# Climate change awareness and adaptation by rice farmers in Surallah, South Cotabato

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**Abstract**
**Purpose:** This study aimed to assess the level of awareness and extent of adaptation strategies of upland and lowland local rice farmers in the municipality of Surallah, in the province of South Cotabato, in response to the impacts of climate change.
**Methodology/approach:** This study utilized a descriptive-correlational research design to evaluate the awareness levels, extent of adaptation strategies, and interrelationships among these variables within upland and lowland local rice farming communities in Surallah, South Cotabato province.
**Results/Findings:** The research findings highlight the significant differences in awareness levels and adaptation strategies between upland and lowland rice farmers. Upland farmers exhibited lower awareness and sporadic adaptation measures, while their lowland counterparts demonstrated a moderately aware status with a corresponding, albeit moderate, application of adaptive strategies. The study also revealed a meaningful positive relationship between awareness levels and adaptation strategies across both groups.
**Limitations:** The study focused only on the municipality of Surallah in the Province of South Cotabato, concentrating on upland and lowland farmers.
**Contribution:** The findings of this study reveal how farmers in different geographical settings respond to the challenges presented by climate change and reveal potential connections between awareness and adaptation strategies, which will become the basis for policy recommendations.
**Novelty:** The novelty of this study lies in its specific focus on upland and lowland rice farmers in Surallah, South Cotabato, providing a comprehensive examination of awareness and adaptation strategies towards climate change.
**Keywords:** *Awareness, Adaptations, Climate Change, Upland, Lowland, Farmers, Surallah, South Cotabato*
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## 1. Introduction

Climate change, a consequence of human-induced activities, such as deforestation and greenhouse gas emissions, has ushered in an era characterized by unpredictable weather patterns. This globally recognized phenomenon significantly impacts agricultural regions, disrupting the traditional farming calendars with shifts in precipitation, prolonged droughts, and extreme weather events (Seneviratne et al., 2022). These changes have led to reduced crop yields and increased vulnerability among farmers.

The agricultural sector, which is vital to numerous communities, faces complex challenges owing to climate change. Altered precipitation patterns disrupt farming cycles and diminish agricultural productivity (FAO, 2019). Farmers experience unpredictable growing seasons, crop failure, and economic instability. Frequent floods and heat waves, which are direct consequences of climate change, pose significant threats to livelihoods and food security.

Internationally, climate change-related risks are emphasized by authoritative bodies, such as the IPCC, highlighting the escalating frequency of extreme weather events (IPCC, 2018). The Philippines grapples with the vulnerability of its agricultural sector, as underscored by the Department of Agriculture (Laureta, Regalado, & De La Cruz, 2021). Surallah faces similar concerns at the local level, compounded by regional traditions and localized adaptation strategies, creating a uniquely intricate situation.

This study explored the awareness and adaptation strategies employed to mitigate climate change among upland and lowland rice farmers in Surallah, South Cotabato. By unraveling the complexity of localized adaptation, this study aims to provide specific policy recommendations that will help enhance the resilience and sustainability of the agricultural landscape of the Surallah municipality.

### 1.1 Research Objectives
1. Determine the level of awareness of upland and lowland rice farmers in Surallah, South Cotabato, regarding climate change.
2. Gauge the extent of adaptation strategies of upland and lowland rice farmers in Surallah, South Cotabato, towards climate change.
3. Determine the significant difference in the awareness of climate change between upland and lowland rice farmers in Surallah, South Cotabato.
4. Identify the substantial disparity in the extent of adaptation strategies employed by upland and lowland rice farmers in Surallah, South Cotabato
5. Examine the significant relationship between the level of awareness and extent of adaptation strategies among upland and lowland rice farmers in Surallah, South Cotabato.

### 1.2 Research Hypothesis
1. There was no significant difference in the awareness of climate change between upland and lowland rice farmers in Surallah and South Cotabato.
2. There is no significant relationship between the level of awareness and the extent of adaptation strategies among upland and lowland rice farmers in Surallah, South Cotabato

## 2. Literature Review
Climate change poses a considerable challenge to the agricultural sector, significantly impacting upland and lowland farmers, whose livelihoods depend on the environment. This literature review aimed to explore upland and lowland farmers' awareness and adaptation practices in response to climate change and identify strategies to fortify their resilience.

### 2.1 Awareness of Upland and Lowland Farmers to Climate Change
Understanding climate change and its repercussions is pivotal for enabling upland and lowland farmers to effectively adapt. Several studies have shown that upland and lowland farmers need more knowledge of climate change and its implications on their livelihoods. For instance, a study conducted in Nepal by Berrang-Ford, Pearce, and Ford (2015) found that only 43% of the surveyed upland farmers had heard of climate change, and 36% knew about its effects on agriculture. Similarly, a study conducted in Ghana by Mapfumo, Chanasyk, Puurveen, Elton, and Acharya (2023) reported that only 40% of the surveyed lowland farmers had heard of climate change, and 35% knew about its effects on their farming activities.

The limited awareness of climate change among upland and lowland farmers makes it challenging to adopt appropriate adaptation strategies. Hence, there is a need for targeted education and training programs to increase students' knowledge of climate change and promote the adoption of appropriate adaptation strategies.

### 2.2 Adaptation of Upland and Lowland Farmers to Climate Change
Upland and lowland farmers have devised diverse adaptation strategies to overcome climate change challenges. One such approach is to adopt climate-resilient crops capable of withstanding droughts, floods, and other extreme weather events. For instance, a study conducted in Ethiopia by Simane et al.

(2016) found that farmers who grew drought-tolerant crops such as maize and sorghum were more likely to adapt to climate change than those who grew traditional crops.

Another adaptation strategy adopted by upland and lowland farmers is water management techniques such as rainwater harvesting, irrigation, and water storage. These strategies help to reduce the impact of droughts and ensure the availability of water for crop production. For example, a study conducted in the Philippines by Nowotny et al. (2018) reported that water management adaptation practices such as rainwater harvesting and irrigation increased crop yields and enhanced farmers' resilience to climate change.

Furthermore, upland farmers have adopted agroforestry practices that involve the cultivation of trees and crops. This approach helps to conserve soil and water, increase biodiversity, and enhance soil fertility, which are crucial for maintaining productivity in the face of climate change. Similarly, lowland farmers have embraced integrated pest management practices to address the repercussions of climate change, as indicated by a study conducted in Bangladesh by Ebi et al. (2021).

## 3. Methodology
### 3.1 Research Design
The study utilized a descriptive-correlational research design to evaluate the awareness levels, extent of adaptation strategies, and interrelationships among these variables within the upland and lowland local rice farming communities in Surallah, South Cotabato province. This study seeks to understand how farmers in different geographical settings respond to the challenges presented by climate change, and to unveil potential connections between awareness and adaptation strategies.

### 3.2 Locale of the Study
The research was conducted in Surallah, South Cotabato, focusing on two selected barangays. Upper Sepaka represents the upland Barangay, and Dajay represents the lowland Barangay.

### 3.3 Sampling Technique and Respondents
Given the limited number of respondents, a total enumeration sampling method was employed. The study included 34 respondents representing upland rice farmers and 40 from the lowland rice farming community.

### 3.4 Data Gathering Instrument
This study employed adapted and modified instruments for the data collection. To gauge the level of awareness, the survey questionnaire drew inspiration from the previous research conducted by Walker and McNeal (2013). To assess adaptation strategies, questionnaires were adapted and modified based on the study by Shariatzadeh and Bijani (2022). To align these instruments with the study's locale and enhance respondent comprehension, a validity test was conducted by experts, and pilot testing was carried out following J. V. Baron and Robles (2023) and J. Baron (2022).

### 3.5 Statistical Treatment
Data collected in this study were analyzed using the mean as a statistical measure to assess the awareness and adaptation strategy levels among rice farmers in Surallah, South Cotabato. Additionally, a t-test was applied to ascertain any significant differences between the responses of the upland and lowland rice farmers.

## 4. Results and Discussions
### 4.1 The Level of Awareness Among Upland Farmers Towards Climate Change

| Awareness of Upland Rice Farmers Towards Climate Change | Mean | SD | Qualitative Description |
|---|---|---|---|
| Attitude toward climate change risk | 2.57 | 0.91 | Moderately Aware |

| | | | |
|---|---|---|---|
| Knowledge of the concept of climate change | 2.40 | 0.85 | Les Aware |
| **Overall Awareness** | **2.47** | **0.86** | **Les Aware** |

Examining upland rice farmers' awareness of climate change has yielded noteworthy outcomes. Regarding their attitude towards climate change risk, the respondents obtained a mean score of 2.57 with a standard deviation of 0.91, signifying a moderate level of awareness of the associated risks of climate change. This outcome aligns with prior research emphasizing the significance of comprehending farmers' perceptions of climate change risks (Hyland, Jones, Parkhill, Barnes, & Williams, 2016; Walker & McNeal, 2013).

In contrast, the assessment of knowledge regarding the concept of climate change yielded a mean score of 2.40, accompanied by a standard deviation of 0.85, which categorized respondents as having lower awareness. This indicates that, while farmers may exhibit a moderate level of awareness concerning associated risks linked to climate change, their knowledge about the broader and more intricate facets of the climate change concept appears to be comparatively limited. The nuanced distinction between overall awareness and specific knowledge levels underscores the need for targeted educational interventions (Mochizuki & Bryan, 2015). It is evident that a more focused approach is essential not only to fortify the existing awareness of associated risks but also to cultivate a deeper and more comprehensive understanding of the broader framework of climate change among farmers. This finding aligns with the insights put forth by Shariatzadeh and Bijani (2022), who emphasized the imperative role of targeted educational programs in augmenting farmers' comprehension of climate change concepts, which is crucial for informed decision-making and adaptive practices in agriculture.

Considering overall awareness, encompassing both attitude and knowledge, the mean score was 2.47 with a standard deviation of 0.86, placing respondents in the less aware category. This consolidated measure underscores the importance of implementing comprehensive awareness programs tailored to upland rice farmers' specific needs and knowledge gaps in Surallah, South Cotabato, Brazil. Addressing these areas of low awareness will be crucial for effective climate change adaptation strategies and sustainable agricultural practices in the region.

*4.2 The Level of Awareness Among Lowland Farmers Towards Climate Change*

| **Awareness of Lowland Rice Farmers Towards Climate Change** | **Mean** | **SD** | **Qualitative Description** |
|---|---|---|---|
| Attitude toward climate change risk | 3.10 | 0.78 | Moderately Aware |
| Knowledge of the concept of climate change | 2.93 | 0.80 | Moderately Aware |
| **Overall Awareness** | **3.01** | **0.74** | **Moderately Aware** |

Awareness of climate change among lowland rice farmers has implications that extend beyond numerical measurements. The observed moderate levels of awareness in both attitudes towards climate change risk (mean score of 3.10) and knowledge of the concept (mean score of 2.93) signify a pivotal juncture for strategic interventions (Levin, Cashore, Bernstein, & Auld, 2012). The realization of a moderate awareness level, though falling short of the desired high level, indicates the existence of a baseline. This baseline offers a critical foundation upon which targeted educational interventions can operate effectively (Beddington et al., 2012). By acknowledging and building on this existing awareness, tailored programs can be designed to increase farmers' understanding of climate change intricacies and associated risks, fostering a more resilient and adaptive agricultural community in the face of evolving climatic conditions.

Moreover, the result that lowland farmers have a well-rounded overall awareness, reflected in the mean score of 3.01, adds a positive aspect to the findings. This implies a strong foundation upon which

awareness-building initiatives can effectively grow. Recognizing this balanced awareness level opens doors for policymakers, agricultural extension services, and educational institutions to create interventions that capitalize on existing moderate levels of awareness (Belay et al., 2023). Tailoring initiatives to align with farmers' current understanding ensure that these interventions are more relevant to the local context, enhancing their potential for success (FAO, 2019). This strategic approach not only acknowledges the current awareness landscape, but also maximizes the impact of future efforts to fortify climate change awareness among lowland farmers.

These findings underscore the notion that adopting a universally applicable approach may not be well suited for crafting effective awareness programs. Instead, impact optimization can be achieved by tailoring interventions to specifically address identified gaps in knowledge and attitudes, as outlined in the study (Walker & McNeal, 2013). For example, interventions may strategically concentrate on augmenting the understanding of the broader concept of climate change, concurrently fostering positive attitudes towards adapting to its associated risks (Sheppard, 2005; Thomas et al., 2019).

The moderate level of awareness observed among lowland rice farmers established a solid foundation for the implementation of targeted interventions. Policymakers and practitioners are encouraged to recognize these nuanced findings when formulating programs. Doing so can design initiatives that are not only contextually relevant, but also capitalize on existing awareness levels. These programs have the potential to contribute significantly to fostering a climate-resilient agricultural sector in the region (Dinesh et al., 2018).

*4.3 Overall Level of Awareness Among Upland and Lowland Farmers of Surallah South Cotabato Towards Climate Change*

| Awareness of Rice Farmers Towards Climate Change | Mean | SD | Qualitative Description |
|---|---|---|---|
| Upland | 2.47 | 0.86 | Less Aware |
| Lowland | 3.01 | 0.74 | Moderately Aware |

The table above indicates a significant difference in the overall awareness levels of upland and lowland rice farmers regarding climate change in Surallah, South Cotabato. The mean awareness score for upland farmers is 2.47, described as Less Aware, while lowland farmers have a higher mean awareness score of 3.01, placing them in the Moderately Aware description.

This disparity highlights that, on average, lowland rice farmers possess a more robust awareness of climate change than their upland counterparts do. The higher mean score of 3.01 among lowland farmers signifies a relatively superior comprehension of climate change risks and adaptation strategies within this demographic (Bojang, Traore, Togola, & Diallo, 2020).

The implications of this finding underscore the necessity for tailored interventions specifically designed for upland rice farmers to augment their awareness and knowledge of climate change (Feola, Lerner, Jain, Montefrio, & Nicholas, 2015). Moreover, the designation of "Moderately Aware" for lowland farmers lays the groundwork for further development. This emphasizes the potential for implementing more advanced and context-specific programs, leveraging existing awareness levels to further enhance their understanding (FAO, 2019; Walker & McNeal, 2013). This strategic approach acknowledges the diverse needs of different farmer groups and aims to bridge the awareness gap.

In conclusion, the data underscores the notable variation in awareness levels across distinct farming communities, underscoring the need to tailor awareness initiatives to meet the unique needs and challenges encountered by both upland and lowland rice farmers in the region. Policymakers and practitioners are well positioned to utilize these insights in crafting interventions that are not only effective but also precisely targeted, thereby enhancing the overall resilience of the local agricultural sector. This strategic approach acknowledges diversity within the agricultural landscape, ensuring that

awareness-building efforts are finely tuned to address the specific contexts and requirements of each farming community.

*4.4 The Extent of Adaptation Strategies of Upland Rice Farmers in Surallah, South Cotabato, Towards Climate Change*

| The Extent of Adaptation Strategies of Upland Rice Farmers Towards Climate Change | Mean | SD | Qualitative Description |
|---|---|---|---|
| Change plant varieties | 2.80 | 0.80 | Sometimes Applied |
| Farming calendar adjustment | 2.26 | 0.70 | Seldom Applied |
| Crop diversification | 2.74 | 0.74 | Sometimes Applied |
| **Overall Adaptation Strategies** | **2.60** | **0.67** | **Sometimes Applied** |

The table above provides an overview of the assessment of the application of the adapted strategy among upland rice farmers in Surallah, South Cotabato, in response to climate change.

Among the strategies evaluated, "Change plant varieties" emerged with the highest mean score of 2.80, indicating that farmers occasionally implement this adapted strategy, reflecting a moderate level of application. Conversely, "Farming calendar adjustment" and "Crop diversification" demonstrate mean scores of 2.26 and 2.74, respectively. These scores fell within the categories of "Seldom Applied" and "Sometimes Applied," indicating a less frequent but occasional application of these strategies.

The cumulative mean score for all adapted strategies is 2.60, characterized by a qualitative description of "Sometimes Applied." This overall trend suggests a prevalent pattern of intermittent utilization of these adapted strategies, signaling an opportunity for improvement and targeted interventions to enhance their consistent application.

The interpretation of these findings accentuates the significance of tailored interventions, especially for strategies like "Farming calendar adjustment," which exhibits a lower mean score. This result underscores the necessity for focused programs that address specific challenges hindering the consistent application of farming calendar adjustments among upland rice farmers. Furthermore, recognizing the moderate application levels of "Change plant varieties" and "Crop diversification" implies the potential for programs to build upon existing practices (Lin, 2011), contributing to the reinforcement of resilience among upland rice farmers facing climate change challenges (FAO, 2019; Walker & McNeal, 2013).

*4.4.1 The Extent of Adaptation Strategies of Lowland Rice Farmers in Surallah, South Cotabato Towards Climate Change*

| The Extent of Adaptation Strategies of Lowland Rice Farmers Towards Climate Change | Mean | SD | Qualitative Description |
|---|---|---|---|
| Change plant varieties | 2.85 | 0.80 | Sometimes Applied |
| Farming calendar adjustment | 2.88 | 0.76 | Sometimes Applied |
| Crop diversification | 2.88 | 0.67 | Sometimes Applied |
| **Overall Adaptation Strategies** | **2.87** | **0.67** | **Sometimes Applied** |

The table delineates the extent to which lowland rice farmers in Surallah, South Cotabato, have implemented various adaptation strategies in response to the challenges posed by climate change. Particularly noteworthy is the strategy of "Change plant varieties," which registers a mean score of 2.85, signaling that farmers occasionally incorporate this approach. This indicates a moderate application of altering plant varieties as an adaptive measure for navigating climate change challenges. Additionally, both "Farming calendar adjustment" and "Crop diversification" reveal mean scores of 2.88, suggesting an intermittent adoption of these strategies as adaptive measures similar to the findings of Emran,

Krupnik, Aravindakshan, Kumar, and Pittelkow (2022). The cumulative mean score for adaptation strategies among lowland rice farmers is 2.87, pointing towards a prevalent inclination to employ these strategies

This interpretation underscores the nuanced strategy adopted by lowland rice farmers, with an explicit emphasis on the moderate use of changing plant varieties (Efisue et al., 2008). This implies a recognized and periodic application of this particular strategy to effectively address the challenges posed by climate change. This strategic insight can inform policymakers and practitioners aiming to enhance the adaptive capacity of lowland rice farmers in the face of evolving climatic conditions.

*4.4.2 Overall Level of Adaptation Strategies Among Upland and Lowland Farmers of Surallah South Cotabato Towards Climate Change*

| Adaptation Strategies Among Upland and Lowland Rice Farmers Towards Climate Change | Mean | SD | Qualitative Description |
|---|---|---|---|
| Upland | 2.60 | 0.67 | Sometimes Applied |
| Lowland | 2.87 | 0.67 | Sometimes Applied |

The table provides an overview of the overarching adaptation strategies adopted by both upland and lowland rice farmers in Surallah, South Cotabato, in response to climate change. Upland rice farmers garnered a mean score of 2.60, indicating the periodic application of adaptation strategies. Similarly, lowland rice farmers achieved a mean score of 2.87, signifying intermittent application of adaptation strategies.

This comparative analysis reveals a parallel frequency in the application of adaptation strategies between upland and lowland rice farmers, both falling within the classification of "Sometimes Applied." This suggests a mutual inclination among these farmers to periodically implement adaptive measures in response to the challenges posed by climate change (Speranza, 2010). The moderate mean scores for both groups further indicate the potential for refinement and targeted interventions to strengthen adaptation efforts in addressing the distinct challenges faced by upland and lowland rice farmers in Surallah, South Cotabato. These findings provide valuable insights for policymakers and practitioners seeking to formulate strategies that meet the specific needs of rice farmers in the region.

*4.5 Difference in the Awareness Towards Climate Change Between Upland and Lowland Rice Farmers in Surallah, South Cotabato*

| Awareness | t | df | Sig. (2-tailed) | Mean Difference | Remarks |
|---|---|---|---|---|---|
| Upland | 17.239 | 34 | .000 | 2.4857 | Significant |
| Lowland | 25.815 | 39 | .000 | 3.0125 | |

*Tested at 0.05 level of significance

Statistical analysis revealed a noteworthy discrepancy in the levels of awareness regarding climate change between Upland and Lowland Rice Farmers in Surallah, South Cotabato. Through t-tests conducted for both groups, resulting in p-values of .000, the statistical significance indicated a substantial difference in mean awareness scores between the two groups. Specifically, Upland Rice Farmers exhibited a mean awareness score of 2.49, whereas their lowland counterparts demonstrated a higher mean of 3.01. This observed significance underscores the presence of a meaningful divergence in the awareness levels of Upland and Lowland Rice Farmers regarding climate change in the study area. These findings offer valuable insights into nuanced variations in climate change awareness among different farming communities, guiding policymakers and practitioners in tailoring awareness programs to address specific needs. The implications extend to the need for targeted and community-specific initiatives, ensuring that resources are allocated efficiently, and educational interventions are

customized to bridge the awareness gap between Upland and Lowland Rice Farmers (Floranza, 2023). Ultimately, this understanding paves the way for informed decision-making and enhanced climate resilience within these distinct farming communities.

### 4.6 Difference in the Adaptation Strategies Towards Climate Change Between Upland and Lowland Rice Farmers in Surallah, South Cotabato

| Adaptation Strategies | T | df | Sig. (2-tailed) | Mean Difference | Remarks |
|---|---|---|---|---|---|
| Upland | 23.107 | 34 | .000 | 2.6000 | Significant |
| Lowland | 26.887 | 39 | .000 | 2.8666 | |

*Tested at 0.05 level of significance

The outcomes of the statistical analysis indicate a substantial disparity in the deployment of climate change adaptation strategies between Upland and Lowland Rice Farmers in Surallah, South Cotabato. The t-tests conducted for both the Upland and Lowland groups produced highly significant p-values of .000, which fell below the conventional significance threshold of .05. This indicates a substantial difference in the mean scores of adaptation strategies between the two groups. Specifically, Upland Rice Farmers exhibited a mean adaptation strategy score of 2.60, whereas Lowland Rice Farmers had a slightly higher mean of 2.87. The observed statistical significance underscores the meaningful divergence in the extent of adaptation strategies employed by Upland and Lowland Rice Farmers (Bojang et al., 2020) in response to the challenges posed by climate change in the study area.

### 4.7 Relationship Between the Level of Awareness and the Extent of Adaptation Strategies Towards Climate Change Between Upland and Lowland Rice Farmers in Surallah, South Cotabato
*4.7.1 Relationship Between the Level of Awareness Towards Climate Change Between Upland and Lowland Rice Farmers in Surallah, South Cotabato*

| Awareness | Mean | r | Degree of Relationship | p-value | Remark |
|---|---|---|---|---|---|
| Upland Rice Farmers | 2.47 | .351 | Moderate Positive Relationship | .039 | Significant |
| Lowland Rice Farmers | 3.01 | | | | |

*Tested at 0.05 level of significance

Notable distinctions surfaced in investigating the correlation between levels of awareness of climate change among Upland and Lowland Rice Farmers in Surallah, South Cotabato. Upland Rice Farmers exhibited an awareness mean of 2.47, whereas Lowland Rice Farmers displayed a slightly higher mean of 3.01. A correlation coefficient (r) of 0.351 indicated a moderate positive relationship between the awareness levels of the two groups. This implies that, as the awareness of Upland Rice Farmers increases, there is a corresponding moderate increase in the awareness of Lowland Rice Farmers. Furthermore, this finding implies that there is a certain degree of interconnectedness or influence between the two groups regarding their awareness of climate change. It suggests that factors, initiatives, or influences that contribute to heightened awareness (Luís, Vauclair, & Lima, 2018) in Upland Rice Farmers may also have a noticeable, albeit moderate, impact on the awareness levels of Lowland Rice Farmers. This could be due to shared educational programs, community-wide initiatives, or other common influences that contributed to a synchronized enhancement in climate change awareness among both groups.

In addition, a significance level (p-value) of 0.039 indicates that this correlation is statistically significant and unlikely to be attributed to chance. Essentially, the findings suggest a meaningful and tangible relationship between the awareness levels of Upland and Lowland Rice Farmers concerning climate change in the study area.

In conclusion, the correlation implies that shared influences, educational programs, and community-wide initiatives may impact both Upland and Lowland Rice Farmers, contributing to a synchronized enhancement in their awareness of climate change issues. However, the term "moderate" indicates that while there is a positive connection, it may not be an extremely strong or direct relationship; other factors could influence the awareness levels of each group independently. This finding underscores the need to explore the shared factors and unique influences that contribute to climate change awareness among Upland and Lowland Rice Farmers in Surallah, South Cotabato (Higham, Cohen, & Cavaliere, 2014).

*4.7.2 Relationship Between the Extent of Adaptation Strategies Towards Climate Change Between Upland and Lowland Rice Farmers in Surallah, South Cotabato*

| Adaptation Strategies | Mean | R | Degree of Relationship | p-value | Remark |
|---|---|---|---|---|---|
| Upland Rice Farmers | 2.60 | .355 | Moderate Positive Relationship | .036 | Significant |
| Lowland Rice Farmers | 2.87 | | | | |

*Tested at 0.05 level of significance

Distinctive patterns surfaced upon scrutinizing the relationship between the extent of adaptation strategies towards climate change among Upland and Lowland Rice Farmers in Surallah, South Cotabato. Upland Rice Farmers displayed a mean of 2.60 in adaptation strategies, whereas Lowland Rice Farmers had a slightly higher mean of 2.87. A correlation coefficient (r) of 0.355 suggests a moderate positive relationship between the adaptation strategies of these two groups. This indicates that, as the extent of adaptation strategies among Upland Rice Farmers increases, there is a corresponding moderate increase in the extent of adaptation strategies among Lowland Rice Farmers. In simpler terms, this observation reveals a notable interconnectedness in the adaptation behaviors of Upland and Lowland Rice Farmers in Surallah, South Cotabato in response to climate change challenges. Specifically, when Upland Rice Farmers take measures to enhance their application of adaptation strategies, Lowland Rice Farmers tend to increase their utilization of such strategies to a moderate degree. This suggests a shared understanding or influence that shapes their approach to climate change adaptation (Ensor & Harvey, 2015). The moderate positive relationship indicates that both groups exhibited synchronized responses, possibly driven by common environmental conditions, agricultural practices, or exposure to shared educational initiatives. This interconnected behavior implies a learning dynamic between the two groups, where successful strategies implemented by one group influence the other. This insight has practical implications, emphasizing the importance of considering shared dynamics in the design of community-wide initiatives, policy measures, and educational programs aimed at enhancing climate change adaptation among Upland and Lowland Rice Farmers. Policymakers and agricultural authorities can leverage this understanding to develop more effective and inclusive strategies to address the collective challenges faced by both groups, fostering a coordinated and holistic response to climate change.

Finally, a significance level (p-value) of 0.036 indicates that this correlation is statistically significant and unlikely to be attributed to chance. These findings suggest a meaningful and noteworthy relationship in the extent of adaptation strategies between Upland and Lowland Rice Farmers regarding climate change in Surallah, South Cotabato. This statistical significance implies that the observed relationship is robust and reliable, providing valuable insights into the synchronized adaptation behaviors of these distinct farmer groups in response to climate change challenges.

## 5. Conclusion
### 5.1 Summary of findings
The findings highlight significant differences in awareness levels and adaptation strategies between upland and lowland rice farmers. Upland farmers exhibited lower awareness and sporadic adaptation measures, while their lowland counterparts demonstrated a moderately aware status with a

corresponding, albeit moderate, application of adaptive strategies. The study also revealed a meaningful positive relationship between awareness levels and adaptation strategies across both groups.

### 5.2. Conclusion

To elucidate the awareness and adaptation landscape of upland and lowland rice farmers in Surallah, South Cotabato, this study provides a nuanced understanding of their awareness and adaptation to the challenges posed by climate change. The findings underscore a significant disparity in awareness levels between the two groups, with upland farmers exhibiting a less aware status and lowland farmers attaining a moderately aware status. This awareness gap necessitates tailored interventions, emphasizing the need for comprehensive educational programs that address specific knowledge gaps among upland farmers and reinforce positive attitudes among their lowland counterparts.

This study delves into the adaptation strategies employed by both groups, revealing a moderate application of strategies among upland and lowland rice farmers. At the same time, there is a shared tendency to sometimes apply adaptation measures to specific areas, such as farming calendar adjustments for upland farmers and periodic application of strategies for lowland farmers, which present opportunities for improvement. These findings underscore the importance of context-specific interventions that address each group's unique challenges by focusing on enhancing the consistent application of targeted adaptation strategies.

Moreover, the observed moderately positive relationship between awareness levels and the extent of adaptation strategies among upland and lowland farmers suggests a shared influence or community-wide initiatives impacting both groups. This correlation emphasizes the interconnectedness of awareness and adaptive actions, reinforcing the need for integrated and collaborative approaches to climate-change resilience.

In light of these findings, the policy recommendations put forth in this study aim to bridge the identified gaps and promote sustainability in Surallah's rice-farming communities. Tailored awareness programs, collaborative initiatives, and adaptive measures were proposed to address the specific needs of upland and lowland farmers. The proposed methods for monitoring and evaluation offer a systematic framework to gauge the efficacy of these policies, guaranteeing their continued relevance and enduring impact.

Therefore, this study provides valuable insights beyond statistical analyses, providing a foundation for evidence-based policies to enhance climate resilience in Surallah's rice farming communities. As climate change continues to challenge agricultural practices, the findings and recommendations presented here guide policymakers, practitioners, and stakeholders working towards a resilient and adaptive agricultural sector in the face of evolving climatic conditions.

### 5.3. Limitation

This study was conducted only in Surallah, South Cotabato, focusing on two selected barangays. Upper Sepaka represents the upland Barangay, and Dajay represents the lowland Barangay.

### 5.4. Suggestion

This study will be broadened to encompass at least one region, aiming to gain insights into the current status of awareness and adaptation strategies among farmers in response to the impact of climate change.

### Acknowledgment

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