



## Farmers Interpretations of Market Uncertainty in Shaping Agricultural Livelihood Strategies

Vicente Manuel Luis Guterres<sup>1\*</sup>, Vicente de Paulo Correia<sup>2</sup>, Joana da Costa Freitas<sup>3</sup>, Celso Ximenes<sup>4</sup>

<sup>1</sup>Faculty of Tourism, Arts, Creative Industries and Culture, National University of Timor Lorosae, Dili

<sup>2,3,4</sup>Agriculture Faculty, National University of Timor Lorosa'e, Dili

**Corresponding Author:** Vicente Manuel Luis Guterres

[vicenteroqueguterres@gmail.com](mailto:vicenteroqueguterres@gmail.com)

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### ABSTRACT

Uncertainty in the price of agricultural commodities is the main challenge faced by farmers in the Indonesia-Timor Leste border area, especially in Belu Regency, East Nusa Tenggara. This study aims to analyze how corn farmers interpret market uncertainty and its implications for their livelihood strategies. This research uses a qualitative approach through in-depth interviews and field observations of small-scale farmers in the 2024 harvest season. The results show that farmers not only view uncertainty as a risk, but also as a strategically anticipated condition. Farmers' interpretations are influenced by limited access to information, dependence on collectors, and cross-border market dynamics. This condition encourages adaptive strategies such as business diversification, crop storage, and the use of informal marketing networks. This research emphasizes the importance of strengthening access to market information and price stabilization policies to increase the livelihood resilience of farmers in border areas

## **INTRODUCTION**

The agricultural sector is one of the main pillars in supporting food security and people's livelihoods, especially in developing countries. However, in recent decades, the sector has faced increasingly complex challenges, especially related to market uncertainty characterized by price fluctuations, changes in demand, and global supply chain instability (Sheikh et al., 2024; Abebaw, 2025). This uncertainty has a significant impact on farmers' income and the sustainability of agriculture-based livelihood systems.

In the global context, market uncertainty is not only caused by economic dynamics, but also influenced by climate change, global crises, and disruptions in the international trading system. Studies show that smallholder farmers are the most vulnerable group to this uncertainty due to limited access to capital, information, and market networks (Beban & Gironde, 2023; Awazi, 2025). This condition encourages farmers to develop various adaptation strategies to maintain the sustainability of their livelihoods.

The livelihood approach emphasizes that farmers' livelihood strategies are not only determined by structural factors, but also by how farmers interpret the uncertainties they face. Interpretation of risks and opportunities is an important element in the decision-making process, including in determining business diversification, changes in production patterns, and the use of available resources (Sainjoo, 2024; Truong et al., 2026). Thus, farmers' responses to market uncertainty are dynamic and contextual.

Various studies have examined farmers' adaptation strategies in the face of uncertainty, such as income diversification, production intensification, and integration into broader markets (Liu et al., 2024; Chumpanya & Panpakdee, 2025). However, most of these studies still focus on structural and economic aspects, while the interpretive dimension, i.e. how farmers understand and interpret market uncertainty, is still relatively under-appreciated in the academic literature.

In fact, farmers' subjective understanding of uncertainty has important implications for the choice of livelihood strategies taken. Differences in interpretation can result in significant variation in strategies, even under similar structural conditions. Therefore, an analysis that integrates the interpretive dimension is important to provide a more comprehensive understanding of the dynamics of farmers' livelihoods in the midst of market uncertainty.

Based on this, this study aims to analyze how farmers interpret market uncertainty and how these interpretations shape the livelihood strategies they develop. This research is expected to make a theoretical contribution to the development of agricultural economics studies based on a livelihood approach, as well as provide practical implications for policy formulation that is more responsive to market volatility dynamics in the agricultural sector.

## **THEORETICAL REVIEW**

### ***Market Uncertainty in the Agricultural Sector***

Market uncertainty is a condition in which economic actors, including farmers, face limitations in predicting prices, demand, and market dynamics in the future. In the agricultural sector, this uncertainty tends to be higher than in other sectors because it is influenced by external factors such as global price volatility, supply chain disruptions, and climate change that impacts production (FAO, 2022; Birthal et al., 2023). The price uncertainty of agricultural commodities is also reinforced by imperfect market structures, where farmers are often in weak bargaining positions in the value chain (Barrett et al., 2022).

The agricultural economics literature shows that market uncertainty not only impacts income risks, but also affects farmers' production and investment behavior. Farmers tend to avoid risk (risk-averse behavior) by choosing more stable commodities or reducing production intensity when uncertainty increases (Kassie et al., 2020; Bellemare et al., 2021). Nevertheless, this approach does not necessarily explain the variation in farmers' responses, as individual perception and interpretation factors also play an important role in responding to uncertainty.

### ***Livelihood Strategies in Agricultural Perspective***

The concept of livelihood strategies refers to a combination of activities and choices made by individuals or households to maintain and improve their livelihoods. In the context of agriculture, this strategy includes diversifying sources of income, intensifying production, and adapting to changing environmental and market conditions (Scoones, 2021; Ellis, 2021). The Sustainable Livelihood Framework (SLF) approach emphasizes that livelihood strategies are influenced by the assets owned, such as human, social, financial, physical, and natural capital, as well as the context of the vulnerabilities faced (De Haan, 2022).

In situations of market uncertainty, farmers often develop adaptive strategies to minimize risk and maintain income stability. These strategies can be in the form of commodity diversification, involvement in non-agricultural activities, and strengthening social networks as a form of coping mechanism (Rakodi, 2023; Nguyen et al., 2024). Recent studies show that livelihood strategies are dynamic and are influenced not only by economic factors, but also by the social values and empirical experiences of farmers (Hussein et al., 2023).

### ***Farmers' Interpretation of Uncertainty***

Contemporary approaches in agrarian studies emphasize the importance of the interpretive dimension in understanding the behavior of farmers. Farmers do not always respond to uncertainty rationally within the classical economic framework, but rather through a process of meaning influenced by experience, local knowledge, and socio-cultural contexts (Cleaver, 2022; Long, 2023). In other words, market uncertainty is not only an objective phenomenon, but also a subjective construct that is interpreted differently by each farmer.

Recent research shows that interpretation of risk and uncertainty influences the choice of strategy taken. Farmers who view uncertainty as a threat tend to avoid risk, while those who see it as an opportunity are more likely to adopt innovative strategies such as diversifying their businesses or exploring alternative markets (Meijer et al., 2021; Tambo & Wünsch, 2022). Therefore, analysis of

farmers' interpretations is important to understand the variations in livelihood strategies that arise under similar conditions.

### ***The Relationship between Market Uncertainty and Livelihood Strategy***

The relationship between market uncertainty and livelihood strategies is complex and multidimensional. Market uncertainty acts as a driving factor that forces farmers to adjust their strategies, while the interpretation of such uncertainty determines the direction and form of adaptation carried out (Dercon, 2021; Barrett & Carter, 2023). In this framework, livelihood strategies can be understood as the result of the interaction between structural conditions and individual interpretive processes.

Conceptual models that develop in the literature show that market uncertainty influences livelihood strategies through two main pathways, namely the structural pathway (access to resources and markets) and the cognitive pathway (farmers' perception and interpretation). The integration of these two pathways provides a more comprehensive understanding of how farmers build adaptive strategies in the face of market dynamics (Béné et al., 2021; Morton, 2023).

Thus, this theoretical study confirms that farmers' livelihood strategies cannot be understood only as a response to external pressures, but also as the result of social constructions influenced by interpretations of uncertainty. This perspective is an important foundation in this study to analyze how farmers shape livelihood strategies in the context of market uncertainty.

## **METHODOLOGY**

### ***Research Design***

This study uses a qualitative approach with a case study design to deeply understand how farmers interpret market uncertainty and how those interpretations shape their livelihood strategies. The qualitative approach was chosen because it is able to capture subjective meanings, experiences, and social processes that cannot be quantitatively measured (Creswell & Poth, 2018; Aspers & Corte, 2019). Case studies are used to contextually explore phenomena in real-life situations (Yin, 2021).

### ***Research Site***

This research was conducted in the corn production center area in Belu Regency, East Nusa Tenggara Province, Indonesia. This location was chosen because it has dryland agricultural characteristics with relatively high levels of commodity price fluctuations, thus creating market uncertainty conditions for farmers.

In addition, most farmers in this region are small-scale farmers who have limited access to market information, infrastructure, and agricultural support institutions. This condition makes the research location relevant to examine how farmers interpret market uncertainty and develop livelihood strategies in the face of agricultural economic dynamics (Scoones, 2021; De Haan, 2022).

### ***Technical Data Collection***

Data were collected through in-depth interviews, field observations, and documentation. The interviews were conducted to explore farmers' perceptions and experiences regarding market uncertainty and the strategies they used.

Observations are used to understand real practices in production and marketing activities, while documentation is used to complement contextual data.

The selection of informants was carried out by purposive sampling by considering experience and involvement in agricultural activities (Campbell et al., 2020). The main informants consist of small-scale corn farmers who are active in production and marketing activities. The number of informants is determined based on the principle of data saturation (Hennink & Kaiser, 2022).

### ***Data Analysis***

Data analysis uses thematic analysis techniques that include the process of coding, categorization, and interpreting data to find patterns of meaning (Braun & Clarke, 2021). This analysis is focused on how farmers interpret market uncertainty and how those interpretations affect livelihood strategies.

### ***Validity and Trustworthiness***

The validity of the research is maintained through triangulation of sources and methods, as well as member checking to ensure the suitability of interpretation (Flick, 2020; Birt et al., 2020). In addition, this study also applies the principles of credibility, transferability, dependability, and confirmability in maintaining data quality. This research was conducted by paying attention to the ethical principles of the research, including informed consent, confidentiality of respondent identities, and responsible use of data (Israel & Hay, 2021).

## **RESEARCH RESULTS**

This study involved as many as 20 informants (n=20) who were small-scale corn farmers. Thematic analysis shows that market uncertainty is not only understood as external conditions, but is constructed subjectively by farmers and directly influences the choice of livelihood strategies. The findings show a dialectical relationship between farmers' perceptions, market structures, and adaptive actions.

### ***Uncertainty as a Socio-Economic Construct***

The findings suggest that market uncertainty is not understood solely as price fluctuations, but as a phenomenon that reflects the limitations of farmers' positions in market structures. Farmers not only experience uncertainty, but also realize that they have no control over the price-setting mechanisms.

"The price of corn sometimes drops suddenly, we don't know why. When the harvest is plentiful, the price falls." (INF-03).

This statement shows that uncertainty is perceived as something "non-transparent", thus creating a distance between farmers and the market system. Uncertainty in this case is not only an economic risk, but also a form of structural helplessness. Further, farmers internalize these conditions as an irreversible reality, which is reflected in their passive attitude towards prices.

"Farmers cannot determine the price, we only receive it from the buyer." (INF-07).

This suggests a process of normalization of uncertainty, in which farmers no longer see these conditions as a negotiable problem, but as an inherent part of agricultural activities. Thus, uncertainty is not only objective, but also socially constructed through repetitive experience. Nevertheless, there is a differentiation

in the way farmers interpret uncertainty. A small percentage of farmers show reflective capacity by seeing uncertainty as a space of possibility.

"If you can save it first, then the price can go up." (INF-01)

This interpretation suggests that uncertainty can be repositioned as an opportunity, depending on an individual's capacity to read market dynamics.

#### ***Dependency Structure and Asymmetry of Market Power***

The analysis shows that market uncertainty cannot be separated from the structure of the relationship between farmers and market actors, especially collectors. Dependence on a single distribution channel creates a power asymmetry that strengthens the bargaining position of traders.

"Usually it is sold directly to collectors, because they come to the village." (INF-05)

This statement indicates that ease of access is actually a factor that strengthens dependence. In this context, the farmer's choice is not based on entirely rational preferences, but on the limitations of the alternatives available. Furthermore, the economic relationship between farmers and traders is not neutral, but rather tied in complex social relationships, such as debt and trust.

"Sometimes we have taken money first, so we have to sell it to them." (INF-02)

This condition shows that the market mechanism does not run purely but is influenced by social relations that limit the autonomy of farmers in determining economic decisions. Market uncertainty in this regard is reinforced by structural dependence, so farmers face not only price risks, but also attachment in an unbalanced distribution network.

#### ***Adaptive Strategies as a Contextual Response***

In the face of uncertainty, farmers are not completely passive, but develop adaptive strategies that are contextual and flexible. These strategies are not always designed formally, but rather develop from everyday experience and practice. One of the main strategies is livelihood diversification, which serves as a mechanism to reduce dependence on a single source of income.

"If just corn is not enough, so we plant others as well." (INF-04)

Diversification in this case is not only an economic strategy, but also a form of risk management based on empirical experience. Farmers implicitly understand that dependence on a single commodity increases vulnerability to uncertainty. In addition, the sales delay strategy shows the existence of a temporal ability to manage market risk.

"If it can be stored, we wait for the price to rise." (INF-01)

However, this strategy cannot be carried out by all farmers, as it requires resources such as storage and financial resilience. Thus, adaptability is determined not only by perception, but also by access to resources. Another strategy that has emerged is the use of social networks as an informal source of information.

"We ask friends about prices elsewhere." (INF-06)

This shows that in conditions of limited formal information, farmers rely on social networks as an alternative mechanism to reduce uncertainty.

***The Dialectic between Interpretation and Strategy***

The most significant finding in this study is the existence of a dialectical relationship between the interpretation of uncertainty and livelihood strategies. Interpretation not only influences the strategy, but is also reshaped by the experience of implementing the strategy. Farmers who interpret uncertainty as a threat tend to adopt defensive strategies, such as selling crops immediately after harvest. In contrast, farmers who have more flexible interpretations tend to develop more adaptive strategies.

"If you want to keep it, you can get a better price, but there are risks." (INF-08)

This statement indicates a reflective awareness of risks and opportunities at the same time. In this context, livelihood strategies are not only a response to external conditions, but also the result of a dynamic interpretive process.

Thus, market uncertainty does not directly determine farmers' behavior, but is mediated by how farmers understand and interpret these conditions. This confirms that livelihood strategies are the result of interactions between structure, experience, and subjective interpretation.

Table 1. Thematic Coding Research Results

Yes	Main Themes	Categories	Findings Indicators	Sample Quotes
1	Interpretation of Uncertainty	Price risk	Unstable prices	"Prices sometimes drop suddenly..." (INF-03)
		Limitations of control	Can't set a price	"Farmers only accept the price..." (INF-07)
		Opportunities	Waiting for a price increase	"If you keep it first..." (INF-01)
2	Market Dependency	Limited market access	Depends on the collector	"Sell it directly to collectors..." (INF-05)
		Socio-economic relations	Debt with the buyer	"I've taken the money first..." (INF-02)
3	Adaptive Strategy	Diversification	Plant other commodities	"Plant beans too..." (INF-04)
		Delay in selling	Storing crops	"Wait for the price to go up..." (INF-01)
		Social networks	Information from fellow farmers	"Ask a friend about the price..." (INF-06)
4	Interpretation-Strategy Relationship	Defensive strategy	Quick Sell	"Just sell it..."
		Adaptive strategies	Save/diversify	"If you dare to keep..." (INF-08)

## DISCUSSION

The results of the study show that market uncertainty not only functions as an external condition that affects farmers, but also as a socio-economic construct that is interpreted subjectively and affects livelihood strategies. These findings are in line with the global literature that emphasizes that farmers' responses to uncertainty are not solely determined by economic rationality, but rather through the interaction between market structures and individual interpretive processes (Rigg et al., 2021; Darnhofer, 2021). In various agrarian contexts, including in developing countries, farmers' decisions are often influenced by empirical experience and limited access to market information, which reinforces the subjective dimension of decision-making (Noor et al., 2024).

First, the findings regarding uncertainty as normalized conditions show a cognitive adaptation to market volatility. Farmers no longer view price fluctuations as an aberration, but as an inherent part of the agricultural system. This phenomenon is in line with the concept of everyday resilience, in which individuals develop the ability to survive in repeated conditions of uncertainty (Tschakert et al., 2022). Cross-border studies also show that normalization of uncertainty is a common form of adaptation in smallholder farmers, although at the same time it can hinder structural transformation in agricultural systems (Béné, 2023).

Second, the dependence on collectors reflects the asymmetry of power in the agricultural value chain. These findings confirm that smallholder farmers globally are often in a weak bargaining position due to limited access to information, infrastructure, and alternative markets (Vermeulen et al., 2022; FAO, 2023). In various agrarian studies, the relationship between farmers and intermediaries is not only economic, but also social, often involving debt and trust mechanisms that reinforce structural dependence. Similar phenomena are also found in various local contexts, where socio-economic attachments limit farmers' flexibility in determining marketing choices (Pravidjayanto et al., 2024).

Third, the adaptive strategies developed by farmers show the capacity of agencies to respond to uncertainty. Diversification of livelihoods, postponement of sales, and utilization of social networks reflect a form of adaptive strategies that develop contextually and experientially (Ellis et al., 2021; Ben, 2023). In a global perspective, diversification strategies have long been identified as a key mechanism in reducing risk and improving the livelihood resilience of smallholder farmers (Barrett et al., 2022). These findings are also consistent with various studies showing that farmers combine different sources of income to cope with market volatility and economic uncertainty.

Fourth, the relationship between interpretation and strategy emphasizes the importance of the cognitive dimension in farmers' economic decision-making. Farmers who interpret uncertainty as a risk tend to adopt defensive strategies, while those who see it as an opportunity show adaptive and innovative tendencies (Wossen et al., 2021; Michler et al., 2022). This approach is in line with the perspective of behavioral economics in agriculture, which emphasizes that economic decisions are influenced by perceptions, experiences, and expectations, not just by rational calculations. Findings from various local

contexts also reinforce that the perception of risk has a significant influence on farmers' production and marketing strategies (Krisnanda et al., 2021).

Furthermore, the results of this study show that there is a dialectical relationship between structure and agency. Market structures limit farmers' choices through limited access and dependence on certain actors, while farmers still have room to adapt through the strategies they develop. This perspective is in line with the structuration theory approach, which places individual actions as the result of an interaction between social structure and agency capacity (Cleaver & Whaley, 2022). In a global context, this dynamic is becoming a common characteristic in small-scale farming systems, where farmers are constantly negotiating between structural constraints and adaptation opportunities (Triana et al., 2025).

The implications of these findings suggest that efforts to improve farmers' welfare need to be carried out through a more comprehensive approach, focusing not only on the aspects of production or price stabilization, but also on strengthening adaptive capacity and access to market information. Farmer institutional development, transparency of price information, and diversification of marketing channels are key to reducing structural dependency and increasing farmer resilience (Pingali et al., 2023). This approach is globally relevant, especially in the context of small-scale agriculture facing increasingly complex market dynamics.

Thus, this study confirms that market uncertainty is a multidimensional phenomenon that not only affects the economic condition of farmers, but also shapes their way of thinking and livelihood strategies. Therefore, analyses that integrate structural and interpretive dimensions are important to understand the dynamics of agricultural economics more comprehensively in various contexts.

## CONCLUSIONS AND RECOMMENDATIONS

This research shows that market uncertainty in the agricultural sector is not only an economic phenomenon, but also a social construct that is interpreted differently by farmers and directly affects their livelihood strategies. Farmers are not completely passive in dealing with uncertainty, but rather develop various adaptive strategies such as business diversification, postponement of sales, and the use of social networks. However, this adaptability is greatly influenced by limited access to market information, resources, and relationship structures that tend to be asymmetrical.

These findings confirm the importance of an approach that integrates structural and interpretive dimensions in understanding farmers' economic behavior. Therefore, efforts to strengthen the agricultural sector need to be directed not only at increasing production, but also at improving a more transparent and inclusive market system. Recommendations that can be submitted include strengthening access to real-time price information, developing farmer institutions to improve bargaining positions, and diversifying marketing channels to reduce dependence on one market actor.

In addition, a program to increase the capacity of farmers in understanding market dynamics is needed so that they are able to interpret

uncertainty more adaptively and strategically. Thus, the resulting policies are not only economical, but also able to strengthen the resilience and sustainability of farmers' livelihoods in the face of increasingly complex market uncertainties.

### FURTHER STUDY

Further research is suggested using a quantitative or mixed methods approach to test the relationship between the interpretation of market uncertainty and livelihood strategies more broadly. In addition, the study can be expanded to include variables such as digital technology, access to market information, and institutional roles. Comparative studies between regions or commodities are also important to understand the variation in farmers' strategies in dealing with market uncertainty.

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