farming strategy to prevent soil erosion.	4.35	0.65	Strongly Agree	Very High Practices
3.	Conservation tillage is a method I adopt to minimise soil disturbance.	4.46	0.59	Strongly Agree	Very High Practices
4.	I participate in government-sponsored programs promoting advanced farming practices.	4.32	0.62	Strongly Agree	Very High Practices
5.	I employ integrated pest management (IPM) techniques in my rice fields.	4.48	0.55	Strongly Agree	Very High Practices
6.	I utilise green manure or organic fertilisers to enrich soil fertility.	4.29	0.87	Strongly Agree	Very High Practices
7.	I adapt my farming practices based on weather forecasts and climate conditions.	4.20	0.74	Strongly Agree	Very High Practices
8.	I participate in workshops or training sessions to stay updated on new farming practices.	4.27	0.77	Strongly Agree	Very High Practices
9.	Precision irrigation systems are integrated into my rice cultivation methods.	4.14	1.09	Agree	High Practices
10.	I actively engage in soil testing to ensure the right balance of nutrients.	4.33	0.70	Strongly Agree	Very High Practices
	Overall Mean	4.32	0.41	Strongly Agree	Very High Practices

* - see Table 1.

Source: Authors' computation, 2025.

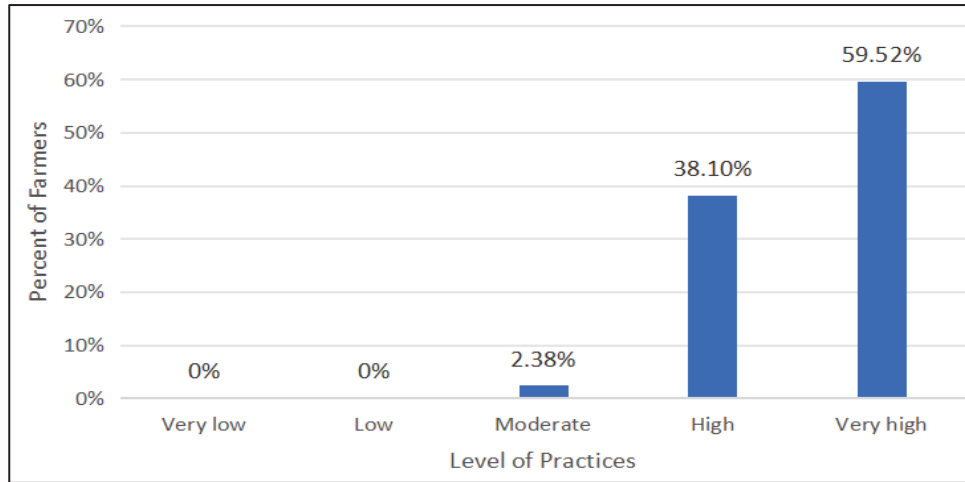


Fig. 2. Rice farmers' level of practices

Source: Authors' construction, 2025.

Table 7 revealed that all production questions are perceived highly by rice farmers, indicating that their farming processes are highly to very highly productive. This implies that rice farming in Barangay Barobaybay, Calbiga, Samar, is performing well from planting to harvesting, which indicates that farmers are equipped for their production and economic activities. On average, farmers' perceived production scores are close to 4.29 (SD=0.39), which can be interpreted as having a "very high production" in farming techniques. Moreover, Fig. 3 revealed that no rice farmers have a very low or low perceived production score. However, about 1.19% of them have a moderate perceived level of production, 35.71% of them have a high perceived level, and 63.10% of them have a very high perceived level. This implies that rice farmers in Barangay Barobaybay, Calbiga, Samar, have an efficient way of farming in which they effectively improve rice production through their high level of knowledge and good practices. In the study by Alzahrani et al. (2023) and Casinillo et al. (2023), it is depicted that if a farmer has good knowledge and has a comprehensive sustainable practice in agricultural techniques, then it is more likely to increase productivity and profitability.

Table 7. Perceived level of rice production of farmers

	Statement	Mean	SD	Description	Interpretation*
1.	My rice farm consistently achieves high yields per hectare.	4.17	0.76	Agree	High Production
2.	I use advanced technology to optimise rice production on my farm.	4.32	0.67	Strongly Agree	Very High Production
3.	I follow recommended planting densities to maximise rice output.	4.36	0.61	Strongly Agree	Very High Production
4.	Precision farming methods contribute to the efficiency of my rice production.	2.89	1.32	Neutral	Average production
5.	I regularly monitor and manage water usage for optimum rice yield.	4.36	0.79	Strongly Agree	Very High Production
6.	Efficient nutrient management is a priority in my rice farming for better yields.	4.54	0.57	Strongly Agree	Very High Production
7.	I engage in soil testing to make informed decisions on fertiliser application.	4.36	0.69	Strongly Agree	Very High Production
8.	I participate in knowledge-sharing networks to enhance rice production techniques.	4.51	0.63	Strongly Agree	Very High Production
9.	My farm utilises mechanised equipment to streamline cultivation processes.	4.36	0.80	Strongly Agree	Very High Production
10.	I adapt my planting and harvesting schedules based on climate conditions.	4.44	0.65	Strongly Agree	Very High Production
11.	I collaborate with agricultural extension services to enhance production skills.	4.48	0.57	Strongly Agree	Very High Production
12.	Post-harvest storage and processing methods on my farm ensure quality rice.	4.45	0.63	Strongly Agree	Very High Production
13.	I continuously seek ways to improve my rice production through research and training.	4.58	0.61	Strongly Agree	Very High Production
	Overall Mean	4.29	0.39	Strongly Agree	Very High Production

* - see Table 1.

Source: Authors' computation, 2025.

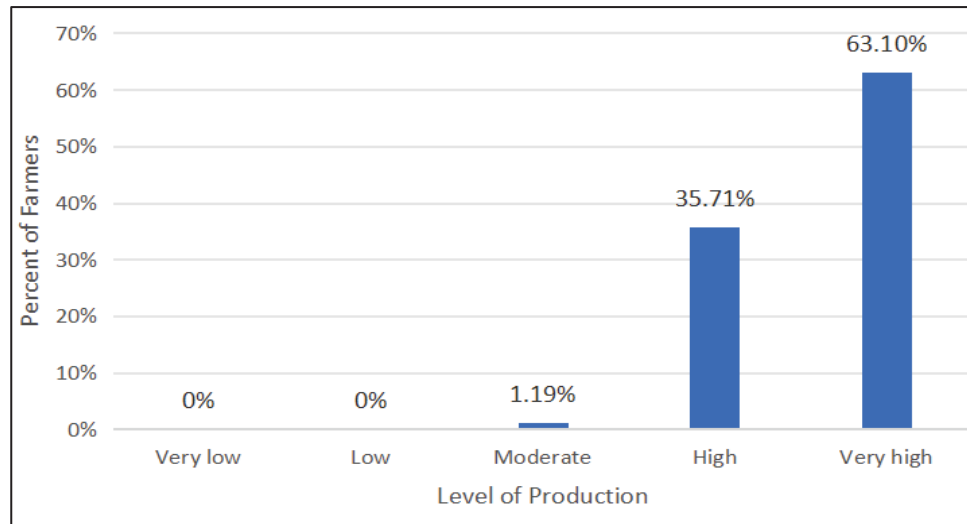


Fig. 3. Rice farmers' level of production

Source: Authors' construction, 2025.

Correlation Analysis

Table 8 shows that the knowledge of rice farmers in Barangay Barobaybay, Calbiga, Samar is highly and significantly correlated ($r_s=0.835$; $p\text{-value}<0.001$) with their practices at a 1% level. The coefficient of determination ($R^2=69.72$) indicates that 69.72% of the variations in rice farmers' perceived knowledge can be attributed to their perceived practices, and based on Table 3, the two variables have a strong association. This means that rice farmers are more knowledgeable about modern technologies and are more likely to adopt them in their farming activities, and vice versa. According to Sarma et al. (2022), knowledge of rice farmers is a very important factor in the decision-making of adopting agricultural technology in planting, pest management, irrigation, and harvesting, among others. In addition, it is shown in Table 8 that the knowledge of rice farmers has a strong association ($r_s=0.731$; $p\text{-value}<0.001$) with their production activities, which is highly significant at a 1% level. The goodness of fit ($R^2=53.44$) indicates that 53.44% of the differences in rice farmers' perceived knowledge can be attributed to their perceived production level. This implies that if a farmer has good knowledge of farming, production processes are smooth and well-managed through the proper adoption of technologies and decision-making. In the study by Omar et al. (2022), it is vital to enhance farmers' knowledge to improve their techniques in farming management to improve the production level and well-being. Moreover, the practices of rice farmers are highly correlated ($r_s=0.769$; $p\text{-value}<0.001$) with their production activities, and it is significant at a 1% level. Based on Table 3, perceived practices and perceived production have a strong association. About 59.14% of the differences ($R^2=59.14$) in rice farmers' perceived practices can be attributed to their perceived production. This means that if a farmer is adopting agricultural technologies, then their production process is performing well and is more likely to be productive. Red et al. (2021)

portrayed that farmers who are adopting more innovative agricultural technologies are more productive in farming activities and more profitable.

Table 8. Spearman correlation matrix for knowledge, practices, and production

Specification	Knowledge	Practices	Production
Knowledge	1.00	0.835* (<0.001)	0.731* (<0.001)
Practices	0.835* (<0.001)	1.00	0.769* (<0.001)
Production	0.731* (<0.001)	0.769* (<0.001)	1.00

* - highly significant at a 1% level.

Source: Authors' computation, 2025.

Ordinal Regression Models

The three (3) regression models in Table 9 do not have a multicollinearity problem ($VIF=1.30<10$) since the computed variance inflation factor (VIF) is less than 10 (Allison, 2012). It is shown that the three models are not significant (Model 1: p-value=0.171; Model 2: p-value=0.144; Model 3: p-value=0.256); however, the individual test for each independent variable found some significant factors affecting the dependent variable. It is also revealed that the models had just a small model fit based on the coefficient of determination (Model 1: pseudo $R^2=0.067$; Model 2: pseudo $R^2=0.064$; Model 3: pseudo $R^2=0.055$), which indicates that there are only a few predictors that affect the dependent variables of the three models. In that case, there are some factors (other independent variables) in the model that remain unexplained. In Model 1 (Table 9), it is revealed that age (p-value=0.126), sex (p-value=0.258), education (p-value=0.747), and years in farming (p-value=0.850) are not significant factors affecting the knowledge of rice farmers. However, tenurial status (p-value=0.066) is statistically significant at 10% which indicates that it influences the rice farmers' knowledge. The negative coefficient (-0.992) of the tenurial status variable indicates that not being an owner of a rice farm is associated with greater knowledge compared to a farmer who owns their land. This implies that a tenant farmer tends to work hard and learn new techniques to improve their production process and economic activities. In the studies of Robedizo (2015) and Moon et al. (2020), it is portrayed that a farmer under the land tenure system has learned various programs and innovative agricultural techniques and practices to improve their efficiency, productivity, and profitability in farming. In that case, a tenant farmer tends to be more knowledgeable in the farming activities compared to an owner. Moreover, the result of the study is parallel to the findings of Maye et al. (2009), who found that tenant farmers tend to maximise their existing assets and knowledge to obtain their economic goals. As for the second regression model, it is shown that age (p-value=0.185), sex (p-value=0.923), education (p-value=0.789), and years in farming (p-value=0.491) are not significant factors affecting the practices of rice farmers in their agricultural activities.

Nevertheless, the second model depicted that a farmer who is a tenant or renting (p-value=0.071) a rice farm tends to be more likely to adopt innovative agricultural practices to improve the farming activities, and it is significant at a 10% level of significance. This result is consistent with the findings of Red et al. (2021), which showed that farmers who are mostly tenants in status are eager to adopt agricultural technologies to enhance their production yield and economic profit. In the study by Jimena et al. (2025), it is portrayed that innovative knowledge and practices in farming are learned from training and guidance from agricultural extension agents. However, the result of the study does not align with the findings of Carolan (2005), which indicates that tenant farmers have barriers in adopting innovative agriculture on rented farms. Lastly, the third model depicted that age (p-value=0.306), sex (p-value=0.248), education (p-value=0.939), and years in farming (p-value=0.650) are not significant predictors affecting the production level of rice farmers. However, it is revealed that a tenant farmer (p-value=0.10) tends to have productive farming activities, which is statistically significant at a 10% level (Table 9). This implies that farmers who are just tenants or rent their rice farms are more active in improving their production activities. It is mentioned in the study by Hoque et al. (2022) that tenant farmers are supported by some organisations in regard to their farm inputs and activities, including agricultural credit, which could boost their productivity. In fact, farmers are supported by the local government in terms of new technologies and training to improve the economic yield that could progress the national income (Red et al., 2021; Casinillo, 2022; Casinillo et al., 2023).

Table 9. Ordinal regression models

Independent variables	Dependent variables (1 to 5 scaling)		
	<i>Model 1: Knowledge</i>	<i>Model 2: Practices</i>	<i>Model 3: Production</i>
Age (in years)	0.035 ^{ns} (0.024)	0.029 ^{ns} (0.022)	0.023 ^{ns} (0.022)
Male ^a	0.670 ^{ns} (0.592)	0.052 ^{ns} (0.535)	0.643 ^{ns} (0.557)
College ^a	0.241 ^{ns} (0.749)	0.191 ^{ns} (0.717)	0.057 ^{ns} (0.738)
Years in farming ^a	-0.133 ^{ns} (0.850)	0.453 ^{ns} (0.658)	0.309 ^{ns} (0.680)
Owner ^a	-0.992* (0.540)	-0.934* (0.517)	-0.864* (0.532)
Participants	84	84	84
Chi-square test	7.74	8.22	6.55
p-value	0.171 ^{ns}	0.144 ^{ns}	0.256 ^{ns}
Pseudo R²	0.067	0.064	0.055

a - dummy variable; standard errors are enclosed with parentheses; ns - not significant; *p<0.10.

Source: Authors' calculation, 2025.

Conclusion

This research study aimed to elucidate farmers' knowledge, practices, and production levels in rice farming. The results revealed that the majority of the rice farmers belonged to the prime working ages, and most of them are male with extensive farming experience and primarily elementary-level education. The majority lease their land, with a low percentage of farmers owning land. Moreover, the study concluded that rice farmers display strong knowledge, effective farming practices, and efficient production processes. Furthermore, the results revealed that farmers' knowledge, practices, and production levels are highly associated with each other. Hence, it suffices to say that the farmers possess strong knowledge of fundamental rice farming practices, including soil health, pest management, and modern technologies. Plus, farmers are also highly aware of various innovative technologies, and they are implementing sustainable farming practices, which positively affect their production processes. Moreover, the ordinal regression revealed that tenure status (being a tenant farmer) is a significant factor in farmers' knowledge, practices, and production activities. Thus, to support farmers who lease land, the government should promote policies that provide more secure land tenure, encouraging long-term investment in rice farming. The government should implement comprehensive training programs to help farmers transition from traditional methods to modern farming techniques and technologies, which include providing subsidies for new machinery and techniques. The government should develop mentorship programs where experienced farmers can share their knowledge with younger or less experienced farmers to enhance their skills and practices. One of the limitations of the study is that the regression model reveals a small coefficient of determination, indicating that there are some important regressors that remain unexplained. Hence, the study suggests incorporating other important independent variables (e.g. income, yield, access to credit, infrastructures, extension services, and household expenditures, among others) in the model to strengthen the current findings. Moreover, future studies should include qualitative analysis along with a quantitative approach and focus on other specific areas in Samar, Philippines, to better understand local farming practices, knowledge, and production levels.

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Entrepreneurship and Competitiveness in Burundi's Coffee Sector: Challenges and Prospects

Abstract. This study examines the role of entrepreneurship and innovation in revitalising Burundi's declining coffee sector, which remains a vital pillar of the country's economy. Despite liberalisation reforms and increased private investment since 2008, coffee production has sharply declined due to structural inefficiencies, ageing plantations, poor infrastructure, and institutional fragility. The research analyses how entrepreneurial initiatives – particularly those led by cooperatives, women, and youth – can foster value addition, enhance coffee quality, and improve market access. It draws on a mixed-methods approach combining a systematic literature review, policy analysis, and over thirty field interviews with stakeholders across the value chain. The findings highlight emerging innovations, such as quality certification, micro-milling enterprises, and digital tools, alongside persistent barriers, including limited access to finance, technical knowledge gaps, and governance challenges. The study concludes that a coherent ecosystem – comprising targeted training, public-private investment, infrastructure upgrades, and regulatory reform – is essential to unlock the sector's entrepreneurial potential. By integrating entrepreneurship into Burundi's coffee development strategy, the country can pursue both rural transformation and export competitiveness.

Keywords: coffee sector, entrepreneurship, agricultural policy, Burundi

JEL Classification: O13, Q13, L26, O55

Introduction

Coffee has historically been the linchpin of Burundi's economy. It is cultivated by millions of smallholder farmers and has provided as much as 30–40% of the country's export earnings. In practice, coffee supports approximately 8 million people, roughly two-thirds of the population (Bro & Clay, 2017), through farm income, processing jobs and allied services. For decades, it was Burundi's largest foreign-exchange crop, even as agriculture overall accounts for over 40% of GDP and employs the great majority of households.

This dependence makes recent trends particularly alarming. Despite a brief boom in speciality coffee markets, Burundi's coffee output has plunged from an average of about 20,000 tonnes per year in the 2000s to just 14,580 tonnes in 2019 and 11,700 tonnes in 2020 (World Bank, 2022). The situation deteriorated sharply in 2021, when only 6,000 tonnes were registered. By 2022, output still barely reached 10,000 tonnes, reflecting a long-term decline (Trends in Africa, 2022). Such steep trends are clearly unsustainable, and reversing the decline in coffee production is imperative not only for farmers but also as a national-level macroeconomic priority (Lenaghan & Clay, 2018).

The causes of this collapse are manifold. Poor weather, ageing trees, low investment and price volatility have all played a role, and the erosion of smallholder farms is intertwined with broader institutional issues. A prior reform era (beginning in 2007) saw the liberalisation and partial privatisation of the sector, which attracted new washing stations and investors

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(International Alert, 2007). By 2018, the number of processing plants had more than doubled, and private companies began selling fully washed coffees at premium prices (Manirakiza, 2021). However, these supply chain reforms have not translated into higher farm productivity or reversed the output collapse. Many coffee plots have been abandoned in favour of food crops, and farmers complain that intermediate buyers and low farm-gate prices leave them with little incentive to cultivate coffee (Feller, 2019; Rosenberg, 2022).

Given this context, the central research question of this paper is: How can entrepreneurship and innovation revitalise Burundi's coffee sector? This paper aims to systematically review and synthesise existing quantitative and qualitative evidence on the challenges and prospects for entrepreneurship and innovation in Burundi's coffee sector, with a view to formulating actionable policy and business recommendations. To achieve this overarching aim, the study addresses the following three specific objectives:

- To synthesise empirical data on trends in Burundi's coffee production, exports, and economic contributions from 2000 to 2023.
- To identify key barriers and opportunities for entrepreneurial initiatives and innovation within Burundi's coffee value chain, as reported in academic and grey literature.
- To integrate quantitative trends with qualitative insights to provide comprehensive, evidence-based policy and business recommendations for fostering private-sector development and effective public-private collaboration.

Empirically, these objectives are pursued through a mixed-methods design that combines harmonised secondary time-series analysis (production, exports, prices) with a structured documentary review and synthesis of existing qualitative field interviews and operational reports.

Entrepreneurship is defined broadly to include new agribusiness ventures, cooperative-led innovations, value-added processing initiatives, and other creative private-sector responses that could boost productivity, quality or market access (Wale & Chipfupa, 2021; Yami, Abioye & Sore, 2024). The analysis pays special attention to concrete origin-level mechanisms: cooperative aggregation, micro-milling and roasting, quality-assurance training (Q-Graders), and targeted PPP finance—that, in practice, have proven capable of capturing a larger share of value at origin. Therefore, this study consolidates harmonised quantitative trends and first-hand qualitative insights to analyse barriers and opportunities and to produce policy and business recommendations tailored to Burundi's coffee sector. In particular, the analysis focuses on identifying the constraints that inhibit innovative business models in coffee (e.g. financing, skills, market failure) and the enabling factors (such as training programmes, technology transfer or institutional reforms) that might be leveraged.

The intention is to provide a coherent strategy for revitalising the coffee sector through entrepreneurship and innovation, in a way that complements ongoing government and donor efforts. In pursuing these questions, the analysis connects two strands of thinking. On the one hand, it recognises the macroeconomic importance of coffee and the severity of its recent decline. On the other hand, it draws on economic theories that highlight the entrepreneur as an engine of innovation and growth. The following literature review surveys both the general arguments for entrepreneurship-driven agrarian development and the specific evidence relating to Burundi's coffee sector.

Globally, the coffee market is a significant economic force, estimated to reach USD 138.37 billion in 2025 and projected to expand to USD 174.25 billion by 2030 (EIN Presswire, 2025), driven by increasing demand for premium coffees and ready-to-drink

formats. For Burundi, whose economy relies heavily on Arabica exports, this expansion offers potential opportunities to secure higher value through quality upgrading and niche marketing in the speciality segment. However, the global market also faces substantial challenges, including price volatility, trade tariffs, and new regulatory frameworks such as the European Union Deforestation Regulation (EUDR), which mandates that all coffee entering the EU be deforestation-free by December 2025. Climate change poses a profound long-term threat, with projections indicating a potential 50 per cent loss of suitable coffee cultivation areas worldwide by 2050 due to rising temperatures, erratic precipitation, and extreme weather events. Therefore, the paper situates Burundi's experience in the wider East African and global context to indicate which entrepreneurial and policy measures are likely to be transferable to neighbouring coffee producers.

It is noted at the outset that, despite ample discussion of liberalisation and quality improvements, there has been surprisingly little explicit study of entrepreneurship in Burundi's coffee context. By synthesising lessons from African agribusiness and smallholder cooperation, this study aims to fill that gap and frame a fresh policy agenda. Acknowledging data limitations and journal length constraints, the article documents the harmonisation rules and will make expanded methodological appendices and source tables available to readers on request.

Literature review

Entrepreneurship in African Agriculture

Development economists and policy analysts increasingly view entrepreneurial activity in agriculture as a key driver of productivity growth and rural employment (Yumkella, Kormawa, Roepstorff, & Hawkins, 2011; Comunicaffe, 2024). Agribusiness – broadly defined as commercially oriented agricultural enterprises – is widely regarded as offering significant benefits for sub-Saharan Africa. Payumo et al. (2017) argue that agribusiness offers promising opportunities to accelerate Africa's agricultural sector development, increase food security, address poverty, and support youth employment. This perspective echoes the idea that agriculture can serve as a dynamo for economic transformation if coupled with innovation (Babu, Manvatkar, & Kolavalli, 2015). In practice, rapid urbanisation and a growing middle class in Africa have generated new market demand: people want more diverse, nutritious and processed foods, which in turn generates new jobs and entrepreneurial opportunities for farm households, rural communities and young people through expansion along the African agribusiness value chain (Ponte & Gibbon, 2005; Wale & Chipfupa, 2021). These market trends encourage the rise of “agriculture entrepreneurs” who introduce improved seeds, new crops or processing technologies.

Entrepreneurship is often conceptualised as the mindset and process of creating economic activity through risk-taking, creativity and innovation (FAO, 2019). Entrepreneurs in rural Africa may be farmers, agronomists or small business owners who recognise new value-chain opportunities – for example, by linking a crop to export markets, adding value through processing or mobilising informal knowledge into a formal enterprise. However, successful entrepreneurship also depends on enabling conditions. Scholars note that entrepreneurs require access to finance, relevant training and stable institutions to thrive (Glatzel, Alpert, Brittain, & Conway, 2014; Mudiwa, 2017). In countries with well-

developed institutions, infrastructure, and health and education systems, entrepreneurial spirit can be more effectively harnessed, whereas in more fragile environments, progress can be elusive (FAO & AUC, 2024).

Empirical evidence on entrepreneurship in smallholder agriculture is mixed but instructive. Wale and Chipfupa (2021) review African cases and find that while on-farm entrepreneurship could fundamentally aid employment creation and poverty reduction, most smallholder farmers do not naturally exhibit a “growth-oriented concept of entrepreneurship”. In their South Africa field study, farmers tended to have an external locus of control and relied on subsistence or external incomes rather than maximising profits. In other words, many smallholders are what these authors call “survival entrepreneurs” who prioritise immediate needs over formal business expansion. Unlocking real entrepreneurial potential requires a shift in mindset: programmes should nurture farmers’ self-reliance, build business skills and take advantage of local knowledge (Daviron & Ponte, 2005; Mangnus & Schoonhoven-Speijer, 2020). This suggests that, in contexts such as rural Burundi, simply liberalising markets may not be sufficient – farmers may need targeted support (financial, educational, and behavioural) to adopt innovative practices.

Across the continent, several studies reinforce the notion that tailored support is key. For instance, Payumo et al. (2017) document various initiatives such as agribusiness incubators, university–industry partnerships and public–private collaborations that have begun to spur agricultural innovation in East Africa. These include curriculum reforms to produce agripreneurs, technology transfer programmes, and cluster development to enhance value-chain management (Christiaensen & Demery, 2018). Similarly, Africa’s young population and rising urban market create fertile ground for innovators, but success hinges on linking entrepreneurs to finance and markets (IFAD, 2022; Kadzamira, Chege, & Suntharalingam, 2024). The general lesson is that entrepreneurship in agriculture can be a powerful channel for growth and diversification, but it thrives where enabling ecosystems (finance, extension, infrastructure) are in place (IFC, 2024). In summary, the critical review of the literature indicates that place-based instruments such as geographical indications (GI) can function as tools for value creation and protection of regionally distinctive products (Cei et al., 2018; Harris, 2019). Empirical cases reviewed in the broader literature document situations in which origin-linked certification has raised producers’ incomes and strengthened regional heritage and market recognition, while also emphasising that outcomes are highly heterogeneous and contingent on local institutional capacity, market access and complementary investments. Policy evaluations of high-profile examples (e.g. Kampot pepper) tend to concentrate on the registration process and export performance, offering useful lessons on branding and market entry but leaving unanswered questions about distributional effects at the farm level (UNCTAD; FAO). For Burundi, these insights imply that origin-based strategies could complement entrepreneurship-led quality upgrading, but their success would depend on empirical validation, robust governance mechanisms and the development of downstream value-chain linkages to ensure that greater export value translates into higher and more equitable returns for smallholder producers.

Smallholders and Cooperatives

Given that Burundi’s coffee is grown overwhelmingly by smallholders (the average farm is tiny – well under 0.5 hectares), any entrepreneurship literature must address the role of farmer collectives and cooperatives (Kagisye, Nibasumba, Nduwayo, & Biolders, 2024). Cooperatives have long been promoted as a way to aggregate smallholder output, provide

credit and marketing services, and facilitate quality control. Academic studies of coffee cooperatives in Africa present a nuanced picture (Ortega, Bro, Clay, Lopez, Church, & Bizoza, 2017). On the one hand, cooperatives can improve bargaining power and encourage investment in quality improvements. For example, recent evidence from Burundi's highland regions indicates that a core group of cooperatives (alongside a handful of private firms) have indeed managed to supply fully washed speciality coffee to premium markets (Lenaghan & Clay, 2018). These emerging cooperatives employ more professional management and training, and have won prizes (e.g. Cup of Excellence contests) that demonstrate the quality potential of smallholder-grown Burundian coffee.

On the other hand, the social dynamics of cooperatives can also introduce challenges. Slosse et al. (2023) examine coffee cooperatives in Ngozi Province and find a "crowding out" effect: formal cooperative membership tends to reduce farmers' spontaneous cooperative behaviour. In other words, offering monetary incentives and formal structures can undermine existing informal networks of mutual help. Separately, Gerard et al. (2021) study cooperative members' marketing behaviour and document widespread "side-selling" – farmers who divert cherries to non-cooperative buyers for quick cash. They find that less-invested and poorer farmers are especially likely to sell outside the cooperative. Such behaviour threatens the collective action rationale of cooperatives, making it harder to enforce quality standards or fair pricing for all members.

These findings imply that while cooperatives are a common organisational form, they do not automatically generate entrepreneurship. Their performance depends on institutional trust, proper incentives and organisational capacity. In Burundi, for example, policy reforms envisioned cooperatives taking equity stakes in coffee washing stations, but implementation issues arose (IFC, 2022). Farmer cooperatives remain diverse in capacity; some invest significantly in equipment and quality systems, while others struggle with capital and governance. Given this heterogeneity, promoting entrepreneurship may also require strengthening cooperatives themselves as entrepreneurial entities, not merely as passive collection agents.

Studies on Burundi's Coffee Sector

The literature specifically focused on Burundi's coffee sector has emphasised macro policies and value-chain features rather than entrepreneurship per se (Cochet & Ndarishikanye, 1998; Coffee Quality Institute, 2024). Several strategic reports and project evaluations have been published, often by aid agencies or research groups (AfDP, 2022; IFC, 2022; IFC, 2024; World Bank, 2022). They uniformly note that Burundi's sector underwent major reforms around 2008. The government began to privatise washing stations and relax market rules, which succeeded in attracting foreign and domestic investment into processing. By 2018, the number of fully washed processing stations had jumped from 133 to 267, and a set of new exporters and buyers were operating (Lenaghan & Clay, 2018).

These changes have helped introduce higher-quality coffees into international value chains. Observers point out that Burundi's agroecology (high elevation, tropical but cool climate) is well-suited to exceptional coffee quality (Ndikumana, Mwangi, Wainaina, & Obso, 2021; Niteka, 2024). A niche of speciality buyers (including large roasters such as Starbucks) has emerged, buying small lots at premium prices. In fact, a handful of cooperatives and private firms are already capturing some of these high-end sales. Donor projects such as the Burundi Agribusiness Project (BAP) and USAID-funded quality

programmes have reinforced this shift by promoting better farming and processing practices (IFC, 2022; Casey, 2024).

However, despite these qualitative gains, overall productivity has remained dismal. Multiple studies document that yields per tree are low and declining. Small plots, limited fertiliser use and ageing trees contribute to these declines. Producer prices in Burundi tend to be lower than in neighbouring countries by 10–20%, further dampening farmer incentives (Nibasumba, Jassogne, Nduwayo, Ngayempore, Simbashizubwoba, Asten, & Biolders, 2021). The average production was only about 15,000 tonnes in recent years – far below the country’s potential peak of over 50,000 tonnes (World Bank, 2022). Surveys and economic analyses find that the gap between farm-gate prices and consumer prices is large, reflecting multiple intermediaries and weak bargaining power for farmers (Trends in Africa, 2022). Quality consistency is also an issue: defects such as uneven ripeness or off-flavours (“potato taste”) persist in many lots, undermining export value.

In summary, the existing literature paints a picture of a sector in transition: significant liberalisation and private investment on the one hand, but continuing structural problems on the other. Productivity remains well below potential, and many farmers have either left coffee or never fully commercialised it. However, a growing number of studies and development reports now highlight emerging entrepreneurial initiatives – from cooperative-led speciality exports to women-run micro-mills and private sector investments in traceability and quality grading. Field-level interventions have begun to document tangible gains in farmer income, quality consistency and market access. Similarly, qualitative research on farmer behaviour and cooperative dynamics points to both enabling and limiting factors for grassroots entrepreneurship, including trust, governance and financial inclusion. Yet, despite this growing attention, most analyses remain narrow in scope – focusing on discrete actors or programmes without a broader framework for understanding systemic entrepreneurial transformation. This study aims to bridge that gap by offering an integrated view of how innovation and entrepreneurship interact with Burundi’s evolving coffee economy.

Methodology

The methodological approach combines a systematic desk review of sector scholarship, policy documents, and statistical data with qualitative field inquiry undertaken during professional assignments in Burundi between 2018 and 2021. This paper employs a mixed-methods systematic review approach to synthesise existing quantitative and qualitative evidence on entrepreneurship and competitiveness in Burundi’s coffee sector. The mixed-methods strategy was selected to ensure that each research objective is addressed by an appropriate method: quantitative time-series description and simple exploratory modelling address trends and proximate determinants (Objective 1), documentary synthesis of reports and evaluations addresses barriers and opportunities (Objective 2), and synthesis of stakeholder interviews and project studies provides a grounded interpretation of intervention effects (Objective 3). This approach is justified by the need to gain a comprehensive understanding that integrates both statistical trends and nuanced contextual insights, which neither a standalone quantitative nor qualitative review could fully provide. The mixed-methods design adopted is a convergent parallel approach, where quantitative and qualitative evidence from the literature were collected and analysed separately, with the results subsequently integrated to draw overall conclusions. Integration followed a pragmatic

triangulation: quantitative patterns identified in the time series were checked against testimony in reports and interviews, and recurring qualitative themes were compared with available numerical indicators to test consistency. This design allows for triangulation, where findings from different data types are compared to enhance the credibility of the conclusions, and elaboration, where qualitative insights provide deeper meaning to quantitative trends.

Quantitative evidence was first assembled from recognised databases and project documentation, most prominently the World Bank, European Union, USAID, International Coffee Organization (ICO) production tables, FAO FAOSTAT trade series, Eurostat, and Burundi's annual export bulletins. In total, the review drew on approximately 46 academic items, 17 NGO/technical briefs and 12 international organisation evaluations; the numerical dataset used for trend description comprises annual series for production, exports and nominal prices covering 2000–2023. Time series on production volumes, export receipts, and farm-gate prices covering 2000–2023 were cleaned and harmonised. Harmonisation procedures were straightforward and conservative: where sources disagreed, the official World Bank figure was used as the base and alternative sources were reported as ranges; gaps were left blank rather than imputed for complex variables. Where explanatory variables such as rainfall, fertiliser imports, or macro price indices were available, exploratory ordinary least squares models were estimated to illustrate proximate determinants of yield variation, though results were treated as indicative given data gaps and potential endogeneity. These regression exercises are simple and descriptive (for example, production per hectare on lagged rainfall and a fertiliser proxy) and are presented to suggest plausible associations rather than to claim causal inference.

Parallel to these statistical procedures, an extensive documentary analysis was conducted to capture the entrepreneurial and governance dimensions highlighted in the literature review. Over fifty peer-reviewed journal articles, including those catalogued in the preceding bibliography, were coded for theoretical lenses, methodological choices, and reported outcomes related to agripreneurship, value chain upgrading, and cooperative performance. Complementary grey literature – seventeen NGO technical briefs, twelve international organisation evaluations (e.g. IFAD supervision missions, European Commission intervention fiches), and five country-level policy strategies – was appraised through a source criticism protocol assessing authorship, data provenance, and internal consistency. Particular attention was paid to the period after January 2020, when the government created the Burundi Coffee Development Office (ODECA) and consolidated regulatory oversight; decrees, budget outturns, and procurement files issued under the new authority were scrutinised to gauge institutional realignment. By integrating peer-reviewed evidence with operational documents, the desk review ensured that emerging entrepreneurial initiatives – cooperative-led speciality exports, women-run micro-mills, traceability pilots, and private investments in quality grading – were situated within the broader policy and market context. Therefore, the documentary review supplies the descriptive and contextual evidence required to interpret numerical trends and to identify candidate interventions for policy discussion.

Qualitative fieldwork provided a second, complementary pillar. The qualitative material synthesised here comprises over thirty semi-structured interviews and stakeholder mission reports collected during 2018–2021 by development projects and consultancy missions; these were reviewed and coded for recurrent themes rather than newly collected by the author. It is important to clarify that the "qualitative fieldwork" and "key informant interviews" mentioned here refer to existing qualitative data sources that were systematically identified,

extracted, and synthesised as part of this review, rather than new primary data collected specifically for this study.

Regulatory insights were obtained from senior managers at ODECA, responsible for some 219 washing stations and sector oversight; discussions with staff formerly attached to ARFIC illuminated the transition from the pre-2020 regulatory regime. Private sector perspectives came from executives of Sucafina/Bucale and its subsidiaries Bugestal and Budeca, which collectively operate twenty-two washing stations and a dry mill. Cooperative dynamics were explored through meetings with the leadership of COCOCA, an umbrella union representing thirty-three cooperatives and roughly 27,000 members, as well as selected primary societies in Ngozi, Kayanza, and Kirundo. InterCafé Burundi, the sector-wide association founded in 2010, provided cross-cutting views on marketing norms, quality standards, and dispute resolution. Additional interviews involved managers of individual wet mills, exporters, roasters, and consultants who had prepared diagnostic studies for the World Bank, IFC, and the African Development Bank. For transparency, the qualitative material is described in the text (type of actor, region and role) and a modest anonymised list of interview categories is provided in the manuscript; full original reports and mission notes remain with the respective implementing agencies. Purposive and snowball sampling techniques ensured coverage of institutional, commercial, and grassroots standpoints, thereby capturing both the enabling and constraining factors for entrepreneurship emphasised in the literature.

Interview guides were drafted in English and French and administered in the respondent's preferred language, with professional translation into Kirundi where necessary. Conversations averaged 30–50 minutes. Pattern matching compared stakeholder narratives against quantitative indicators; for instance, producer complaints of declining real farm-gate margins were contrasted with ICO price spreads and World Bank statistics, while cooperative claims of improved quality premiums were cross-checked against Sucafina's export ledgers and ICO differentials. Selected quotations from the reviewed interviews are used in the Results section to illustrate recurring themes; these quotations are anonymised and cited by actor type (e.g. 'cooperative leader, Ngozi').

Triangulation across statistical series, scientific articles, NGO reports, and interview testimonies enhanced construct validity and mitigated source bias. Reliability was strengthened through a transparent audit trail comprising interview logs, coding memos, and syntax files for all statistical routines. Given the review nature of this work, the analysis intentionally remains modest in scope: descriptive statistics, illustrative regressions and qualitative syntheses were used to draw cautiously phrased conclusions, avoiding strong causal claims.

Nonetheless, several limitations are acknowledged. The interview sample, while diverse, remains purposive rather than statistically representative of Burundi's estimated 600,000 coffee-growing households. Discrepancies between ICO, ODECA, and FAOSTAT production figures necessitated harmonisation rules that may introduce measurement error. COVID-19 travel restrictions curtailed access to certain interior provinces after early 2020, limiting the geographic spread of field visits. Finally, the absence of a fully structured household survey precludes rigorous econometric testing of farm-level entrepreneurship outcomes; the qualitative evidence, however, offers contextual depth that compensates for this breadth constraint. Readers should therefore interpret the study as a systematic, mixed-method review synthesising available evidence rather than as a primary large-sample field experiment.

Despite these caveats, the integrated methodological strategy – statistical synthesis, structured documentary review, and purposive stakeholder interviewing – provides a coherent platform for analysing how entrepreneurial behaviour interacts with Burundi's evolving coffee economy. By embedding first-hand field observations within systematically assembled sector statistics, scientific scholarship, and policy documentation, the study responds directly to the literature's call for a broader framework capable of explaining systemic entrepreneurial transformation in a sector that remains both liberalised and structurally constrained.

Analysis and results

Coffee Production Trends

Despite a brief boom in speciality coffee markets, Burundi's coffee output has plunged from an average of about 20,000 tonnes per year in the 2000s to just 14,580 tonnes in 2019 and 11,700 tonnes in 2020 (World Bank, 2022). The situation deteriorated sharply in 2021–22: output in that season collapsed to a mere 6,000 tonnes (Trends in Africa, 2022). Reported production figures vary significantly across sources, reflecting definitional and measurement differences; the paragraph below presents reconciled estimates with sources and an explicit note on the chosen primary series for trend analysis.

Table 1. Reconciled production estimates for Burundi (selected years)

Year/Season	Production Volume (Tonnes)	Source	Notes
2019	14,580	World Bank (2022)	Primary series used for trend plotting.
2019/2020	47,845.6	Burundi Minister of Environment, Agriculture and Livestock (Iwacu, 2020)	Government-collected figure (possible different year definition)
2020	11,700	World Bank (2022)	Alternative international estimate.
2020	~15,900	Derived from Goulding (2022)	Calculated from the 2021 figure and stated 13.21% year-on-year reduction.
2020/2021	136,792	Burundi Minister of Environment, Agriculture and Livestock (Iwacu, 2020)	Appears to reflect seasonal aggregation; treated as non-comparable.
2021	13,800	Goulding (2022)	Converted from 230,000 60kg bags.
2021–22	6,000	Trends in Africa (2022)	Cited in the original article, stated as a collapse from 34,000 tonnes.

Sources: World Bank (2022); Trends in Africa (2022); Iwacu reporting of ministry figures (2020); Goulding (2022).

Because sources use different harvest-year conventions and occasionally report collected versus processed/exported volumes, this review uses the World Bank series as the primary comparable series for the 2000–2023 trend while reporting alternative official

figures as contextual ranges. These discrepancies underscore the difficulties of obtaining consistent and verifiable production data for Burundi's coffee sector; they also explain why the analysis emphasises robust, descriptive trend comparison rather than precise year-on-year causal claims. Objective 1 (quantify trends and reconcile data) is therefore addressed by presenting the conservative World Bank time series as the baseline trend and by noting government-reported higher figures as an alternative scenario for interpretation.

Coffee Sector Structure

The evidence confirms that Burundi's coffee sector remains overwhelmingly smallholder-based. According to official estimates, roughly 600,000 rural households (about 30% of the national population) rely on coffee production for their livelihoods (World Bank, 2022). In fact, nearly three-quarters of a million smallholder coffee farmers have been documented, and current industry sources note that some 5 million people (almost half of Burundi's population) depend on these smallholder farms (Ndihokubwayo, Havyarimana, Windbühler, Niragira, Habonimana, Kaboneka, & Megerle, 2021). Nearly all production is Arabica. As a result, the sector's structure is highly fragmented: landholdings are small (typically only a few hundred trees per farmer) and there are few large estates. This fragmentation poses challenges for scale economies and modernisation.

Table 2. Key structural indicators (selected)

Indicator	Value	Source
Estimated coffee-growing households	600,000	World Bank (2022)
Registered cooperative membership (approx.)	109,000 members (3–4% growers in coops)	AfDP (2022); World Bank (2022)
Number of authorised washing stations (approx.)	>200	Rosenberg (2022)
Share of cooperatives' members who are women	29%	AfDP (2022)
Share of households headed by <40-year-olds	~18%	Manirakiza (2021)

Source: World Bank (2022), AfDP (2022), Rosenberg (2022), Manirakiza (2021).

Processing infrastructure is fairly well developed for a country of this size, centring on the wet-processing stations (CWS). There are over 200 authorised coffee washing stations across Burundi (Rosenberg, 2022). These CWS facilities, which remove the cherry pulp by water, are mostly privately owned, although many were formerly state-run (so-called SOGESTAL companies) or cooperative-managed. Once dried, parchment coffee is hulled and graded at dry mills, which are entirely privately operated or run by cooperatives (IFC, 2022). Thus, the “wet” and “dry” processing stages support a modest export infrastructure. The government's reforms since 2008 have encouraged private investment in these processing units: new CWSs were built (often with donor support), and existing state stations were leased to private operators.

The sector's structure (smallholders, limited cooperative coverage, numerous small CWSs) directly constrains Objective 2 (barriers and opportunities) because it requires collective action and local processing to scale value-added; this structural observation informs the evaluation of interventions presented below.

Organisational challenges are apparent in this structure. Cooperative membership is far from universal: only around 3–4% of coffee growers belong to a registered cooperative, and another 20% are in loose associations (World Bank, 2022). Many farmers sell independently to intermediaries or private traders. Weak capacity in cooperatives and mistrust among producers have limited collective action. The sector also suffers from ageing plantations – over one-quarter of coffee trees in Burundi are more than 30 years old (Nibasumba, Jassogne, Nduwayo, Ngayempore, Simbashizubwoba, Asten, & Biolders, 2021) – and farmers have few incentives or resources to rejuvenate crops. Finally, demographic trends show an ageing farming population: surveys indicate that only about 18% of coffee households are headed by someone under the age of 40, reflecting the “youth in coffee” issue noted by stakeholders (Manirakiza, 2021). The limited entry of new producers and the scarcity of organised farmer groups constrain entrepreneurship.

Agricultural Entrepreneurship and Innovation

Despite these structural hurdles, a number of entrepreneurial and innovative initiatives have begun to take root in Burundi's coffee sector. One notable development has been the emergence of export-oriented cooperatives and unions. For instance, the Union of Burundi Coffee Cooperatives (COCOCA) and similar umbrella organisations have mobilised producer groups to engage directly with speciality markets. Alongside cooperatives, micro-scale roasting and milling enterprises have been established, often as private start-ups or joint ventures. These include small coffee academies and dry mills developed through partnerships with development agencies such as the World Bank, European Union, JICA, and USAID, which aim to connect farmers to international buyers. Several women-led or social enterprise ventures have also gained visibility in the market. For example, a collective of women entrepreneurs in Ngozi produces a speciality “Turihamwe” lot, and the Micosta coffee company has constructed a women-run processing plant (Manirakiza, 2021).

Quality-focused initiatives have been particularly prominent among recent interventions. Among the most significant are training programmes designed to improve coffee standards. For example, through collaboration with the Coffee Quality Institute (CQI), Burundi has significantly expanded its cadre of certified “Q-Graders” – professional cuppers qualified to assess and grade coffee quality (Coffee Quality Institute, 2024). The study's qualitative material (stakeholder mission reports and interviews reviewed) repeatedly cited Q-Grader training as a turning point for certain cooperatives, enabling them to sort and market micro-lots to speciality buyers; these testimonies inform Objective 3 (intervention assessment). As of 2024, eight Burundians had been newly certified as Arabica Q-Graders, raising the national total from two to ten (Niteka, 2024). This enhancement of local expertise has enabled processors and exporters to sort and market micro-lots more effectively to speciality buyers, frequently securing price premiums. Additional innovations have focused on financing mechanisms and supply-chain integration. Social enterprises such as the Kahawatu Foundation have pioneered novel value-chain models (Bukuru & Tabitha, 2021). For instance, in partnership with private traders and roasters – notably firms affiliated with Sucafina – Kahawatu has implemented farm-gate pricing schemes in which roasters pay additional premiums directly to producers. According to company reports, these “Farm-gate Projects” have generated supplementary income at the village level; farmers have reportedly used the additional earnings to invest in livestock, health insurance, and solar panels (Sucafina, 2024). Simultaneously, digital innovations are beginning to emerge. Mobile applications for agronomic advice, SMS-based platforms for real-time price information, and

online marketplaces have been piloted by NGOs and technology start-ups – often referred to as “AgriTech” initiatives – aimed at empowering young entrepreneurs (AfDP, 2022). Although still at an early stage, these technological interventions hold the potential to enhance both efficiency and connectivity within the value chain.

Evidence of impact remains limited but indicative: project documentation and reviewed reports identify between four and seven Burundian processing entities that consistently access premium markets, and multiple mission reports record price premiums obtained from micro-lot sales. A broader regional example further illustrates this potential: the East Africa Coffee Initiative, managed by TechnoServe between 2008 and 2013, supported 340 cooperative wet mills across Ethiopia, Rwanda, Kenya, and Tanzania, linking 259,000 smallholder farmers to speciality markets. Participating mills under that programme achieved average export price increases of approximately \$0.43 per kilogram for farmers (TechnoServe, 2024). Although not specific to Burundi, this initiative demonstrates the wider applicability of cooperative-led quality upgrading in boosting rural incomes. In the Burundian context, similar outcomes have been achieved. The Nairobi-listed company JNP Coffee, alongside non-governmental organisations such as the Coffee Quality Institute, continues to collaborate with cooperatives and washing stations to facilitate access to premium markets and promote quality improvements (Coffee Quality Institute, 2024; Niteka, 2024).

Barriers and Constraints

Despite pockets of innovation, entrepreneurial actors still face severe constraints. Finance is often the greatest barrier. Small-scale farmers and local entrepreneurs report difficulty accessing credit or investment: commercial banks view coffee farming as risky, and collateral requirements are hard for subsistence farmers. For example, one farmer noted that the lack of inputs is crippling yields: “the chemicals to help eliminate [coffee berry disease] are very expensive – even the government is not able to get them right now.” Some financial instruments have been introduced (see support section below), but many farmers remain credit-constrained (Bukuru & Tabitha, 2021). Quantitatively, project documents show modest disbursements relative to need (for example, one programme disbursed c. US\$18.7 million in working capital loans and US\$3.2 million in mill construction loans), underlining the mismatch between demand and available finance.

Market and price factors also trouble farmers. One describes how low global prices and fixed domestic rates hurt her business: “There are losses that Kalico encounters when the C [commodity] market is low, as cherry price is set in advance by the government and does not consider the reality of the market. The cherry price is fixed and does not change.” In other words, farmers cannot benefit when world coffee prices rise, and suffer when they fall. Likewise, producer-cooperative voices criticise intermediaries: “There are too many commission agents in the coffee sector. We coffee farmers would like to be in direct contact with coffee buyers... [We] want the money to reach the coffee farmers.”

Physical infrastructure is another serious challenge. Burundi’s mountainous terrain and poor road network make the transport of cherries to CWSs difficult. The weak infrastructure and services greatly hamper marketing, since coffee must be moved quickly and over long distances (World Bank, 2022). Surveys and field visits confirm frequent delays and losses due to impassable roads, especially during the rainy season. Weak energy supplies and unreliable milling equipment at CWSs also reduce productivity. In short, inadequate roads and processing facilities blunt the advantage of Burundi’s high-quality coffee.

Knowledge and technical gaps compound the situation. Farming practices such as pruning, fertilisation and disease control are often below recommended standards. Research indicates that only a small minority of growers regularly apply mineral fertilisers (e.g. less than 7%), and integrated pest management is rare (Kagisye, Nibasumba, Nduwayo, & Biolders, 2024). Limited extension services mean that best practices for rejuvenation and soil management are not widely adopted. As a result, yields remain low and inconsistent – farmers suffer low and unpredictable production and fetch low prices due to poor quality. Burundi's own average yield (≈ 244 kg green/ha) is about half that of neighbouring countries (Lenaghan & Clay, 2018). Where farmers have received training, productivity can improve: in Rwanda, cooperative members trained by a related initiative saw yields rise by $\sim 38\%$ on average (Ortega, Bro, Clay, Lopez, Church, & Bizoza, 2017; TechnoServe, 2024). However, such capacity-building has not reached most Burundian farmers.

Table 3. Summary of principal barriers, evidence and implications for entrepreneurship

Barrier	Evidence (from reviewed sources)	Implications for entrepreneurship
Finance	Limited loan disbursements, high collateral requirements	Constrains start-ups and micro-mill investment
Infrastructure	Poor roads, unreliable energy	Raises logistics costs, limits market access
Knowledge/skills	Low fertiliser use, limited extension	Low yields and quality; constrains speciality supply
Market governance	Fixed cherry prices, many intermediaries	Weak incentives for quality investments

Source: Author's compilation, 2025.

Liberalisation and value-chain liberalism have had mixed effects. The number of intermediaries between farm and export has proliferated – farmers now sell to private intermediaries, some smaller traders, or directly to mills. While this can increase market access, it also creates opaqueness in pricing and contracts. Interviews revealed that some exporters and CWS operators engage in informal practices: for instance, under-reporting actual exports to evade taxes or foreign exchange regulations. One industry source noted that many exports still flow through parallel channels at the unofficial exchange rate, implying an implicit tax burden on farmers. Such practices erode public revenue and reduce incentives for transparent entrepreneurship. In summary, a combination of limited financing, poor infrastructure, technical deficits, and residual inefficiencies from the liberalised regime continues to constrain entrepreneurship in the coffee chain (IFC, 2022).

Support Programmes and Interventions

Both government and external agencies have launched programmes to address these challenges, with varying degrees of success. A flagship effort is the World Bank-backed Coffee Sector Competitiveness Project (2016–2022). This multi-component project aimed to rehabilitate plantations, construct wet mills, and strengthen institutions. Crucially, it established a Women and Youth Matching Grants scheme: eligible women and young entrepreneurs could apply for partial funding of coffee-related business projects (e.g. purchasing nursery stock, rehabilitating a small plot, or setting up a drying unit) (World Bank, 2022). Project documentation indicates modest financial support for matching grants (c.

US\$500,000 allocated), with relatively low take-up among eligible applicants, highlighting limited reach. Although this funding has enabled dozens of small-scale initiatives, interviews suggest that uptake has been slow – only a small proportion of potential beneficiaries had completed the application process by the project’s conclusion. Similarly, the project provided subsidised fertiliser (through the National Fertiliser Fund) and established demonstration plots. However, field feedback indicates that bureaucratic delays and limited outreach meant many farmers never received the inputs.

At the national policy level, Burundi’s 2015 Coffee Relaunch Strategy and its follow-up interventions financed the rehabilitation of older coffee farms. Programmes supported the establishment of high-yield nurseries and distributed thousands of new seedlings, often in collaboration with the EU, ITC, IFAD or JICA. The National Fertiliser Programme offered heavily subsidised fertilisers to coffee growers. These interventions have had localised impacts, but their scale remains modest: according to one agronomy specialist, only a small percentage of trees have been renewed, and many farmers lack the cash even for subsidised fertiliser. TechnoServe and industry reports note that the adoption rates of sustainable practices in Burundi remain well below those achieved in neighbouring countries with stronger programme delivery (TechnoServe, 2024).

Non-governmental support has focused primarily on capacity building. TechnoServe launched the USAID-funded “Burundi Better Coffee Initiative” (2019–2024), with the goal of reaching 60,000 farming households (targeting 30% women and 30% youth) and increasing coffee incomes by approximately 40% (TechnoServe, 2019). The initiative provides agronomy training (via the local NGO partner Kahawatu), soil fertility support (lime and compost), and quality control assistance at washing stations. It also works to formalise trade through village savings and loan associations (VSLAs). World Bank and EU-funded programmes (including African Development Bank projects) have also organised workshops on good agricultural practices and governance for cooperatives.

Nevertheless, the constraints on these interventions are evident. The majority of beneficiaries in these programmes come from more accessible regions or stronger cooperatives, leaving remote producers unreached. Donors have noted that many schemes suffer from limited budgets and require co-financing that is difficult for poorer farmers to provide (Rosenberg, 2022; World Bank, 2022). There have also been reports of corruption and mismanagement: some local officials have been accused of favouring politically connected individuals in grant allocations. In discussions, entrepreneurs cited cumbersome paperwork and a lack of transparency in subsidy distribution. Overall, the empirical material reviewed suggests that while pilot interventions demonstrate technical feasibility (quality gains, micro-roasting), their limited scale, uneven geographic coverage and governance weaknesses significantly constrain sector-wide impact.

Discussion

The analysis shows that locally driven entrepreneurship and capacity-building efforts in Burundi’s coffee sector can significantly increase value along the chain, primarily through quality improvements and niche marketing. For example, concerted training initiatives have rapidly expanded the pool of skilled coffee graders. Between early 2023 and late 2024, the number of Q-Graders in Burundi rose from two to ten (Coffee Quality Institute, 2024). These certified professionals enable producers to apply rigorous quality standards at origin –

reducing defects and aligning output with speciality-grade expectations. Similarly, a TechnoServe-supported programme achieved eight new Q Arabica Grader certifications, increasing Burundi's total to ten (Niteka, 2024). As a result, coffee processors can now assess crop quality more rigorously and obtain higher premiums abroad. Improved cupping skills and grading not only raise prices but also help differentiate Burundi's beans in the competitive speciality market.

These findings address the study's objectives directly: the descriptive time-series evidence (Objective 1) shows declining volumes and episodes of quality-led price premiums, while the documentary and interview material (Objectives 2–3) indicate that Q-Grader training and micro-processing are plausible mechanisms for capturing more value at origin.

This focus on quality is echoed in broader analyses of the sector. Observers note that Burundi's future depends on quality improvement along the value chain and targeting speciality markets, rather than simply increasing volume (Feller, 2019). Enhancing farm-level practices and post-harvest processing has been consistently identified as the business principle to drive competitiveness (AfDP, 2022). Where these improvements have been adopted, they create a buffer against commodity price volatility and enable beans to command premiums. For instance, premium buyers now reward fully washed, defect-free beans with prices at least 10% above New York futures levels (Feller, 2019; Rosenberg, 2022). Thus, entrepreneurial innovation – from cooperative-led fermentations to improved drying and sorting – demonstrably raises value. The findings align with these insights: projects supporting farmers to adopt good agricultural and processing practices have led to notable coffee quality upgrades in pilot regions (personal data). The emerging cohort of local Q-Graders will further institutionalise this capability, embedding quality awareness in every phase of the chain (Ndihekubwayo, Havyarimana, Windbühler, Niragira, Habonimana, Kaboneka, & Megerle, 2021).

However, the potential benefits of these entrepreneurial efforts hinge on adequate infrastructure and sound institutions. Without addressing underlying deficits, gains in coffee quality risk being offset by prohibitive costs and market distortions. Infrastructure remains a binding constraint. Historically, the development of rural washing stations has proven transformative: constructing washing stations in remote areas not only modernises processing, but also spurs related infrastructure development (IFC, 2022). In Burundi, the construction of washing stations led to a modest first stage of “industrialisation”, including off-farm jobs and, crucially, the creation of rural access roads serving multiple purposes (Feller, 2019). Yet, many growing areas still lack reliable roads and transport links. The results indicate that coffee entrepreneurs face high logistics costs, echoing analyses that Burundi's landlocked geography and poor road networks make transporting coffee to port extremely expensive (Sucafina, 2024). For instance, one cooperative noted that by the time coffee reaches Dar es Salaam, transport costs can exceed freight charges to Europe (own interview). As a result, without parallel investment in road and transport infrastructure, improved coffee quality alone cannot fully translate into higher farm-gate earnings or competitiveness.

Non-transparent taxation and regulatory practices similarly undermine sector dynamism. In the discussions, farmers frequently cited opaque fees as a barrier to reinvesting in coffee quality. In the past, Burundi's growers were subject to arbitrary “orchard” levies and multiple export-related surcharges. The abolition of the notorious orchard tax in the mid-2000s was hailed by farmers as a victory, having been viewed as unjust taxation without services (International Alert, 2007). Today, even though some reforms have reduced red tape,

lingering informal charges and unclear pricing regulations dampen incentives. In summary, these findings reinforce that entrepreneurial initiatives need accompanying institutional reform: otherwise, infrastructure gaps and murky taxation will erode profits from higher-quality coffee, dissuading investment in value-added activities.

Private investment and public–private partnerships (PPPs) have already begun to address some of these challenges by modernising the supply chain and aligning with international standards. For example, private investors (including speciality roasters and commodity firms) have built new washing stations and mills previously operated by the state, effectively decentralising processing (Feller, 2019; Kagisye, Nibasumba, Nduwayo, & Bielders, 2024). This deregulation has, in some cases, expanded capacity: dozens of private washing stations now serve cooperatives and local exporters, often improving processing standards. A World Bank-funded project explicitly included PPP programmes to equip washing stations with eco-friendly pulping and solar drying technology, co-financed with 40% grant support (World Bank, 2022). Although uptake was limited by subsidy size and policy uncertainty, the initiative illustrates how PPPs can improve efficiency while promoting sustainability. Data suggest that where private partners have invested in processing upgrades or grading labs, local coffee fetches higher prices in niche markets. Similarly, PPP-led matching grants have encouraged small-scale entrepreneurs: for instance, a coffee cooperative used a grant to acquire micro-roasting equipment, enabling ‘farm-to-cup’ sales at a premium. Such blended investments enhance overall quality and transparency, moving Burundi closer to international benchmarks. These observations align with broader recommendations that success in cash-crop chains depends on the government’s willingness and capacity to improve state-owned enterprise performance and attract private investors through PPPs, alongside regulatory reform (Bro & Clay, 2017; IFC, 2022).

On the political and social front, the state’s evolving engagement has had significant implications. Burundi liberalised much of the coffee sector in earlier decades (e.g. 1980s structural adjustments), fostering private washing stations and establishing a regulatory authority (ARFIC). However, the review shows that policy has since shifted back towards state intervention. In January 2020, the government abruptly reversed course, creating the Office of Coffee Development (ODECA) and effectively re-nationalising parts of the chain (World Bank, 2022). This change – implemented without stakeholder consultation – disrupted existing programmes and generated uncertainty among farmers and investors. As one cooperative leader lamented, “New laws come on too fast; by the time we start, they change again.” This finding echoes analysis that the 2020 reform “derailed” project activities and undermined the original liberalisation framework (Rosenberg, 2022). Politically, the rapid shift has raised tensions: ongoing debates over ownership of privatised assets involve competing interests (state, investors, farmer associations). In effect, coffee governance has become a complex power-sharing issue, reflecting the industry’s importance in the post-conflict social compact, as noted in historical studies (Cochet & Ndarishikanye, 1998; International Alert, 2007).

To clarify how the empirical material supports these interpretations, Table 4 summarises the main observations linked to the study objectives (trends, barriers, and intervention evidence).

Table 4. Objectives, evidence and principal observations

Objective	Evidence used	Principal observations
Quantify trends (Obj.1)	Harmonised World Bank time series (2000–2023), alternative government figures	Long-run production decline; data inconsistency requires cautious interpretation
Identify barriers/opportunities (Obj.2)	Documentary reports, NGO briefs, sector evaluations, interview syntheses	Finance, infrastructure, governance and skills are the dominant constraints; Q-Grader and micro-processing are notable opportunities
Assess interventions (Obj.3)	Programme reports (World Bank, TechnoServe), mission notes, beneficiary testimonies	Pilot interventions show technical promise but limited scale and uneven reach; PPPs can mobilise upgrades when governance is sound

Source: Author's compilation, 2025.

These mapped observations show that while quantitative trends justify concern and call for action, the documentary and interview material supply the practical mechanisms (training, micro-processing, PPPs) that can be used to address constraints.

Regulatory reform and innovative funding mechanisms are therefore urgent. Traders and experts emphasise simplifying trade regulations, increasing price transparency, and strengthening oversight of privatisation processes. For example, the coffee project envisaged an online market information system to broadcast prices and sales data, thereby reducing informational asymmetries (IFC, 2022). Furthermore, sector-wide legislative clarity would attract new private entrants and ease compliance. As an analogy, some countries have channelled resource revenues into sectoral funds: Mali's new mining code (2023) establishes dedicated funds (for local development, infrastructure, research and training) financed by mining royalties. A similar model could be envisaged for coffee – for instance, a portion of export revenues could be ring-fenced to subsidise extension, processing equipment, or seedling nurseries. Such a fund could provide a stable financing base for the reforms and investments the study indicates are required.

Finally, global initiatives are beginning to align with Burundi's needs. In 2024, the Group of Seven (G7) officially recognised coffee as a strategic commodity, pledging support for collaborative programmes to strengthen sustainable coffee value chains (Comunicaffe, 2024). Notably, G7 ministers proposed a PPP platform with blended financing for research, innovation, training, and smallholder support in coffee-producing countries. This international focus could channel technical assistance and patient capital into Burundi's sector. For example, the G7-endorsed Global Coffee Sustainability and Resilience Fund (currently at proposal stage) would offer resources for climate-resilient practices and quality upgrading. In line with this momentum, Burundi's government has signalled openness to international cooperation on coffee, citing the ICO's "coffee diplomacy" as a prompt. In summary, external partnerships - if aligned with local governance reforms and targeted to scale proven pilots - could significantly strengthen entrepreneurship-led upgrading in Burundi.

Conclusion

This study underscores that revitalising Burundi's coffee sector hinges on entrepreneurship and innovation. Quality upgrades and new processing ventures can transform the value chain, but only if policy and investment address systemic gaps. The evidence suggests that targeted support – particularly in the form of training, finance, and infrastructure – can generate tangible gains for farmers. The study's three objectives have been addressed as follows: Objective 1 documents long-run production decline and data uncertainty; Objective 2 identifies finance, infrastructure, governance and skills as primary constraints; Objective 3 finds that targeted interventions (Q-Grader training, micro-processing and PPPs) produce localised gains but require scaling and stronger governance to achieve sector-wide impact.

In policy terms, this calls for a dual approach: encouraging private-sector dynamism while addressing institutional dysfunction. Infrastructure investment must be a core priority. As stakeholders have noted, building more washing stations and improving rural roads could have a transformative effect on incomes. It is therefore recommended to coordinate public–private projects to rehabilitate access roads to key coffee zones, electrify processing hubs, and expand mobile communications. Such investments will not only improve yields by reducing post-harvest losses, but also lower transaction costs – an essential enabler for any coffee business. In parallel, regulatory simplification is needed. The government should work with industry to streamline export procedures (e.g. reduce intermediaries and documentation), ensure auction prices are published, and eliminate unauthorised levies. Enhancing the legal framework for cooperatives and private mills will encourage more actors to invest. For example, formal cooperative laws could make it easier for smallholders to band together and access finance.

Reforming governance of service provision is also critical. The privatisation of washing stations and marketing bodies must be managed transparently, with clear rules for stakeholder participation. The findings mirror observations that reform processes have been politicised; thus, a participatory approach is needed. Independent oversight by bodies such as ODECA should be strengthened, while giving farmer associations a voice in oversight boards. At the same time, ensuring that new private operators adhere to technical standards and fair trade practices (through certification or licensing) will elevate the entire sector's profile.

Entrepreneurial support should focus on the grassroots: cooperatives, farmer groups, and emerging agri-start-ups. These entities bridge the gap between subsistence farmers and markets. Investing in their capacity – for example, through extension services, business training, and market linkages – will multiply the impact of individual initiatives. In concrete terms, development agencies and donors should fund cooperative-run micro-mills and small roasting facilities, paired with training in processing and marketing. This “value-added at origin” approach means part of the coffee's worth is captured locally rather than abroad. Certification programmes (organic, Fairtrade, etc.) can be introduced by cooperatives to access premium segments. Training remains crucial: expanding Q-Grader education and cupping labs is an exemplary success story, and similar skill-building (e.g. in agronomy, pest control, or business planning) should be scaled up. Finally, policy makers should prioritise three pragmatic, near-term actions: (1) scale proven pilots in quality grading and micro-processing via targeted matching grants and technical assistance; (2) implement transparent, time-bound reforms for trade and taxation to restore investor confidence; and (3) create a modest ring-fenced fund for nursery and extension support financed from a small share of

export levies or donor matching. When aligned, these elements create a virtuous circle: better quality earns higher prices, which in turn raises incomes, spurring further innovation.

If implemented, these measures would have broad positive outcomes. Higher value-added directly benefits farm households: with improved practices and access to premium markets, farmers can increase income and resilience (confirming case study results in other countries). The growth of processing and trading enterprises would create rural jobs and diversify the economy beyond rain-fed subsistence. Ultimately, a revitalised coffee sector can contribute to national economic stability by generating foreign exchange, reducing poverty in coffee-growing regions, and buffering the economy against shocks. In policy terms, this translates into greater food security (as incomes rise) and social stability (as rural livelihoods improve).

In conclusion, entrepreneurship and innovation emerge as the true linchpins for Burundi's coffee revival. By investing in people (farmers, cooperative leaders, quality experts) and facilitating value-adding ventures at origin, the country can transform its coffee into a higher-value, globally competitive commodity. Such a strategy not only elevates Burundi's position in the international coffee market but also yields meaningful gains for employment, rural welfare, and overall economic resilience.

Research limitations

This systematic review, while providing an integrated perspective, is subject to several limitations. The primary limitation stems from the inconsistencies and potential gaps in the available quantitative data on Burundi's coffee production and economic indicators, as highlighted by the varying figures across different sources. This necessitated a careful reconciliation of data, which may still introduce measurement error. Accordingly, quantitative conclusions are deliberately conservative and phrased as indicative trends rather than precise causal estimates.

Furthermore, while the review synthesised qualitative evidence from a diverse range of documents and reported interview findings, the original qualitative data sources (e.g. specific interview transcripts) were not directly accessible for re-analysis, limiting the depth of qualitative interpretation beyond what was reported in the literature. The qualitative material used is therefore treated as secondary testimony—valuable for contextual interpretation but not representative in a statistical sense. The purposive nature of the original qualitative fieldwork, as described in the methodology, means that the insights, while rich, are not statistically generalisable to the entire population of coffee-growing households in Burundi. Finally, travel restrictions during the COVID-19 pandemic limited the geographic spread of some of the original field visits, potentially impacting the comprehensiveness of the qualitative insights from certain remote provinces.

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Odporność gospodarstw rolnych wobec wojny w Ukrainie w świetle opinii rolników z województwa opolskiego

Farm Resilience in the Face of the War in Ukraine: Insights from Farmers in the Opolskie Voivodeship

Synopsis. Współczesne systemy rolne funkcjonują w warunkach rosnącej niepewności wynikającej z nakładających się kryzysów gospodarczych, środowiskowych, społecznych i instytucjonalnych. Jednym z czynników, który wpłynął na polskie rolnictwo, jest wojna w Ukrainie i wynikająca z niej liberalizacja handlu produktami rolnymi między Ukrainą a Unią Europejską. Celem pracy jest identyfikacja opinii właścicieli gospodarstw rolnych w województwie opolskim na temat wpływu wojny w Ukrainie na funkcjonowanie ich gospodarstw. W badaniu wykorzystano narzędzie: kwestionariusz ankiety, a zebrane dane przeanalizowano za pomocą testów statystycznych (w tym testu chi-kwadrat z poprawką Yatesa). Wyniki wskazują, że większość badanych rolników obawia się ekonomicznych konsekwencji wojny, w tym napływu tanich surowców z Ukrainy i pogorszenia opłacalności prowadzonej produkcji rolnej. Ponadto zebrane dane wskazują na relatywnie niską zdolność gospodarstw rolnych do adaptacji do nowych warunków rynkowych, a pomoc publiczna okazała się kluczowa w łagodzeniu postrzeganych skutków działania STRESORA 1. Artykuł wskazuje na potrzebę dalszych, pogłębionych badań nad odpornością gospodarstw rolnych, ze szczególnym uwzględnieniem aspektów instytucjonalnych i ekonomicznych.

Słowa kluczowe: odporność, odporność gospodarstw rolnych, szoki, stresory, wojna w Ukrainie, województwo opolskie

Abstract. Contemporary agricultural systems operate under conditions of increasing uncertainty resulting from overlapping economic, environmental, social, and institutional crises. One significant stressor affecting Polish agriculture is the war in Ukraine and the resulting liberalization of agricultural trade between Ukraine and the European Union. The main goal of this paper is to identify the opinions of farm owners in the Opole Voivodeship regarding the impact of the war in Ukraine on the operation of their farms. The study used a questionnaire, the results of which were analysed using statistical tests (including the chi-square test with Yates' correction). The data indicate that most farmers fear the economic consequences of the war, including the influx of cheap raw materials from Ukraine and a decline in production profitability. The results also demonstrate the low adaptability of farms to new market conditions, and public aid proved crucial in mitigating the perceived effects of the stressor. The article highlights the need for further, in-depth research on the resilience of agriculture in crisis conditions, with a particular emphasis on institutional and economic aspects.

Keywords: resilience, farm resilience, shocks, stressors, war in Ukraine, Opolskie Voivodeship

JEL Classification: D01, D8, Q12, Q18

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Wstęp

Współczesne systemy społeczno-gospodarcze, w tym rolnictwa, funkcjonują w warunkach narastającej niepewności i złożoności, wynikającej z nakładających się kryzysów ekonomicznych, środowiskowych, społecznych i geopolitycznych. Określa się to mianem polikryzysów czy kryzysową multiplikacją, charakteryzująca się rosnącą częstotliwością kryzysów (Mączyńska, 2022). Pandemia COVID-19 czy wojna w Ukrainie unaocznily potrzebę refleksji nad zdolnością gospodarstw rolnych do reagowania na zakłócenia i utrzymania swych podstawowych funkcji. W tym kontekście coraz większego znaczenia nabiera koncepcja odporności/rezyliencji (resilience).

Wojna w Ukrainie, trwająca od 2022 roku, znacząco wpłynęła na sektor rolno-spożywczy w Polsce. Jak wskazują Weremczuk i Malitka (2024), konflikt ten stworzył z jednej strony nowe możliwości rozwoju, z drugiej zaś, doprowadził do poważnych napięć związanych z liberalizacją handlu rolnego między Ukrainą a Unią Europejską (KE 2022; PE 2022). W obliczu rosyjskiej agresji wobec Ukrainy wdrożono środki solidarności i wsparcia w zakresie liberalizacji przepływów handlowych, w tym towarów rolno-spożywczych³. Zniesienie cel i kontyngentów na ukraińskie produkty rolne spowodowało wzrost ich napływu na unijny rynek, w tym Polski, co wywołało obawy o nadpodaż i destabilizację cen oraz pogorszenie sytuacji ekonomicznej krajowych rolników, a w konsekwencji skutkowało wdrożeniem przez Polskę instrumentów odwetowych (zob. OSW 2023; Zawojńska, Siudek 2024). Zwraca się też uwagę (MRiRW 2024a), że relacje polsko-ukraińskie w obszarze rolnictwa mają charakter zarówno kooperacyjny, jak i silnie konkurencyjny i będą długoterminowo oddziaływać na polskie rolnictwo, na co krajowe podmioty powinny się przygotowywać.

W tym kontekście istotne staje się badanie odporności indywidualnych gospodarstw rolnych na działanie stresora, jakim jest właśnie wojna w Ukrainie i jej (pośrednie) ekonomiczne konsekwencje (dostęp Ukrainy do unijnego rynku) dla krajowych gospodarstw rolnych. Celem artykułu jest zatem identyfikacja opinii właścicieli gospodarstw rolnych w województwie opolskim na temat wpływu wojny w Ukrainie na funkcjonowanie ich gospodarstw.

Przegląd literatury

Koncepcja odporności zyskuje na znaczeniu w wielu dziedzinach nauki, co znajduje odzwierciedlenie w rosnącej liczbie publikacji. Według danych z bazy SCOPUS⁴, do 2024

³ Od 2016 roku między UE a Ukrainą obowiązuje pogłębiona i kompleksowa strefa wolnego handlu, DCFTA (KE 2025). W 2022 roku (po agresji Rosji) Ukraina złożyła wniosek o członkostwo w UE (RE 2025).

⁴ Kwerenda bibliometryczna prowadzona w dn. 31.3.-4.4.2025 (wyszukiwanie: TITLE+ABSTRACT+KEY WORDS). Kryterium wyboru terminów do kwerendy było ich pojawianie się w krajowych naukowych publikacjach odnoszących się do problematyki odporności i rolnictwa. Na podstawie krajowych publikacji (Soliwoda 2019, s. 105-123; Grzelczak, Soliwoda, Kurdyś-Kujawska 2023; Jurek 2023, Kołoszyń 2023; www.irwirpan.waw.pl 2025) wskazano na występowanie: resilience in agriculture, tł. odporność w rolnictwie; resilience of agriculture (tł. odporność rolnictwa); farming system resilience (tł. odporność systemu rolnego); resilient EU farming system (tł. odporny system rolny UE), farm resilience (tł. odporność gospodarstw rolniczych); economic resilience of farms (tł. odporność ekonomiczna gospodarstw rolnych).

roku zindeksowano łącznie 247 843 dokumentów zawierających termin „resilience” w tytule, streszczeniu lub słowach kluczowych. Od 2018 roku⁶ obserwuje się wyraźny wzrost liczby publikacji, a w samym 2024 roku było ich ponad 45 tysięcy. W przypadku frazy „resilience of farming system” (tł. odporność systemu rolniczego/rolnictwa) zidentyfikowano 2 630 dokumentów, z czego 50,5% przypisano do obszaru Rolnictwo i Nauki Biologiczne, 27% rekordów do Nauk Społecznych, a jedynie 5,7% dla Ekonomii, Ekonometrii i Finansów, a dla Biznesu, Zarządzania i Rachunkowości ok. 3,5%⁷. Dla hasła „resilience in agriculture” (tł. odporność w rolnictwie) liczba rekordów wyniosła 8 934, przy czym ok. 20% miało przynajmniej jednego autora z afiliacją w USA, a tylko 1%: z Polski (95 rekordów). Zawężając wyszukiwanie do dokumentów z terminem „resilience” w abstrakcie, uzyskano 1 246 rekordów, z dominacją Nauk Przyrodniczych (56%) oraz Rolnictwo i Nauki Biologiczne (38%). Udział dla obszaru Ekonomii, Ekonometrii i Finansów wyniósł 7%, a dla Biznesu, Zarządzania i Rachunkowości 4%. Dla frazy „farm resilience” (tł. odporność gospodarstw rolnych) zidentyfikowano 3 520 dokumentów, z czego tylko 45 (1,3%) miało autora z polską afiliacją. W tej grupie dominowały publikacje z obszaru Rolnictwa i Nauk Biologicznych (46%) i Nauk Przyrodniczych (40%), a udział Ekonomii, Ekonometrii i Finansów oraz Biznes, Zarządzanie i Rachunkowość wyniósł odpowiednio 8% i 4,5%. Po dalszym ograniczeniu do dokumentów z terminem „resilience” w słowach kluczowych oraz przypisanych do obszaru Ekonomii lub Biznesu, uzyskano jedynie 59 rekordów⁸, z czego tylko 2 rekordy spełniały dodatkowe kryteria: artykuł naukowy z polską afiliacją (publikacja w 2022 i 2023)⁹.

W świetle rosnącej liczby publikacji naukowych dotyczących odporności w rolnictwie i ekonomii, zauważa się zainteresowanie badaczy analizą strategii adaptacyjnych gospodarstw rolnych wobec zakłóceń. Z jednej strony podejmuje się zatem próbę identyfikacji atrybutów/cech umożliwiających sam pomiar odporności systemów rolnych lub gospodarstw rolnych. Z drugiej zaś koncentruje się na wskazaniu działań (ich planowaniu) na rzecz wzmocnienia, poprawy „zachowań” czy też wyboru ścieżki reakcji wobec oddziaływania szoków i stresorów na system rolny, w tym jego podmioty. Boahen i in. (2023, s. 3701–3710) wskazują, że badania koncentrują się na poszukiwaniu odpowiedzi, jakiego typu strategie/zachowania systemy rolne i rolnicy podejmują w odpowiedzi na zakłócenia. Zauważa się, że rodzaje szoków (ekonomiczne, środowiskowe, społeczne czy biologiczne) wskazywane przez rolników wyraźnie różnią się regionalnie. W Europie dominują zakłócenia związane z wojną handlową, zmiennością cen, COVID-19, patogenami czy ekstremalnymi zjawiskami pogodowymi. W Afryce i Azji badania skupiają się głównie na aspektach środowiskowych, często pomijając zakłócenia ekonomiczne czy instytucjonalne. Zastanawiające jest względnie duże zainteresowanie kwestiami środowiskowymi dotyczącymi systemów rolnych Azji czy Afryki, w porównaniu do badań nawiązujących do

⁵ W krajowych publikacjach z dziedziny nauk społecznych, a szczególnie dyscypliny ekonomii i finansów, termin tłumaczy się jako „odporność”, „rezyliencja” czy „prężność” (zob. Drobnik 2015, Masik 2022).

⁶ Po raz pierwszy zarejestrowano w bazie powyżej 10 tys. dokumentów.

⁷ Od 2017 roku dostrzega się wzrost tego typu publikacji rejestrowanych w bazie SCOPUS (w 2017 roku było to 106 dokumentów). Od 2020 roku roczna liczba zaczęła przekraczać ponad 200 dokumentów, a w 2024 było to już 518 dokumentów w bazie.

⁸ 44 artykuły, 12 rozdziałów, 2 recenzje i 1 artykuł pokonferencyjny.

⁹ Po odrzuceniu kryterium przypisania do obszaru Ekonomii... i Biznesu... wyodrębniono 11 artykułów naukowych opublikowanych w latach 2020–2024. W przypadku wyszukiwania „resilient farm” (tł. odporne gospodarstwo rolne) wyodrębniono 1 614 rekordów, w tym ze słowem kluczowym „resilience”: 170, w tym 3 artykuły z krajową afiliacją co najmniej jednego autora.

wyzwań ekonomicznych, społecznych czy właśnie instytucjonalnych. Warto podkreślić w Ameryce Północnej (głównie USA) również dominują badania nad odpornością na zakłócenia środowiskowe (Boahen i in., 2023, s. 3706). Wydaje się zasadne, aby rozważania dotyczące odporności systemów rolnych uwzględniały kontekst regionalny, z uwagi na to, że zarówno gospodarstwa rolne, jak i podmioty łańcucha dostaw są osadzone w określonym lokalnym, krajowym czy regionalnym otoczeniu i funkcjach samego rolnictwa (otoczenia instytucjonalnego), o czym piszą również Meuwissen i in. (2019),

Odporność systemu rolnego/żywnościowego, w tym gospodarstw rolnych, odnosi się do zdolności radzenia sobie z szokami i stresorami, w tym takimi, które są nieznane, a nawet „niewyobrażalne” (OECD 2025, s. 4, por. Soliwoda 108-109; Grzelczak, Soliwoda, Kurdyś-Kujawska 2023). Meuwissen i in. (2021, s. 2) definiują odporność systemu rolnego jako jego zdolność do zapewnienia realizacji pożądanych funkcji w obliczu często złożonych i narastających wstrząsów i napięć ekonomicznych, społecznych, środowiskowych i instytucjonalnych, poprzez przewidywanie, radzenie sobie i reagowanie¹⁰. Natomiast Tendall i in. (2015, s. 17), łącząc to z problematyką bezpieczeństwa żywnościowego, odporność określają jako zdolność systemu żywnościowego i jego jednostek (przyp. autora m.in. gospodarstw rolnych) na wielu poziomach do zapewnienia wystarczającej, odpowiedniej i dostępnej żywności dla wszystkich, w obliczu różnych, nawet nieprzewidywanych zakłóceń¹¹.

Mając na uwadze powyższe definicje kluczowe jest zatem zdefiniowanie, czym są napięcia (stresory) i wstrząsy (szoki), o których piszą wskazani choćby powyżej autorzy oraz wskazanie różnic między dwoma głównymi typami oddziaływania na odporność systemu rolnego, w tym gospodarstw rolnych. W przypadku tych pierwszych mamy do czynienia z powolnym, długotrwałym naciskiem/działaniem, tzw. napięciem (m.in. zmienność klimatu, wahania rynkowe cen surowców rolnych, środków do produkcji rolnej, zmiany regulacji dotyczących funkcjonowania podmiotów), które stopniowo kumulują się w czasie, osłabiając zdolność systemów rolnych, w tym gospodarstw rolnych, do funkcjonowania. Oddziaływanie stresora będzie już zatem wymuszało przystosowanie się systemu rolnego, gospodarstw rolnych do „nowych” warunków. Wymagają one podejmowania długofalowych działań adaptacyjnych. Przy czym zasadne w tym kontekście wydaje się pytanie, co w przypadku jeśli, np. gospodarstwa rolne nie podejmą tego typu działań, czy będzie to oznaką braku odporności. Z kolei w przypadku szoków określa się je jako nagłe, zewnętrzne zdarzenia (np. klęski żywiołowe, kryzysy gospodarcze), które natychmiast zakłócają funkcjonowanie systemu rolnego, w tym np. gospodarstw rolnych. Wymagają one najczęściej szybkiej reakcji (np. ze strony polityki publicznej) i mają zazwyczaj relatywnie krótkotrwały charakter, np. ekstremalne zdarzenia pogodowe: powódź, susza, pożar (Meuwissen i in. 2019, s. 2-3; zob. Cabell, Oelofse 2012). Można zatem zadać pytanie od czego zależna (oraz w jakim stopniu) jest odporność gospodarstw rolnych, tj. od specyficznych cech systemu, czy samego podmiotu (np. gospodarstwa rolnego), określanych mianem atrybutów, czy też od otoczenia, w którym ten system czy podmiot funkcjonuje. To ostatnie odnosi się głównie do kwestii dostępności zasobów oraz formalnych i nieformalnych instytucji (Meuwissen i in. 2021, s. 2; zob. Paas i in. 2021; Termeer i in. 2019). Dlatego

¹⁰ *The resilience of a farming system as its ability to ensure the provision of its desired functions in the face of often complex and accumulating eco-nomic, social, environmental and institutional shocks and stresses, through anticipating, coping and responsive capacities; Meuwissen i in. 2021, s. 2).*

¹¹ *(... capacity over time of a food system and its units at multiple levels, to provide sufficient, appropriate and accessible food to all, in the face of various and even unforeseen disturbances.; Tendall i in. 2015, s. 17).*

kluczowe jest określenie czynników determinujących odporność, wrażliwość/podatność współczesnych systemów rolnych, w tym jego podmiotów. W wymiarze praktycznym chodzi o odpowiedź na pytanie, jak mają one (systemy czy podmioty) odpowiadać na te krótko i długookresowe wstrząsy i naprężenia.

Wskazuje się, że wrażliwość (vulnerability), odporność (resilience) i zdolność do adaptacji (adaptive capacity) są kluczowymi i ściśle powiązаныmi ze sobą elementami w kontekście tych rozważań. Choć powszechnie stosowane, to ich definicje i zakresy znaczeniowe bywają rozbieżne (Gallopín, 2006, s. 293; Folke, 2006). Dotychczas zidentyfikowano trzy główne typy/rodzaje odpowiedzi (w zakresie odporności) na działania szoku lub stresora (Darnhofer 2014, s. 467-468): (1) wytrzymanie, przyjęcie (robustness) zakłócenia bez znaczących zmian w samym systemie rolnym/żywnościowym czy gospodarstwie rolnym, utrzymanie realizowanych funkcji; (2) „pomyślna” adaptacja/dostosowanie (adapdability) strategii, praktyk rolniczych i innych obszarów na działanie czynników o charakterze szokowy i stresogennym; (3) zdolność do transformacji (transformability) czyli fundamentalnej/głębokiej zmiany samego systemu rolnego, a w przypadku gospodarstwa rolnego m.in. struktury, kierunków produkcji tak, aby móc sobie lepiej radzić z przyszłymi szokami i stresorami. Odbywa się to przy utrzymaniu podstawowych funkcji przypisywanych temu systemowi, m.in. produkcja żywności, dostarczanie dóbr publicznych (Ashkenazy i in. 2018; Meuwissen i in. 2020; Meuwissen i in. 2019; Carpenter i in. 2001).

Odporność systemów rolnych wydaje się interesującym poznawczo problemem badawczym. Skupia się bowiem na próbie określenia mechanizmów oddziaływania szoków, stresorów oraz budowy kompleksowych ram analitycznych. Z uwagi jednak na dynamikę i złożoność procesów, które potencjalnie mogą determinować odporność systemu rolnego, w tym gospodarstw rolnych, istotny pozostaje sposób prowadzenia zintegrowanych badań o charakterze empirycznym, m.in. wśród gospodarstw rolnych (por. Zhu, Ying, Xiang 2025). Kluczowa wydaje się zarówno sama procedura wyodrębnienia, klasyfikacji i sposobu badania szoków czy stresorów, a także identyfikacja i określenie siły/istotności oddziaływania czynników determinujących odporność gospodarstw rolnych i ich reakcji. Ważne jest również określenie, kiedy gospodarstwo rolne nie jest odporne i jakie niesie to za sobą implikacje praktyczne. To sprawia, że istnieje wyraźna luka poznawcza i empiryczna w zakresie odporności systemów rolnych, w tym gospodarstw rolnych, szczególnie w krajowej przestrzeni badawczej (zob. Jurek 2023; Stępień 2024; Czekaj i in. 2020). Do programu badań nad odpornością zasadne jest włączenie analizy oddziaływania narracji ekonomicznych¹², jako czynnika ekonomicznego kształtującego zachowania jednostek, w tym przypadku właścicieli/zarządzających gospodarstwem.

¹² Narracje ekonomiczne to opowieści, historie (ludzie opowiadają je sobie nawzajem) bardzo często proste, łatwe do zapamiętania często nacechowane emocjonalnie, które tłumaczą zjawiska gospodarcze. Mogą one też zawierać sugestie w zakresie zachowań jednostek. To w konsekwencji może kształtować masowe zachowania i trendy makroekonomiczne. Zwraca się również uwagę, że takie narracje ekonomiczne mogą wręcz „zarażać” w sposób masowy jednostki – porównuje się je zatem do wirusów i wywoływać realne już skutki ekonomiczne, np. zmiany w konsumpcji, produkcji i inne (Baszczak 2023, s. 67-68; por. Shiller 2019).

Dane i metody badawcze

W artykule przyjęto (za Durant i in. 2023, s. 3; por. Darnhofer, Fairweather, Moller 2010), że odporne gospodarstwo rolne to takie, które będzie w stanie włączać/integrować i równoważyć: (1) w krótkim okresie wytrzymać (buforować) oddziaływanie szoku; (2) w długim okresie oddziaływania stresora/ów wykaże się tzw. zdolnością do adaptacji i (3) tzw. zdolnością do przekształcenia/transformacji działalności gospodarstwa rolnego/produkcji rolnej, tak aby odpowiedzieć/sprostać/radzić sobie z oddziaływaniem stresora/ów¹³.

Przedmiotem badań była odporność indywidualnych gospodarstw rolnych zlokalizowanych na terenie województw opolskiego. Na potrzeby realizacji badania empirycznego rozważania zawężono do wyodrębnienia jednego stresora oddziałującego na obiekty badania w momencie jego prowadzenia. Stresory tu rozumie się jako zewnętrzne/wewnętrzne bodźce/czynniki, które zakłócają funkcjonowanie podmiotu (w dłuższym okresie oddziałują/naprężają jednostkę badania). W efekcie działania stresora ujawniają się mechanizmy odpornościowe. Za Meauwissen in. (2019, s. 8) przyjęto typologię szoków i stresorów. Dla potrzeb badania skoncentrowano się wyłącznie na jednym stresorze. Określono go jako: STRESOR 1: wojna w Ukrainie. Odnosi się on do: zakłóceń w stosunkach handlowych (od 2022 roku); liberalizacji przepływów handlowych surowców rolnych z Ukrainy na terytorium Unii Europejskiej, w tym Polski (kraj szczególnie wrażliwy ze względu na sąsiedztwo); wzrost importu z Ukrainy do Polski surowców rolnych, szczególnie w przypadku zbóż (pszenica, nasiona rzepiku); wzmocnienie konkurencji ze strony Ukrainy (Weremczuk, Malitka 2024; Zajac, Bogusz 2024; MRiRW 2024a). Uwzględniając powyższe określono główny cel badania, którym jest identyfikacja opinii właścicieli gospodarstw rolnych w województwie opolskim na temat wpływu wojny w Ukrainie (STRESOR 1) na funkcjonowanie ich gospodarstw.

Dla realizacji tak zdefiniowanego celu wykorzystano badania empiryczne z wykorzystaniem narzędzia, jakim był kwestionariusz ankiety. Populację generalną stanowiły gospodarstwa rolne z województwa opolskiego, współpracujące z instytucją wspierającą rozwój rolnictwa i obszarów wiejskich (operat losowania: 2000 jednostek). Jednostki badania (respondenci) zostali wylosowani na podstawie operatu¹⁴. Ze względu na pilotażowy charakter badania liczebność próby ustalono na 100 jednostek badania. Zastosowano technikę ankietową bezpośrednią (papier i długopis), PAPI (Paper and Pencil Interviewing), realizowaną przez członków zespołu badawczego. Badanie było prowadzone w okresie lutym-maj 2024 roku. Kryterium włączenia była sprzedaż na rynek surowców rolnych wytworzonych w gospodarstwie. Wyniki badań z uwagi na dobór i wielkość uzyskanej próby mają charakter niereprezentatywny. Mogą stanowić jedynie przyczynek do bardziej pogłębionych badań w tym zakresie.

Ankieta zbierała dane dotyczące cech demograficznych rolników: właścicieli/zarządzających gospodarstwem (np. wiek, płeć, stan cywilny, wykształcenie,

¹³ Zatem nieodporne gospodarstwo rolne to takie, które nie posiada zdolności do skutecznego radzenia sobie z szokami, stresorami, przez co nie jest w stanie utrzymać swoich podstawowych funkcji w dłuższym okresie (zob. szerzej: Darnhofer 2021).

¹⁴ Dobór próby losowej spośród 2000 rolników przeprowadzono z wykorzystaniem funkcji LOS.ZAKRES(1;2000) w arkuszu Microsoft Excel. Każdemu rolnikowi przypisano unikalny identyfikator, a następnie generowano liczby losowe odpowiadające wylosowanym respondentom. Duplikaty zostały wyeliminowane, co zapewniło równą szansę wyboru dla każdego elementu populacji zgodnie z zasadami losowania prostego.

przynależność do organizacji rolniczej, posiadanie konta w mediach społecznościowych czy prowadzenie bloga, strony internetowej związanej z branżą rolną), charakterystyki gospodarstw rolnych (np. wiek gospodarstwa, wielkość, liczba osób w gospodarstwie, typ produkcji, rodzaj kanału sprzedaży i inne), które były zmiennymi niezależnymi. Natomiast zmienne zależne dotyczyły percepcji sytuacji związanej ze skutkami oddziaływania STRESORA 1 przez gospodarstwa rolne. W tym ostatnim przypadku chodziło o wojnę w Ukrainie. Aby zidentyfikować czynniki determinujące odporność badanych gospodarstw rolnych w czasie oddziaływania STRESORA 1, zastosowano cztery miary oparte na samoocenie respondentów. Respondenci oceniali stopień zgody z następującymi stwierdzeniami:

- 1) prowadzona w moim gospodarstwie rolnym produkcja rolna była zdolna do adaptacji/przystosowania się do nowych warunków rynkowych będących skutkiem wojny w Ukrainie z Rosją;
- 2) obawiam się tego, jak wojna w Ukrainie i nowe warunki rynkowe wpłynę na prowadzoną przeze mnie produkcję rolną;
- 3) obawiam się tego, jak otwarcie rynku europejskiego na surowce rolne z Ukrainy wpłynę na prowadzone przeze mnie gospodarstwo rolne.

Stopień zgody mierzono za pomocą zmodyfikowanej skali Likerta, obejmującej trzy odpowiedzi: nie zgadzam się, ani się zgadzam/ani nie zgadzam, zgadzam się.

Czwarta miara odnosząca się do odporności to zmiana w opłacalności produkcji rolnej w badanym gospodarstwie, wyprowadzona z pytania: „Jak zmieniła się opłacalność produkcji rolnej w prowadzonym/posiadanym gospodarstwie rolnym od wybuchu wojny na Ukrainie?”. Odpowiedzi również oparto na zmodyfikowanej skali Likerta: pozostało bez zmian, pogorszyła się, poprawiła się.

Dla realizacji celu głównego i uchwycenia zależności między wyznaczonymi cechami badanych jednostek o charakterze nieparametryczny wykorzystano test chi-kwadrat z poprawką Yates'a. Przyjęto hipotezę zerową (H_0): dwie cechy X (zmienna zależna) i zmienna Y (zmienna niezależna) opisujące badaną zbiorowość są statystycznie niezależne, oraz hipotezę pierwszą (H_1): cechy X i Y są zależne względem siebie. Hipotezy były weryfikowane na poziomie istotności 5%. Na podstawie wartości p -value dokonano weryfikacji hipotez, w przypadku odrzucenia hipotezy H_0 (brak zależności) za prawdziwą przyjęto H_1 (występuje zależność). Dokonano również walidacji kwestionariusza na podstawie wypełnionych ankiet i uzyskano współczynnik α Cronbacha dla ogólnego wyniku kwestionariusza na poziomie 0,813, a dla jego wymiaru: STRESOR 1: wojna w Ukrainie: 0,824.

Wielkość uzyskanej próby wyniosła 72 jednostki, a jej cechy socjodemograficzne przedstawiono w tabeli 1.

Tabela 1. Charakterystyka próby: cechy badanych obiektów

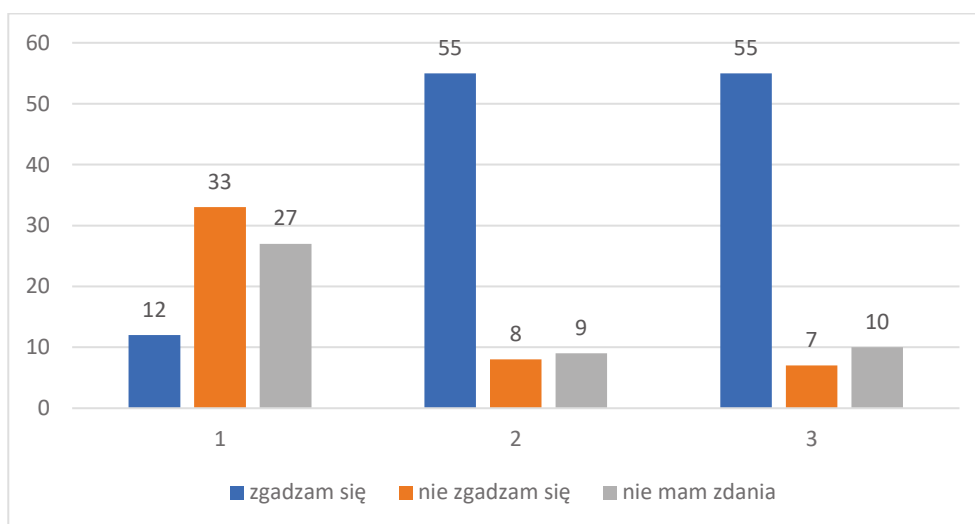
Table 1. Sample description

Zmienna niezależna (charakterystyki rolnika/zarządzającego gospodarstwem)	Udział	Zmienna niezależna (charakterystyki gospodarstw rolnych)	Udział
Płeć	M – 77% K – 23%	Wiek gospodarstwa (Mediana wieku 67)	< 67 - 47% >=67 – 53%
Obywatelstwo	PL – 100%	Liczba osób w gospodarstwie (Mediana liczby osób w gospodarstwie 3)	<3 osób - 37% >=3 osoby – 63%
Wykształcenie	- Wyższe (mgr): 18% - Wyższe (lic., inż.): 6% - Policealne: 5% - Średnie: 38% - Zasadnicze zawodowe: 31% - Podstawowe ukończone: 2%	Liczba osób niepełnoletnich	Bez niepełnoletnich – 45% Z niepełnoletnimi – 55%
Stan cywilny	Żonaty/żonata: 82% Kawaler/panna: 14% Wdowa/wdowiec: 2% Nie udzielam odp.: 2%	Gospodarstwo wykorzystuje nieodpłatną siłę roboczą członków rodziny	Tak – 16% Nie – 84%
Wiek	< 50 – 60% >=50 – 40%	Kierunek produkcji roślinnej (główna)	71%
Rolnik w pierwszym pokoleniu	6%	Kierunek produkcji zwierzęcej (główna)	29%
Członkostwo w rolniczej organizacji branżowej	29%	Sprzedaż bezpośrednia	42%
Przynależność do organizacji rolniczej	74%	Sprzedaż poprzez powiązania umowne	55%
Konto w mediach społecznościowych (prywatne)	Tak - 54% Nie – 46%	Gospodarstwo korzystało ze wsparcia dla rolników w związku z wojną w Ukrainie	80%
Prowadzenie strony internetowej, blog, konto społecznościowe związane z branżą rolną	Tak - 6% Nie – 94%		

Źródło: badania własne (n=72).

Wyniki badań

Wojna w Ukrainie jest czynnikiem wpływającym na funkcjonowanie gospodarstw rolnych na terenie województwa opolskiego. Na podstawie przeprowadzonego badania można stwierdzić, że producenci rolni obawiali się w głównej mierze otwarcia europejskiego rynku rolnego na surowce pochodzące z Ukrainy oraz nowych warunków rynkowych, które mogą pojawić się w efekcie zwiększenia dostępu do unijnego rynku, w tym szczególnie polskiego, dla producentów z Ukrainy (55 respondentów wskazało takie obawy). Jednocześnie badani ocenili (33 wskazania), że prowadzona przez nich produkcja rolna nie jest zdolna do adaptacji do nowych warunków, niekoniecznie (a może w ogóle nie) korzystnych (rys. 1).



Oznaczenia: 1 - Prowadzona w moim gospodarstwie produkcja rolna była zdolna do adaptacji/przystosowania się do nowych warunków rynkowych będących skutkiem wojny w Ukrainie; 2 - Obawiam się tego, jak wojna w Ukrainie i nowe warunki rynkowe wpłyną na prowadzoną przeze mnie produkcję rolną; 3 - Obawiam się tego, jak otwarcie rynku europejskiego na surowce rolne z Ukrainy wpłynie na prowadzone przeze mnie gospodarstwo rolne.

Rys. 1. Rozkład odpowiedzi na pytania dotyczące obaw związanych z wojną w Ukrainie

Fig. 1. Distribution of answers to questions about concerns about the war in Ukraine

Źródło: badania własne.

Tabela 2. Wyniki testów niezależności chi-kwadrat z poprawką Yetes'a pomiędzy zmiennymi niezależnymi i zmiennymi zależnymi

Table 2. Results of Chi-Squared Independence Tests with Yetes Correction Between Independent Variables and Dependent Variables

Zmienna	Prowadzona w moim gospodarstwie rolnym produkcja rolna była zdolna do adaptacji/przystosowania się do nowych warunków rynkowych będących skutkiem wojny w Ukrainie z Rosją	Obawiam się tego, jak wojna w Ukrainie i nowe warunki rynkowe wpłynę na prowadzoną przeze mnie produkcję rolną	Obawiam się tego, jak otwarcie rynku europejskiego na surowce rolne z Ukrainy wpłynie na prowadzone przeze mnie gospodarstwo rolne
Typ produkcji	Brak zależności $\chi^2=2,419$; $p=0,659$ ($V=0,092$)	Brak zależności $\chi^2=6,544$; $p=0,162$ ($V=0,151$)	Brak zależności $\chi^2=2,008$; $p=0,734$ ($V=0,083$)
Wykształcenie	Brak zależności $\chi^2=3,847$; $p=0,427$ ($V=0,116$)	Występuje zależność $\chi^2=10,558$; $p=0,032$ ($V=0,191$)	Występuje zależność $\chi^2=8,701$; $p=0,029$ ($V=0,174$)
Stan cywilny	Brak zależności $\chi^2=7,987$; $p=0,092$ ($V=0,167$)	Występuje zależność $\chi^2=11,553$; $p=0,021$ ($V=0,201$)	Występuje zależność $\chi^2=11,914$; $p=0,018$ ($V=0,204$)
Płeć	Brak zależności $\chi^2=8,209$; $p=0,084$ ($V=0,169$)	Brak zależności $\chi^2=6,710$; $p=0,152$ ($V=0,152$)	Brak zależności $\chi^2=4,445$; $p=0,349$ ($V=0,124$)
Obywatelstwo	Brak zależności $\chi^2=2,599$; $p=0,627$ ($V=0,009$)	Brak zależności $\chi^2=5,062$; $p=0,281$ ($V=0,133$)	Brak zależności $\chi^2=4,219$; $p=0,377$ ($V=0,121$)
Wiek	Brak zależności $\chi^2=8,610$; $p=0,072$ ($V=0,173$)	Brak zależności $\chi^2=7,206$; $p=0,125$ ($V=0,158$)	Brak zależności $\chi^2=5,782$; $p=0,216$ ($V=0,142$)
Rolnik w pierwszym pokoleniu	Brak zależności $\chi^2=6,318$; $p=0,176$ ($V=0,148$)	Brak zależności $\chi^2=6,318$; $p=0,176$ ($V=0,148$)	Brak zależności $\chi^2=6,318$; $p=0,176$ ($V=0,148$)
Członkostwo w rolniczej organizacji branżowej	Brak zależności $\chi^2=7,260$; $p=0,128$ ($V=0,159$)	Występuje zależność $\chi^2=9,572$; $p=0,048$ ($V=0,183$)	Brak zależności $\chi^2=2,145$; $p=0,709$ ($V=0,086$)
Przynależność do organizacji rolniczej	Brak zależności $\chi^2=3,754$; $p=0,440$ ($V=0,114$)	Brak zależności $\chi^2=4,802$; $p=0,395$ ($V=0,119$)	Brak zależności $\chi^2=3,623$; $p=0,459$ ($V=0,112$)
Konto w mediach społecznościowych (prywatne)	Brak zależności $\chi^2=2,761$; $p=0,598$ ($V=0,098$)	Brak zależności $\chi^2=1,381$; $p=0,847$ ($V=0,069$)	Występuje zależność $\chi^2=10,983$; $p=0,026$ ($V=0,195$)
Prowadzenie strony internetowej, blog, konto społecznościowe związane z branżą rolną	Brak zależności $\chi^2=2,482$; $p=0,647$ ($V=0,093$)	Brak zależności $\chi^2=1,359$; $p=0,851$ ($V=0,068$)	Brak zależności $\chi^2=5,219$; $p=0,265$ ($V=0,135$)
Wiek gospodarstwa	Brak zależności $\chi^2=2,482$; $p=0,647$ ($V=0,093$)	Brak zależności $\chi^2=1,359$; $p=0,851$ ($V=0,068$)	Brak zależności $\chi^2=5,219$; $p=0,265$ ($V=0,135$)
Liczba osób w gospodarstwie (Mediana liczby osób w gospodarstwie 3)	Brak zależności $\chi^2=6,235$; $p=0,182$ ($V=0,147$)	Brak zależności $\chi^2=4,192$; $p=0,380$ ($V=0,120$)	Brak zależności $\chi^2=1,847$; $p=0,763$ ($V=0,080$)
Liczba osób niepełnoletnich	Brak zależności $\chi^2=2,869$; $p=0,579$ ($V=0,099$)	Brak zależności $\chi^2=6,419$; $p=0,169$ ($V=0,149$)	Brak zależności $\chi^2=7,458$; $p=0,113$ ($V=0,161$)
Gospodarstwo wykorzystuje nieodpłatną siłę roboczą członków rodziny	Występuje zależność $\chi^2=11,241$; $p=0,023$ ($V=0,197$)	Brak zależności $\chi^2=7,528$; $p=0,110$ ($V=0,162$)	Brak zależności $\chi^2=6,495$; $p=0,165$ ($V=0,150$)
Kierunek produkcji rolnej	Brak zależności $\chi^2=3,527$; $p=0,473$ ($V=0,110$)	Brak zależności $\chi^2=3,628$; $p=0,458$ ($V=0,112$)	Brak zależności $\chi^2=8,629$; $p=0,071$ ($V=0,173$)
Sprzedaż bezpośrednia	Brak zależności $\chi^2=6,517$; $p=0,163$ ($V=0,150$)	Występuje zależność $\chi^2=12,451$; $p=0,014$ ($V=0,207$)	Brak zależności $\chi^2=4,859$; $p=0,302$ ($V=0,130$)
Sprzedaż poprzez powiązania umowne	Brak zależności $\chi^2=2,843$; $p=0,584$ ($V=0,099$)	Brak zależności $\chi^2=8,657$; $p=0,070$ ($V=0,173$)	Brak zależności $\chi^2=6,529$; $p=0,162$ ($V=0,151$)
Gospodarstwo korzystało ze wsparcia dla rolników w związku z wojną w Ukrainie	Występuje zależność $\chi^2=10,329$; $p=0,035$ ($V=0,189$)	Brak zależności $\chi^2=7,542$; $p=0,109$ ($V=0,162$)	Brak zależności $\chi^2=6,325$; $p=0,176$ ($V=0,148$)

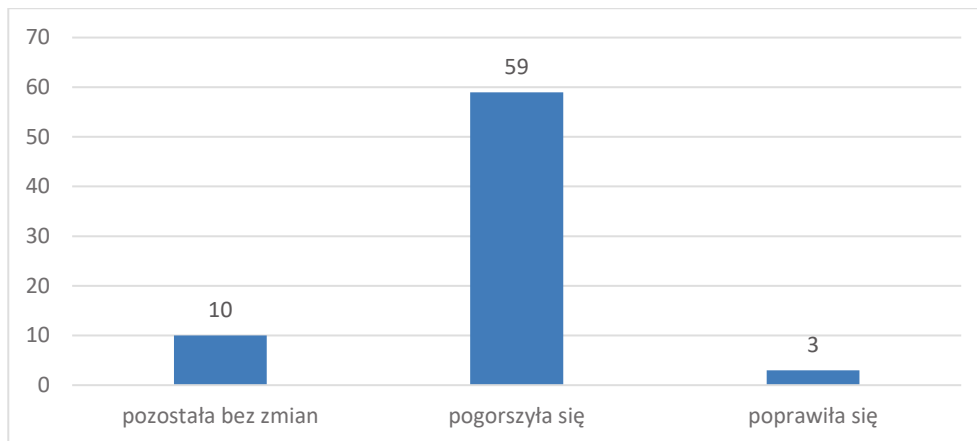
Źródło: badania własne.

Zestawiając te odpowiedzi na te pytania z typem głównej produkcji rolnej prowadzonej przez badane gospodarstwa rolne (tab. 2), można dostrzec że zdecydowanie częściej twierdząco na temat obaw wypowiadali się rolnicy zajmujący się produkcją zwierzęcą. Gospodarstwa zajmujące się produkcją roślinną, bądź mieszaną, w 82% korzystały ze wsparcia dla rolników w związku z wojną w Ukrainie, tzw. pomocy wojennej (dopłat do materiału siewnego elitarnego lub kwalifikowanego; pomoc w zakresie dochodów w związku z wojną na Ukrainie: dopłaty do zboża i nawozów). Może to sugerować, że ten typ wsparcia był czynnikiem, który (potencjalnie) pozwolił gospodarstwom rolnym łagodniej odczuwać skutki wojny w Ukrainie. W przypadku zmiennej zależnej „zdolność do adaptacji” zidentyfikowano jedynie zależność między zmienną zależną: „wsparcie dla rolników związane z wojną na Ukrainie” oraz zmienną niezależną: „wykorzystanie nieodpłatnej siły roboczej członków rodziny”. Co może oznaczać (wymaga to jednak pogłębionych badań), że gospodarstwa te odpowiedziały na STRESOR 1, radzeniem sobie poprzez tzw. wytrzymanie/przyjęcie zakłócenia¹⁵. Spośród cech socjodemograficznych branych pod uwagę w badaniu, istotna zależność wystąpiła pomiędzy wykształceniem i stanem cywilnym, a obawą przed wpływem wojny w Ukrainie oraz otwarciem rynku Europejskiego na produkty pochodzące z Ukrainy na prowadzoną działalność rolniczą. Nie zidentyfikowano zależności zarówno pomiędzy aktywnością czynną w mediach społecznościowych – zmienna niezależna „prowadzenie strony internetowej, bloga, konta społecznościowego związanego z branżą rolną, jak i przynależnością do organizacji rolniczych a STRESOREM 1: wojna w Ukrainie¹⁶. Warto jednak zaznaczyć, że w tym przypadku wystąpiła zależność dla zmiennej niezależnej „posiadanie konta w mediach społecznościowych”, co może potencjalnie oznaczać, że badani wykazywali się tzw. bierną aktywnością w obszarze mediów społecznościowych i w większości przypadków byli jedynie konsumentami treści pojawiających się w tych mediach¹⁷.

¹⁵ Pierwszy rodzaj odpowiedzi za klasyfikacją Darnhofer (2014, s. 467-468).

¹⁶ Zidentyfikowano zależność między zmienną zależną „obawiam się, tego jak wojna w Ukrainie i nowe warunki rynkowe wpłynę na prowadzoną przeze mnie produkcję rolną” a zmienną niezależną „członkostwo w organizacji branżowej” oraz „sprzedaż bezpośrednia”.

¹⁷ Mogą wystąpić zagrożenia poznawcze i algorytmiczne związane z bierną konsumpcją informacji, np. zjawisko iluzji prawdy.



Rys. 2. Rozkład odpowiedzi na pytanie o zmianę opłacalności produkcji rolnej w prowadzonym/posiadanym gospodarstwie rolnym od wybuchu wojny na Ukrainie (luty 2022-grudzień 2023)

Fig. 2. Distribution of answers to the question about the change in the profitability of agricultural production on a run/owned farm since the outbreak of the war in Ukraine (February 2022-December 2023)

Źródło: badania własne.

Oceniając opłacalność produkcji rolnej producenci rolni byli prawie jednomyślni, ponad 80% respondentów stwierdziło, że opłacalność produkcji rolnej, jak również sytuacja ekonomiczna gospodarstwa rolnego pogorszyła się (rys. 2). Relatywnie niewielu respondentów (ok. 4%) stwierdziło poprawę warunków produkcji. W tym przypadku zwrócić należy uwagę, że byli to producenci, którzy prowadzą sprzedaż poprzez umowy na dostawę lub kontrakty rolne. Ocena sytuacji ekonomicznej jest zależna ze zmienną niezależną „wykształcenie”¹⁸ ($\chi^2 = 10,791$; $p = 0,029$).

Podsumowanie

Niniejszy artykuł podejmuje ważny temat odporności gospodarstw rolnych na STRESOR 1: wojna w Ukrainie i jej potencjalnych ekonomicznych konsekwencji dla krajowych rolników. Badania przeprowadzone w województwie opolskim pokazują, że producenci rolni postrzegają skutki wojny jako istotne zagrożenie dla stabilności ekonomicznej swoich gospodarstw. Większość respondentów odczuwało (w ich opinii) pogorszenie opłacalności produkcji rolnej w gospodarstwie i wyrażało obawy dotyczące dalszego otwierania rynku UE na surowce rolne z Ukrainy. Jednocześnie stosunkowo niska zdolność adaptacyjna gospodarstw rolnych (w opinii badanych) wskazuje na potrzebę szerszego wsparcia instytucjonalnego i opracowania strategii wzmacniających odporność. Pomoc publiczna (dotacje, wsparcie dochodów) miała istotny wpływ na złagodzenie skutków

¹⁸ Innych zależności między zmiennymi zależnymi i niezależnymi nie zidentyfikowano (uwzględniono te same zmienne niezależne jak w tab. 2).

kryzysu. Wyniki wskazują również na potrzebę dalszych badań uwzględniających regionalne i sektorowe zróżnicowanie reakcji gospodarstw rolnych oraz szersze zrozumienie czynników determinujących odporność, w tym narracji ekonomicznych. Może to bowiem stanowić podstawę dla rekomendacji dla polityki rolnej w zakresie przygotowania gospodarstw rolnych na przyszłe szoki i stresory.

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