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Report on the identification of the factors affecting farmers' participation to insurance schemes (Task 3.a)

Deliverable 3.2

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Report on the identification of the factors affecting farmers' participation to insurance schemes

(Task 3.a)

Deliverable 3.2

Agricultural insurance serves as a critical risk management tool that helps farmers cope with the inherent uncertainties of agricultural production (Capitanio & Adinolfi, 2009).

Its importance can be understood through several key aspects:

First, agricultural insurance provides essential financial protection against multiple risks, including weather events, price fluctuations, and yield losses (Tsiboe & Turner, 2023b). This protection enables farmers to stabilize their income and maintain operational continuity even when faced with adverse conditions (Doherty et al., 2021). Second, insurance plays a vital role in encouraging agricultural investment and development. When farmers have insurance coverage, they are more likely to invest in their operations and adopt innovative practices, knowing they have protection against potential losses (Bulte & Lensink, 2022; Koenig & Brunette, 2023; Mishra & El-Osta, 2002). As extreme weather events become more frequent, insurance provides crucial financial security to farmers, often proving more efficient than post-disaster aid (Doherty et al., 2021; Nordmeyer & Musshoff, 2023). The significance of agricultural insurance is reflected in its global expansion, with participation growing substantially in both developed and developing countries. For example, in the United States, the Federal Crop Insurance Program has seen significant increases in enrolled acreage following legislative changes that enhanced premium subsidies (Santeramo, 2018; Tsiboe & Turner, 2023b).

Despite its benefits, challenges persist, including low coverage levels relative to agricultural output and potential design flaws that may discourage broader adoption. Nevertheless, agricultural insurance remains a foundational tool for managing risks and promoting resilient agricultural systems in the face of uncertainties (Doherty et al., 2021).

Scholars has investigated which one are the factor related to insurance participation find that can be classified in Socio-Demographic facotrs, Farm Characteristics, Economic Variables, 2.4 Insurance relationship, location and subsidies.

Socio-demographic factors

Socio-demographic factors, particularly the **age of farmers**, play a significant role in determining their propensity to purchase insurance. Generally, younger farmers are more inclined to insure their operations. However, the literature presents mixed findings. For instance, while several studies (Doherty et al., 2021; Liesivaara & Myyrä, 2014, 2017; Mishra & El‐Osta, 2001; Nordmeyer & Musshoff, 2023; Santeramo, 2018; van Winsen et al., 2016; Wąs & Kobus, 2018) suggest that younger farmers exhibit a higher likelihood of insuring, (Sherrick et al., 2004) report contrasting results, indicating that older farmers may be more likely to insure. Additionally, (Ghosh et al., 2021) find no significant influence of age on insurance decisions.

The literature suggests that younger farmers participate more actively in insurance

programs because they are generally more willing to adopt new risk management tools and have longer time horizons to realize potential benefits. Conversely, older farmers may be motivated by their aversion to financial losses and greater awareness of risks accumulated through experience. This suggests that age-related differences in risk perception and decision-making drive variations in insurance participation.

In the socio-demographic context, **gender** plays a significant role in insurance participation, with studies generally indicating that male farmers are more inclined to purchase insurance than female farmers (Mußhoff et al., 2014; Nordmeyer & Musshoff, 2023). This is often due to structural barriers faced by women, such as limited financial independence, restricted access to credit, and cultural norms. However, (Akter et al., 2016) found contrasting evidence, suggesting that female farmers may be equally or even more likely to insure their crops. Male farmers are hypothesized to insure more due to greater financial resources and focus on production risks. However, tailored insurance schemes that improve accessibility and relevance for women could significantly boost female participation, potentially exceeding male rates in some cases.

Education is positively associated with the likelihood of farmers purchasing insurance, as highlighted in studies by (Enjolras & Sentis, 2011; Finger & Lehmann, 2012; Liesivaara & Myyrä, 2014) showing the role of education in improving risk awareness and understanding of insurance benefits.

Farm Characteristics

Farm size is a key factor influencing insurance participation, with numerous studies highlighting its positive correlation with insurance uptake. Larger farms are often more likely to engage in insurance programs due to their greater financial resources, better access to information, and advanced risk management capabilities (Di Falco et al., 2014; Enjolras et al., 2012; Enjolras & Sentis, 2011; Finger & Lehmann, 2012; Franken et al., 2017; Koenig & Brunette, 2023; Liesivaara & Myyrä, 2014; Nordmeyer & Musshoff, 2023; Santeramo, 2018; Santeramo et al., 2016). However, some studies, such as (van Winsen et al., 2016) suggest that smaller farms may also demonstrate notable levels of insurance participation. This is often attributed to their heightened vulnerability to risks and reliance on insurance as a critical safety net.

The observed dynamics suggest that larger farms tend to adopt insurance strategically, leveraging their superior resources and ability to manage premium costs. Meanwhile, smaller farms may turn to insurance out of necessity to safeguard against potential vulnerabilities, despite facing financial constraints. This dual perspective reflects the contrasting motivations driving insurance participation across different farm sizes.

Research consistently indicates a negative relationship between **land tenure** and farmers' engagement in insurance programs. Specifically, (de Mey et al., 2016; Meraner & Finger, 2019; Nordmeyer & Musshoff, 2023; Sherrick et al., 2004; Vigani & Kathage, 2019), demonstrate that farmers with insecure land tenure are significantly less likely to invest in insurance. This aversion can be attributed to concerns about potential land loss, which diminishes their commitment to financial risk management tools. Enhancing land tenure security is hypothesized to positively influence insurance participation rates among farmers. By reducing ownership uncertainties, policymakers could bolster confidence in insurance

investment as a protective strategy, fostering agricultural resilience.

Crop diversification has been found to have mixed effects on insurance participation. Several studies report a negative relationship, suggesting that higher diversification reduces the need for insurance as it serves as a natural risk management strategy (Koenig & Brunette, 2023; Nordmeyer & Musshoff, 2023; Santeramo et al., 2016). Diversification spreads risk across multiple crops, decreasing reliance on external risk mitigation tools like insurance. Conversely, other research indicates a positive relationship, where farmers with more diversified cropping systems may still opt for insurance to protect against systemic risks or unforeseen events that affect all crops simultaneously (Santeramo, 2018).

It is hypothesized that higher crop diversification generally reduces the likelihood of insurance participation due to its role as an internal risk management tool. However, in contexts where systemic risks are prevalent or where diversified farmers perceive additional benefits from insurance, participation rates may increase. This suggests that the effect of diversification on insurance uptake is context-dependent and influenced by farmers' risk perceptions and external conditions.

Different **type of farming** influencing insurance participation.

Findings suggest a negative correlation between livestock farms and insurance participation, indicating hesitance among farmers to engage with insurance products due to perceived risks or financial constraints (Kazianga & Udry, 2006)Conversely, newer research indicates a positive relationship, with some livestock farmers recognizing the benefits of risk management and participating in insurance plans (Nordmeyer & Musshoff, 2023).

Research shows a positive association between arable farming and insurance participation, suggesting that these farmers tend to invest more in insurance as a mechanism to mitigate agricultural risks (Sherrick et al., 2004).

It is hypothesized that the type of farming significantly influences insurance participation patterns, with livestock farmers displaying varied tendencies towards insurance based on experience and perception, while arable farmers consistently show a stronger inclination towards insurance products.

Research by (Tsiboe & Turner, 2023a) reveals that the **orchard area** does not have a significant impact on farmers' participation in agricultural insurance programs. It is hypothesized that a deeper understanding of the specific challenges and risks faced by farmers with varying orchard areas can facilitate the design of tailored insurance products and targeted educational initiatives, thereby improving overall participation rates in agricultural insurance schemes.

Irrigation has shown varying effects on insurance participation. Several studies, such as (Deryugina & Konar, 2017) and (Santeramo et al., 2016) report a positive relationship, suggesting that farmers with irrigation systems are more likely to purchase insurance due to their higher investments and the need to protect these assets. However,(Koenig & Brunette, 2023) found no significant effect, indicating that irrigation may not always influence insurance decisions. The mixed findings highlight the complexity of the relationship between irrigation and insurance participation. Farmers with irrigation systems might view insurance as a complementary tool to safeguard their investments, while others may see irrigation itself as sufficient risk mitigation, reducing the perceived need for insurance. It is hypothesized that

farmers with irrigation systems are more likely to purchase insurance when they perceive it as an additional layer of security for their substantial investments. Conversely, in regions where irrigation is seen as a standalone risk management strategy, its impact on insurance uptake may be negligible.

Fertilizers have a negative association with insurance participation, as highlighted by studies such as (Pietrobon, 2024) and (Zhang et al., 2023). This relationship may stem from the fact that higher fertilizer use increases variable costs, which can strain farmers' budgets and reduce their capacity to invest in insurance. Additionally, farmers relying heavily on fertilizers might perceive them as a substitute for insurance, believing that improved yields from fertilizer application reduce the need for risk management tools. It is hypothesized that higher fertilizer use negatively impacts insurance participation due to increased variable costs and perceived substitution effects. However, providing subsidies or bundled products that combine fertilizers with insurance could mitigate this effect and encourage greater adoption of both inputs and risk management tools.

Crop Protection is found to have a positive influence on insurance participation in several studies, as it enhances farmers' awareness of agricultural risks and the importance of mitigating them through insurance (Enjolras & Aubert, 2020; Zhang et al., 2023). However, other research presents mixed results, suggesting that the relationship may vary depending on factors such as farm size, crop type, and regional differences (Koenig & Brunette, 2023).

It is hypothesized that crop protection positively influences insurance participation by increasing farmers' awareness of risks and the need for financial safeguards. However, this effect may weaken or become inconsistent when effective crop protection measures reduce farmers' perceived exposure to risks, thereby diminishing their motivation to insure.

Organic farmers tend to show lower participation in crop insurance programs due to several structural and behavioral factors. According to (Enjolras et al., 2012)

, organic producers often exhibit a negative attitude toward insurance adoption, which can be attributed to their unique farming practices and risk management strategies.

Economic Variables

The relationship between **income level** and insurance participation is multifaceted, with studies presenting varying perspectives:

Positive Relationship: Higher income levels are often associated with greater insurance adoption, as wealthier farmers have more financial resources to invest in insurance products (Kuethe & Morehart, 2012; Menapace et al., 2016) Increased income may also enhance access to information and reduce the burden of premium costs.

Negative Relationship: Conversely, some studies suggest that higher income may reduce insurance uptake. Wealthier farmers might perceive themselves as less vulnerable to risks and therefore see less necessity for insurance (Farrin et al., 2016; Wąs & Kobus, 2018)

No Significant Relationship: Other research finds no substantial link between income level and insurance participation, indicating that other factors, such as risk perception, education, or farm size, may play a more decisive role in influencing farmers' decisions (Koenig & Brunette, 2023; Zhao et al., 2016). It is hypothesized that income level influences insurance participation in both positive and negative ways. Higher income can facilitate adoption by reducing financial barriers, but it may also lower perceived vulnerability. A differentiated

approach to farmer education and outreach is needed to address these contrasting effects and enhance overall participation rates.

The relationship between **off-farm income** and agricultural insurance participation exhibits contrasting findings across studies. Several researchers, including (El Benni et al., 2016; Finger & Lehmann, 2012; Mishra & El-Osta, 2002; Mishra & El‐Osta, 2001; Mishra & Goodwin, 2003; Velandia et al., 2009) . report a negative correlation, suggesting that farmers with off-farm income may perceive less need for insurance due to their additional income sources. Conversely, (Nordmeyer & Musshoff, 2023) found that off-farm income had a not-significant effect on insurance participation, indicating that the impact may vary based on context or specific circumstances. Farmers with higher off-farm income are less likely to participate in crop insurance because they view off-farm earnings as a substitute for formal risk management tools. However, when off-farm income is unstable or insufficient to cover potential losses, its influence on insurance participation becomes negligible.

Research indicates a positive relationship between **rental land** arrangements and crop insurance participation (de Mey et al., 2016; Meraner & Finger, 2019; Nordmeyer & Musshoff, 2023; Sherrick et al., 2004; Vigani & Kathage, 2019). This trend can be attributed to several factors that make insurance more appealing or necessary for both landlords and tenants:

Risk Mitigation: Crop insurance helps mitigate risks associated with unpredictable weather or market conditions, which is particularly important in rental agreements where financial stability is shared between landlords and tenants.

Shared Incentives: In arrangements such as sharecropping or flexible cash leases, both parties benefit from reduced downside risks when crop insurance is in place. This encourages broader adoption of insurance policies.

Landlord Requirements: Landlords often mandate tenants to carry crop insurance to protect their investment, ensuring that any losses are covered.

Access to Financing: Tenants with crop insurance are often viewed as lower risk by lenders, improving their access to credit and making it easier to sustain rental agreements.

The necessity to manage shared financial risks in rental agreements motivates both landlords and tenants to adopt crop insurance. This is further reinforced by institutional factors, such as landlord requirements and improved access to credit for insured tenants.

Capital is positively associated with insurance participation, as noted by (Enjolras et al., 2012). Farmers possessing greater capital resources are more inclined to invest in insurance products since they have the financial ability to pay premiums and effectively manage risks related to agricultural production. This relationship underscores how financial robustness facilitates access to risk management tools, making it vital for enhancing agricultural stability.

Research indicates that **leverage** may not significantly influence farmers' decisions regarding insurance participation, suggesting that factors beyond financial leverage play a critical role in these decisions (Enjolras et al., 2012; Santeramo et al., 2016; Uzea et al., 2014). Conversely, studies have demonstrated a positive relationship, where increased leverage encourages participation in insurance schemes. This trend may arise from the heightened need for risk management strategies among heavily leveraged farmers, who seek

to protect their investments (Ifft et al., 2015; Mishra & El‐Osta, 2001). It is hypothesized that farmers with higher leverage will be more inclined to purchase insurance as a financial safeguard against potential losses, reflecting a complex interplay between leverage levels and risk management behaviors.

Recent losses in agricultural production are positively associated with the likelihood of insurance participation, as evidenced by studies from (Cole & Xiong, 2017), (Koenig & Brunette, 2023), and (Nordmeyer & Musshoff, 2023). These findings indicate that farmers who experience significant losses are more inclined to invest in insurance as a risk management strategy, recognizing insurance as a vital tool for mitigating future financial impacts due to adverse events.It is hypothesized that the experience of substantial losses will lead to a heightened likelihood of insurance purchases among farmers, driven by an increased awareness of agricultural risks and the necessity for financial safeguards against them

Insurance relationship

Experience with the insurance is positively correlated with the likelihood of farmers purchasing insurance policies (Koenig & Brunette, 2023; Santeramo, 2018, 2019; Santeramo et al., 2016). Farmers who have previously engaged with insurance products gain valuable insights into their advantages and complexities, fostering increased confidence in utilizing these financial instruments for effective risk management. This familiarity encourages a stronger inclination to secure insurance coverage, as experienced farmers better appreciate its role in protecting their investments.

A positive correlation exists between **farmers' fidelity to the same insurance contract** and their likelihood to renew policies. When farmers consistently engage with the same insurer, they develop trust and familiarity with the specific terms and conditions, which enhances their overall satisfaction and confidence in the coverage provided. This relationship encourages the renewal of contracts, reflecting the impact of previous positive experiences on current decision-making processes (Coletta et al., 2018; Santeramo, 2018)

Location

The relationship between **geographic location** and farmers' participation in crop insurance exhibits a complex and varied landscape. Research indicates that farmers' decisions regarding insurance are significantly influenced by regional characteristics, access to resources, information availability, and specific local risks (Enjolras & Sentis, 2011; Koenig & Brunette, 2023; Mishra & El‐Osta, 2001; Nordmeyer & Musshoff, 2023; Santeramo et al., 2016).

In regions where farmers have better access to agricultural extension services and insurance education, participation rates tend to be higher. Conversely, in areas where farmers face obstacles such as limited information dissemination and lower trust in insurance products, engagement in insurance offerings is notably lower. This spatial variability in insurance participation underscores the significance of local contexts in shaping farmers' risk management strategies.

Research indicates a negative correlation between **altitude** and farmers' participation in insurance programs, as suggested by (Santeramo, 2018). Higher altitudes present unique agricultural challenges, such as harsher climatic conditions and limited access to resources, which may deter farmers from investing in insurance. These difficulties could lead to the perception that insurance is either irrelevant or inaccessible, resulting in lower participation

rates.

It is hypothesized that the challenges associated with higher altitudes substantially hinder insurance participation among farmers. Thus, targeted interventions and support systems are crucial to address the specific needs and barriers experienced by those operating in elevated agricultural environments, enabling increased insurance uptake in these regions

Policy support

Research by (Enjolras & Sentis, 2011; Finger & Lehmann, 2012; Sherrick et al., 2004), has consistently highlighted a negative relationship between certain forms of **policy support** and farmers' participation in crop insurance programs. This counterintuitive outcome can be attributed to several interconnected factors:

- Income Support as a Substitute: Direct income support policies, such as subsidies or guaranteed payments, reduce the financial vulnerability of farmers. As a result, these policies may act as substitutes for formal insurance, diminishing the perceived need for additional risk management tools like crop insurance. For instance, (Finger & Lehmann, 2012), found that direct payments in Switzerland led to lower insurance uptake.
- Moral Hazard and Risk Perception: When farmers receive substantial income support, they may engage in riskier behaviors or perceive themselves as less exposed to financial risks, further reducing their motivation to purchase insurance. (Enjolras & Sentis, 2011), observed this trend in France, where higher-risk farms were more likely to insure, but overall participation was negatively influenced by policy structures.
- Crowding-Out Effect: Subsidized income support can crowd out private risk management strategies, including insurance adoption. (Sherrick et al., 2004), noted that excessive reliance on government interventions might undermine the development of a robust private insurance market.

Farmers' decisions to adopt crop insurance are inversely influenced by the availability of direct income support policies because such policies reduce their perceived need for additional risk management tools. This suggests that policy interventions designed to stabilize farm incomes may unintentionally disincentivize participation in formal insurance programs.

Agro-environmental schemes have shown limited impact on farmers' participation in insurance programs, indicating a potential disconnect between environmental initiatives and farmers' financial motivations. (Doherty et al., 2021) highlight that the incentives provided by

such schemes do not significantly influence insurance uptake, suggesting a need for a more strategic integration of these programs with risk management tools to address the immediate concerns of farmers.

This disconnect implies that developing comprehensive policies that align environmental goals with financial security could enhance the effectiveness of agro-environmental schemes, ultimately fostering greater participation in insurance programs. Policymakers should focus on creating incentives that resonate more closely with farmers' economic realities to drive adoption and compliance.

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