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### Determinants of the Availment of Crop Insurance Program

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#### Abstract

Crop insurance is a crucial shield for farmers facing the challenges of climate change, including natural disasters, pests, and diseases. This descriptive-relational study using a researcher-made questionnaire examines the determinants of crop insurance adoption among 180 farmers in Negros Occidental's fourth district. The statistical tools are frequency, percentages, means, standard deviations, ranks, and linear regression. Findings reveal that coverage amount, covered risks, indemnity settlement, and adjustment significantly impact farmers' decisions to adopt crop

insurance. Farmers highly value crop insurance for its potential coverage against pests and diseases. Correspondingly, loan requirements and farm eligibility moderately affect utilization, with debt levels emerging as a significant predictor. Optimizing crop insurance as a protection tool can raise farmer awareness and bolster agricultural sustainability and income stability. Recommendations include updating insurance components, expanding local government adoption, enhancing service delivery, and providing ongoing farmer education.

**Keywords:** Crop Insurance, Policy Coverage, Delivery of Services, Public Administration, Linear Regression Analysis, Philippines

#### 1. Introduction

Agriculture is a cornerstone of the Philippine economy, sustaining livelihoods for a substantial portion of the population, including marginalized groups such as indigenous communities, landless farmers, and fisherfolk (Praburaj, 2018; Briones *et al.*, 2017) <sup>[27, 4]</sup>. However, this vital sector faces severe vulnerability to the adverse impacts of climate change, which can disrupt agricultural productivity, jeopardize food security, and lead to increased dependence on imports (Rosegrant *et al.*, 2016) <sup>[28]</sup>.

The Philippines is prone to frequent natural disasters, imposing substantial risks on crops and those engaged in agriculture. To address these challenges, the Philippine Crop Insurance Corporation (PCIC) implements the government's agri-fishery insurance policy, providing farmers with protection against natural disasters, plant diseases, and pest infestations. Complementary initiatives like the Registry System for Basic Sectors in Agriculture (RSBSA) prioritize farmers and fisherfolk accessing agricultural and fishery assistance, including crop insurance.

Despite these programs, there exists a gap in the adoption of crop insurance in Negros Occidental, with only a limited number of local government units partnering with PCIC. According to records from the Department of Budget and Management (DBM), the number of farmers and fisherfolk in Negros Occidental under RSBSA declined significantly from 370,223 in 2016 to 197,525 in 2018 (PCIC-RO6, 2019) <sup>[26]</sup>. Although guidelines for program utilization exist, there needs to be more comprehension among intended beneficiaries.

In response to these challenges and the need to enhance agricultural productivity while adapting to climate change, the Negros First Universal Crop Insurance Program was initiated. This program focuses on bridging knowledge gaps, climate change adaptation, and addressing deficiencies in the agriculture sector.

This study aims to identify the factors influencing farmers' decisions to participate in crop insurance programs in Negros Occidental. Examining policies, coverage options, and service delivery seeks to address the comprehension gap among intended beneficiaries. Furthermore, this research aims to contribute to refining the crop insurance program, making it more accessible and beneficial to farmers and fisherfolk, ultimately enhancing agricultural productivity. Given the paramount importance of the agriculture sector and the imperative for sustainable climate change adaptation, a comprehensive

understanding of the determinants of crop insurance utilization is critical. The findings from this study will provide valuable insights for policymakers, insurance providers, and agricultural authorities to enhance the effectiveness of crop insurance programs in Negros Occidental.

## 2. Framework of the Study

This study is rooted in the Cumulative Prospect Theory (CPT), a behavioral economics theory Chen (2021) [5] defines as a framework for decision-making under risk and uncertainty. CPT explores how individuals make choices in situations where the probabilities of various outcomes are uncertain. Recent evidence, as highlighted by Chen (2021) [5], suggests that CPT is a robust predictor of farmers' insurance decisions. Building on the work of Tversky and Kahneman in 1992, Luckstead and Devadoss (2019) [20] emphasize CPT's relevance in explaining why farmers are more inclined to insure against potential losses than seek corresponding gains.

Crop insurance serves as a pivotal risk management tool to counteract the impacts of climate change. As noted by Babcock (2015) [1], governments in numerous countries heavily subsidize crop insurance to incentivize farmer participation. Additionally, Dalhaus *et al.* (2020) emphasize that the availability of crop insurance aligns with farmers' preferences and willingness to invest in such coverage. Visser, Jumare, and Brick's (2020) [31] research examines the interplay between insurance and technology adoption, revealing connections between insurance uptake, farm yield volume, technology adoption, and coverage extent.

In the context of this study, where farmers confront climate change-induced risks and government-supported insurance programs, CPT provides a valuable lens for understanding the factors influencing farmers' decision-making regarding insurance participation. This framework will inform data collection, analysis, and interpretation by exploring elements like reference points, loss aversion, probability weighting, framing effects, and other cognitive factors. Ultimately, it will shed light on the key determinants that sway farmers to avail of crop insurance programs. This insight will contribute to improving the accessibility and effectiveness of these programs in Negros Occidental.

## 3. Methodology

This study employed a descriptive-relational research design to assess the factors influencing the utilization of crop insurance programs among farmers in Negros Occidental and to identify predictors of such utilization. Descriptive research systematically depicts a population, situation, or phenomenon, while correlational research examines relationships between variables (Sahin *et al.*, 2021 [29]; McCombes, 2019 [22]; Wushe & Shenje, 2019 [33]; Curtis *et al.*, 2016).

A quota sampling approach was utilized, selecting thirty farmers from various barangays in Bago City, Pulupandan, Valladolid, San Enrique, La Carlota, and Pontevedra. The researcher developed a three-part questionnaire for data collection and employed convenience sampling. Before the survey, content validation was conducted using Lawshe's

Content Validity Ratio. Reliability was assessed with Cronbach's alpha ( $\alpha$ ), resulting in a coefficient of 0.744, signifying acceptable reliability.

The researcher secured consent from the City and Municipal Agriculture offices and the selected barangays to conduct the study. An enumerator trained by the researcher assisted in data collection. Adequate time was allotted for participants to complete the questionnaire, and the researcher ensured a 100% retrieval rate within one month. Ethical considerations were carefully observed throughout the study, with voluntary participation, and no coercion or financial incentives were offered to respondents. Participant identities were treated with utmost confidentiality, and individuals could withdraw from the study at anytime.

Descriptive statistical measures such as frequency counts, percentage distributions, means, and standard deviations were employed in analyzing the descriptive objectives. Linear regression analysis was used for the inferential objective, exploring the predictors of crop insurance utilization among farmers. Ethical principles were diligently upheld to safeguard the rights and well-being of study participants.

## 4. Results and Discussion

### *Socio-Economic Profile of the Participants*

The socio-economic profile of the 180 participants encompassed various variables, including age, sex, marital status, educational attainment, household size, number of years in farming, gross monthly income, and membership status in the association.

As presented in Table 1, data shows that the participants exhibited a diverse age distribution. Specifically, 8.3% of participants were 38 years old or below, 43.3% fell in the age range of 39-53 years, 39.4% were aged 54-68, and 8.9% were 69 or above. As to sex, the study featured a nearly balanced gender distribution, with 43.9% being male and 56.1% being female farmers. Moreover, among the participants, 12.8% were single, 69.4% were married, and 17.8% were widowed or separated. Considering the educational backgrounds, data varies widely, with 10% having incomplete elementary education, 13.3% completing elementary school, 16.7% stopping at high school without graduating, 28.9% graduating from high school, 12.8% attending some college without completion, 17.8% holding a college degree, and 6% pursuing post-graduate studies.

Also, most participants (67.8%) reported having household sizes of 1-5 members, while 31.7% had 6 to 10 members, and only 0.6% had 11 or more members in their households. Notably, participants' experience in farming varied, with 32.2% having 1-16 years of farming experience, 40% having 17-32 years, 20% having 33-48 years, and 7.8% having 49 years or more. A wide range of income levels was also observed, with 80% earning between 1,000 and 8,250 per month, 16.7% earning between 8,251 and 15,501 per month, 2.2% earning between 15,502 and 22,752 per month, and 1.1% earning 22,753 per month or more. Lastly, regarding their membership status in the farming association, 69.4% were members, while 30.6% were non-members.

**Table 1:** Socio-economic Profile of the Participants

Variables	Classification	f	%
Age	38 years old below	15	8.3
	39-53 years old	78	43.3
	54-68 years old	71	39.4
	69 years old & above	16	8.9
Sex	Male	79	43.9
	Female	101	56.1
Marital Status	Single	23	12.8
	Married	125	69.4
	Others	32	17.8
Educational Attainment	Elementary Undergraduate	18	10
	Elementary Graduate	24	13.3
	High School Undergrad	30	16.7
	High School Graduate	52	28.9
	College Undergraduate	23	12.8
	College Graduate	32	17.8
	Post Grad/MA/Ph.D.	1	6
Household Size	with 1-5 members	122	67.8
	with 6-10 members	57	31.7
	with 11 or more members	1	0.6
Years in Farming	1-16 years	58	32.2
	17-32 years	72	40
	33-48 years	36	20
	49 years and above	14	7.8
Gross Monthly Income	1,000-8,250	144	80
	8,251-15,501	30	16.7
	15,502-22,752	4	2.2
	22,753 and above	2	1.1
Status of Farmers Membership to Assn.	Member	125	69.4
	Non-member	55	30.6

*Farm Profile of the Participants*

The farm profiles of the 180 participants encompassed various key variables, including land category, tenurial status, topography, debt fraction, yield forecast, and farm commodities produced are presented in Table 2. Regarding farm size, most participants (60.6%) possessed farms less than 1.5 hectares. About 30% had farms between 1.5 and 3.0 hectares, 7.8% between 3.0 and 4.0 hectares, and 1.7% had farms larger than 4.0 hectares. In terms of land category, the majority (71.1%) of the farms were irrigated, while the remaining 28.9% were rainfed. Participants exhibited various tenurial statuses for their farms. Notably, 33.9% of the farms were wholly owned, 28.9% were under tenant arrangements, 20% were under rent/lease agreements, 12.2% held Certificates of Land Ownership Award (CLOA), and 5% had other arrangements, such as rotation. On the topography of the farms, the majority (80.6%) had flat terrain, while 19.4% had rolling terrain. Furthermore, the participants' debt fractions varied, with 26.7% experiencing high debt levels (68-100% of cropping capital sourced from lending), 47.6% having moderate debt levels (34-67% of cropping capital from lending), and 26.1% maintaining low debt levels (1-33% of cropping capital from lending). In terms of yield forecasts, 36.1% of participants anticipated high yields (80% productive; 20% waste), 60% expected moderate yields (50% productive; 50% waste), and 3.9% predicted low yields (20% productive; 80% waste). Lastly, participants engaged in diverse agricultural activities, with 91.1% involved in rice production, 3.9% in corn, 35% in vegetable farming, 13.9% in fruit cultivation, 21.1% in livestock raising, 9.4% in poultry farming, and 1.1% in other commodities like sugarcane and mushrooms.

**Table 2:** Farm Profile of the Participants

	Variables	f	%
Farm Size	> 1.5 hectares	99	55.0
	1.5 < 3.0 hectares	54	30.0
	< 3.0 hectares	27	15.0
Land Category	Irrigated	128	71.1
	Rainfed	52	28.9
Tenurial Status	Fully Owned	61	33.9
	Tenant	52	28.9
	Rent/Lease	36	20.0
	CLOA	31	17.2
Topography	Flat	145	80.6
	Rolling	35	19.4
Debt Fraction	High	48	26.7
	Moderate	85	47.2
	Low	47	26.1
Yield Forecast	High	65	36.1
	Moderate	108	60.0
	Low	7	3.9
Farm Commodity	Rice	164	91.1
	Corn	7	3.9
	Vegetables	63	35
	Fruits	25	13.9
	Livestock	38	21.1
	Poultry	17	9.4
	Others	2	1.1

*Factors Affecting the Availment of the Crop Insurance Program*

Farmers' decisions to participate in crop insurance programs are significantly shaped by policy coverage factors such as the amount covered, covered risks, area covered, and timeliness. Data in Table 3 shows that the insurance program's coverage emerged as a critical factor, with 70.6% of participants considering it crucial. This coverage is determined based on the cost of production inputs per Farm Plan and Budget (FPB), with the option of an additional amount of up to 20% of the expected yield value. This finding underscores that farmers are motivated to engage in crop insurance when the coverage aligns with their production costs and potential losses. Notedly, the types of risks covered by insurance programs hold significant sway over farmers' decisions. A substantial proportion (61.7%) highlighted the importance of coverage for losses caused by Natural Calamities, Plant Diseases, and Pest Infestations. Farmers are more inclined to participate in insurance programs that specifically address these risks. Also, it is interesting to note that the area covered by the insurance program, whether in square meters or hectares, was a significant consideration for 57.2% of participants. This suggests that farmers place value on comprehensive coverage that corresponds to the size of their farms. Additionally, nearly half (45.6%) of farmers considered the timeline for filing a Notice of Loss (NOL) influential in their decision-making process. Timely reporting of losses is essential for mitigating potential damages. In terms of the delivery of services, data revealed that a significant majority (73.3%) emphasized the importance of the expeditious settlement of indemnity claims, ideally within 60 calendar days from the submission of complete claims documents. Timely claims settlement is a crucial driver of farmers' trust and participation. Also, more than half (57.8%) regarded the time taken for adjustments following a Notice of Loss filing as a significant factor influencing their willingness to avail of crop insurance.

Farmers expect prompt and fair assessments of their losses. While a smaller percentage (16.7%) mentioned program accessibility as a factor, it remains crucial. Ease of access to insurance services can significantly impact farmers' decisions. Some participants (13.9%) pointed to the absence of adequate monitoring that affected their decision to avail of crop insurance. Regular monitoring can enhance accountability and program effectiveness.

Moreover, the availability of personnel to assist during the application process or inquiries was a factor for 11.1% of participants, highlighting the importance of accessible support services. Data also shows that a minority (4.4%) considered the time spent on processing applications as a consideration. Streamlining this aspect of the process could improve program attractiveness. A small percentage (4.4%) also noted the attitude of frontline personnel as a factor in their decision. Friendly and helpful personnel can positively influence farmers' experiences. Lastly, it is noted that an even smaller percentage (3.9%) considered trust in the institution offering insurance as a factor affecting their decision. Trust-building initiatives may be crucial in fostering greater participation.

These findings align with prior research by de Groot *et al.* (2020)<sup>[8]</sup> and Mason-D'Croz *et al.* (2020)<sup>[21]</sup>, underscoring the significance of coverage amounts in influencing farmers' decisions regarding insurance participation. The observations made by Falconer and Coble (2018)<sup>[12]</sup> regarding the importance of coverage levels and premium subsidies are also reaffirmed.

To overcome skepticism and build trust among farmers, educational initiatives may be required to enhance their understanding of insurance mechanisms and providers, as indicated in studies by Miljatović *et al.* (2021)<sup>[24]</sup> and Nshakira-Rukundo *et al.* (2021)<sup>[25]</sup>. Additionally, improving the timeliness and transparency of claims processing and enhancing accessibility to services can contribute to greater program uptake.

**Table 3:** Factors affecting availment of crop insurance program

Variables	f	%	Rank
<b>A. Policy Coverage</b>			
Amount of Cover	127	70.6	1
Covered Risks	111	61.7	2
Area Covered	103	57.2	3
Calendar days in Filing NOL	82	45.6	4
Premium	34	18.9	5
Period Coverage	18	10	6
<b>B. Delivery of Services</b>			
Settlement of Indemnity	132	73.3	1
Adjustment	104	57.8	2
Accessibility	30	16.7	3
Lack of Monitoring	25	13.9	4
Personnel to Assist	20	11.1	5
Time spent for Processing Application	8	4.4	6
Attitude of the Frontline Personnel	8	4.4	7
Trust with the institutions offering insurance	7	3.9	8

#### *Extent of Availment of the Crop Insurance Program of the Participants*

The extent of the participants' availment of the crop insurance program was measured using the mean score and standard deviation. Each component of crop insurance had statements that the participants rated, with each statement using the 5-point scale: (5) Always, (4) Usually, (3) Sometimes, (2) Rarely, and (1) Never. Generally, Table 4

showed that the extent of availment of the crop insurance program of the participants based on its components was high (Mean = 4.18, SD = 1.081). This means 85-94% of the crop insurance components were availed.

Specifically, four (4) of the components incurred very high mean scores such as the probability of receiving claims (Mean = 4.68, SD = 0.731); pest and diseases covered (Mean = 4.64, SD = 0.767); natural calamity (Mean = 4.63, SD = 0.824); and insurance product (Mean = 4.59, SD = 0.824) respectively. This result showed that 95-100% of crop insurance program components were availed. The farmers availed of crop insurance by the probability of receiving claims to compensate for loss; they are covered for pest and disease infestation, the occurrence of natural calamity, and the insurance products offered to them.

This insurance product line offered by the agency was rice, corn, high-value crops, livestock, non-crop insurance, fisheries, credit, and life-term insurance. Farmers purchase crop insurance due to the possibility of getting claims or compensation for yield loss. This cash will purchase farm supplies such as seeds and fertilizer for the following cropping season. Natural disasters such as typhoons, floods, drought, and pest and disease infestation cause yield loss. Weather can be unpredictable nowadays, causing crop failure for our farmers.

Throughout the literature, the positive and negative effects of income smoothing on farm viability, risk management, and profitability have been demonstrated (Du *et al.*, 2015; Kim *et al.*, 2019; Kirwan, 2017)<sup>[10, 17, 18]</sup>, but its implications for farm debt have yet to be addressed. Suppose the payment surpasses the sum of missed revenue and out-of-pocket premium payments; an insured farm's liquidity improves, potentially reducing debt. According to the study of was and Kobus (2018)<sup>[32]</sup>, farms' decisions to protect their crops are influenced mainly by compensation received in the preceding period and considerable declines in realized yield in past years. In addition, Balcita (2015)<sup>[2]</sup> stated that crop insurance is a risk management strategy for reducing the impact of natural disasters and other catastrophic events. According to some studies, extreme weather events (such as heat waves, droughts, floods, and cold waves) cause a 10% loss in cereal production alone (Lesk *et al.*, 2016)<sup>[19]</sup> and reduce the food quality of many other crops (Kawasaki & Uchida, 2016<sup>[16]</sup>; Dalhaus *et al.*, 2020). With the increasing severity and frequency of risk events in agriculture (Fischer *et al.*, 2021)<sup>[14]</sup>, a focus on credible insurance options to de-risk agriculture from weather and disease/pest hazards has been added.

The participants moderately availed based on the farm eligibility (Mean = 3.82, SD = 1.54) and low to loans required (Mean = 2.29, SD = 1.647). This means the farmer had 60-74% availed crop insurance program because of the required loan. The relatively high standard deviation (SD = 1.65) suggests considerable variability in responses. Some farmers may perceive loans required as a substantial barrier, while others might not consider it inhibitory. This wide variation underscores the importance of recognizing diverse financial circumstances among farmers.

The results imply that the farm eligibility component is that the farmers need to be fully aware of the farm eligibility in crop insurance. These are the guidelines for the farm if qualified or not insured. The loans required are low because of the following reasons: They have no idea through loans, if the present collateral is too limited, through banks,



specifically the Land Bank of the Philippines, required crop insurance, accessibility of farmers to the lending conduits available in their area, documents requirement of bank and lengthy process before releasing.

**Table 4:** The Extent of Availment of the Crop Insurance Program

Components of Crop Insurance	Mean	SD	Interpretation
Probability of Receiving Claims	4.68	0.73	Very High
Pest and Diseases Covered	4.64	0.76	Very High
Natural Calamity Covered	4.63	0.81	Very High
Insurance Product	4.59	0.82	Very High
Period of Cover	4.48	1.10	High
Subsidized Premium	4.40	0.93	High
Life Insurance	4.14	1.37	High
Farm Eligibility	3.82	1.54	Moderate
Loans required	2.29	1.65	Low
<b>Grand Mean</b>	<b>4.18</b>	<b>1.08</b>	<b>High</b>

Legend: 4.51-5.0 (Very High), 3.51-4.50 (High), 2.51-3.50 (Moderate), 1.51-2.50 (Low), 1.0-1.50 (Very Low)

#### *The Predictors of the Availment of the Crop Insurance*

The regression analysis aimed to identify predictors among various farm profile factors influencing farmers' decision to avail of crop insurance programs. The results are presented in Table 5, indicating the predictors, correlation coefficients (R), coefficients of determination (R<sup>2</sup>), and p-values.

Table 5 reveals that farm size in hectares does not significantly predict the availment of crop insurance programs ( $p > 0.05$ ). This implies that the extent of a farmer's landholding plays a minor role in their decision to participate in crop insurance. Farmers with small and large land sizes make insurance decisions independently of their land size. Similarly, the type of land category, whether irrigated or rainfed, does not significantly predict crop insurance availment ( $p > 0.05$ ). Farmers do not base their insurance decisions on the specific category of their land. The tenurial status of the farm, including ownership, tenancy, or lease, also does not emerge as a significant predictor ( $p > 0.05$ ). This suggests that farmers' decisions to avail of crop insurance depend on how they hold their land. The topography of the farming area, whether flat or rolling terrain, shows a p-value ( $p > 0.05$ ) indicating that it is not a significant predictor of crop insurance availment. Also, the yield forecast, which relates to the expected productivity of the farm, does not emerge as a significant predictor ( $p > 0.05$ ). Their yield forecasts do not substantially influence farmers' decisions to avail of crop insurance.

Notably, the debt fraction on the farm exhibits a significant positive correlation ( $p < 0.05$ ) with the availment of crop insurance programs. This suggests that farmers with higher debt levels, where a substantial portion of their cropping capital is from lending, are more likely to participate in crop insurance.

Research by Ifft *et al.* (2015)<sup>[15]</sup> highlights the multifaceted benefits of crop insurance, including risk reduction, alleviation of credit constraints, and enhanced farm liquidity via indemnity payments. DeLay *et al.* (2019)<sup>[9]</sup> uncovered that these payments are instrumental in paying down existing debt, thus decreasing overall debt levels in the initial year. Furthermore, Kim *et al.* (2019)<sup>[17]</sup> discovered that farms utilizing crop insurance tend to have a significantly longer lifespan, with a 70% lower likelihood of closure than non-insured farms, underscoring the positive impact of crop insurance on farm survival. Importantly,

DeLay *et al.* (2019)<sup>[9]</sup> emphasized that indemnity payments do not differ significantly from traditional revenue sources in affecting long-term debt, suggesting that crop insurance's income-smoothing effect does not contribute to long-term debt burdens.

**Table 5:** Regression Results for Farm Profile as Predictors of Availment of Crop Insurance

Predictors	R	R <sup>2</sup>	p-value
1. Farm Size in Hectares	0.052	0.003	0.486
2. Land Category	0.034	0.001	0.652
3. Tenurial Status	0.063	0.004	0.403
4. Topography	0.092	0.008	0.219
5. Debt Fraction	0.175	0.031*	0.019
6. Yield Forecast	0.011	0.000	0.885

\* Significant at  $< 0.05$  level

#### **5. Conclusions**

Crop insurance is a vital safeguard for farmers against natural calamities and pest-related risks in agriculture. However, its adoption hinges on policy coverage and service quality. Farmers prioritize adequate coverage aligned with production costs and risk types like natural calamities and diseases. Timely claims settlement and adjustments post-loss filing are pivotal. The debt fraction significantly influences adoption. Enhancing program delivery and educating farmers about its value can bolster its effectiveness. In essence, crop insurance is pivotal for agricultural sustainability, and optimizing its strategies can stabilize farmers' incomes and protect against crop failure, benefiting both farmers and the agriculture sector.

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