

Rehabilitation of Damaged Coconut Plantations After Super Typhoon Yolanda: A Case Study

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Abstract

Typhoon Yolanda is one of the most destructive disasters ever to make landfall in the Philippines. Its intensity left devastating impacts on people's lives, particularly on their livelihoods. As one of the main producers of copra in Asia, the Philippines' coconut industry has been crippled due to millions of affected coconut trees. However, even 12 years after the typhoon, some of these coconut farms still falter in the race of recovery due to challenges in many facets of farming. While numerical data about the status and recovery of these damaged coconut farms are widely available, there is still lack of studies that explore the in-depth experiences of farmers in their rehabilitation efforts, especially in Burauen, Leyte. This study utilized a descriptive single-case study design to gather a deeper understanding of farmers' experiences in recovering their farms in different areas of the locale. To gather rich data, semi-structured interviews were conducted with seven (7) coconut farmers and were analyzed through thematic analysis. The findings of the study revealed that *despite farmers' rehabilitation initiatives, which included replanting, farm clearing, and intercropping, substantial farm recovery, as manifested by low farm produce and idle areas, is still distant*. This phenomenon was accordingly due to barriers such as *staggered replanting, financial constraints, diseases, typhoons, and poor soil quality*. Ultimately, the results suggest that despite massive external efforts to rehabilitate coconut farms, farm recovery is still a long way off. This underscores the need for agriculture stakeholders to revisit their programs' design and implementation, and to consider post-implementation strategies like consistent monitoring to ensure the sustainability of rehabilitation measures.

Keywords: Burauen, Leyte; challenges; coconut farmers; coconut plantations rehabilitation; Typhoon Yolanda; livelihood

1. Introduction

The Philippines is recognized as one of the leading producers of copra and an exporter of coconut-based products. In 2013, the coconut industry generated approximately Php 77.4 billion and ranked 4th in the country's GDP of major agricultural products, following rice, banana, and corn. One-fourth of the country's total agricultural land is planted with coconut, which constitutes to around 3.56 million hectares. Region VIII, Eastern Visayas, is considered the second largest coconut-producing region in the country. The region is cultivated with coconuts numbering to about 46 million trees producing approximately 1.77 million metric tons of coconut annually (Rodriguez, 2014). Leyte alone, one of the provinces in the region, has around 168,000 hectares of land allocated to coconut plantations (Pormon, et al., 2021).

The country's coconut sector is deemed vulnerable due to the recurrence of natural disasters like typhoons. Given the value of the sector in the country's economy, whenever the coconut sector is wrecked by disasters, the economy suffers as well. On November 8, 2013, super typhoon Yolanda hit the Philippines and brought traumatic and catastrophic destructions. The typhoon caused thousands of deaths and missing individuals, millions of displaced persons, and billion dollars of economic losses. Livelihood was crippled particularly the coconut sector. According to Rodriguez et al. (2014), approximately 14.1 million coconut trees were destroyed, not mainly due to uprooting, but due to defoliation and canopy loss. In Region VIII alone, an estimated 33 million coconut trees were destroyed across 295,191 hectares of land (Rodriguez,

2014). Prior to the typhoon, the region produced approximately 1.77 billion nuts annually. Due to millions of destroyed coconut trees, a drastic decline in coconut produce has been recorded and more than a million of coconut farmers were affected.

Due to large-scale destruction, massive rehabilitation and recovery programs were implemented by the Philippine government and non-government organizations (NGOs). Among these programs was the Presidential Assistant for Rehabilitation and Recovery (PARR) under Memorandum Order No. 62, in December 2013, which aimed to develop and implement integrated short-term, medium-term, and long-term recovery plans (NEDA, 2013). Moreover, the Yolanda Recovery and Rehabilitation Program (YRRP) provided a number of rehabilitation initiatives including tree planting, seedling distribution, debris management, and other livelihood programs aimed to assist the recovery of coconut farms. It shows that various programs aimed to recover the coconut sector were implemented by the government and other organizations. Coconut farmers were provided with the essential support and interventions to recover the massive farm loss that typhoon Yolanda has caused.

In spite of the massive institutional efforts to rehabilitate coconut farms, issues in implementations gaps and community engagement surfaced. A significant portion of farmers lack full awareness to rehabilitation programs causing underutilization of available support services (Borrelli, et al., 2024; Oxfam Pilipinas Post-Haiyan Coconut Farmers Report, 2014). Moreover, farmers faced lack of access to financial resources, delayed delivery of seedlings, lack of technical support, and pest infestations on their coconut farms, this was highlighted in the studies of Perez et al. (2019) and Lasco et al. (2017). These issues complicate the timely planting and rehabilitation initiatives which further lengthen, the already long cultivation period, needed for coconut maturation. It is apparent therefore, that despite various initiatives, numerous problems hindered efficient rehabilitation efforts.

Despite the richness of data about the impacts of typhoon Yolanda, rehabilitation measures, and their associated challenges, there are still gaps that needed to be addressed in the existing literature. A comprehensive accounts of coconut farmers in rehabilitating their farms remain uncaptured, since most studies about post-Yolanda communities focused on numerical data, farmers' in-depth experiences remain overlooked. How farmers adapt, adjust, and live with the miserable ruins left by typhoon Yolanda, is incomprehensible by solely relying to statistical figures. Another is that existing studies were conducted mostly in regional or broader scope, but very few typhoon Yolanda coconut-related topic was carried out in the research locale. Burauen, Leyte as the area of the study, is a major coconut-producing municipality, undertaking this academic endeavor, could provide a meaningful and impactful knowledge that could be practically useful to the people. Moreover, there is also a general knowledge about the potential inefficiency of some rehabilitation programs, conducting this study, though couldn't be use to generalize results to a wider population, can still confirm or negate this phenomenon in the research locale. These identified gaps, strengthens the need to conduct this study due to its anticipated capability to address the said unexplored areas. Therefore, this study aims to fill-in these gaps by exploring the coconut plantations severely damaged by typhoon Yolanda, in terms of; a) their current conditions, b) implemented recovery practices for rehabilitation, c) barriers faced by farmers in rehabilitation, and d) to proposed outputs based on the study's findings. Consequently, the results can potentially inform agriculture stakeholders to undertake further support services such as better, inclusive, and sustainable programs for the coconut farmers. Finally, through this study, additional knowledge can enrich the existing literature which can benefit anyone who has the interests in this topic.

2. Methodology

2.1 Research Design

This research used a descriptive single-case approach to closely examine how severely damaged coconut farms destroyed by typhoon Yolanda have worked towards restoration. A descriptive single-case

study design is a research approach that examines and describes a single-case in its natural environment without manipulating variables, making it suitable for studying phenomena that cannot be experimentally controlled (Crowe et al., 2011). This approach allows for an in-depth focus of a bounded case within its real-life context to generate a comprehensive data. This design is suitable in this study to gain rich and detailed insights focused on fewer participants that are characterized with the same or single case, in this context, severely damaged coconut plantations. Moreover, the typhoon's damaged has occurred twelve (12) years ago, thus making experimentation impossible, so studying the phenomenon through observation and in-depth investigation within its actual context is particularly suitable. Consequently, the descriptive single-case study design can provide in-depth data regarding the experiences of farmers in their rehabilitation practices and challenges which numerical data alone cannot capture. Overall, this approach guides the realization of the study's goals to provide practical insights that can inform recovery efforts in similar contexts.

2.2 Research Locale

This study was conducted in the Municipality of Burauen, a predominantly agricultural town located in the central part of Leyte Island, Eastern Visayas, Philippines. Burauen is characterized by extensive agricultural lands planted with a variety of crops like palay, abaca, and especially coconuts, in fact coconut farming is one of the major livelihoods of Burauen folks. In addition, Burauen, Leyte was also one of the municipalities that was severely hit by typhoon Yolanda, especially its upland areas, making the town a geographically appropriate research locale. The researcher has chosen seven (7) upland barangays in Burauen, since upland areas are more prone to disasters. According to UP Population Institute (2024), upland and mountainous areas are especially susceptible to natural disasters like typhoons because of its steep slopes, unstable terrain, and higher exposure to strong winds. Since this study looks into the cases of severely damaged coconut plantations, the upland areas included in this study are deemed to be suitable.

2.3 Research Participants

According to Creswell and Poth (2018), case studies need a fewer number of participants since they are after depth rather than breadth. The typical number of participants are approximately 3 to 10, depending on scope and data saturation. The participants of this study were seven (7) farmers whose coconut farms suffered significant damage from typhoon Yolanda. This number of participants is considered enough since this study looks into the rich, detailed experiences of the farmers in rehabilitating their farm and not after generalizing results to a wider population. The farmer participants were chosen because their coconut plantations have severe damaged, making them important sources of information for comprehending the restoration process and status of these coconut farms after more than a decade since the typhoon strike. The selection of participants was based on purposive sampling method to ensure that relevant and meaningful information could be collected.

2.4 Research Instrument

The data collection instrument used in this study was a semi-structured interview guide. The guide consists of open-ended questions designed to elicit rich and comprehensive insights about the farmers' experiences in relation to the rehabilitation of their coconut farms. The research instrument was validated by experts, both in agriculture and qualitative research experts. One of the validators of the instrument works as a field representative officer of the Philippine Coconut Authority in the Municipal Agriculture Office (MAO) of Burauen, Leyte. He has been in the field for several years, thus, his expertise in the coconut sector, contributed to the credibility and reliability of the research instrument. Another expert particularly in language and qualitative research, also validated the instrument. The esteemed validator is a Doctor of Arts in Literature and Communication and a renowned figure in the research area who has published several scholarly qualitative research papers. Currently, he is affiliated in a local community college and handling a key role in its Research and Extension Services. The validation of the research

instrument ensured its alignment with the goals of the study while maintaining credibility and reliability of data.

2.5 Data Gathering Procedure

Prior to data gathering, the researcher submitted the research proposal for review to the university's Research Ethics Committee (REC) and adjustments were made in accordance with the ethical protocols of the school. Communication letters were secured and afterward, coordination with the local barangay officials was made to identify and contact participants who met the inclusion criteria. Then the interview proper was set based on the availability of the participants. Once set, the researcher conducted the one-on-one interviews using the validated semi-structured interview guide. Prior to the interview proper, the informed consent was read and provided to the participants to ensure of their awareness of the study, rights, and their protection. During the interview, follow-up questions were asked in order to generate rich insights of the participants based on their experiences while still adhering to their comfort level. To ensure that all responses were saved, the whole interview duration was recorded using a recording device, however, a permission to record was secured first from the participant.

2.6 Data Analysis

The collected data was analyzed using Braun & Clark (2006) reflexive thematic analysis. The analysis includes six (6) steps, namely; familiarization of data, generation of initial codes, generation of themes, reviewing the themes, defining and naming themes, and writing up the results. Prior to the conduct of thematic analysis, the researcher carefully transcribed the data while ensuring that verbatim responses were left intact. The analysis started with familiarization of data which included reading the manuscript many times. It was followed by moving through the data line by line, and identifying relevant segments and assigning labels to them. The initial codes were then closely studied to look for collective meaning which was then organized into groups that reflects similar meanings or patterns. Once the themes were generated, the researcher reviewed them including the codes, key words, and statement, whether they belong together or not. It was followed by naming the theme with a concept that captures the overall ideas of the codes and at the same time carefully giving interpretation or defining of the theme. Lastly, a comprehensive discussion of the themes was made and their linked to the wider scope of the study was established.

2.7 Ethical Consideration

The researcher made sure that the participants understood the purpose of the study, their roles, as informants, potential risks and benefits, confidentiality, and their rights to withdraw as informants any time. A printed copy of Waray translated informed consent was provided to the participants and was explained to them in the said language before they were asked to sign. Participants were also allowed to choose not to answer uncomfortable questions along the interview process. To uphold confidentiality, pseudonyms like "Participant 1," were used to protect the participants identity. The researcher also avoided the sharing of participants' responses to other participants, kept a password-protected audio-recorded files, and made sure that transcriptions were only accessible to the researcher. Prior to publication of results, the researcher also guaranteed the accuracy of findings by thoroughly checking and verifying the data to make sure that credibility and reliability is maintained all throughout the research process.

2.8 Trustworthiness

To achieve credibility of results, the researcher's conduct of interview followed a detailed and prolonged engagement with the participants by asking thought-provoking, open-ended questions with prompts. To ensure that no answers were accidentally provided, the researcher verified responses by asking similar questions yet different in structure, however, the interview guide is guaranteed to have no leading questions and in fact validated by experts. The semi-structured interview of the participants strictly adhered to the research instrument guide to ensure that major questions were asked across the interviews.

Data analysis was done with adherence to the step-by-step process of thematic analysis. The researcher made sure that each step of analysis was done thoroughly and was given enough time and effort. Overall, the researcher carried out the whole research process as accurate, consistent, and objective as possible to yield results that would truly reflect the essence of the study and could provide a meaningful impact to the society.

2.9 Reflexivity

The researcher conducted the whole research process by adhering to the ethical standards of research. However, as an individual who grew up in a coconut farming community and given the subjective nature of the qualitative design, personal lens of the researcher may have influenced the research at some point. Nonetheless, the researcher guaranteed that biases were minimized by consistently reflecting on the data collection and analysis decisions, maintained an open attitude towards the emerging themes, especially in times when themes do not synchronize with the rest, and ensured that participants' perspectives dominate and accurately represented the findings as much as possible. These practices helped strengthen credibility and trustworthiness of the findings.

3. Results and Discussion

This section presents the results and discussion arranged based on the focus of the study a) current conditions of coconut plantations, b) recovery measures implemented for the recovery of coconut farms, c) barriers faced by farmers in rehabilitating their farms, and d) proposed outputs based on the findings of the study. The results were grouped by themes. Each theme is followed by discussion and significant statements of the participants.

3.1 Current Conditions of Coconut Plantations in Leyte

Twelve (12) years have passed since Typhoon Yolanda made a bold swept in the Philippines. Its one-of-a-kind strength changed the course of life for most affected people. The typhoon left significant wreckage to infrastructure, livelihood, and even killed thousands of people. The damaged brought by the typhoon resulted to significant economic losses that may be felt even up to this day. The Philippines, being considered as an agriculture-based country has been crippled, particularly its coconut industry. Looking into the status of these affected coconut farms will inform us about their current conditions, whether or not the impacts of the typhoon really persists until today. Using thematic approach, the following themes emerged from the analysis.

Theme 1: Substantial Output Reduction

Though there have been variations among the extent of the decline in coconut produce, one thing is apparent, there is generally significant output decline shared among the coconut farms affected by typhoon Yolanda. This decline in output is linked to the considerable number of coconut trees that were uprooted and cut off, even young ones were not spared. The damaged was especially worst in upland areas because of a more exposed vegetation. The participants mentioned how miserable their farms looked after the onslaught of the typhoon, like they were deliberately been cleared off, since almost nothing left standing. Due to the havoc, some of them were forced to worked in other places and had to looked for other sources of income to survive. It took several years before they were able to re-harvest, but when they did, it was no longer the same. Due to the substantial number of coconut trees that were destroyed, their produce has fell sharply and failed to be restored, even today. Comparatively, the current price of copra is way higher than before, but it hardly matters since their produce has declined a lot. This is confirmed by the study conducted by Villamor et al. (2017) which indicated that even more than a decade after the typhoon, several affected coconut plantations still failed to recover due to underproductivity. The following statements outline the participant's responses that support the theme.

Significant response 1: *"Previously yields more than 3 thousand. Right now, sometimes 300 or 500."* (P₁, L₃)

Significant response 2: *"As of now, we have poor yields. Sometimes, 500, 600 is the highest. Previously, our yield was 6 thousand, or 4 thousand."* (P₂, L₅₋₆)

Significant response 3: *"Before, our yield reaches more than 4 thousand, however, in our last harvests, the produced only reaches more than a thousand, 1100 or 1200."* (P₃, L₇₋₈)

Significant response 4: *"Approximately 5 thousand previously, but does not even reach a thousand now, sometimes 700 only."* (P₅, L₁₀)

Significant response 5: *"Before the typhoon, our yield reaches 2 thousand. Currently, only 800 or 400."* (P₇, L₁₃)

Theme 2: Prevalence of Unplanted Areas

Most of the participants affirmed that they still have areas that are left uncultivated, specifically unplanted with coconut trees. Among the reasons cited were lacked of seedlings, though there were seedlings provided by the Municipal Agriculture Office (MAO) and non-government organizations (NGO), those were insufficient. Though they could have made seedlings of their own from their harvest, and some did, but were restricted due to perceived income loss. Based on their narrations, why allocate their low harvest for seedlings when they could sell them? In addition, the lack of financial capability in clearing their farms to make the land suitable for planting constrained the farmers to complete coconut replanting. Further, some replanted coconut trees did not thrive for a variety of reasons to be explained in the succeeding themes. The statements that follow highlight the responses that support theme 2.

Significant response 1: *"There is...still a lot, I have regrets. Because coconut seedlings were difficult to find, though we had harvests, but instead of using them as seedlings, we sell them to meet our needs, that's why."* (P₃, L₁₂₋₁₄)

Significant response 2: *"There's still part that is not planted with coconuts. It's beyond our capacity. My siblings also have vast areas that remain unplanted."* (P₄, L₁₆₋₁₇)

Significant response 3: *"There's still a vast area that remain unplanted. Around 200 coconut seedlings won't suffice."* (P₅, L₁₉)

Significant response 4: *"There is. Because I failed to prepare for seedlings, though there's coconut yield, we sold them to earn money."* (P₇, L₂₁₋₂₂)

Theme 3: Completed Coconut Replanting

On a positive note, while there were coconut farms with unplanted areas, there are already some which have completed replantation. Though these farms have encountered issues of seedling insufficiency, the farmers' resourcefulness have enabled them to complete replanting. For instance, a few of the participants confirmed that every available seedling was planted without delay and during harvest season, they would allocate part of their harvest for seedlings. This means that although there was a free provision of coco seedlings, these were inadequate, so farmers had to find ways to complete replanting. The importance of farmers' initiative is supported by Food and Agriculture Organization (FAO, 2015) which states that external aid alone is often insufficient for sustainable recovery, thus improving farmers' adaptive skills through local knowledge and resourcefulness is essential to rebuild farms destroyed by disasters. Moreover, the farmers also narrated that significant sacrifices were poured to rehabilitate their farms such as the case of farm clearing, as coconut planting on weeds and trees-covered farms wouldn't be possible. It was also mentioned, that after replanting was completed, the farms encountered setbacks such as disease infestations. The following statements confirm the responses of the participants regarding the completion of replanting initiative.

Significant response 1: *"No more, already been planted."* (P₁, L₂₄)

Significant response 2: *"Already been planted, there is."* (P₂, L₂₆)

Significant response 3: *"No more, because we planted right away."* (P₆, L₂₈)

Theme 4: Absence of Substantial Recovery

When asked about whether or not their coconut farms recovered from the occurrence of the typhoon, all participants answered little to no recovery due to a variety of reasons, such as unplanted areas, recurrence of typhoons, but the most significant is low farm produce that is far less than what they had before

Typhoon Yolanda. This phenomenon of minimal to absence of farm recovery is supported by Theme 1, “substantial output reduction,” wherein a profound output decline was observed. Even though a few of the farms involved affirmed that coconut replanting was completed, as what Theme 3, “completed coconut replanting” verifies, however, its completion does not guarantee full recovery of the farm, especially that coconuts require a considerable length of time, depending on several factors, before they began bearing fruits. Even if replanting was made, these newly-planted coconuts are too young to bear fruits, some do but only few. This is supported by the Food and Agriculture Organization (FAO, 2014), that destructions on coconuts can result to prolonged income loss. This is backed by the fact that biological characteristic of coconut trees requires approximately 6 to 10 years to produce fruits, unlike seasonal crops that require only few months. This means that coconut recovery is particularly slow and economically challenging especially for farmers that are coconut-dependent. This leads to a conclusion that coconut farmers have to endure years without stable income following the disaster and explains why currently, full coconut farm restoration is still distant.

Significant response 1: *“Not yet, because our produced is low. Its fine if yield reaches 1 thousand especially when price is good. But right now, no, not really.” (P₁, L₃₀)*

Significant response 2: *“Still not, because every time the farm recovers, typhoon strikes. It recovers, a little, though.” (P₂, L₃₅)*

Significant response 3: *“Not yet, since Yolanda’s effects, still not yet. Since it has significantly declined.” (P₃, L₃₈)*

Significant response 4: *“Not yet, since the damaged was too much, harvests were no matched with the previous.” (P₄, L₄₀₋₄₁)*

Significant response 5: *“Still none, it cannot keep up since harvest has been too little.” (P₅, L₄₃)*

Significant response 6: *“It has recovered a little.” (P₆, L₄₅)*

Significant response 7: *“Yes, those that survived has recovered, however, those that remain unplanted remains a problem.” (P₇, L₅₀)*

3.2 Recovery Measures Implemented for the Rehabilitation of Coconut Plantations

This section discusses the rehabilitation practices that coconut farmers have undertaken to restore their farms affected by typhoon Yolanda. The narratives of the participants about the conditions of their farms after the typhoon was utterly heartbreaking. The decades old coconut trees that their ancestors have worked hard with to cultivate, have fallen and were cut-off in an instant. They described their farms to have started over, with almost cleared vegetations while those that remain standing look like candles, as canopies were blown off. Though, the previous sections generally revealed that coconut farms still failed to recover due to still substantial decline in harvest, unplanted areas, and delayed and uneven fruiting of newly-planted coconuts, it does not mean that farmers have not made attempts to restore their farms. The succeeding themes will inform us the rehabilitation measures of farmers to restore their farms. Similar responses were grouped and themes came out from the analysis.

Theme 1: Crop Diversification

The farmers planted a variety of plants such as fruits, vegetables, root crops, abaca, and mostly coconuts. However, the first three (3) products were planted only for household consumption, the farmers failed to market them since most people after the typhoon planted the same, so who will buy their products if everyone had? Nevertheless, their replanting measures somehow helped them survived the economic hardships after the typhoon. The impact of the typhoon Yolanda to the farmers was truly enormous because of their heavy reliance to coconuts. As what the FAO (2014) pointed out, heavy reliance on one product known as monocropping, would reinforce farmers’ vulnerability to disastrous calamities that could bring income shocks. Monocropping can significantly hinder recovery, which can lead to the introduction of intercropping as an alternative way for a short-term income alleviation. In this case, the farmers did crop diversification as a temporary means to generate farm outputs while waiting for coconut maturation.

Therefore, this phenomenon partly explains why crop diversification is no longer practiced since in the first place, farmers concentrated on coconut cultivation. In addition, diseases, poor soil quality, pests, and even natural disasters hinder the sustainability of crop diversification. The following statements highlight the responses associated with the theme.

Significant response 1: *"We planted...cassava, sweet potatoes...squash, vegetables. The abacas and rambutan were not productive and died."* (P₁, L₅₂₋₅₃)

Significant response 2: *"We planted root crops like cassava, sweet potatoes, taro, vegetables...we were not able to sell them, since they were only for our own consumption."* (P₂, L₅₄₋₅₅)

Significant response 3: *"Our plants were banana, sweet potatoes, cassava...those were for our consumption only, we're not able to sell them. We also planted abaca."* (P₃, L₅₈₋₅₉)

Significant response 4: *"We planted banana, cassava..we planted coconuts. We also planted taro, cassava, but No vegetables."* (P₄, L₆₀₋₆₁)

Significant response 5: *"We planted bananas and root crops as well. The abaca did not thrive."* (P₅, L₆₂)

Significant response 6: *"We planted vegetables, for own consumption only, also cassava and sweet potatoes. We Were also provided with calamansi and lettuce but did not thrive."* (P₆, L₆₅₋₆₈)

Theme 2: Farm Clearing to Enhance Land Suitability

Another restoration measures that the farmers have undertaken was clearing unwanted plants, like weeds and trees from their farms. These plants needed to be cut-off since they compete with the soil nutrients that is supposedly for the coconuts. Six (6) out of seven participants confirmed that this practice is significant for coconuts to thrive. The farmers also narrated that they had to pay for the labor or had reciprocal farm clearing when they could no longer manage on their own. Consequently, in times when farmers face financial hurdles, this led to failure to maintain farm clearing, and in turn, adversely affected the growth of their coconut plants. The statements presented below validate the theme.

Significant response 1: *"We cleared the farm, actually two times, so that we could replant. We spent for it."* (P₁, L₇₀)

Significant response 2: *"When we came back, we always do farm clearing."* (P₂, L₇₁)

Significant response 3: *"Sometimes I pay for farm clearing. And reciprocal farm clearing at times."* (P₄, L₇₄)

Significant response 4: *"We also made farm clearings, because planting without it wouldn't be suitable."* (P₅, L₇₆)

Significant response 5: *"We also paid for farm clearings. But only once a year, my husband also helps, we only pay when it's no longer manageable."* (P₆, L₈₀₋₈₁)

Significant response 6: *"Whenever I visit there, I would clear the farm especially the coconut trees that already bear fruits."* (P₇, L₈₄₋₈₅)

3.3 Barriers Faced by Farmers in Rehabilitating their Coconut Farms

Coconut farmers involved in this study have undertaken measures to recover their farm from the destruction brought by typhoon Yolanda. As farm restoration meant recovery of their livelihood since coconut farming was their main source of income. The rehabilitation practices they've made includes replanting diverse crops and farm clearing. Along the rehabilitation process, these farmers have encountered problems that hindered significant agricultural recovery. The barriers they've went through are discussed through the succeeding themes.

Theme 1: Staggered Re-Planting due to Seedlings' Constraints

A pattern of replanting coconuts was observed from the thematic analysis. Out of seven (7) participants, there were six (6) of them who narrated that their manner of replanting wasn't simultaneous, it was done based on the availability of seedlings. Though they have received seedlings from the Department of Agriculture (DA) and other non-government organizations (NGO), they were insufficient. They had to reserve fruits for seedlings from their poor harvest, which sometimes they were constrained from, due to perceived income loss. The lack of seedlings clearly posed a barrier toward the completion of replanting, resulted to uneven coconut fruiting, which thereby delayed the overall rehabilitation process. The lack of

seedling is truly one of the issues being confronted by farmers, this is supported by the study of Mendoza, et al., (2015), which stated that limited seedling supply is a major bottleneck in plantation establishment. The responses below validate the staggered replanting due to seedling constraints as a barrier that farmers encountered on their rehabilitation journey.

Significant response 1: *"Only around 40 bears fruits. Since the planting wasn't done all at once."* (P₁, L₉₀)

Significant response 2: *"None, it was alternate. Planting was staggered since we had to wait for seedlings."* (P₂, L₉₃)

Significant response 3: *"Planting was not at the same time, because of delayed seedlings. We only planted whenever we find seedlings, that's why it wasn't simultaneous."* (P₄, L₉₆₋₉₇)

Significant response 4: *"We planted whenever we find seedlings, planting wasn't done simultaneous because it was difficult to use the fruits for seedlings when we could process and sell them instead."* (P₅, L₉₈₋₁₀₁)

Significant response 5: *"We replanted, but it takes time to grow them. We planted whenever seedlings are available."* (P₆, L₁₀₃)

Significant response 6: *"Whenever I visit the farm, I would plant 3 or 2, that is if I could find a seedling, that was what I would plant."* (P₇, L₁₀₅₋₁₀₆)

Theme 2: Financial Constraints

One of the problems that farmers encountered was lack of financial resources. Most participants admitted that they lack capital in restoring their farm. The farm expenses included payment for replanting and farm clearing. Since labor works in their farm needs external workers, they had to allocate capital for paying the laborers who would replant and clear the field. These farm activities are necessary to restore agricultural productivity. A participant specifically mentioned that he did not attempt to use fertilizers in his coconut farm since failure to maintain fertilization would cause damaged. He knew that maintenance wouldn't be feasible because of lack of financial resources. Financial resource really has a critical role in farming, according to the study of Picpican and Duyan (2024), credit is a vital input in agriculture as it enables farmers to meet production costs. The study also emphasized that limited access to finance restricts productivity and farm expansion. This only highlights that financial resources play an important role in agricultural restoration and maintenance, without it, these affected farms would have delayed rehabilitation progress and can in turn worsen their already difficult situations. The following statements support the theme about the financial constraints that farmers have experienced.

Significant response 1: *"We couldn't solely afford to pay."* (P₁, L₁₀₉)

Significant response 2: *"Sometimes we could do farm clearing, but at times, we couldn't because of financial issues."* (P₂, L₁₁₅)

Significant response 3: *"Our main problem is finance, without it, you'll be solely working in your farm because you'll have nothing to pay."* (P₄, L₁₁₇₋₁₁₈)

Significant response 4: *"Recovery would be possible with sufficient finance, but since we don't have, that's why it lacks."* (P₅, L₁₂₁₋₁₂₂)

Significant response 5: *"I don't have the means to pay, and since I couldn't manage clearing the farm alone, I really needed financial support then."* (P₇, L₁₂₅₋₁₂₆)

Theme 3: Crop Damage Due to Diseases

Almost all farmers included in this study declared that their farm has been infected with diseases. Coconuts and abaca suffered from a disease locally known as "ugpong." They described it as bacteria that turns coconut tree canopy yellow, and from then, the tree would gradually die. An alarming case was narrated by a participant, with 30 ugpong-caused death of coconut trees. This "ugpong" does not only attack coconuts, but also abaca. Some of the farmers received abaca seedlings from the Department of Agriculture (DA) after the typhoon and planted them, however, they did not thrive due to diseases. Another response from a participant highlights the importance of insecticides in farming vegetables.

According to him, planting vegetables without insecticide would worked in the past, but right now, it's difficult since worms would feast on them. Plant diseases are common problem that undermines farming. It threatens agricultural productivity, food security, and farmer livelihoods. According to Gai and Wang (2024), plant diseases remains a global threat in farming as they interfere with plant growth, damage plant tissues, and contribute to production losses that threaten food supply systems. The statements below are significant responses associated to the theme.

Significant response 1: *"Coconut seedlings died because they were infected with "ugpong," a plant disease carried by bacteria." (P₂, L₁₂₈)*

Significant response 2: *"When it comes to the abaca, they were infected as well by "ugpong." All were washed out." (P₃, L₁₃₀)*

Significant response 3: *"When you plant vegetables now, it is usually infested by worms, that's why it is not possible to plant without spray, unlike before." (P₄, L₁₃₂₋₁₃₃)*

Significant response 4: *"Coconut trees now have diseases, like "ugpong." Same case with abaca." (P₅, L₁₃₆)*

Significant response 5: *"Those parts planted with abaca did not work due to diseases." (P₆, L₁₃₈)*

Significant response 6: *"Coconut trees now are disease infected, their leaves become yellowish and gradually dies. From the remaining coconut trees after the typhoon, there are around 30 of them that died due to disease." (P₇, L₁₄₀₋₁₄₃)*

Theme 4: Farm Vulnerability Due to Typhoons

Natural calamities like typhoons are inevitable in the Philippines, so it continues to be a barrier towards successful farm restoration. Though the succeeding typhoons after Yolanda weren't that strong, or were no match to it, but they still left enough damage that impede agricultural recovery. Five (5) participants expressed their misery because whenever their farms start to rebuild, a new typhoon would strike. Although there were no mentioned cases of fallen or cut-off coconut trees from the succeeding typhoons, this still pose adverse impacts since young coconut fruits and canopy are destroyed. As a result, farmers would have to wait for a few months or even a year to fully restore agricultural productivity. Studies like Su et al. (2024) even underscore the worsening agricultural disasters due to climate change. The unpredictable weather patterns make it more difficult for farming communities to manage their farms. Their findings highlight that crop production and food security is significantly affected by recurring disasters. Below are significant responses of the participants that support the theme.

Significant response 1: *"The past typhoons have wiped again those that recovered already. There's always a typhoon." (P₁, L₁₄₆)*

Significant response 2: *"Still not, because every time the farm recovers, typhoon strikes, so it does not fully recover." (P₂, L₁₄₈)*

Significant response 3: *"The typhoon that just struck destroyed young coconut fruits." (P₄, L₁₅₀)*

Significant response 4: *"Typhoons frequently struck the farm. That is why, areas that remain unplanted is still vast." (P₅, L₁₅₅)*

Significant response 5: *"We have planted around 20 bananas. But was destroyed by typhoon again." (P₇, L₁₅₈)*

Theme 5: Poor Soil Quality Slows Plant Growth

Another problem that farmers faced in their pursuit for farm restoration is the poor quality of soil, more specifically dry and hard soil that is not suitable for farming. This condition hinders plants' growth. Consequently, their plants took longer years to grow than what they naturally take. This could have been address with the right equipment like plow, but the problem is, some farmers doesn't own any. The existing literature such as what Borrelli et al. (2024) confirm, soil degradation remains a widespread global issue that reduces agricultural capacity and threatens food production. Poor soil conditions limit plant growth, reduce nutrient availability, and increase farmers' dependence in fertilizer and other external inputs.

Significant response 1: *"It takes 5 years for plant to sprout because the soil has hardened. It should have been plowed, but we don't have the equipment."* (P₁, L₁₆₀₋₁₆₁)

Significant response 2: *"It does not bear fruits yet, because plants here are stunted, the soil here is so dry, since water here is scarce."* (P₂, L₁₆₅₋₁₆₆)

Significant response 3: *"It depends on the soil, since it's located in far the mountains, soil quality is like filtered, that's why plant growth is slow."* (P₇, L₁₆₈₋₁₆₉)

3.4 Proposed Output Based on the Findings of the Study

Coconut farms that were heavily destroyed by typhoon Yolanda has been found to have failed to achieve substantial recovery, even more than a decade after the typhoon mainly due to farm produce that has no match with those during the pre-Yolanda period. As an agricultural-reliant country, specifically, one of the top producers of copra, this situation of farmers is alarming. Their current condition reflects vulnerability, most especially that coconut farming serves as their major source of livelihood. When our farmers are struggling, the people are also affected, though not always directly and equally, as people are consumers of agricultural products. These encounters of farmers in rehabilitating their farms, suggest that people's support matter a lot. Thus, through the findings of this study, the researcher proposed the following outputs:

Coconut Farm Rehabilitation Framework. This is a structured plan that is consist of a practical guide on how to rehabilitate coconut farms. The document plan includes of a sample situation analysis, goals, strategies, timeline, and expected outcomes. This framework needs to be anchored from existing related studies, articles, and even consultation from experts and concerned agencies to ensure accuracy and reliability. The framework specifically consists of design and implementation strategies that can provide the concerned government agencies and farmers a guide for a comprehensive and sustainable rehabilitation process.

Youth Awareness and Advocacy Program. This school-led program includes campaigns on the importance of agriculture, climate change impacts, sustainable farming practices which may be in the form of seminars, forums, workshops and training sessions, and social media advocacy campaigns of the youth. Involving the youth in agriculture-related issues can increase awareness, instill responsibility, and develop empathy towards societal issues like the case of marginalized coconut farmers which can in turn help in nation-building.

Community Extension Activities. Issues in agriculture does not only affect farmers, it affects the whole community, though at different levels and manner. Thus, schools, considering their significant authority and wide reach influence, can led agriculture-related community extension activities. Community extension activities may involve seedling distribution drives, tree-planting activities, basic training of farmers in collaboration with experts. Community extension drive requires collaboration and a deep sense of commitment for all stakeholders to be successful.

4. Summary, Conclusion, and Recommendation

4.1 Summary

The Philippine coconut industry was impaired from the devastating impacts of typhoon Yolanda when it hit the country in 2013. Its incomparable strength has caused enormous damage to coconut plantations, and in turn affected the livelihood of many people. Documenting the journey of these farmers in rehabilitating their coconut farms can provide a valuable resource in the existing body of literature. This research looks into the cases of heavily-affected coconut farms' rehabilitation process. The result of this case study, analyzed through thematic approach, revealed that the effects of typhoon Yolanda still linger up to this day. Coconut produce has significantly declined as compared to the period prior to typhoon Yolanda. While there are areas that have been completely planted with coconuts, there are still lands that are neglected. Although replanting was made, the newly-planted coconuts have generally low productivity due to delayed and staggered replanting. These conditions led the participants to a conclusion that their

coconut farms have none to minimal recovery because their current conditions were still far from what from what they've used to be.

Though recovery may have failed, it doesn't mean that farmers have done nothing to rehabilitate their farms. It is implied from the previous paragraph that some coconut farms affected by typhoon Yolanda, were replanted with coconuts. In addition to coconut replantation, farmers also made other rehabilitation measures like crop diversification. This means that they have planted a variety of crops such as fruits, vegetables, root crops, and abaca. Though their harvest for the selected products was for their own consumption only, it helped them survived the aftermath of the typhoon. However, crop diversification is less practiced at present since farmers prioritized coconut cultivation. Apart from crop diversification, farmers also did farm clearing to improve plant growth, which requires them to allocate money for labor, and in some cases, farmers failed to maintain clearing their farms due to financial difficulties.

Along the rehabilitation process, farmers have experienced challenges that may have caused the limited to lack of farm recovery, and one of them was staggered replanting. Farmers failed to plant coconuts simultaneously due to lack of seedlings. Although they received external seedlings, they weren't sufficient enough to cover what they needed. Self-grown seedlings could have been made, and while some did, there were farmers who did not due to income prioritization. Farmer participants also faced financial struggles specifically related to labor for farm clearing and planting. As supported by existing literature, financial machinery is one of the main drivers to agricultural development, without it, farming is adversely affected since farming requires inputs like seedlings, fertilizer, insecticides, and labor. Another problem that farmers faced was crop damage brought by diseases. The locally known "ugpong" that gradually destroyed and killed plants apart from the frequent occurrence of typhoon, made it harder for the farmers to rehabilitate their farms. On the other hand, since some coconut farms under this study have arid soil, that resulted to stunted growth of their plants.

Agricultural issues like the case of coconut farms failing substantial recovery after typhoon Yolanda isn't solely a concern of farmers and agricultural agencies, it is an issue for everyone. The effects of agricultural problems are far-reaching, with the logic that agriculture is one of the major drivers of the economy in agricultural-reliant country, like the Philippines. In consonance, the researcher proposed outputs, based on the findings of the study, that require community involvement. The recommended outputs include coconut farm rehabilitation framework, youth awareness and advocacy campaigns, and community extension activities. These frameworks aim to mainstream agriculture-related issues to everyone, especially to the youth to inculcate awareness, develop critical thinking, cultivate empathy, and promote civic responsibility. However, these drives wouldn't be feasible without the support and genuine commitment of stakeholders to their cause.

4.2 Conclusion

The findings of the study revealed a disturbing reality of some coconut farms still *failing to achieve substantial recovery manifested in their minimal farm produce*. The considerable output reduction was driven by presence of *unplanted areas* in some farms, mostly still *unproductive coconuts due to delayed and staggered replanting* attributed mainly to *lack of seedlings*. Farm restoration is also influenced by *financial hurdles, recurrence of typhoons, diseases, and poor soil quality*. However, it does not imply the absence of rehabilitation measures of farmers to restore their farms. Aside from replanting coconuts, they've also *cultivated a variety of plants* in an attempt to recover farm loss, though some were unsustainable. The present conditions of coconut farms involved in this study convey an alarming status of the coconut industry. The substantive decline in farm produce and the challenges they faced at present imply a dire need of coco farmers for a holistic support especially that coconut farming serves as one of the major livelihoods of the people in the research locale. For instance, the presence of still vast unplanted

areas in some coconut farms require an adequate support of seedlings from the concerned agencies. However, considering the massive amount of coco seedlings needed, that may have led to the absence and insufficient seedling distribution to some, especially right after typhoon Yolanda, it is of utmost importance for the farmers to have taken actions by themselves. For instance, consistently keeping a few numbers of coconut fruits for every harvest season for replanting purposes wouldn't have significantly affected their income and could have completed coconut replantation. Resourcefulness is an underrated value that remains a valuable guiding force in such situations because overreliance for instance, to the government, will lead to nowhere. The results also highlight that programs do not just end in implementation, revisiting their sustainability by frequent monitoring if desired outcomes are met is equally important. In this case, since lots of farmer participants were coconut seedling benefactors, even though they labeled it as insufficient, if persistent monitoring were made, coconut replantation could have been inclusively completed without wastage of time. Moreover, the case of coconut farms that completed replanting tells us that resourcefulness is still embodied, because even if they faced seedling insufficiency issues, they have still done what needs to be done. The forces that are naturally occurring like typhoons, also suggest the need for farming preparation, adaptability, and sustainable practices. In addition, since coconut produce is still minimal, this conveys that even though coconut prices at present are way higher compared to pre-Yolanda period, farmers are still vulnerable, especially if coconut price fluctuations occur. Overall, this study highlights that there's still much to be done in rehabilitating the coconut industry and collaborative efforts are needed for a meaningful recovery to be felt.

4.3 Recommendation

The findings of this study highlight the absence to minimal recovery of coconut plantations severely damaged by typhoon Yolanda in selected areas of Burauen, Leyte. Addressing this issue requires immediate and coordinated actions by key stakeholders such as farmers, responsible agencies, local government units, educational institutions, and future researchers. In reality, the government cannot provide all the needs of the farmers simultaneously since agriculture is not solely the field that needs support, so farmers should be adaptive, resourceful, and consistent. Considering the need for seedlings, financial mechanism, prevention of diseases, preparedness for typhoons, and all others, these require resilience and embodiment of the right values to thrive in farming. It is important to bear in mind that even though coconut cultivators may not benefit from replanting, since it requires long years for coconuts to grow, that the future generation which will composed of our descendants will surely benefit from it. The Department of Agriculture (DA) as the main body responsible for developing and supporting the country's farming sector, must design, implement, and monitor programs and services that truly address the needs of farmers. Farmers innovation are equally important. Local Government Units (LGU) should also aid in the realization of programs by providing support most especially adequate funding and better opportunities for farmers. Moreover, schools must educate the youth about the importance of farming to develop awareness, skills, and interest in sustainable agriculture. The youth as the future food producers if educated and developed the love of farming has the potential to improve food security and likely avoidance of hurdles that farmers are going through right now. Lastly, the future researchers must pursue more agriculture-related studies, both qualitative and quantitative approaches, for a more holistic understanding of issues concerning the sector in order to find solutions that will improve the overall farming practice.

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