Unraveling the Mediating Role of Resilience in the Social Capital-Well-Being Nexus Among Farmers in Kano State, Nigeria

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Abstract

Resilience is increasingly recognized as a key factor in improving farmers' well-being in response to various agricultural challenges. However, the mediating role of resilience in the relationship between social capital (SOCAP) and farmers' well-being (FWB), especially in resource-constrained environments, remains insufficiently explored. This quantitative study, based on 348 valid responses from Kano State, Nigeria, employed Partial Least Squares Structural Equation Modeling (PLS-SEM) to examine the relationships within the proposed framework. The findings reveal that social capital (SOCAP) has a positive impact on farmers' well-being (FWB), both directly and indirectly, through resilience. Resilience emerges as a critical mediator, enabling farmers to adapt to shocks, access resources, and leverage their social networks effectively. By fostering resilience, farmers can enhance their capacity to sustain and improve their livelihoods despite economic and environmental challenges. This study underscores the importance of developing social capital and resilience to address agricultural vulnerabilities, providing valuable insights for policymakers and development practitioners to design interventions that promote sustainable well-being and agricultural practices in rural communities.

Keywords: *Social capital, Resilience, Well-being, Farmers, Kano-Nigeria*

Introduction

Farmers' well-being cannot be overemphasized (Anadozie et al., 2021). The global community of eight billion people largely rely on farmers for their daily food needs and a better quality of life. In fact, sustainable food security will be hardly attainable in modern nation-states, with their vast populations, without the cooperation and diligent efforts of farmers. And this is what has made life economically and socially meaningful to most farming and non-farming communities around the world (World Bank, 2023). However, it has become a common reaction for some farmers to disengage from agriculture once they are hit by poor harvest and dwindling earnings, leading to poor well-being. These negative consequences have affected farmers in both rich and poor countries alike. For instance, in Australia the pressure of agricultural production, debt, and daily life has led to a higher suicide rate among farmers (Smallwood et al., 2023). Additionally, the adoption of advanced agro-technology has forced some farmers out of the industry (Peel et al., 2015). And in parts of Africa such as Ghana, farmers are grappling with similar and even peculiar challenges, as farming is often perceived as a means of livelihood for older people (Chipfupa & Tagwi, 2021). Similarly, in Nepal, a sense of alienation from agriculture prevails, with up to 92% of households unwilling to let their descendants become farmers (KC & Race, 2020). In India, 40% of the farmers are not interested in farming (Agarwal & Agrawal, 2017), while in China abandoned agricultural land is not uncommon (Zhang et al., 2022).

Farmers in Nigeria, and Kano State in particular face diverse challenges that undermine their well-being. Limited access to credit facilities is a significant barrier, restricting their ability to adopt advanced farming techniques and technologies, ultimately lowering productivity and quality of life (Abdullahi et al., 2019). Additionally, unpredictable weather patterns, exacerbated by climate change, disrupt agricultural activities. Erratic rainfall and prolonged droughts create economic instability, further threatening farmers' livelihoods (Adebayo et al., 2020). Market inefficiencies, including poor infrastructure, price volatility, and limited market access, exacerbate this instability by reducing profitability and impeding economic growth (Aliyu & Yusuf, 2021). Another critical challenge is the inadequacy of agricultural extension services, which delays the dissemination of essential information about farming techniques, pest control, and market opportunities. This limitation hinders farmers' ability to adapt to changing conditions, affecting their resilience and overall well-being (Ibrahim et al., 2018). Insecurity in the region, characterized by conflicts and banditry, further compounds these issues by disrupting farming activities and displacing farmers, leading to reduced productivity and economic hardship. The psychological toll of this insecurity adds another layer of adversity (Usman & Suleiman, 2022). Environmental challenges, such as soil degradation and resource depletion due to unsustainable farming practices, also contribute to declining soil fertility and diminishing yields, jeopardizing livelihoods (Bello et al., 2021).

In agrarian communities, social capital plays a vital role in determining socioeconomic outcomes. This concept encompasses the intricate networks, shared norms, and trust that facilitate cooperation and collective action among community members, ultimately influencing their social and economic well-being. In contexts like Kano State, social capital influences farmers' access to resources, information, and mutual support, enhancing their capacity to withstand adversities and improving their well-being. However, the

mechanisms by which social capital affects farmers' well-being remain underexplored. While it is acknowledged as a driver of well-being, its influence is often indirect, mediated by resilience which is the ability to recover from challenges and adapt to adversity. Consequently, Farmers in Kano State face challenges that necessitate an exploration of factors enhancing their adaptability and well-being. Social capital, with its role in fostering collective action and resource sharing, offers potential solutions. Elucidating the mediating role of resilience in the relationship between social capital and well-being is crucial, particularly in the context of farming communities. Social capital is instrumental in facilitating access to essential resources, information, and emotional support, thereby substantially influencing farmers' overall well-being. Despite the established significance of social capital in shaping farmers' well-being, as highlighted by Li et al. (2022), who emphasized the importance of collective social capital in rural settings, further empirical research is needed to explore the mediating effects of resilience in this relationship. Niu et al. (2023) further note that cultural contexts influence how social capital impacts well-being, with emotional ties sometimes outweighing instrumental connections. These findings highlight the necessity of considering cultural nuances when evaluating social capital's role in enhancing well-being in Kano State.

Moreover, resilience is increasingly recognized as a critical mediator in the social capital-well-being relationship. Studies indicate that social capital strengthens resilience, which in turn positively impacts well-being. For example, Wang et al. (2021) found that social capital enhances resilience in rural communities, aligning with Aldrich and Meyer's (2014) assertion that social capital fosters community resilience. This suggests that strengthening social cohesion can yield better outcomes during crises. For farmers in Kano State, understanding how resilience mediates social capital's benefits is vital for strategies aimed at bolstering community ties and individual well-being. Psychological resilience, a vital aspect of overall resilience, plays a mediating role in the relationship between social capital and mental health outcomes. Research by Feng (2024) underscores the importance of psychological resilience in linking social capital to improved mental health, emphasizing the need for interventions that bolster both social networks and psychological resilience. Given the distinct stressors faced by farmers, cultivating psychological resilience is crucial for enhancing their overall well-being. The significance of social capital in fostering community resilience is well-established, with studies by Carmen et al. (2022) and Wang et al. (2021) highlighting its role in enhancing collective agency, social trust, and participation, ultimately contributing to rural resilience. These insights are particularly relevant for Kano State, where communal ties often provide critical support during economic and environmental challenges.

Theoretical frameworks suggest that resilience is a dynamic capacity cultivated through social interactions and networks. The resilience activation framework posits that social support enhances adaptive capacities, emphasizing the role of interpersonal relationships (Zhang et al., 2021). Xie et al. (2022) argue that community resilience can be bolstered through social media, an important consideration in rural areas with limited traditional communication channels. Examining resilience as a mediator in the social capital-well-being nexus provides a nuanced understanding of how farmers leverage social

networks to enhance their quality of life. From a practical standpoint, these findings inform policy and community interventions aimed at strengthening farmers' resilience. Social capital's role in fostering resilience suggests that initiatives promoting social cohesion and trust can significantly benefit farmers. For instance, community-based programs that enhance social ties and build trust could improve farmers' capacity to cope with challenges. Alfitri (2024) underscores the significance of community engagement in fostering resilience, emphasizing that such efforts play a key role in strengthening adaptive capacities. Addressing economic constraints and strengthening social networks is crucial for sustainable agricultural development. Therefore, this study seeks to investigate the mediating role of resilience in the relationship between social capital and well-being among farmers in Kano State. By addressing this gap, it provides insights into how social and psychological resources interact to influence farmers' quality of life. These findings hold important implications for policymakers and development practitioners aiming to design interventions that enhance farmers' livelihoods in resource-limited environments. The insights provided are valuable not only for academic discussions but also for promoting sustainable agricultural practices and fostering community development in regions such as Kano State.

This paper is structured to address the research concerns in a logical and coherent manner. The study begins with an introduction in Section 1, followed by a comprehensive literature review and hypothesis formulation in the second part. The methodology and empirical model testing used to analyze the variable correlations are then presented in Section 3. Finally, the closing portion provides the key findings, discusses their theoretical and practical implications, and acknowledges the study's limitations, providing a thorough conclusion to the research.

Literature Review

Well-being

Theorists have proposed several theoretical assumptions for well-being. For example, Aristotle defined well-being as a feeling of happiness, which he believed was essential to an individual's existence (Deeg & May, 2021). According to Matud et al., (2019) and (Rahim, 2015) well-being is a thorough evaluation of a people's health, economic situation, interactions, and unique values. Humans typically proceed from "survival" to "development," and finally to "well-being." Individuals can work together to improve their well-being based on social groups, culture, or history. To achieve long-term well-being, sufficient social capital is required at each of these periods (Musavengane & Kloppers, 2020). A number of studies on well-being are available (Clair et al., 2021; Rahm & Heise, 2019; Thompson & Bruk-Lee, 2021). Clair et al. (2021) investigated the effect of social exclusion on individuals during the global epidemic and discovered that young people suffered the highest degrees of isolation, resulting in reduced life fulfillment and higher work stress. However, they did not investigate the function of social capital in moderating or worsening these impacts, which could provide a fuller picture. Thompson & Bruk-Lee (2021) discovered that increasing expectations reduced employees' job satisfaction, negatively influenced their commitment, performance, and behavior at work, and raised their desire to leave. To further understand employee outcomes, this study should take into account social capital, self-efficacy, and a broader definition of well-being

Social Capital

According to Bourdieu (2018) social capital is the total of resources that come from various sources inside a person's social network. Social

capital is something that people acquire via direct or indirect interactions, according to Lin (2017). Putnam's concept, which states that social capital is "the collection of resources in different types of interpersonal networks with reciprocity," was applied in this study (Putnam 2000). Additionally, Putnam separated social capital into two categories: bridging, which serves development purposes, and bonding, which serves survival purposes (Putnam, 2000). Several academics concurred with Putnam's explanation of the roles of bonding and bridging social capital, which are "getting by" and "getting ahead," respectively (Erlandsen & Svendsen, 2023; Rusmawati et al., 2023). Put differently, BRSC gives people the developmental potential to stand out and establish themselves, whereas BOSC gives people the assistance they need to survive and cope (Rusmawati et al., 2023). Thus, the two aspects of attaining well-being are living for survival and growing for success. One of the intellectual facets of social capital theory is self-efficacy, which is linked to individual cognition (Putnam, 2000). According to Bandura (2012) self-efficacy refers to an individual's belief and acceptance of their own ability to carry out activities and fulfill commitments. Farmers frequently exhibit a need for social capital in their work and daily lives, as well as in building community order, in rural areas with comparable racial and socioeconomic features.

Resilience

Resilience (RES), derived from the Latin terms "resilire" and "resilio", meaning "to bounce back" or "jump back," has evolved into a concept studied across diverse disciplines, including psychology, organizational sciences, engineering, and ecology (Abdullahi et al., 2024b). In the realm of organizational management, Meyer (2008) played a pivotal role in introducing resilience, leading to substantial research on Organizational Resilience (ORES). Despite the absence of a universally accepted definition, RES is widely recognized as a vital capability for organizations to absorb, adapt to, and capitalize on disruptive events that threaten their survival (Abdullahi et al., 2024a). RES is dynamic and continuously reinvented, aligning with the view that it is a natural extension of Dynamic Capabilities (DCs). From this perspective, the Dynamic Capability Theory (DCT) serves as an effective framework for understanding resilience. ORES underscores an organization's ability to manage disruptions, endure uncertainties, and thrive under adverse conditions (Abdullahi et al., 2023). This capacity is critical for organizational longevity and operational stability in volatile environments.

Existing literature identifies three core dimensions of RES: anticipative response, reactive response, and growth response. Anticipative response involves identifying potential threats and formulating preventative strategies to mitigate their impact (Abdullahi, Mohamed, & Senasi, 2023). Reactive response emphasizes restoring normalcy following disruptions or adverse events (Martín-Rojas et al., 2023). Growth response, in contrast, focuses on learning from challenges and implementing improvements, enabling organizations to evolve and flourish post-adversity. This process encompasses interconnected attributes, including anticipation, adaptability, and configuration, which collectively support efficient responses to shocks and unfavorable occurrences (Abdullahi, Mohamed, & Senasi, 2023). Building on prior studies (e.g., Abdullahi, Mohamed, Senasi, et al., 2023), RES can be described as an organization's ability to perceive, mitigate, and absorb jolts while maintaining, adapting, and enhancing operations amidst adversity. Procedurally, resilient organizations anticipate challenges, respond effectively during disruptions, and

adapt to ensure sustainable growth after adversities. By fostering this capacity, organizations not only secure survival but also achieve long-term improvement and stability.

Hypothesis Development

Social capital and farmers' well-being

Social capital, defined as the networks, relationships, and norms that facilitate cooperation among individuals, plays a crucial role in enhancing farmers' well-being. Evidence suggests that strong social networks enable farmers to access vital information, resources, and support systems, which are essential for improving agricultural productivity and economic stability (Guo, 2024; Sunday, 2019). For example, farmers who participate in cooperative societies often experience better economic outcomes due to shared knowledge and resources, which directly contribute to their overall well-being (Sunday, 2019). Additionally, social capital fosters a sense of community and belonging, which can enhance psychological well-being, further supporting the notion that social ties are integral to farmers' livelihoods (Diana, 2023). Hence, the study postulate that:

H1: Social capital positively influences Farmers' Well-being.

Social capital and resilience

The relationship between social capital and resilience is well-documented, with studies indicating that robust social networks enhance farmers' adaptive capacities in the face of challenges. For instance, social capital facilitates information exchange and collective action, which are critical for developing resilience strategies (Wood et al., 2014). Research has shown that farmers who are part of strong social networks are more likely to adopt innovative agricultural practices and technologies, thereby increasing their resilience to climate-related shocks (Huang et al., 2020). Moreover, social capital can mitigate the impacts of conflicts and disputes among farmers, which, if unresolved, could undermine resilience (Kliem, 2022). The ability to cooperate and share resources within social networks is essential for building resilience in agricultural communities (Maltou & Bahta, 2019). Social capital enhances resilience by fostering social cohesion and trust within communities, which are essential for collective problem-solving and resource sharing (Nuvey et al., 2020; , Aldrich & Meyer, 2014). Studies indicate that communities with high levels of social capital are better equipped to respond to crises, as they can mobilize resources and support networks more effectively (Wippold et al., 2021). Additionally, social capital provides emotional support and shared experiences that can enhance individual resilience, allowing farmers to better navigate challenges and uncertainties (Hagen et al., 2020). This interplay suggests that investing in social capital development can lead to increased resilience among farmers, thereby improving their overall well-being. Therefore, we proposed that:

H2: Social capital positively influences the resilience of farmers.

Resilience and farmers' well-being

Resilience is a critical factor that enables individuals, particularly farmers, to cope with adversities such as economic instability, climate change, and health crises. Research indicates that farmers who possess higher resilience are better equipped to manage risks and uncertainties, leading to improved well-being outcomes. For instance, studies have shown that

smallholder farmers who engage in adaptive strategies, such as diversifying their crops or utilizing climate-smart agricultural practices, exhibit enhanced resilience and, consequently, better livelihood outcomes (Teklu et al., 2023; Mujeyi et al., 2021). Studies have shown that resilience helps protect against adverse mental health outcomes, particularly in high-stress occupations like farming (Jones-Bitton et al., 2019; Brew et al., 2016). Furthermore, resilience is linked to psychological factors, where farmers' perceptions of their adaptive capacities significantly influence their overall well-being (Hashmiu, 2020). It is associated with better coping strategies that enhance farmers' ability to manage challenges effectively, thereby promoting their well-being (Xie et al., 2023). This aligns with findings that suggest resilience acts as a buffer against the psychological distress commonly experienced by farmers, enhancing their quality of life and mental health (Gee et al., 2018). The interplay between resilience and well-being is also evident in the context of cooperative farming, where shared resources and collective problem-solving enhance both resilience and individual farmer welfare (Maltou & Bahta, 2019). Thus, it is hypothesized that:

H3: Resilience positively influences Farmers' Well-being.

The Mediating Role of Resilience between Social Capital and Farmers' Well-being

Resilience, defined as the capacity to recover from difficulties, is vital in shaping how social capital influences well-being, especially in agricultural contexts. Social capital enhances farmers' access to resources, information, and support networks, significantly contributing to well-being. For instance, Li et al. found that collective social capital positively affects the subjective well-being of farmers and herdsmen, leading to improved mental health and life satisfaction (Li et al., 2022). Similarly, Zhang demonstrated that social networks strongly predict happiness among farmers (Zhang, 2022), while Kehinde et al. showed that social capital boosts farm productivity and food security, essential components of well-being (Kehinde et al., 2021). However, the complex relationship between social capital and well-being is further explained by resilience, which mediates this connection by enabling individuals to better utilize their social capital. Serrão et al. observed that higher resilience levels reduce burnout and depression, suggesting resilient farmers can leverage their social networks more effectively to cope with challenges (Serrão et al., 2021). Zhang's study on new nurses also supports this, showing that resilience enhances clinical belongingness, mitigating disengagement and improving well-being (Zhang, 2024). In rural development, Upe et al. highlighted that strengthening social capital among rice farmers increases agricultural productivity, which supports economic stability and well-being (Upe et al., 2021). Resilience amplifies these positive effects by enabling farmers to adapt and thrive, ultimately leading to improved livelihoods. This has led to the proposition that:

H4: Resilience mediates the relationship between social capital and Farmers' Well-being

Methodology

Participants and procedures

The study was conducted in Kano State, located in northern Nigeria, which has experienced significant growth over the years. As of 2022, its population was estimated at approximately 15,462,200, making it one of Nigeria's most populous states (citypopulation.de). Kano covers a land area of about 20,131 square kilometers (Wikipedia) and features a tropical

wet and dry climate with distinct seasons. The average annual temperature is around 26.3°C, ranging from 24°C during cooler months to 30°C in hotter periods (World Bank Climate Knowledge Portal). Annual rainfall averages 674 mm, primarily occurring between April and October (Climate Data). The population, predominantly Hausa/Fulani, is largely engaged in agriculture, including farming, animal husbandry, and agricultural processing. Kano also serves as a commercial hub, with numerous markets operating daily, bi-weekly, and weekly.

Respondents for the study were purposively selected from Doguwa, Bunkure, Garun Malam, Gwarzo, and Kura Local Government Areas (LGAs) due to their agricultural resources. A total of 86 participants were chosen from each LGA, amounting to 430 respondents, with 348 properly completed questionnaires retrieved. Data collection occurred between August and December 2024, facilitated by the researcher and trained enumerators. Confidentiality was assured, and participants rated statements using a five-point Likert scale, where 1 indicated strongly disagree and 5 indicated strongly agree.

Analysis and Results

Using SmartPLS version 4 (Becker et al., 2023), a variance-based method appropriate for investigating intricate interactions between observable and latent variables, the study used partial least squares (PLS) modeling. This approach is most suited for small samples, complex models, anomalous data, and formative measures (Benitez et al., 2020). It also increases the explained variance of outcome variables (Hair et al., 2014) and is becoming more and more popular in the social sciences and management (Guenther et al., 2023). Complete collinearity assessments were carried out in accordance with Kock and Lynn's (2012) recommendations in order to address Common Method Bias. Table 1's maximum Variance Inflation Factor (VIF) was 2.102 below the suggested cutoff of 5 (Hair et al., 2023), suggesting little bias.

Table 1. Full collinearity (VIF)

Variables	BONDING	BRIDGING	RES	FWB
VIF	1.655	1.665	2.102	1.772

Demographics

The participants' demographic characteristics are included in this section. Personal information, including gender, marital status, age, level of education, and household size, was gathered using a set of five items. The measurement technique used for each object differs according to its particular qualities. For example, gender is a binary option between male and female, whereas the other categories are multiple choice. Refer to Table 2.

Table 2. Descriptive statistics of the respondents

Variables	Frequency	Percentage
Gender		
Male	280	80.5
Female	68	19.5
Total	348	100
Age		

Variables	Frequency	Percentage
20-29	23	6.7
30-39	104	29.8
40-49	177	50.9
50-above	44	12.6
Total	348	100
Marital Status		
Married	273	78.5
Single	48	13.7
Widowed	11	3.2
Divorced	07	2.0
Separated	09	2.5
Total	348	100
Educational Qualification		
Non-formal	192	57.1
Primary	93	26.7
Secondary	42	12.0
Tertiary	21	6.0
Total	348	100
Household Size		
5-9	242	69.5
10-15	33	9.4
16-20	30	8.6
21-25	24	6.8
More than 25	19	5.4
Total	348	100

Measurement Model

To ensure validity and reliability in reflective measurement models, researchers are advised to evaluate outer models (Hair Jr et al., 2022). This involves assessing indicator loadings, composite reliability (CR), and average variance extracted (AVE) to establish convergent validity, ensuring that the indicators accurately represent their respective constructs. In line with Anderson and Gerbing's (1988) two-step approach, this study initially evaluated the measurement model to validate and confirm instrument reliability (Ramayah et al., 2018), before moving on to assess the structural model for hypothesis testing.

The measurement model assessment included the analysis of loadings, AVE, and CR. Recommended thresholds are loadings of 0.5, 0.6, 0.7, or preferably ≥0.708; AVE values ≥0.5; and CR values ≥0.7. As detailed in Table 3, all AVE values exceeded the 0.5 threshold, and CR values surpassed 0.7, indicating strong reliability. While a few indicator loadings were marginally below 0.708, they were still within acceptable and valid ranges.

Table 3. Convergent Validity

Variables	Items	Loadings	CA	CR-RhO-A	CR-RhO-C	AVE
BONDING SOCIAL CAPITAL	BONSC1	0.733	0.871	0.875	0.899	0.528
	BONSC2	0.770				
	BONSC3	0.770				
	BONSC4	0.640				
	BONSC5	0.757				
	BONSC6	0.699				
	BONSC7	0.745				
	BONSC8	0.687				
BRIDGING SOCIAL CAPITAL	BRGSC1	0.718	0.893	0.894	0.914	0.541
	BRGSC2	0.678				
	BRGSC3	0.730				
	BRGSC4	0.723				
	BRGSC5	0.786				
	BRGSC6	0.733				
	BRGSC7	0.773				
	BRGSC8	0.750				
	BRGSC9	0.722				
RESILIENCE	RES1	0.770	0.916	0.917	0.930	0.598
	RES2	0.770				
	RES3	0.786				
	RES4	0.820				
	RES5	0.737				
	RES6	0.742				
	RES7	0.828				
	RES8	0.771				
	RES9	0.727				
FARMER'S WELL-BEING	FWB1	0.795	0.889	0.894	0.912	0.599
	FWB2	0.756				
	FWB3	0.822				
	FWB4	0.800				
	FWB5	0.749				
	FWB6	0.725				
	FWB7	0.765				

Additionally, the study employed the Heterotrait-Monotrait Ratio (HTMT) to evaluate discriminant validity, adhering to recommended thresholds of ≤ 0.85 or ≤ 0.90. As presented in Table 4, all HTMT ratios complied with the stricter threshold of ≤ 0.85 (Franke & Sarstedt, 2019;

Henseler et al., 2015; Ringle et al., 2023). Consequently, the study met all validity and reliability requirements.

Table 4. Discriminant Validity (HTMT)

Variables	1	2	3	4
BONSC				
BRGSC	0.628			
FARMERS WELLBEING	0.552	0.415		
RESILIENCE	0.574	0.598	0.678	

Structural Model

According to Hair et al. (2014), the structural model highlights the links between endogenous and exogenous latent variables and shows the relationships between constructs within the suggested framework. Organizational sustainability was the endogenous variable in this study, whereas organizational resilience was the exogenous variable. Following Cain et al. (2017), multivariate skewness and kurtosis were evaluated, and based on Mardia's (1970) skewness ($\beta = 6.445$, $p < 0.01$) and kurtosis ($\beta = 61.065$, $p < 0.01$), non-multivariate normality was found.

As suggested by Becker et al. (2023) and Ramayah et al. (2018), a 10,000-sample bootstrapping technique was used to estimate path coefficients, standard errors, t-values, and p-values. The study took effect sizes and confidence intervals into account in addition to p-values to evaluate the significance of the hypotheses in order to address criticisms made by Hahn & Ang (2017) about an excessive dependence on p-values.

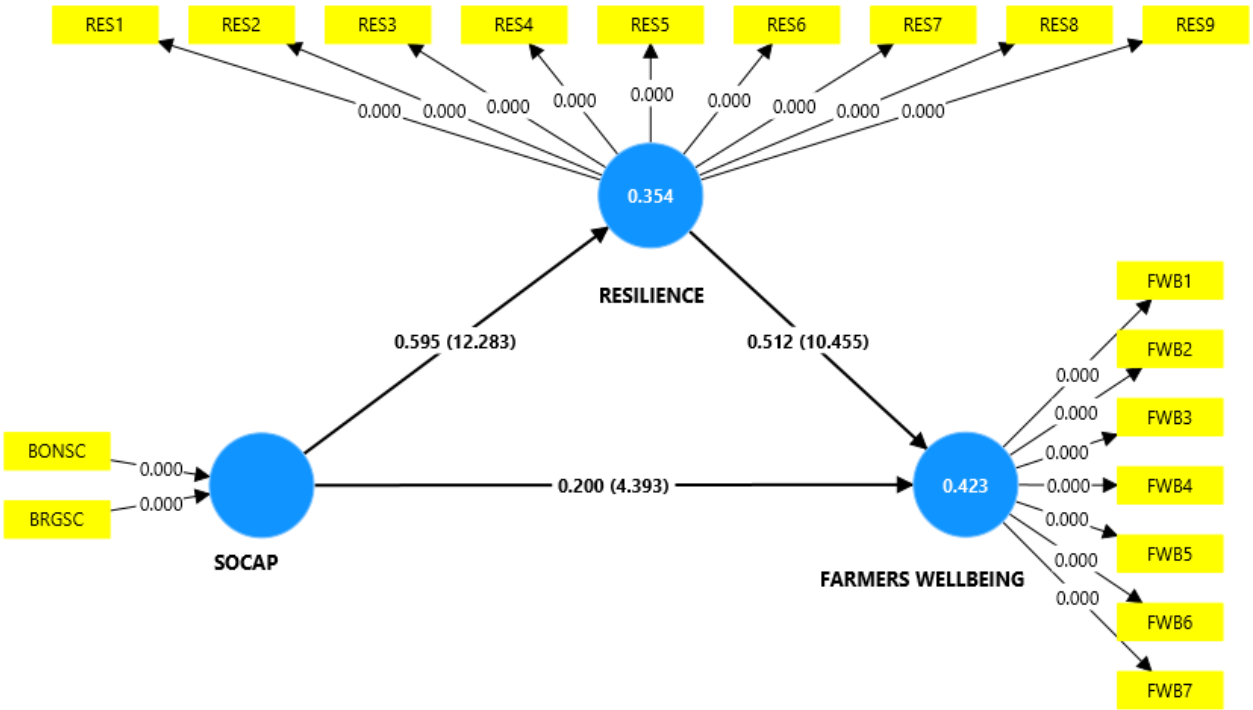

Figure 1. Structural model

Evaluation of the direct effects

The study initially assessed the effect of social capital on farmers' well-being, revealing a positive and significant relationship ($\beta = 0.200$, $t = 4.393$, $p < 0.001$), thus confirming H1. Additionally, social capital was found to have a positive and significant association with resilience ($\beta = 0.595$, $t = 12.283$, $p < 0.001$), providing support for H2. Similarly, resilience showed a strong positive effect on farmer's well-being ($\beta = 0.512$, $t = 10.455$, $p < 0.001$), confirming another support for H3. The structural model explained 35.4% ($R^2 = 0.354$) of the variance in resilience, as well as 42.3% ($R^2 = 0.423$) of the variance in Farmer's well-being demonstrating satisfactory predictive accuracy (see Figure 1 and Table 5). Effect sizes (f^2) were assessed using Cohen's $f2$ (Cohen, 1988), revealing that SOCAP had the small effect size in predicting well-being ($f^2 = 0.045$), while having a large effect in predicting resilience ($f^2 = 0.547$), besides, resilience had a medium effect ($f^2 = 0.294$), indicating moderate to strong influence farmer's well-being.

In addition, the relationship between social capital and FWB was examined in relation to resilience's indirect effect, and the results indicate that resilience plays a positive and substantial mediating role in the proposed relationship ($\beta = 0.304$, $t = 7.500$, $p < 0.001$). Therefore, as seen in Table 5, H4 was similarly supported.

Table 5. Hypotheses testing results

Hypo	Relationships	Std-Beta	Std-error	t-values	p-values	CILL	CIUL	F2	Decision
H1	SOCAP -> FWB	0.200	0.045	4.393	0.000	0.147	0.287	0.045	Supported
H2	SOCAP -> RES	0.595	0.048	12.283	0.000	0.521	0.670	0.547	Supported
H3	RES -> FWB	0.512	0.049	10.455	0.000	0.362	0.553	0.294	Supported
H4	SOCAP -> RES -> FWB	0.304	0.041	7.500	0.000	0.241	0.366	0.092	Supported

PLS-Predict

According to Shmueli et al. (2019), PLS-Predict uses a holdout sample and a 10-fold cross-validation procedure to assess predictive relevance at the item or construct level. Strong predictive capacity is indicated by small variations between PLS and LM errors, and lesser predictive power is indicated by higher discrepancies. The model has moderate predictive capability if the majority of the items display smaller errors; predictive power is low if this is only the case for a small number of items. Table 6 indicates that the PLS model has a moderate level of predictive power because its errors were primarily lower compared to the LM model.

Table 6. PLS-Predict

Variables	Q^2predict	PLS-SEM_RMSE	LM_RMSE	PLS-LM
RES1	0.205	0.81	0.827	-0.017
RES2	0.228	0.749	0.765	-0.016
RES3	0.236	0.806	0.817	-0.011
RES4	0.255	0.791	0.814	-0.023
RES5	0.149	0.788	0.804	-0.016
RES6	0.235	0.745	0.753	-0.008
RES7	0.214	0.799	0.811	-0.012
RES8	0.174	0.795	0.806	-0.011
RES9	0.248	0.733	0.727	0.006
FWB1	0.157	0.993	1.007	-0.014
FWB2	0.131	1.069	1.087	-0.018
FWB3	0.124	1.076	1.089	-0.013
FWB4	0.121	1.089	1.066	0.023
FWB5	0.052	1.174	1.177	-0.003
FWB6	0.219	0.915	0.928	-0.013
FWB7	0.183	0.937	0.955	-0.018

Discussions and Research Implications

The findings of this study highlight the significant role of social capital and resilience in improving farmers' well-being. The positive and significant relationship between social capital and farmers' well-being ($\beta = 0.200$, $t = 4.393$, $p < 0.001$) confirms the hypothesis that social networks and community engagement are essential for enhancing farmers' quality of life. This is consistent with prior studies, which suggest that social capital promotes resilience and well-being by improving access to resources and support systems (Li et al., 2022; Ma et al., 2019). For instance, Li et al. (2022) emphasizes the value of collective social capital in boosting farmers' subjective well-being, noting that strong community ties can help mitigate the negative impacts of economic and environmental challenges. Additionally, Qin et al. (2021) highlight the critical role of financial capital, a component of social capital, in empowering farmers to adopt diverse resilience strategies, thereby reducing their vulnerability to market fluctuations and disasters. The study further demonstrates a strong positive relationship between social capital and resilience ($\beta = 0.595$, $t = 12.283$, $p < 0.001$), reinforcing the idea that social networks significantly enhance farmers' adaptive capacities. This aligns with existing literature, which emphasizes the importance of social capital in building resilience within agricultural communities (Bahta & Myeki, 2021; Kangogo et al., 2020). For instance, Bahta and Myeki found that participation in cooperative organizations significantly bolstered farmers' resilience to agricultural drought, highlighting the practical implications of social capital in enhancing adaptive capacities (Bahta & Myeki, 2021). Moreover, the substantial effect of resilience on farmers' well-being ($\beta = 0.512$, $t = 10.455$,

$p < 0.001$) further corroborates the interconnectedness of these constructs. Previous research has also highlighted the positive relationship between resilience and well-being, indicating that individuals with higher resilience are better prepared to cope with life's challenges, leading to improved overall satisfaction and quality of life (Svence & Majors, 2015; Liu et al., 2020).

The structural model's explanatory power, accounting for 35.4% of the variance in resilience and 42.3% in farmers' well-being, indicates satisfactory predictive accuracy. Effect size analysis revealed that social capital has a small effect size in predicting well-being ($f^2 = 0.045$) but a large effect in predicting resilience ($f^2 = 0.547$), while resilience itself has a medium effect size ($f^2 = 0.294$) on well-being. This nuanced understanding of effect sizes suggests that while social capital is essential for fostering resilience, resilience plays a more significant role in directly influencing well-being outcomes. This is consistent with the findings of Kangogo et al. (2020), who assert that resilience is a crucial determinant of sustainability amid environmental and market uncertainties. Moreover, the study's examination of the indirect effect of resilience on the relationship between social capital and farmers' well-being ($\beta = 0.304$, $t = 7.500$, $p < 0.001$) underscores resilience's mediating role in this dynamic. This result supports the hypothesis that resilience serves as a channel through which social capital impacts well-being, emphasizing that social networks strengthen adaptive capacities, ultimately leading to enhanced well-being outcomes (Nguyen & James, 2013). The interaction among these factors highlights the significance of promoting social capital and resilience in agricultural policy and practice, as they are pivotal for improving the well-being of farming communities.

The findings of this study add to the expanding literature on the importance of social capital and resilience in agricultural settings. By clarifying the relationships among these constructs, the study offers actionable insights for policymakers and practitioners seeking to enhance farmers' well-being through initiatives that strengthen social networks and promote resilience-building strategies. The empirical results highlight the significant role of social capital in improving both farmers' well-being and resilience. Specifically, the study found a positive association between social capital and farmer well-being ($\beta = 0.200$, $t = 4.393$, $p < 0.001$) as well as resilience ($\beta = 0.595$, $t = 12.283$, $p < 0.001$). This indicates that farmers with stronger social connections tend to experience enhanced well-being and are better equipped to adapt to challenges. Furthermore, the structural model explained 35.4% of the variance in resilience and 42.3% in well-being, underscoring the predictive power of social capital for these outcomes. These findings align with prior research that underscores the pivotal role of social networks in fostering community resilience and individual well-being among farmers (Carmen et al., 2022; Qin et al., 2021; Li et al., 2022).

The theoretical implications of these findings enhance the understanding of social capital as a multifaceted construct that impacts both individual outcomes and broader community dynamics. The significant mediating role of resilience in the relationship between social capital and farmer well-being ($\beta = 0.304$, $t = 7.500$, $p < 0.001$) reinforces the idea that

resilience serves as a mechanism through which social capital exerts its influence. This supports theories that view social capital as a facilitator of adaptive capacity and collective agency in agricultural settings (Zhang et al., 2021; Vesely et al., 2017). From a practical perspective, the findings suggest that initiatives aimed at strengthening social capital among farmers could lead to improvements in both well-being and resilience. Programs designed to promote community engagement, trust, and cooperation can play a key role in developing social networks that assist farmers during crises. The strong effect of social capital on resilience ($f^2 = 0.547$) highlights that enhancing social ties could be a strategic priority for agricultural development efforts (Hidayat, 2024; Qin et al., 2021).

In terms of managerial implications, agricultural managers and policymakers should recognize the importance of social capital in their strategies. The significant relationships identified in the study suggest that fostering social networks among farmers can lead to better outcomes in terms of resilience and well-being. Managers could implement training programs that emphasize the development of social skills and community-building activities, which could enhance cooperation and trust among farmers (Ekadina et al., 2022; Prayitno et al., 2022). Additionally, integrating social capital considerations into the design of agricultural policies could improve the effectiveness of interventions aimed at enhancing farmer welfare. The policy implications of this research are significant. Policymakers should integrate the role of social capital into agricultural policy frameworks, especially in rural revitalization initiatives. The findings suggest that strengthening collective social capital can greatly enhance farmers' subjective well-being and resilience to external shocks (Li et al., 2022; Supratikno et al., 2023). Policies that encourage the formation of farmer cooperatives, community networks, and social support systems could be highly beneficial. Moreover, recognizing the mediating role of resilience in the relationship between social capital and well-being can inform the design of targeted interventions that not only strengthen social connections but also enhance resilience among farmers (Zain et al., 2022; Sunday, 2019).

Conclusion, limitations and future research directions

However, the study also has limitations that warrant consideration. The reliance on self-reported measures of social capital and well-being may introduce biases, as farmers might overestimate their social connections or well-being due to social desirability effects (Niu et al., 2023; Su et al., 2021). Additionally, the study's cross-sectional design limits the ability to infer causality between social capital, resilience, and well-being. Future research should employ longitudinal designs to better understand the dynamics of these relationships over time. Moreover, the study's focus on a specific geographical area may limit the generalizability of the findings. Future studies should explore these relationships in diverse agricultural contexts to validate the findings across different populations and settings (Qin et al., 2021; Guo et al., 2022).

Future research directions could include examining the mechanisms through which social capital influences resilience and well-

being. For instance, investigating the specific types of social capital (e.g., bonding vs. bridging social capital) that are most effective in enhancing resilience could provide deeper insights into how to leverage social networks for better outcomes (Zhang et al., 2021; Ogunleye et al., 2021). Additionally, exploring the role of external factors, such as government policies and economic conditions, in moderating the relationship between social capital and farmers' well-being could yield valuable information for policymakers (Upe et al., 2021; Li et al., 2022).

In conclusion, the study provides compelling evidence for the positive impact of social capital on farmers' well-being and resilience, emphasizing the need for policies that foster social networks and community engagement. While the findings are promising, addressing the limitations and expanding the scope of future research will be essential in developing a comprehensive understanding of the role of social capital in agricultural contexts. By enhancing social capital, stakeholders can potentially improve the adaptive capacities of farmers, leading to more sustainable agricultural practices and improved livelihoods.

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