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Original Article

VARIATION OF FARMERS' ATTITUDES ON THE EFFECTIVENESS OF CONTROLLING MEASURES FOR WELIGAMA COCONUT LEAF WILT DISEASE: A CASE STUDY IN HABARADUWA AND IMADUWA DIVISIONAL SECRETARIATS

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Abstract

Weligama Coconut Leaf Wilt Disease (WCLWD), a phytoplasma-borne pathogen, severely threatens coconut cultivation in the Southern Province of Sri Lanka. This study investigates the complex relationship between farmers' attitudes and the effectiveness of disease control measures, focusing on three different Grama Niladari Divisions in Galle district, namely, Goviyapana (high disease prevalence), Bonavista (moderate prevalence), and Mayakaduwa (disease-free), which are selected to represent varying levels of disease prevalence. Using a mixed-methods approach, data from semi-structured questionnaires, key informant interviews, observations, and institutional sources revealed spatial disparities in farmers' attitudes and compliance with disease management practices. The findings underscore that communities in high-risk areas demonstrated notably lower adherence to the disease preventive measures compared to those in disease-free areas, suggesting that socio-cultural attitudes and risk perceptions play a crucial role in disease spread. The study highlights that WCLWD control extends beyond technical solutions; it requires community-centred strategies that align with farmers' socioeconomic realities and local knowledge to develop sustainable management strategies for Sri Lanka's coconut industry.

Keywords: Weligama Coconut Leaf Wilt Disease, Phytoplasma, Farmers' Attitudes, Controlling Measures

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1. INTRODUCTION

Coconut is one of the oldest agro-based industries in Sri Lanka, which spans approximately 402,649 hectares and accounts for 21% of the agricultural lands of the island (Zubair et al., 2007). It is one of the major sources of export revenue that contributes significantly to the Sri Lankan economy. Over the last decade, the main threat to the coconut cultivation of Sri Lanka was a sudden outbreak, which was named 'Weligama Coconut Leaf Wilt Disease' (WCLWD), which was first reported in Weligama in the Matara district and later spread to all coconut growing regions in Southern Province (Wijesekara et al., 2008). This disease is caused by phytoplasma and transmitted by infective insect vectors, *Proutista moesta* and *Stephanitis typical* with characteristic symptoms which is similar to the Kerala wilt disease in India. Although many controlling measures have taken to prevent the spreading of this disease, it presents management challenges due to the absence of curative treatments.

Despite the controlling measures, 17 years after its initial detection, WCLWD persists as an uncontrolled epidemic, raising questions about the effectiveness of existing strategies. So, one of the important factors to be addressed is the attitudes of coconut farmers towards WCLWD, its control measures, and their collaboration for the implementation of the disease-controlling efforts, as farmers' attitudes play a crucial role in determining farmers' willingness to adopt and adhere to recommended practices. If farmers hold a negative attitude towards the disease or consider control measures to be ineffective or impractical, their engagement may be limited. This will ultimately lead to the malfunctioning of controlling efforts. There is a lack of comprehensive research on how farmers' attitudes impact the effectiveness of WCLWD control measures in Sri Lanka. To address this gap, this study investigates the attitudinal determinants of disease control effectiveness in Habaraduwa and Imaduwa Divisional Secretariats. By identifying how farmers' beliefs, perceptions, and socioeconomic contexts influence the implementation of control measures, this research aims to develop more holistic management strategies that integrate technical aspects of disease management approaches with community-centred engagement.

2. OBJECTIVES

The study aims to identify the variation of farmers' attitudes on the effectiveness of the controlling measures of WCLWD in Habaraduwa and Imaduwa Divisional Secretariats, focusing on understanding the attitudes of farmers towards the disease controlling methods. By analyzing this relationship, the study provides insights into how attitudes influence disease management and suggests targeted interventions to improve control efforts.

Specific Objectives

- Identification of the attitudes of the coconut farming community towards WCLWD and its controlling measures.
- Examine the relationship between the effectiveness of WCLWD controlling measures and attitudes of the affected

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community.

3. LITERATURE REVIEW

Introduction to Coconut Plantation

The coconut (*Cocos nucifera* L.) is a tree of the palm family Arecaceae, which is called the tree of life. Coconut is believed to have its origin in the Indo-Malayan region, from where it spread throughout the tropics (Chan & Elevitch, n.d.). They grow well in tropical regions where the climate is hot and humid and has abundant rainfall (Chan & Elevitch, n.d.). Coconut is a smallholder crop of the coastal tropics. About 85% of the crop is produced in Asia and the Pacific region. However, coconut has been planted over 90 countries, especially in Asia, the Pacific Islands, and South America. The major coconut-producing countries include India, Indonesia, the Philippines, Brazil, Sri Lanka, Papua New Guinea, Vietnam, Mexico, Thailand, and Malaysia. India, Indonesia, and the Philippines are the world's leading coconut-producing countries (Kek Hoe, 2018). Coconut is considered one of the most beneficial plant groups known to humans. For hundreds of years, the coconut has been a great source of versatility. The coconut is a source of food, oil, coconut water, coconut milk, and medicine, as well as income from its products. To create awareness among people about the countless benefits of coconuts across the globe, September 2nd has been declared as World Coconut Day by the members of the International Coconut Community (ICC) (Henrietta et al., 2022).

Coconut Plantation in Sri Lanka

Sri Lanka is the fourth-largest coconut producer in the world. The country's coconut cultivation spans about 402,679 ha, which accounts for 21% of agricultural lands in the country, which is second only to paddy in terms of the cultivated area (Kanatiwela-de Silva et al., 2019). The cultivation of coconut is concentrated in the coconut triangle, which includes Puttalam, Kurunegala, and Gampaha districts, while many medium-scale plantations and several home garden-level palms are found in the Southern Province of Sri Lanka, especially in the 'Mini Coconut Triangle,' which is bordered by the towns Middeniya, Beliatta, and Ranna (Wijesekara et al., n.d.). Coconut is a major source of export revenue to Sri Lanka that provides livelihood to more than 0.8 million people of the island (Kanatiwela-de Silva et al., 2019). Coconut is an important food crop in Sri Lanka, which provides about 22% of the per capita calorie intake in the diet, being second only to paddy, the staple food of Sri Lankans (Herath et al., 2015). However, coconut trees suffer from diseases. Some of them are very harmful, while a few slowly affect the tree by gradually reducing the overall yield. During the last decade, the coconut cultivation in Sri Lanka was facing such problems. One of the main threats to the coconut cultivation of Sri Lanka over the last decade was a sudden outbreak, which was named 'Weligama Coconut Leaf Wilt Disease' (WCLWD), a phytoplasma-associated disease.

Weligama Coconut Leaf Wilt Disease

Weligama Coconut Leaf Wilt Disease is a severe phytoplasma-associated disease affecting coconut palms, which was first reported in coconut palms from Southern Sri

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Lanka in 2006, and which is transmitted by vectors, *Proutista moesta* and *Stephanitis typica.* This disease initially emerged in Weligama and later spread across to all coconut-growing areas in Matara, Galle, and Hambantota districts (Perera et al., 2012; Wijesekara et al., 2020). A survey conducted by the Coconut Cultivation Board (CCB) estimated yield loss of 18%, 2.42% and 25.87% in Galle, Hambantota, and Matara districts, respectively, due to WCLWD (Wijesekara et al., 2020).

Key symptoms include leaflet flaccidity, downward bending of fronds, yellowing of lower fronds, and reduction of yield, ultimately leading to secondary infections like leaf rot and palm mortality (De Silva et al., 2023). The disease closely resembles Kerala Wilt Disease in India, a confirmed phytoplasma-borne disease (Nainanayake et al., 2016). Current management strategies focus on vector control, removal of infected palms, and restricting planting material movement (Perera et al., 2016). While studies have extensively documented the disease's etiology and symptomatology, limited research has explored how farmers' knowledge, attitudes, and practices shape the effectiveness of mitigation strategies.

No specific remedy has been found in any country in the world to control this disease caused by intracellular pathogens (Perera et al., 2016). As soon as this disease was detected, the authorities established a buffer zone to prevent the spread of this disease to other areas, and a 2008 gazette notification declared WCLWD a quarantine pest, enforcing strict regulatory measures (Nainanayake et al., 2016).

Initial control efforts (2008-2010) included removing severely affected palms in the protective zone and fungicide treatments for leaf rot-affected palms, but these proved ineffective due to the rapid increase of diseased palms. So, from 2010 onward, all affected palms were removed and infected regions underwent regular field inspections (De Silva et al., 2022). Checkpoints were established at key locations such as Walasmulla and Akuressa to prevent unauthorized plant movement, and compensation was provided for removed palms. For non-removed palms, systemic pesticides like glyphosate or glufosinate ammonium were injected to ensure the destruction of palms within two weeks (De Silva et al., 2022). Awareness programmes targeted farmers, school children, and government officers, utilizing print media and broadcast channels to promote disease control (De Silva et al., 2022). WCLWD's incubation period (8 months to two years) and vector transmission, eradication remains challenging. Continuous field inspections, conducted at least twice a year for two consecutive years, are essential for effective disease management (De Silva et al., 2022). Despite decades of research, no definitive cure exists, but strict quarantine and palm removal efforts have confined WCLWD to Galle, Matara, and Hambantota districts (Rajendran et al., 2012; De Silva et al., 2022). Addressing farmers' attitudes is vital for bridging the gap between scientific knowledge and practical disease management, enabling the formulation of targeted interventions to improve disease management efforts.

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Farmers Attitudes

An attitude is the feeling a person has about a particular person, substance, event, or action. Once formed, attitudes tend to persist and influence an individual's responses to related situations. Attitudes are fundamental components of human behavior, shaping how individuals perceive, interpret, and respond to various phenomena in their environment (Haddock & Maio, n.d.). They are a complex interplay of personality, beliefs, values, behaviors, and motivations. Attitudes influence decision-making and behavior (Pathmasiri, 2013), playing a crucial role in the adoption of agricultural practices, including WCLWD control measures (Lanyon et al., 2015).

Attitudes play a critical role in guiding behavior and decision-making. For example, farmers' attitudes toward WCLWD control measures are shaped by their emotional responses (affective component), beliefs about the disease (cognitive component), and past actions or intentions (behavioral component). So, these attitudes can either facilitate or hinder the adoption of disease management strategies.

4. METHODOLOGY

According to the Coconut Cultivation Board, Sri Lanka's total coconut cultivation area is 400,000, with 47,674 ha in the Southern Province. Of this, 22,935 ha are affected by WCLWD (Table 1).

In the Galle district, WCLWD is present only in Habaraduwa and Imaduwa DS Divisions. Habaraduwa is the most affected, with 44 of its 59 GN Divisions affected, while Imaduwa has three affected GN Divisions. The study selected three GN Divisions namely, Goviyapana (most affected), Bonavista (mildly affected), and Mayakaduwa (healthy area), to analyze spatial variations of farmer attitudes towards WCLWD control measures (Figure 1).

Table 1: Disease Prevalence in the Southern Province

District	Coconut Area (ha)	Affected Area (ha)	Infection Rate (%)
Galle	12,543	3442	28%
Matara	14,398	9756	68%
Hambanthota	20,733	9737	47%

Source: (Coconut Cultivation Board Labuduwa, 2023)

This research employs a mixed-methods approach, integrating quantitative surveys with 79 farmers (selected via simple random sampling at 10% of coconut-growing households) and qualitative interviews with 21 key informants. The survey covers demographics, crop details, disease awareness, control measures, tree health, and attitudes. (Table 2 & 3).

Secondary data were obtained from CCB, Divisional Secretariat Office, research papers, journals, and official sources. To verify the collected data, passive observation was used to assess WCLWD symptoms, tree removals, and farmer compliance with control measures. Quantitative data were analyzed using statistical software Microsoft Excel, while qualitative data collected were transcribed and analyzed through thematic analysis.

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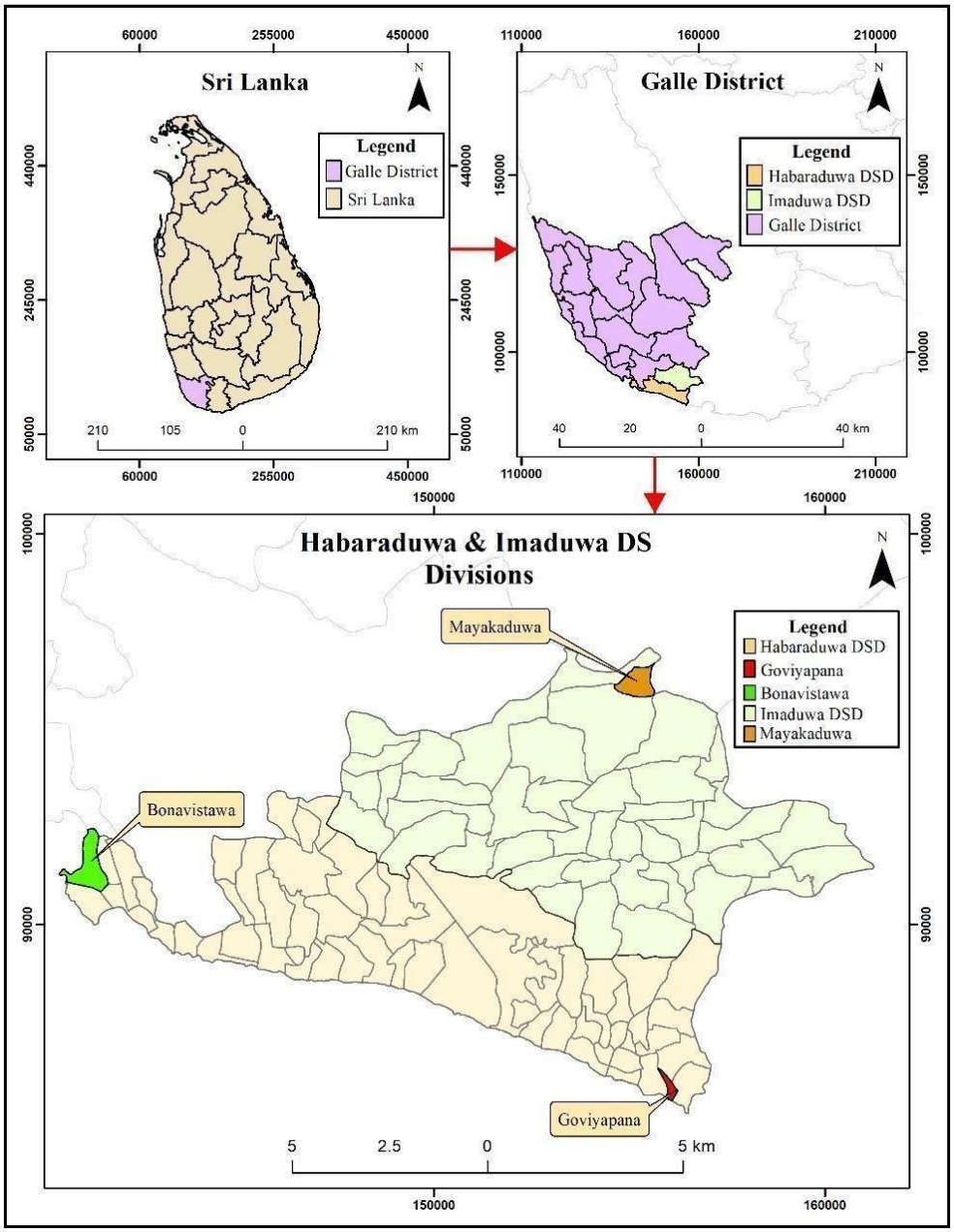
Figure 1: Study Area Map



Created based on data of Department of Census and Statistics

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Table 2: Sample Selection of the Questionnaire Survey

DS Division	GN Division	Population	Sample Size
Habaraduwa	Goviyapana	255	25
	Bonavista	318	31
Imaduwa	Mayakaduwa	232	23
Total		805	79

Source: Divisional Secretariat Habaraduwa (2020) and Divisional Secretariat Imaduwa (2020)

Table 3: Key Informant Interviews

Key Informant	Number
CCB Officer	2
Development Officers	3
Export Agriculture Expansion Officer	1
Agriculture Research Officer	3
Grama Niladari Officers	3
Community Leaders	3
Elders	5
Total	21

Source: Author Compiled

5. RESULTS AND DISCUSSION

The prevalence and severity of WCLWD vary across Habaraduwa and Imaduwa, with some areas being heavily affected while others remain mildly affected or unaffected. While the disease is confined to specific areas, the risk of its further spreading remains a concern. Despite numerous control measures being ongoing, complete eradication has not been achieved, highlighting the need to examine farmers' attitudes towards disease management. Therefore, to achieve the central objective, the study explores the relationship between community attitudes and the effectiveness of control strategies within these areas.

5.1. Community Attitudes Towards WCLWD and Its Controlling Measures

The attitudes of coconut farmers towards WCLWD reflect the complexity of their perceptions regarding its severity and impact on coconut cultivation. Survey results indicate varying perceptions of WCLWD.

The level of awareness varies across different regions. In Goviyapana, 80% of farmers' view WCLWD as a significant threat, while in Bonavista and Mayakaduwa, uncertainty remains higher (39% and 55%, respectively). This uncertainty may stem from difficulties in distinguishing WCLWD symptoms from those of other coconut diseases. This indicates the need for targeted awareness programmes

A majority of farmers acknowledge the economic threat posed by WCLWD. Most farmers agree that WCLWD reduces coconut yield. High agreement on WCLWD's adverse effects on productivity is observed in Goviyapana (72%) and Bonavista (65%). However, a significant number of respondents in all three areas remain uncertain about the severity of the disease's effect on productivity. This lack of clarity could contribute to negative attitudes toward existing control measures (Figure 2).

Opinions on the effectiveness of current disease control methods vary. In Goviyapana, 72% of farmers are dissatisfied with the current control measures, while in Bonavista, 54% share this sentiment. However, in Mayakaduwa, 57% of farmers are satisfied

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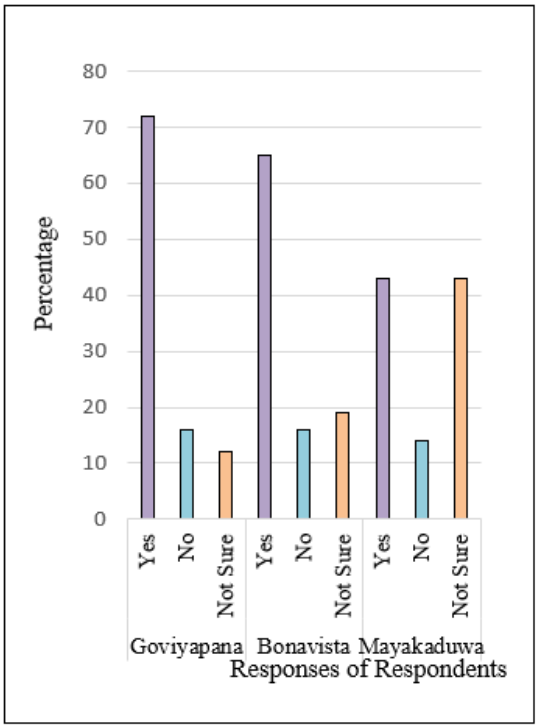
with existing control efforts. This dissatisfaction among farmers in affected regions suggests that current methods may not be fully effective or that farmers lack confidence in their implementation. Negative perceptions about control measures can discourage community participation in disease management efforts. Almost all the respondents emphasize the need for stronger government intervention, highlighting the need for improved policies, better support for farmers, and enhanced disease control strategies (Figure 3).

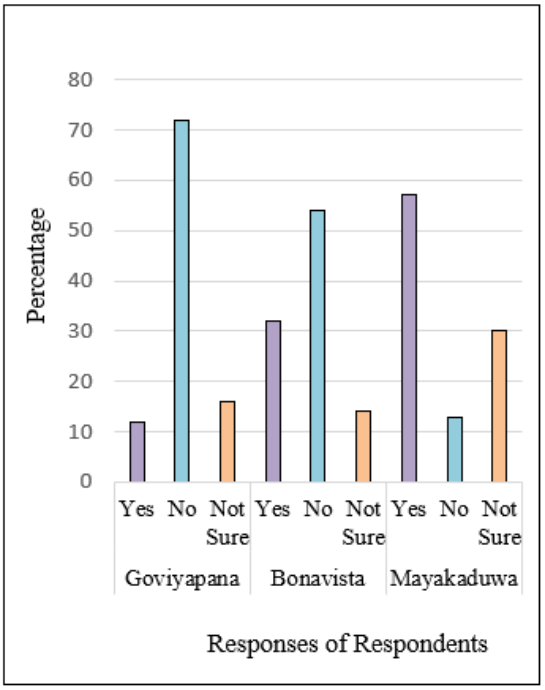
Figure 2: Community Responses on WCLWD Affects the Coconut Productivity



Source: Questionnaire Survey, 2024

The potential role of traditional and cultural practices in mitigating WCLWD is a subject of interest among farmers. Views on traditional practices are mixed. While 36% in Goviyapana believe traditional methods can mitigate WCLWD, the majority in Bonavista (97%) and Mayakaduwa (96%) consider them ineffective. This suggests that while some farmers may trust traditional approaches, most recognize the need for scientifically proven control strategies (Figure 4).

Figure 3: Satisfaction of Current Methods to Control WCLWD



Source: Questionnaire Survey, 2024

Overall, the findings highlight varying awareness and attitudes toward WCLWD. Dissatisfaction with control methods underscores the need for effective government intervention and improved engagement with local farmers. Enhanced awareness campaigns and participatory approaches may foster community support for controlling WCLWD effectively.

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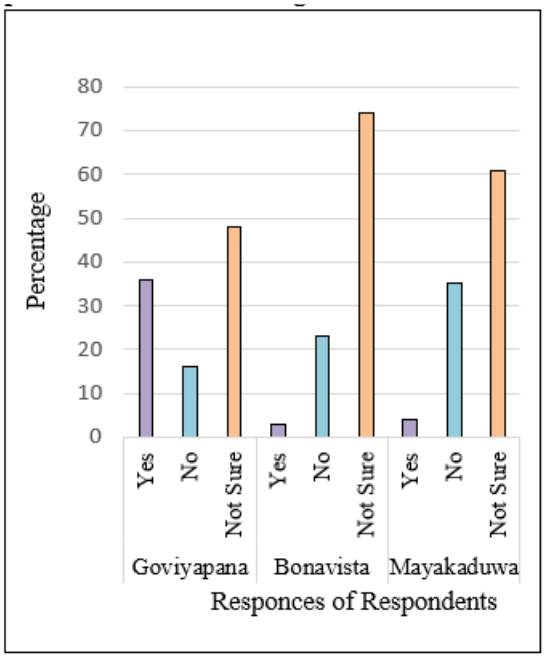
Figure 4: Role of traditional and cultural practices in disease management



Source: Questionnaire Survey, 2024

Perceptions and Beliefs Towards the WCLWD Controlling Measures

The attitudes of farmers play a crucial role in the effectiveness of controlling measures against the WCLWD. Farmers' perceptions towards control methods vary by region, largely driven by the disease's prevalence and the economic burden of interventions (Table 4).

In highly affected areas like Goviyapana and Bonavista, there is a strong resistance to tree removal (76% and 49% disagreement, respectively) and chemical injections, due to fears of income loss. Conversely, disease free Mayakaduwa, showed higher support for preventive measures. These disparities reflect economic anxieties. The farmers in affected regions feared income loss from destroying productive trees, while disease-free communities prioritized prevention.

Table 4: Attitudes of coconut communities towards the controlling measures of WCLWD (Values in percentages)

Perceptions and Believes	Goviyapana			Bonavista			Mayakaduwa		
	AG	DI	NS	AG	DI	NS	AG	DI	NS
Cutting down the affected trees	12	76	12	32	49	19	57	13	30
Injecting the diseased trees to die.	16	56	28	32	39	29	57	4	39
Prohibiting transportation of coconut palms beyond the boundary	48	16	36	48	10	42	52	4	44
Prohibiting planting new coconut saplings	8	56	36	19	42	39	48	13	39

Key: AG-agreed; DI-disagreed; NS- Not sure
Source: Questionnaire Survey, 2024

Restrictions on palm transportation garnered moderate support (48–52% agreement across regions), but prohibitions on planting new saplings were not well accepted, particularly in Goviyapana (56% disagreement) and Mayakaduwa (48% disagreement). This mixed response suggests that farmers believed that stopping new plantings would reduce future harvests, creating a conflict between disease control and their income. These findings underscore the need to align control strategies with farmers' economic concerns and provide transparent communication on their importance.

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Knowledge and Awareness on WCLWD and Its Controlling Measures

The effectiveness of control strategies relies heavily on farmers' understanding of the disease, its symptoms, and the available interventions. (Table 5)

Table 5: Knowledge and Awareness

Awareness	Goviyapana			Bonavista			Mayakaduwa		
	Yes	No	Not Sure	Yes	No	Not Sure	Yes	No	Not Sure
Awareness of WCLWD	92	0	8	64	12	25	61	17	22
Aware of the symptoms of WCLWD	68	0	32	65	29	6	43	26	31
Ability to identify infected trees separately from healthy trees	44	12	44	16	29	55	13	39	48
Aware of the controlling measures	84	0	16	42	26	32	56	22	22

Source: Questionnaire survey data analysis, 2024

Although general awareness of WCLWD is relatively high in endemic areas (92% in Goviyapana), many farmers struggle to accurately identify symptoms, leading to misdiagnosis and delays in taking action. Most of the time, this misdiagnosis was common, with farmers attributing leaf yellowing to nutrient deficiencies rather than WCLWD.

> "*Many people misdiagnose this disease. WCLWD also causes yellowing of the leaves, but people misdiagnose it as another disease. Some diseases turn the coconut leaf yellow. Sometimes coconut leaves turn yellow due to a lack of fertilizer, or when there is too much. It is different in WCLWD, the leaves turn yellow and turn dark green at the end of the disease, and eventually the coconut leaves sometimes wind up*" (Key Informant – Agriculture Research Officer – Bonavista GND, 38 years old).

Accordingly, the uncertainty about symptoms can influence people's attitudes toward controlling measures. This is evident from the farmers' responses.

> "*Last year, officials came to inspect trees. Our trees do not have WCLWD. The leaves of these trees have now turned yellow, but according to my knowledge, usually leaves turn yellow when the tree is lacking salt. That is the reason for the lower productivity of coconuts than before*" (P56, Farmer, 48 years, Bonavista GND).

Confidence in identifying infected trees is low in Bonavista (16%) and Mayakaduwa (13%) compared to Goviyapana. Lack of confidence in diagnosing the disease can hinder the timely identification and management of WCLWD. In terms of government-imposed control measures, awareness is higher in Goviyapana (84%) and Mayakaduwa (56%), but a considerable number of farmers are uncertain. This knowledge gap further complicates effective disease management.

> "*I am not aware of the control measures implemented by the government. I have heard it is prohibited to transport coconut saplings beyond Galle. But I didn't know that it was because of the WCLWD. We don't have time to look into that*" (P03, farmer, Goviyapana GND, 35 years old)

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These findings reveal that gaps in knowledge, particularly regarding symptoms and control measures, further hinder effective disease management. This results in delayed or ineffective control actions. Overall, despite significant levels of awareness among farmers, the persistence of the disease indicates that attitudes and behaviors strongly influence individuals' knowledge and awareness levels. People make decisions by using their level of knowledge, based on the facts they have gathered at the time. But whether the decisions they make are tangible or not is determined by their knowledge (Pathmasiri, 2013). For instance, people express their willingness to cut trees based on their knowledge of the consequences caused by the disease. Accordingly, identifying and addressing these gaps is crucial for improving the efficacy of the controlling measures against WCLWD.

Experience on Previous Disease Incidence

Farmers' past reliance on traditional practices influences current attitudes. Farmers dealt with minor pests like mites, beetles, or animal damage using traditional methods, but the sudden emergence of WCLWD has significantly altered the agricultural landscape, challenging farmers' reliance on traditional control methods.

> "*Coconut trees did not have such destructive diseases before. Even if there were some diseases that occurred in some seasons, we were able to treat such diseases using our local remedies and recover the trees as soon as possible. This is the first time that this region has experienced such a devastating outbreak, without any suitable remedies*" (P02, Adult Farmer, 62 years old, Goviyapana GND)

This lack of experience with such a destructive disease left many farmers feeling helpless. Farmers' reliance on past experiences and traditional methods has influenced their perceptions of WCLWD control measures. Many resisted cutting trees, recalling past successes with non-invasive methods.

> "*One of our coconut trees was marked to be cut, but I didn't cut the tree, because it bears lots of fruit. I cut all the branches of the tree and lit a fire under the tree. After some time, the coconut tree recovered. So, it's a myth saying that there are no remedies for this disease*" (P53, Farmer, 64 Years Old, Bonavista GND).

The deeply rooted belief in traditional methods has shaped farmers' attitudes towards disease control. However, WCLWD's rapid spread and severe damage overwhelmed these traditional approaches. Unlike past outbreaks, which could be managed through indigenous practices, WCLWD has resulted in large-scale economic losses. The disconnect between past experiences and current realities fueled frustration and eroded trust in both traditional methods and government directives. This underscores the need for adaptive strategies that respect indigenous knowledge while integrating scientific evidence.

Land Ownership

Land ownership significantly affects

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compliance with control measures. Inheritance laws and land ownership systems can create differences in agricultural attitudes among farmers. Often, land inheritance in Sri Lanka follows a patrilineal line of descent.

A majority of farmers own hereditary land and view coconut trees as family heritage rather than economic assets. Farmers with hereditary land often feel a deep connection to their coconut trees, viewing them as part of their family legacy rather than just an economic asset. This emotional connection makes them reluctant to follow control measures. Resistance from hereditary landowners poses a significant challenge to disease control efforts.

> "*We are generational coconut farmers. These trees are very old and were very productive. How long does it take for a coconut tree to bear fruit? These coconut trees take at least 10 years to be productive. So how do we let them cut down such valuable, fruit-bearing trees? Cutting a coconut tree is easy, but a big crime*" (P06, Adult Farmer, 64 years, Goviyapana GND).

In contrast, farmers who rent land or do not own it long-term are more likely to prioritize economic benefits over sentimental values. However, hereditary landowners dominate the study area, and their resistance to tree removal poses a major challenge to WCLWD control.

The size of coconut plots also emerged as a critical factor influencing farmers' attitudes. For small-scale farmers, coconut trees are not merely agricultural assets but vital components of household livelihoods. Many rely on a few trees for daily needs such as cooking oil, coconut-based products, and supplementary income. Consequently, the prospect of cutting down diseased trees is met with strong resistance, as it threatens both economic stability and cultural practices tied to coconut cultivation.

The findings highlight a critical tension between disease control imperatives and the socio-economic realities of smallholder farmers. For many, coconut cultivation is a secondary but indispensable source of income, deeply embedded in their way of life. The losses inflicted by WCLWD not only weaken their economic resilience but also strengthen their resistance towards current control measures.

5.2. Barriers in Implementing Controlling Efforts for WCLWD

The attitudes of people can be highlighted through their behavior. The study reveals that farmers' attitudes and behaviors pose significant barriers to managing WCLWD. These barriers highlight the socio-cultural and economic complexities that hinder the successful implementation of disease management strategies.

Resistance to Change the Habits

Farmers' reluctance to adopt new methods, driven by fear of unknown outcomes, remains a critical barrier to controlling WCLWD. Authorities have promoted alternative cash crops (e.g., cinnamon, pepper) to replace diseased coconut trees, but this initiative has

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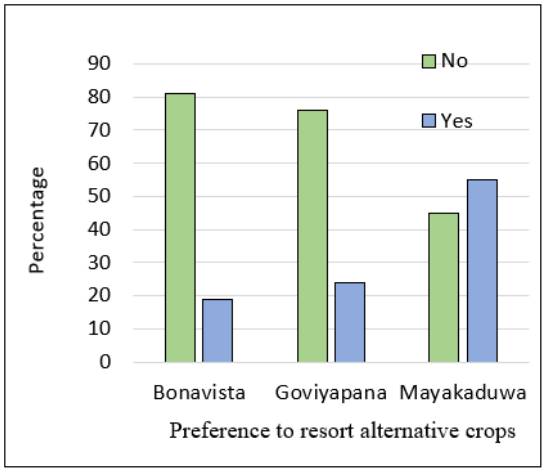
faced widespread resistance. As shown in Figure 5.13, 81% of farmers in Bonavista and 76% in Goviyapana oppose switching crops (Figure: 5)

Figure 5: The preference of resort alternative crops other than coconut palms



Source: Questionnaire Survey, 2024

This resistance is deeply rooted in practical concerns and cultural habits, often citing issues like soil salinity.

> "*No crop can grow in these areas with salty soil. Alternative crops won't succeed here except coconut plants. Therefore, we do not like to refer to other alternative crops*" (P28, Farmer, 68 years, Bonavista GND).

Such beliefs reflect deeply ingrained habits shaped by decades of coconut-centric livelihoods. Thus, it is clear that people's attitudes become habits over time and get deeply structured in society, making societal change difficult. As noted by behavioral studies, altering long-standing traditions disrupts cultural and economic stability, creating resistance to change. Farmers require assurance that alternative crops will be viable and economically rewarding. Without addressing these practical and cultural barriers, efforts to promote crop diversification will not succeed.

Less Perception of Disease Severity

Farmers' perception of disease severity significantly influences their willingness to adopt control measures. In Bonavista 39% viewed WCLWD as a minor concern (Figure 5.1). Many prioritize short-term economic gains or immediate household needs over long-term disease management, while some farmers neglect restrictions on planting new saplings. Lack of awareness among farmers about the seriousness of the disease creates problems in the successful implementation of controlling measures. Despite strict rules against replanting coconut trees in diseased areas, farmers in the affected areas use fake addresses to obtain saplings, prioritizing household needs over long-term risks.

> "*Now we are not given the coconut saplings by the officers, so we put fake addresses and bring coconut saplings from Galle coconut distributing centers*" (P08, Farmer, 64 years, Goviyapana GND).

Accordingly, it is possible to understand that no matter how much the disease exists in this area, people are still interested in planting new saplings even in a fake way. This is not only for economic gain and there are many reasons for doing so.

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> "*The authorities advise to incinerate the diseased trees after cutting. But we don't do so. We sell the trunks for income. The rest is left to decay*" (P16, Farmer, 42 years, Goviyapana GND).

A notable proportion of farmers in high-risk areas perceive WCLWD as less severe compared to other pests like coconut mites, which directly reduce fruit size and market value.

> "*Coconut mites impact the coconut cultivation than WCLWD. Mites reduce the fruit size and market value, but WCLWD doesn't harm the coconut fruit directly. Even though the productivity of the coconut tree gradually decreases overtime, it does not immediately damage the coconut fruit all at once*" (P08, Farmer, 64 years, Goviyapana GND).

Such actions reflect a disconnection between official guidelines and farmers' priorities. Many prioritize short-term economic gains (e.g., selling wood) or practical needs (e.g., household coconut supply), which may not align with the long-term goals of disease control. People make decisions based on their thoughts and perceptions. People make decisions to do or not to do something. Accordingly, people's actions are affected by their decisions and way of thinking. So, the negativity of people's thoughts regarding the severity of this disease is evident in their activities against the controlling measures.

Strong Opposition to the Implementation of Control Measures

Farmers' objections directly affect the implementation of the controlling measures. Farmers' resistance to control methods, particularly in high-impact areas, poses a major barrier to manage WCLWD. In the regions where the disease has caused extensive tree loss and economic hardship, farmers strongly oppose measures like tree removal or chemical injections.

> "*Officials injected chemicals into our trees without informing us. We didn't even sign the forms to cut the trees. Only 10 trees were previously marked to cut but they have already injected chemicals to 12 trees without informing. Now, we won't let them enter our land again"* (P07, Farmer, 45 years old, Goviyapana GND).

Such resistance stems from distrust and poor communication between officials and farmers, creating ongoing tensions. The problem highlights that enforcing top-down control strategies without community support creates more distrust and resistance. Farmers often see these measures as harmful rather than helpful, leading to protests and non-cooperation. This highlights the need for rebuilding trust through transparent communication and inclusive decision-making.

Distrust in government services and officials

Farmers' lack of trust in authorities is a major barrier to controlling WCLWD. Many believe officials lack expertise or consistency in

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managing the disease.

> "*This disease has been detected for more than ten years now. Some officials mark trees for cutting, while others say the same trees are healthy. It seems they don't have an understanding about the disease. We don't want to cut trees that are bearing good fruit for nothing*" (P 09, Farmer, 41 years old, Goviyapana GND).

Such contradictions deepen distrust and discourage cooperation, leading to negative attitudes towards control strategies. Beyond the direct economic impact of losing coconut trees, the psychological distress of seeing plantations destroyed leaves a lasting negative impression on WCLWD controlling measures. Farmers feel frustrated and uncertain when control measures disrupt their livelihoods without clear benefits. They often view government strategies as ineffective or poorly suited to their needs, leading to resistance. For instance, some farmers believe officials focus more on cutting down trees instead of finding better long-term solutions, which makes them feel left out.

Fatalistic Beliefs of farmers towards WCLWD and its controlling measures

The study identified a growing sense of fatalism among farmers in WCLWD-affected areas. Many farmers believe this disease is unavoidable and uncontrollable, leading to a passive acceptance of the spread of this disease. Unlike Kerala in India, where farmers accepted living with a similar phytoplasma disease, Sri Lanka initially contained WCLWD in the Southern Province. This fatalism leads farmers to passively accept the spread of the disease without taking any proactive measures to mitigate its impact. Years of unsuccessful interventions without full eradication have strengthened this fatalism.

> "*We bring coconut husks to our coir mill from Weligama, Middeniya and Matara areas which are highly affected. I know that it is prohibited to transport raw coconut husks. But this disease has already spread, there is no way to control it. There is no reduction in the disease although we obey the controlling measures or not. The only thing is to live with this disease. There is no cure for this*" (P23, Coir mill owner, 59 years old, Goviyapana GND).

This fatalism reduces motivation to comply with control measures. So, it is needed to overcome these fatalistic attitudes within the farming community, highlighting the need for targeted interventions to instill hope and empower farmers to take action.

The study highlights the diversity of attitudes among the three selected areas and emphasizes the influence of economic, socio-cultural, and environmental factors in shaping their attitudes over time. So, it highlights the importance of interventions to shape the needs of the affected communities while implementing effective strategies to address the mindset of the communities to shape their attitudes positively toward disease control efforts.

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6. CONCLUSION

Farmers' attitudes shaped by personal experiences, cultural values, and environmental realities play a central role in the struggle to control WCLWD. While attitudes are subjective and often personal, they become collective barriers when shared widely within communities. For instance, our attitudes may change within the family. The attitudes we have in the family can be changed in society. Accordingly, when the scale becomes larger, the attitudes become more generalized. If we accept something as correct in society, we must agree with it in society, regardless of our attitude towards it. But people's attitudes become more personal when they are outside society. For example, despite strict rules against replanting coconut trees in disease-affected areas, farmers use fake addresses to obtain saplings, prioritizing household needs over long-term risks. This is not only for economic gain, but there are many reasons for doing so. The study has found that farmers also resist alternatives due to practical challenges such as soil salinity. These actions reflect the complex interplay of economic, cultural, and environmental factors influencing farmers' decisions. Accordingly, proper solutions cannot be found by looking at this problem from only one dimension; it requires a multi-dimensional approach that goes beyond enforcing rules and technical solutions. No matter how advanced the control measures are, their success depends on the willingness of communities to adopt and comply with them. So, without addressing farmers' beliefs and practical realities, control efforts will continue to face resistance. Accordingly, quick actions should be taken for the sustainable existence of coconut cultivation not only in the Southern province but across Sri Lanka, as coconut remains one of the country's main export crops.

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