

Hybrid tourism for sustainable land use and
development of post-conflict villages in
Puthukkudiyiruppu, Northern Province, Sri
Lanka

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Abstract

Hybrid tourism is posited as a nexus of tourism models that has economies of scale, is environmentally and socioeconomically sustainable and can influence socioeconomic development with sustainable livelihood and land use practices. This thesis uses a mixed methods approach to explore the potential for hybrid tourism in Puthukkudiyiruppu, Northern Province, Sri Lanka with land use and land cover analysis, surveys of households, tourism industry participants and pilot tourist groups and participatory scenario planning.

Four chapters are used to present findings. The first uses Geospatial Information Systems to analyse land use and land cover change and shows significant changes in the past with post-conflict settlements and predicts reductions in natural capital with growth in settlements and agriculture. The second uses Maslow's hierarchy of needs and shows how nonfulfillment of basic and growth needs is driving land use practices, and that a transition to sustainable land use with sustainable farming is therefore unlikely despite climate and social impacts. The third uses Participatory Scenario Planning and the Three Horizons Framework and identifies that maintaining the status quo or incremental change with existing land use practices and conventional farming to support a growing population is unsustainable, whereas transformative change with alternative development pathways such as hybrid tourism is a plausible futures scenario. The fourth shows that hybrid tourism is a viable alternative sustainable development pathway to fulfil needs for human wellbeing and influence sustainable land use practices. The findings show that hybrid tourism has potential to increase tourism in a post-conflict area, influence the socioeconomic development of rural farming communities, improve wellbeing, transform unsustainable land use practices and ultimately support the communities to navigate a challenging future.

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Declaration

I declare that this thesis is a presentation of original work, and I am the sole author. This work has not previously been presented for a degree or other qualification at this University or elsewhere. All sources are acknowledged as references.

I also declare that all geospatial maps and their analysis were conducted by Dr Pavithra Jayasinghe and interpreted by me. Second, I declare that household survey data was collected by the Centre for Children's Happiness (CCH) and analysed by me.

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1. Introduction

Tourism has strong potential to be an ideal engine of economic growth for countries with attractive landscapes and have the need to develop socioeconomically. Such economies were collectively referred to as “third-world countries” after World War II, starkly differentiating them from countries that were comparatively richer, a differentiation that continues to present day with terms such as ‘global south’ and ‘developing nations’ (Bell, 2019; Soederberg, 2005). This differentiation was at the behest of consumerism or ‘more is good’ as a part of a bigger neoliberal undercurrent which forced ‘third-world countries’ into globalisation by opening markets to imbue consumerism, privatising state enterprises and reducing social expenditure in exchange for loans from the World Bank, foreign investment and exports (Dwyer, 2015; Hall, 2011; Soederberg, 2005; Kaynak, 1985). The same underpinnings of neoliberalism and globalisation are visible in global tourism development from the 1970s to the 1990s, with pro-poor tourism, the endorsement of tourism to eradicate poverty in line with the United Nations (UN) Millennium Development Goals (MDGs) and the ensuing Sustainable Development Goals (SDGs) (Scheyvens and Hughes, 2019; Dwyer, 2015; Scheyvens, 2011, 2007). Tourism grew rapidly, fuelled in part by tourism development loans, despite the difficulties such ‘third world’ nations faced in a post-colonial world (Carrillo-Hidalgo and Pulido-Fernández, 2020; Hawkins and Mann, 2007). Over the four decades following World War II, global supply of hotel accommodation and its related products grew astronomically; reflecting this, between 1950 and 1995 global arrivals and revenues grew from 25 million visitors and US\$ 2 billion to 566 million visitors and US\$ 393 billion (Latham, 1998).

The purpose of this thesis is to assess a new model of tourism for sustainable development in a post-conflict region. The approach to assessing appropriate models for tourism-led development in a post-conflict region has been varied. Among them, dark tourism has been used in the wider context of cultural and heritage tourism (Reddy, Boyd and Nica, 2020; Boyd, 2000). With dark tourism, the history associated with conflict is used for tourism. Sites for dark tourism include prisons, cemeteries, crash sites and death camps. There are many examples of such sites being used for tourism in other parts of the world. In Germany its war history is displayed with sites such as Auschwitz (Hartmann et al., 2018; Fonseca, Seabra and Silva, 2015). Vietnam has several sites such as a museum, the tunnels complex and a prison (Sharma, Arora and Shukla, 2024; Pham, 2024; Gillen, 2018). Bosnia and Serbia uses dark tourism associated with its war-related history and artefacts (Causevic and Lynch, 2011). Sustainable

tourism with ecotourism has also become popular as an approach to such development. However, it lacks adequate economies of scale to work as a standalone model. Its approach, associated benefits and pitfalls are detailed in sections 1.1 and 1.3.

The conflict occurred in the Northern and Eastern Provinces of Sri Lanka from the 1970s until 2009. There were several social and political factors leading up to the war. These factors are detailed in Chapter 4 and provide context for my thesis. Soon after the conflict ended, many tourists were drawn to the Northern Province to see the artefacts of war. However, by 2013 the government of Sri Lanka removed sites that showcased the Liberation Tigers of Tamil Eelam (LTTE) and retained only sites that displayed the armed force's role in the conflict with memorials and museums (Shome, 2023; Samarathunga, Cheng and Weerathunga, 2020). This in essence inhibited the use of dark tourism in this region, a model that contributed to increasing tourism in other parts of the world.

Sri Lanka is an island with a tropical climate, long sandy beaches, several heritage sites and protected areas (PA), a rich and ancient cultural history and beautiful biodiverse landscapes including hilly areas (Wijewardena, 2021). Due to these factors the country had largely beneficial outcomes with tourism throughout the period of conflict, although it was limited to Southern Sri Lanka. Further, tourism grew steadily after the war, but faced setbacks due to the Easter bombings in 2019, when three churches and three hotels were bombed, causing the deaths of over three hundred people. Thereafter, the country faced the Covid pandemic from 2020 to 2021 followed by an economic crisis from 2021 (Imtiyaz, 2020; George, George and Baskar, 2022). Despite these challenges, tourism has increased significantly with 1,487,303 tourist arrivals in 2023 growing to 2,053,465 in 2024 (Sri Lanka Tourism Development Authority, 2025).

1.1 Research problem and problem statement

Despite the steady growth of tourism in Sri Lanka, its introduction and accrual of benefits in the Northern Province remain lacklustre after the war. For example, tourist visits to the Jaffna Fort, a popular tourism site, was 10,292 in 2023 and 10,722 in 2024. Further, tourism primarily developed in Jaffna, the main district in this region. The Northern Province had 1063 rooms (2%) registered with the Sri Lanka Tourism Development Authority compared to 53,150 in the entire country as of 2024. Further, 712 of these rooms are in the Jaffna district. (Sri Lanka

Tourism Development Authority, 2025). These figures show there is a need for an appropriate model of tourism in the Northern Province to increase tourism in rural areas.

Most rural areas are populated by post-conflict communities composed of internally displaced persons (IDPs) who have not enjoyed significant socioeconomic development. Further, tourism development is negligible. Their livelihoods are mainly agrarian, with limited access to financial capital and markets, and they face high levels of poverty. Second, tourism and related infrastructure grew in the Southern half of the country with the exclusion of the Northern Province during the conflict. The furthest North tourists travelled to was Anuradhapura in the North-Central Province (Figure 1). Third, in the post-conflict era from 2009, the South, due to popularity built over the years of conflict among markets providing tourists, continues to attract tourists. A contributory factor was coastal tourism which grew along the South-western coastal belt. Fourth, as mentioned, tourist accommodation facilities mainly grew in the Jaffna district after the conflict ended. These factors are presented with more elaboration in Chapter 4.

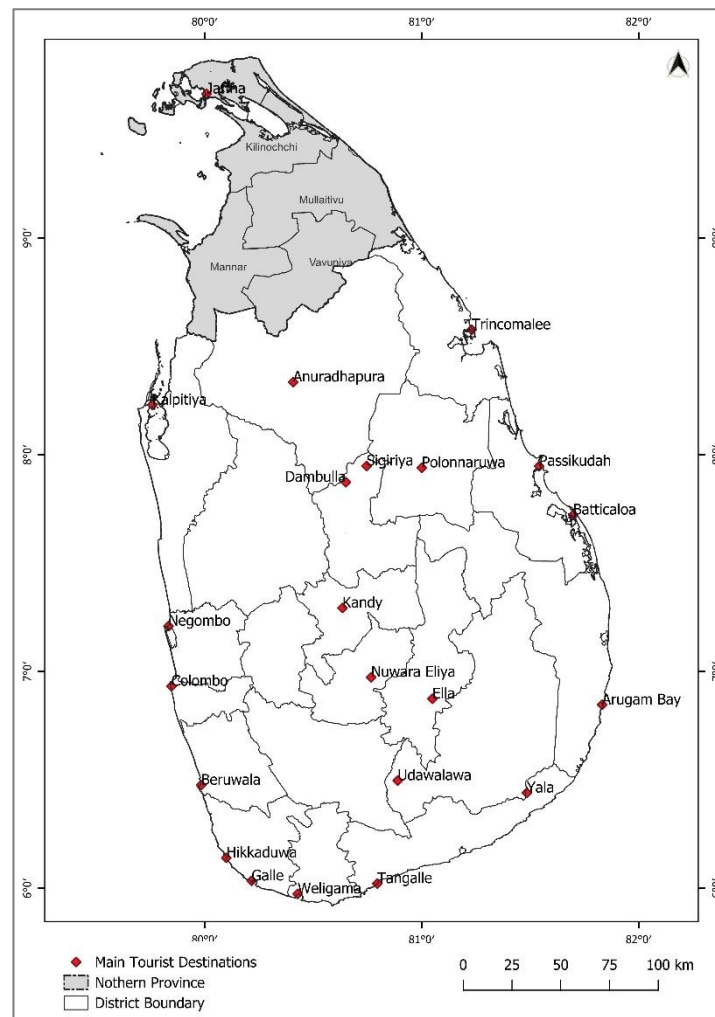


Figure 1 Map of Sri Lanka with The Northern Province shaded in grey and main tourism sites

Hybrid tourism (Figure 2) represents four nexuses and is posited as a new form of sustainable tourism to bring tourism-led development to such rural areas in the Northern Province for socioeconomic development. The first, a nexus of mass and nature tourism, the second, a nexus of mass tourism, nature tourism and agritourism, the third, a nexus of agritourism and nature tourism and the fourth, a nexus of mass tourism and agritourism.

In its four nexuses, hybrid tourism must demonstrate adequate economies of scale, which in turn is predicated on two factors that mass tourism has demonstrated based on its inherent economies of scale, which makes it sustainable for the tourism operator (Gu, 2005). In this regard, tourism provides opportunities for large-scale employment with a global employment of 357 million people in 2024 (World Travel and Tourism Council, 2025). Second, it provides large-scale opportunities in the supply chain for a variety of goods and services such as farm products, food, attractions, transport, hotels, souvenirs and travel agents (Naidoo and Sharpley, 2016; Peng, Xu and Chen, 2011). Taking these factors into consideration, mass

tourism must be combined with ecotourism and other types of tourism for hybrid tourism, to provide the economies of scale and year-round revenues, or economies of scale should be embedded in ecotourism initiatives. In this regard, Weaver (2014), building up from previous works (Weaver, 2012, 2005, 2001), explores how sustainable tourism is “evolving as a synthesis of mass tourism and alternative tourism”, predicated on mass tourism’s economies of scale and the “fundamental contradictions inherent in the latter” (p. 1). Further, Weaver (2001) states that despite the negativity towards mass tourism due to its scale, it is the very economies of scale it possesses that makes it sustainable and therefore the most likely to “implement positions that deal with environmental and social issues” (p5). Similarly, Butler (1990), in a dated but relevant paper, emphasises how alternative tourism could fulfil several roles including serving as a complementary product to mass tourism, thus fulfilling the needs of tourism segments and supplementing the income of rural people. Further, the author states that tourism development should be predicated on the needs of the geographic area and the size required to sustain the market, not on ‘pious hopes’ (p6). Butler (2015) rephrases this perspective in the context of sustainable tourism by stating the need to consider ‘the relationship between tourism and the environments in which it occurs’ (p10). Vainikka (2013) takes a similar position in stating that tourism is contextual to where it takes place.

There are limited studies on ecotourism with embedded economies of scale that have resulted in positive economic outcomes. Among these, fair revenue sharing schemes of tourism earnings from nature tourism and agriculture have contributed to socioeconomic and environmental goals (Carius and Job, 2019). In a recent example, positive outcomes were accomplished in China using ecotourism with embedded mass tourism and economies of scale (Xu, Zhu and Bao, 2016). In Mastatal, Costa Rica, the adaptation of agritourism has encouraged a transformation to sustainable farming over a fifteen-year period. Second, a nature tourism site nearby has created a synergy between both locations. Third, there were positive outcomes for the rural economy with adequate economies of scale for employment and the creation of supply chains (Little and Blau, 2019). Several studies show how agritourism with organic farming created socioeconomic and sociocultural value for villages while preserving the natural environment (Aoki, 2014; Uğurlu, 2014; Choo and Jamal, 2009). These studies resonate with the premise of hybrid tourism for sustainable development as one of its four possible nexuses as conceptualised in Figure two.

The Northern Province has huge potential for tourism. Its natural capital includes an estimated 49% land cover with dense forest inclusive of protected national parks and nature reserves, several sites for cultural heritage such as the Jaffna fort, temples and churches, and a long coastline with unspoilt beaches. There are also many small, inhabited islands and the coastal belt has wetland areas, fisheries, ports and aquaculture. Further agriculture and home gardens are prevalent (Bharathy et al., 2024; Aloysius, Gunawardana and Kumari, 2022; Sasitharan and Premaratna, 2022). These built and natural capital resources, and the region's cultural heritage and livelihoods, presented an opportunity to assess the potential for hybrid tourism to take advantage of them to sustainably improve the wellbeing of post-conflict communities.

There is an absence of a developmental model like hybrid tourism that could use the region's natural capital and cultural heritage and potentially benefit local communities. There was also limited evidence of the term hybrid tourism in the wider literature in the context explored in this thesis. The term has been previously used for tourism that combines leisure and work, for a site recommender system based on a location and for studying the impacts of white-water rafting on a specific location (Bassiyouny and Wilkesmann, 2023; Kbaier, Masri and Krichen, 2017; Tirasatayapitak, Chaiyasain and Beeton, 2015). Further, the term heritage tourism is used to describe a model that uses a mix of urban, natural, cultural and natural landscapes combined with different types of tourism in Canada (Boyd, 2002). However, it must be noted heritage tourism is generally used for historic sites and conveys different meanings depending on geography and history. Further, the term cultural heritage tourism (or cultural tourism) is used to reflect intangible cultural practices such as music, dance, food and ceremonies (Timothy, 2014). Therefore, there is a marked difference in the approach to my thesis. I have used terms that are commonly used for different types of tourism. In this regard, my focus was on mass tourism and ecotourism in the context of nature tourism and agritourism (Section 2.4.). Based on these findings, assessing hybrid tourism could potentially benefit the region with tourism-related sustainable development.

1.2. Post-conflict tourism development studies

There are several studies that show the need and the potential for tourism in this region (Samarakoon, 2023; Ranasinghe, 2019; Chandrasiri, 2019; Mathivathany and Sasitharan, 2012). Second, there are studies reflecting the potential for ecotourism and post-conflict development (Rajkumar and Wijesundara, 2021; Gajapathy, Suvanthini and Arthiyan, 2024).

Third, tourists have demonstrated a high level of satisfaction with the Northern Province (Kalimuththu, Abeysekara and Gamini, 2017). These studies show there is potential for tourism. However, there are several examples that show the approach of most studies was to achieve their objectives with a mono method i.e., using a single source of data for analysis (Samarakoon, 2023; Dissanayake and Samarathunga, 2021; Mathivathany and Sasitharan, 2012). Evidence of case-study based research with adequate data is limited. Further, such studies are qualitative with thematic interpretation (Pathirana et al., 2024; Perera and Ranasinghe, 2024). There is a dearth of research with multiple perspectives and larger samples that evaluate potential tourism models in this region. These findings showed the potential to conduct case study-based research with data from multiple sources to assess hybrid tourism as envisaged for my thesis.

The region faced many problems historically after the end of World War II, during the civil conflict and after it ended. This context is relevant to my thesis and is provided in Chapter 4. Notably, the final battles between the country's armed forces and the LTTE took place in the vicinity of the Chundikulam National Park where Puthukudiyiruppu lies. This park is a PA, with significant forest cover, was declared as a national bird sanctuary in 1938 and was subsequently made a national park in January 2020 (Gajapathy et al., 2024). This PA is protected by the Forestry Department under the purview of the national government. Until 2009 the communities living within the park's present boundaries faced frequent displacement due to the conflict. Further, inhabitants from the same and other areas who lived in rehabilitation camps were relocated commencing in 2009 to the vicinity of this park. Subsequently, some communities were relocated due to the government making it a national park. The resettlement of such communities in villages in the park's vicinity has increased demand on the resource base, including land, water, and natural resources, due to the main livelihood of farming. Further, this region has not enjoyed significant alternative socioeconomic development with tourism. Also, there have been limited studies on Chundikulam National Park, on its potential for nature tourism and its flora (Gajapathy et al., 2024; Rajkumar and Wijesundara, 2021; Ekanayake et al., 2016).

Hybrid tourism could potentially use the region's natural, rural, cultural and urban landscapes and tourism sites to provide sustainable socioeconomic development and wellbeing for post-conflict communities (Boyd, 2002). Further, it could utilise the existing skillsets of such communities, especially agriculture and knowledge on natural capital such as national parks

and their cultural heritage. By doing this it could contribute to socioeconomic development and improve wellbeing. Therefore, assessing hybrid tourism as a new model of tourism by researching its potential in this area of the Northern Province of Sri Lanka forms the basis of this thesis.

1.3 Aim and Objectives

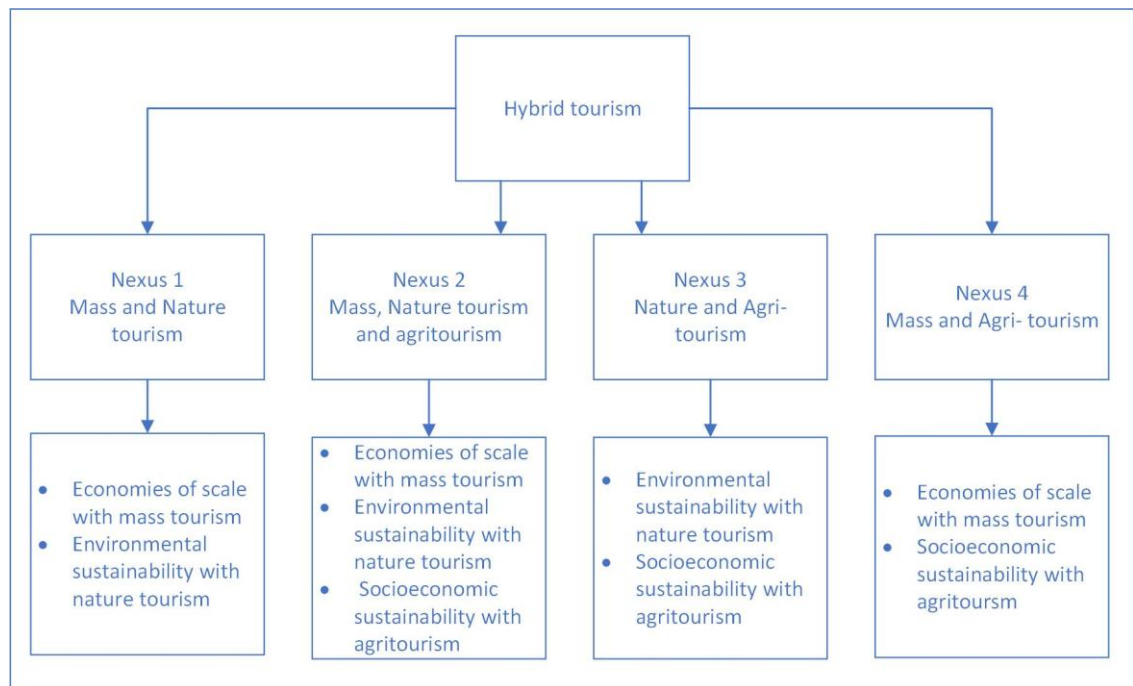


Figure 2 Conceptual representation of hybrid tourism.

In this conceptual representation of hybrid tourism, while nexuses one, two and three would be both environmentally and socioeconomically sustainable, nexus four would require organic agritourism to be environmentally sustainable. Further, as the findings in Chapter 2 will show, organic farming is the preferred type of agriculture for agritourism.

The aim of this thesis is to critically assess whether hybrid tourism can be successful in delivering sustainable development for isolated resettled rural villages by addressing the question, “Can hybrid tourism influence sustainable land use practices by transforming the livelihood practices and improving the wellbeing of resettled post-conflict communities?”

To fulfil my aim the objectives of this thesis are (1) To critically evaluate to what extent land use patterns changed around Puthukkudiyiruppu, Sri Lanka due to resettlement, (2) To critically evaluate socioeconomic activities and their drivers in the region after the conflict and their relationship with environmental changes and (3) To critically assess whether hybrid

tourism development can lead to sustainable farming practices with better livelihood choices, alongside desirable futures to improve human wellbeing in the post-conflict region.

The aim of my thesis is justified based on several factors. From a socioeconomic perspective, smallholder farmers constitute over two thirds of the developing world's three billion rural population, with estimates of their share of global food supply varying, ranging from 28% to 77% (Ricciardi et al., 2018; Herrero et al., 2017; Hazell et al., 2010). Such rural farmers face poverty, are negatively impacted by climate change, are forced into migration and are treated unfairly in buffer zones near PAs (Dawson, Martin and Danielsen, 2018; Fanzo, 2017; Coria and Calfucura, 2012; Apata et al., 2010). The farmers in Puthukkudiyiruppu are also mainly smallholder farmers based on initial scoping, and engage in agriculture in the vicinity of a PA. Whether such farmers use land and other resources sustainably depends on what type of farming and extent of use best contributes to their livelihood income and wellbeing. Also, recent studies show how land used for rice paddy cultivation, a key agricultural activity in the Northern Province, has been significantly abandoned due to soil salinity (Gopalakrishnan, Kumar and Llugany, 2021; Gopalakrishnan and Kumar, 2020). Second, the entire Northern Province's agriculture is vulnerable due to climate change and its impacts of droughts and floods (Wickramasinghe, De Silva and Dayawansa, 2021). Third, there are human-wildlife conflicts as well as a decline in forest cover and an increase in bare land between 1994 and 2022 in the Mullaitivu district (Rajeevan, Jeyavanan and Sivachandiran, 2023; Bharathy et al., 2022). Fourth, the conflict was prolonged for over 30 years and there were shifts in settlements over this period, followed by resettlement after the conflict ended. These temporal changes in population influenced land use change over a long period of time, with studies from other parts of the world showing the impacts resettled post-conflict communities have on the environment in the context of land use (Younes et al., 2023; Kilama Luwa et al., 2021; Wilson, 2014). Fifth, natural landscapes are needed to sustain tourism (Zhang et al., 2021; Osti and Cicero, 2018; Torquati et al., 2017). Studies on Mullaitivu, the main district where Puthukkudiyiruppu is located, are limited. However, studies covering Jaffna district and the peninsula show there is inadequate access to housing, potable water, sanitation and electricity (Balachandran and Thennakoon, 2023). Second, the Northern Province had the third highest Poverty Headcount index of 10.9% in 2016 among the nine provinces. This worsened to 23.8% in 2022. Third, the province's poor household percentage increased from 6.3% in 2016 to 19.9% in 2022 (Central Bank of Sri Lanka, 2023). Fourth, 68% of home gardens in the Mullaitivu are underutilised (District Secretariat Mullaitivu, 2020). Fifth, recent studies show

lack of access to jobs for youth, education, markets and financial capital (Kavitha and Shivany, 2020; Tharmine, Sivashanthini and Edrisinghe, 2018; Bowden and Binns, 2016).

Methodologically, my aim is justified by evidence in studies on nature tourism and agritourism in the wider literature, which showed there is a dichotomy in their methodological approaches. There is an eco-centric approach evident in nature tourism studies, with lack of clarity or omission of socioeconomic factors. Further, the problems with nature tourism are that it lacks economies of scale, has largely failed in creating socioeconomic value and focuses on the environment more than the inhabitants. These findings resonate with an aggregate study of 73 community-based conservation initiatives in Africa. Ecotourism was used in 59% of these initiatives. However, only 48% of them had positive social outcomes and most of them had positive ecological outcomes (Galvin, Beeton and Luizza, 2018). Further, the ideologies of NGOs are predicated on ecological conservation with an aggregate study showing that 91% of 214 ecotourism initiatives were linked with PAs and NGO participation (Romero-Brito, Buckley and Byrne, 2016). In contrast there is an anthropogenic approach evident in agritourism studies with lack of clarity or omission of environmental factors. This dichotomy is explored in greater detail in Chapter 2.

There are limited examples of studies evidencing the success of tourism embedded with economies of scale for sustainable development (Little and Blau, 2019; Xu et al., 2016). Further, there is a dearth of research on using tourism for the sustainable development of resettled post-conflict communities. In Cambodia, a study reflects on using cultural and heritage tourism (Winter, 2008). Recent studies show the barriers and drivers for tourism in Burundi and how post-conflict ecotourism is generating socioeconomic value in Rwanda (Maekawa et al., 2013; Novelli, Morgan and Nibigira, 2012). Also there are studies with frameworks for post-conflict tourism and the potential for community-based tourism (CBT) in areas where there is predominantly mass tourism in a country where conflict ended three decades ago (Boyd et al., 2021; Andries et al., 2021; Reddy et al., 2020). There are limited studies on assessing a model with sustainable post-conflict tourism development for resettled communities. This area needs attention due to the social-ecological problems that arose historically and led to anti-mass tourism models; this resulted in ecotourism becoming a frontrunner for sustainable development by considering both the community and the environment (Higgins-Desbiolles, 2008). In this regard, several studies resonate with this thesis due to three main reasons, the synthesis of different iterations of tourism, the fair sharing of

revenues and economies of scale (Carius and Job, 2019; Little and Blau, 2019; Choo and Jamal, 2009). Relevant areas touched on above are explored in detail in Chapter 2.

To summarise, this thesis will assess the factors enabling or constraining a more broad-based model with hybrid tourism for the sustainable development of isolated post-conflict communities based on the findings in the preceding sections. Further, it is hoped that this will be a groundbreaking piece of research, with findings that can be adapted and replicated for the development of isolated communities whereby, the goals of sustainability are achieved for them, tourism industry participants and the environment.

1.4. Thesis structure

This thesis is made up of nine chapters. The introduction presents and discusses the contribution tourism made towards socioeconomic development since World War II, qualifies the research problem and problem statement, briefly introduces the study area and outlines the aim and objectives of this thesis. The second chapter covers my literature review across three broad themes namely land use, socioeconomic factors and hybrid tourism, to formulate the research approach to my thesis. Second, it presents the conceptual framework applied to this thesis. Chapter 3 outlines the methodological approach taken encompassing the research paradigm, research strategies, methods applied for the analytical chapters, research design and my positionality. Chapter 4 provides the context for this thesis in relation to the study area covering geopolitical, socioeconomic and tourism history.

Chapters 5,6,7 and 8 are the main analytical chapters. I have followed a standard structure for these chapters, with an introduction, the results, a discussion and a summary of findings. The fifth chapter is devoted to land use and land cover change (LULCC) analysis. It meets my first research objective and sets the foundation for the remaining chapters by analysing geospatial data over a 42-year period and a predicted land use in 2030. Chapter 6 focuses on the socioeconomic indicators from household surveys and contributes to my second research objective. The seventh chapter is devoted exclusively to a participatory scenario planning (PSP) workshop, covering results from storytelling and participatory GIS (PGIS) and presents a Three Horizons Framework. Chapter 7 contributes to all three objectives with corroboration using PGIS, socioeconomic factors and assessment of hybrid tourism. Chapter 8 analyses data using surveys of households, a tourism pilot and tourism industry participants to assess hybrid tourism and contributes to my third research objective. Chapter 9 concludes by connecting the

findings from Chapters 5, 6, 7 and 8 together and establishes that the overarching aim of my thesis has been met. Further, I present a revised conceptual framework for hybrid tourism based on my findings, the contribution my thesis makes to available knowledge, directions on future research, suggestions on immediate term steps that can be taken in the study area and a regulatory framework for hybrid tourism.



Figure 3 Photographs of natural life in Chundikulam National Park



Figure 4 Photographs taken during the poultry intervention in Puthukkudiyiruppu in 2020

2. Literature review

2.1. Introduction

The aim of this thesis was to critically assess hybrid tourism. To fulfil this aim, my objectives were to understand land use patterns, the key socioeconomic activities and their drivers that influence land use, and to assess whether hybrid tourism could influence sustainable land use practices and improve human wellbeing in Puthukudiyiruppu. The approaches and key insights in the available literature were explored in this chapter to gain insights for the approach I would take to fulfil the thesis's key objectives.

For my first objective I explored available literature on LULCC, encompassing its general applications and technical background. Thereafter, I studied its use in post-conflict regions and tourism to understand the approach taken to decide the drivers of LULCC.

To fulfil my second objective, my approach was to understand livelihoods, how they contribute to human wellbeing by fulfilling needs, and how they influence use of natural resources. Further, it was to understand the environmental factors such as climate change that connect with livelihoods and natural resources such as water and land use. Due to this approach, I endeavoured to understand what such needs for wellbeing were and how they could be measured and assessed. From an environmental perspective I strove to gather how they influence and are influenced by the drivers of fulfilling such needs.

For my third objective, since hybrid tourism is made up of other models of tourism, I explored the approach taken in research on nature tourism and agritourism. This approach was driven by a desire to have a balanced assessment of hybrid tourism. By doing so I discovered key concepts and high-level indicators to set a direction for my research approach for this thesis. I conclude this chapter with my conceptual framework.

2.2. Land use analysis

The wider literature shows that resettlement of IDPs influences land use change with urbanisation, human settlements, and agriculture. Globally, such IDPs are caused by natural and human-induced disasters, political factors, development, conflict, environment deterioration and climate change and are estimated at 33.3 million (Eweka and Olusegun, 2016; Mulugeta and Woldesemait, 2011). There are many articles on the impacts of

environment-led displacement and resettlement, typically due natural disasters such as floods and the creation of PAs (Mucherera and Spiegel, 2022; Dhakal, Nelson and Smith, 2011; Cernea and Schmidt-Soltau, 2006). Further, resettlement took place due to environmental deterioration in Ethiopia and has influenced land use change (Mulugeta and Woldesemait, 2011).

Geospatial analysis has been established as an appropriate tool for the study of LULCC with Remote Sensing (RS) and GIS (Toth and Józków, 2016; Attri, Chaudhry and Sharma, 2015). First, it enables the measurement of land use and land cover in a bounded geographic location at a particular time. Therefore, measuring such land use and land cover for the same bounded area at different points in time will permit the quantitative analysis of changes. Second, geoinformatics facilitates the classification of land use and land cover, for example into forest and urban areas (Attri et al., 2015). With this data, LULCC analysis can be applied to several classifications in two or more specific timeframes and compared. This gives researchers the opportunity to go back in time to observe topographical changes across land use and land cover classes using data from RS and GIS (Gorelick et al., 2017). Specialised tools are also used in geospatial analysis to predict future LULCC (Jayasinghe et al., 2021).

There are many recent articles that demonstrate the relevance of LULCC analysis. These include studies on government policy to increase forest cover, sustainable development, the impacts of tourism activity, urbanisation and agriculture and on fragmentation of land in a PA due to human activities (Kullo et al., 2021; Mishra, Rai and Rai, 2020; Akinyemi, 2017; Boori, Voženílek and Choudhary, 2015; Nagendra, Pareeth and Ghate, 2006). Further, there are several studies that use LULCC to illustrate the impact of economic development and agriculture on the environment, particularly cover with water, forests and wetlands (Näschen et al., 2019; Karki et al., 2018; Fonji and Taff, 2014). Its usefulness has also been established in studies on tourism including its impact on LULCC, the impacts of urbanisation, agriculture and tourism and potential of a site for tourism (Acharya et al., 2022; Roy, Mitra and Datta, 2021; How, Hasmadi and Melissa, 2020).

From a tourism perspective, studies in other parts of the world show how forests and wetlands are used for ecotourism and accrue value for the region (Farkic, Isailovic and Taylor, 2021; Lamsal et al., 2016; Sharma, Rasul and Chettri, 2015). However, natural capital must be preserved for such tourism activities to flourish, with studies showing how tourism is or could be affected when the natural environment gets compromised (Yahiya, 2012). Examples of how

land use change affects tourism and vice versa are evident in available literature. In the Maldives, urban and agricultural expansion to support tourism and a growing population has caused conversion of forest cover to shrublands. Second, expansion of tourism sites has led to loss of lagoon cover. Third, plantations and agriculture have replaced forest cover on uninhabited islands to a great extent (Fallati et al., 2017). In Nepal, major land use cover classes such as snow/glacier, forest, shrub and bare land have reduced due to climate change. Further, increases in agriculture and tourism are influencing reduction of forest cover (Gupta, 2024). In Hungary, tourism has influenced an increase in forest cover and a reduction in agriculture (Kertész, Nagy and Balázs, 2019).

These findings established the relevance of geospatial analysis for my thesis since it studies whether hybrid tourism could influence sustainable land use practices. Thereafter, in reviewing the available literature, it was important to understand the academic lenses that have been used to study land use in the context of post-conflict resettlement. The wider body of literature showed that conflict-led resettlement, like other forms of human resettlements, influences land use and cover change due to increased use of land for settlements and agriculture. Among Bosnia and Herzegovina, Burundi, El Salvador, Liberia, Rwanda and Sierra Leone, countries that faced internal conflict, most faced deforestation after the conflict ended. Further, there were several drivers of environmental change including poor land use planning, the return of IDPs, the return of farming communities and increases in natural resource extraction. These drivers in turn influenced environmental degradation due to increased demand for agricultural land, and overexploitation of forest and soil cover with unsustainable practices. Second, they influenced the increased extraction of natural resources such as biomass, fossil fuels, minerals and ores (Enaruvbe et al., 2019; Suarez, Árias-Arévalo and Martínez-Mera, 2018). In Sierra Leone, a study across two periods and six land classes before and during the war (1976 – 2000) and after the war (2003 – 2011) shows increased landscape fragmentation after the war with built-up areas, over-exploitation of forest resources and agriculture. However, wetlands remained static (Gbanie, Griffin and Thornton, 2018). In Iran, deforestation was high prior to the Iran-Iraq War and significantly higher after the war. The reasons attributed to these changes were migration to safer areas during the war and their return after it ended (Beygi Heidarlou et al., 2020). In Colombia, forest cover diminished during conflict and there is a risk of this cover diminishing further (Sánchez-Cuervo and Aide, 2013). In Syria, land use for agriculture declined during a period of conflict and bare lands expanded (Mohamed, Anders and Schneider, 2020). Conversely, in the Nagorno – Karabakh conflict

(1991 to 1994), only 17% of land used for agriculture and abandoned due to the conflict was reused after the conflict ended (Baumann et al., 2015). This shows that resettlement did not occur in the same areas despite the shorter duration of conflict.

These findings showed that LULCC analysis uses temporal scales such as the periods of conflict and peace, and the spatial scales in the geographic area of conflict. Further, socioeconomic factors are reflected with land cover change for economic gain. This is reflected in conversion of land cover with natural resources such as trees, land with minerals and ores, to land use for agriculture, urban areas and settlements. Also, there is evidence of the inclusion of wetlands and water bodies. Therefore, the technical approach taken in these studies has been geospatial analysis across specific spatial scales, temporal scales and land use and land cover classes. Further, some of these studies use predictive modelling, whereby using LULCC data for two or more specific time periods, the likelihood of LULCC in the future is predicted (Petty et al., 2012). Based on the knowledge gained from available literature, a similar technical approach was taken for my thesis. I have detailed this approach in Chapter 3.

2.3. Socioeconomic factors

The approach I took to understand how socioeconomic factors were studied in the wider literature cut through five themes. First, I reviewed the approach among studies of socioeconomic development in post-conflict regions. Second, I looked at widely accepted indices that are used to measure human wellbeing. Third, I reviewed studies that examined the social impacts rural communities face. Fourth, I explored needs hierarchy theories used to study fulfilment of human needs. Fifth, I looked at the connectors between livelihoods and the environment, and how they influence each other.

The premise for this approach was that the available research shows that maintenance of social-ecological systems is vital for long-term access to natural capital for meeting human needs. They provide ecosystem services in the form of breathable air, good quality water, soil, timber, firewood, minerals, and a range of natural resources, economic benefits, and play a role in climate regulation and soil formation (Yang et al., 2015; Petrosillo, Aretano and Zurlini, 2015; Sharma et al., 2015). These services are in turn needed by human settlements to maintain their wellbeing to meet basic and security needs, to maintain good health, and to enjoy social relations and freedom. However, an alarming factor is that major downward shifts in ecosystem services by 2050 are predicted (Alcamo et al., 2005). A key driver is

socioeconomic needs which influence unplanned land use, causes forest fragmentation and the over-extraction of water for agricultural use resulting in loss of biodiversity (How et al., 2020; Seki et al., 2018; Kehoe et al., 2017). Such land use change for livelihood development has impacts on ecosystem services for the provision of freshwater and seasonal water bodies during the dry season (Kertész et al., 2019; Karki et al., 2018). Further, unplanned use causes environmental hazards such as flooding which circles back to affecting people (Adnan et al., 2020). Based on these findings, for the research approach for this thesis, it was important to understand the key socioeconomic and environmental factors that connect with livelihood choices made to fulfil needs for human wellbeing.

There are limited studies that assess socioeconomic factors for post-conflict development, with factors selected based on a specific purpose of each study. For example, in Angola, a study examines a variety of indicators such as access to microfinance, land and housing and the nature of employment (Cain, 2007). In Liberia, the demand for extension services is assessed using variables such as age, income, experience and gender (Sumo, Ritho and Irungu, 2022). With the inclusion of tourism, CBT is explored in a study on Colombia and highlights the importance of social capital such as knowledge, training and investment (Rocca and Zielinski, 2022). These findings shed inadequate light on the approach I should adopt. Therefore, I examined several indices that are popular in measuring human wellbeing.

In this regard, a study of eleven popular indices established that none of them satisfy fundamental steps of normalisation, weighting and aggregation. These indices include the Living Planet Index, Ecological Footprint, Human Development Index, Environmental Sustainability Index (ESI), Environmental Performance Index and Wellbeing Index to name a few of them (Böhringer and Jochem, 2007). There is also ambiguity in the definition of sustainable development rendering them inappropriate, evidenced by how ranking for a specific country varies from one index to another (Parris and Kates, 2003). Sustainable development is also criticised as a Western tool to reinforce the status quo with the example of ESI which overplays 'local problems that are insignificant in a global context' (Morse and Fraser, 2005; p. 3). Moreover, most indices are either heavily weighted towards environmental parameters or inadequately cover sustainable development (Van de Kerk and Manuel, 2008). The ESI for example, has 20 indicators but its attention to human wellbeing parameters is limited (Jha and Murthy, 2003). Also, most studies use macroeconomic indicators and such indices for studying countries, not smaller study areas. However, there is an approach that

balances the spatial scales in 'The Barometer of Sustainability' which measures factors for assessing sustainable development such as human health and wealth, knowledge and culture, and access to resources such as land and water and resource depletion. Further, household wealth was assessed by taking a needs-based approach (Prescott-Allen, 1995). This finding established that I should take a similar approach for my thesis.

I then gathered knowledge on the social impacts faced by rural communities. In this regard, rural households struggle due to natural disasters and climate change impacts (Fanzo, 2017; Chanda Shimi et al., 2010). Second, they face limited access to financial capital and markets, and high transportation costs (Mgbenka, Mbah and Ezeano, 2016; Khapayi and Celliers, 2016; Saxena, 2012; Torrez, 2011). Third, they lack management and technical skills, access to extension education programs, information on and access to modern agricultural technology, land tenure, and face high cost of inputs (Mgbenka et al., 2016; Saxena, 2012). Studies also show that education is important for the wellbeing of farmers; households with a more educated head enjoy higher income and possess better management and marketing skills (Silva and Mosimane, 2013; Torrez, 2011; Apata et al., 2010). Such communities live in poverty due to inadequate income (Pujiriyani et al., 2020; Apata et al., 2010). This knowledge established that there are many needs that are unfulfilled for rural communities.

To understand a needs-based approach for my research I reviewed literature about needs hierarchy theory, a theory that categorises human needs across several categories, and uses upward and downward shifts between them as humans improve or worsen their lot to explain human wellbeing fulfilment. This theory is grounded in works by Alderfer with three need categories, Langer with two and Maslow with five. Alderfer's theory has been applied in the corporate sector and showed marked differences in the relationships across the three categories compared to the theory. Maslow's theory has been criticised for too many categories, that the higher level intellectual and aesthetic needs are not innate and that empirical testing is not possible since the fulfilment of one level of need cannot be accurately measured before the next level is attained (Kay, 2003; Neher, 1991; Wanous and Zwany, 1977). Further, it can be reasoned that it is anthropogenic since it considers human perspectives. However, it can also be contended that fulfilment of any category of needs should be consistent and could lead to striving for meeting the next level of needs. Second, growth needs which include cognitive needs, aesthetic needs, self-actualisation, and transcendence could contain subsets that are eco-centric. Third, a key finding was that

Maslow's hierarchy of needs has been the foundation for many development initiatives such as the UN MDGs. Fourth, there is a strong linkage between the satisfaction of physiological needs and adequacy of income and between deficiency needs and growth needs (Rojas, Méndez and Watkins-Fassler, 2023; Noltemeyer et al., 2012).

Thereafter, I explored Maslow's hierarchy of needs for its applicability in my thesis. In this regard, in a similar context to this thesis, this theory is applied near a national park in a study to understand the fulfilment of the basic needs of villagers (Rishi, Moghe and Upadhyay, 2008). Second, a study on tourism covers fulfilment of physiological, higher level and safety needs of the local population in the context of trade-offs with conservation in the provision of ecosystem services (Kovács et al., 2015). Third, several tourism studies have used Maslow's theory to understand fulfilment of needs from the tourist's perspective (Shahidul Islam, 2024; Yousaf, Amin and Santos, 2018; Šimková, 2014). Fourth, it has been used to understand achieving quality of life (Rojas et al., 2023; Poston, 2009; McLeod, 2007; Hagerty, 1999). However, Maslow's theory has not been used widely to understand the sustainable fulfilment of needs from the local population's perspective in tourism studies. This is despite its usage in formulating the MDGs, which in turn relates to sustainable development. Second, this thesis examined the impacts faced by the local population with climate change, lack of access to financial capital and several other factors. Based on these findings, I selected Maslow's theory as the approach to assess such impacts and fulfilment of needs.

MASLOW'S MOTIVATION MODEL

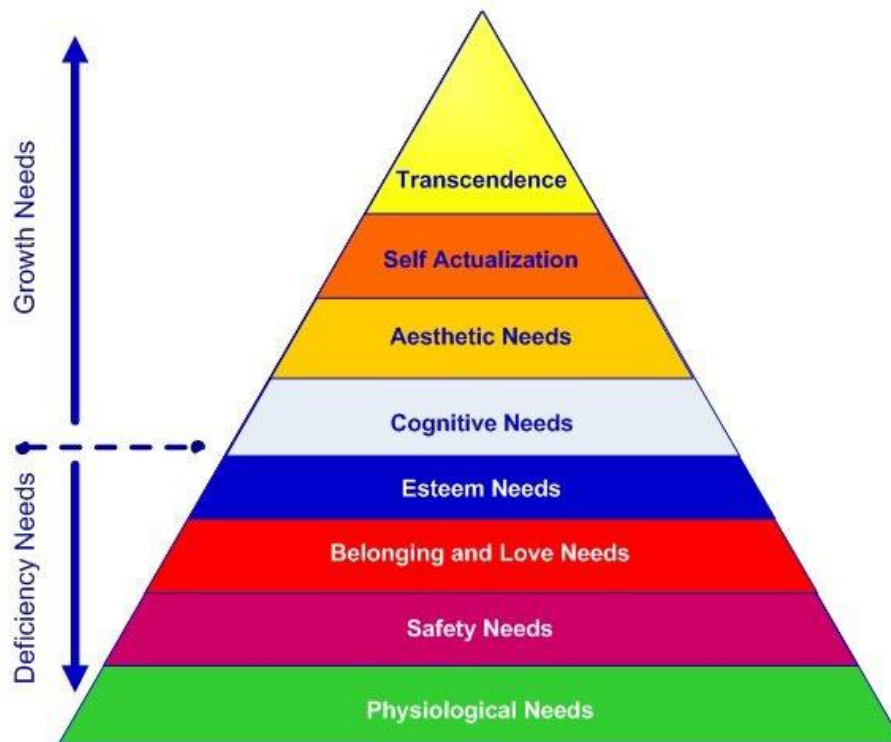


Figure 5 Maslow's hierarchy of needs (McLeod, 2007)

Basic needs

Based on Maslow's hierarchy of needs (Figure 5), fulfilling a human being's physiological needs of food, clothing and shelter is a fundamental requirement for existence (Poston, 2009). The need to fulfil physiological needs is higher among lower classes compared to the middle class (Gratton, 1980). If basic needs are not met, the local population will be apathetic towards conservation and will prioritise fulfilment of their basic needs (Bello, Lovelock and Carr, 2017; Wishitemi et al., 2015; Engel et al., 2014). These factors could also influence deforestation and loss of wildlife since human-wildlife conflicts cause economic losses such as lower harvests and loss of livestock near PAs (Karanth et al., 2012; Chambers, 1986). Therefore, the inhabitant's ability to meet basic needs by engaging in an appropriate livelihood is an important precedent towards environmental sustainability (Nagendra et al., 2006). Based on these findings, it was clear that sustainable socioeconomic value creation for the rural economy will be reflected in the long-term livelihood choices made by rural inhabitants to maintain their wellbeing and the environment. Therefore, assessing whether basic needs are being fulfilled was an important

aspect of this thesis, since inadequate value creation could cause shifts among livelihood choices, apathy towards life and conservation, and migration.

Safety and security needs

Safety and security needs are the second tier of Maslow's hierarchy. Economic stability, protection from natural elements and disasters, savings, income and access to health facilities are important factors in this tier (Badhan and Sikdar, 2025; Carius and Job, 2019; Kassa, 2018; Alderman and Yemtsov, 2014). Further, livelihood choices are an important constituent of these needs to fulfil food security (Tian et al., 2024). The need for fulfilment of safety needs was found to be higher among those from lower social classes compared to the middle class (Gratton, 1980). Further, attainment of basic needs has been shown to foster fulfilment of safety needs in the context of self-care (Acton and Malathum, 2000). From the perspective of my thesis, these findings showed the importance of understanding livelihoods in the study area to understand needs fulfilment. Second, it showed the importance of understanding income, safety nets and access to healthcare. In the context of the study area assessing access to the Employee Provident Fund (EPF) and Employee Trust Fund (ETF) became evident. Both funds are provided by the central government as a safety net with contributions from employer and employee; employees can withdraw their funds at the age of 55 (Rannan-Eliya and Eriyagama, 2003).

Since the communities in my study area are mainly agrarian, I explored farming practices as a livelihood choice, to understand what they are and how they influence and are influenced by environmental and socioeconomic factors. Farming is a dominant livelihood in isolated villages that influences land use, the environment and ecosystem provisioning services. Mechanised farming with intensive tilling, monocrops and agrochemical fertilisers and pesticides are utilised in conventional farming (Reganold, Elliott and Unger, 1987). Over-fertilisation leads to acidification of the soil, the production of harmful greenhouse gases and the nitrate contamination of water resources leading to soil degradation. Further, nitrogen fertiliser is made from natural gas, and is therefore a high user of energy, rendering it a potential cause of global warming (Carberry et al., 2013). Conventional agriculture with monocrops has caused the breakdown of linkages with ecosystems. Its popularity is attributed to vested interests such as multinational corporations that produce farm equipment and agrochemicals, and purchasing programs by governments that favour farms that use conventional agriculture as opposed to those that rotate crops (Altieri, 1998). Corroborating this, most improvements in

agriculture over the last fifty years have focused on monocropping. Intensive farming is a subset of conventional agriculture, with monocropping on large scale farms with agrochemical inputs. Yields increase substantially in intensive farming with both monocropping and multiple crops (Carberry et al., 2013). However, new cultivars are continuously introduced for monocropping since a preceding variety's resistance to disease and insects typically lasts around five to nine years. This has resulted in a levelling off and even a reduction in yields and increased usage of agrochemicals (Altieri, 1998). Further, biodiversity has been compromised by intensive farming (Kehoe et al., 2017). Therefore, both conventional and intensive agriculture cannot be called sustainable types of farming, due to the use of agrochemicals.

Conservation agriculture (CA) is defined by the FAO with three linked principles that must work together, continuous minimum mechanical soil disturbance, permanent soil cover with crop residues and crop rotation. Another emerging type with a similar approach is Eco-agriculture, with the framework suggested for it as the scale of landscape usage, "synergies among conservation, agricultural production, and rural livelihoods" (Buck et al., 2006; p 9). CA has shown positive socioeconomic outcomes in income, and land-use efficiency and lower water usage (Adu-Baffour, Daum and Birner, 2019; Bhan and Behera, 2014). However, negative impacts are evident including soil degradation, less employment opportunities, migration, less adaptability for smallholder farms with livestock which could reduce land cover (Adu-Baffour et al., 2019; Thierfelder et al., 2015; Kassam et al., 2014). Further, the fact remains that CA permits agrochemicals, and therefore causes greenhouse gases (Dendooven et al., 2012).

A key principle for organic farming and sustainable development is non-usage of synthetic chemicals in agriculture as well as in the raising of livestock (Ciolac et al., 2019; Hole et al., 2005). Therefore, the inputs for organic agriculture are fertilisers and herbicides made with natural inputs including animal waste, food waste, foliage, and plant residue. The sequestration of soil organic carbon (SOC) is crucial for maintaining soil quality since this supports active ecosystems for the provision of food and water. SOC improves with animal manure (Maltas et al., 2018; Tuomisto et al., 2012; Ramesh et al., 2010; Reganold et al., 1987). However, studies on soil quality are contentious. Soil quality has been shown to be the same in both organic and conventional farming (Hathaway-Jenkins et al., 2011). Further, yields with organic farming are shown to be less by a range of 6% to 28% compared to conventional farming resulting in higher land use (Reganold and Wachter, 2016; Tuomisto et al., 2012). Conversely, harvests have also been shown to be comparable in organic farming, with higher

vegetable yields when compared to conventional agriculture. Further, from a socioeconomic perspective, although yields are lower, income is higher due to the higher pricing commanded for organic produce and cost is lower along with lower input cost (Yadav et al., 2013; Pandey and Singh, 2012; Ramesh et al., 2010). Moreover, it provides more employment opportunities, particularly for women and has positive impacts on the environment, particularly on biodiversity (Tuck et al., 2014; Tuomisto et al., 2012; Pandey and Singh, 2012). Therefore, the concern raised over higher land use for organic farming may be a moot point.

A gradual transition to sustainable farming has been shown to occur over fifteen years where agritourism is practised (Little and Blau, 2019). Further, recent studies have stressed the importance of using organic farming in sustainable agritourism (Shen, Chang and Liu, 2020; Privitera, 2010). Factors that affect this decision in the available literature include training and experience in organic farming, technological and government support, and access to subsidies, markets and financial capital (Sapbamrer and Thammachai, 2021). Moreover, there are rudimentary factors such as access to water, pricing and the farmer's attitude towards the problems of conventional farming (Wynen and Director, 2011). Therefore, due to its relevance in sustainable tourism, assessing barriers and drivers for organic farming were relevant in the approach taken for my thesis.

Land sparing, land sharing and intensification

In land sparing, nature conservation and agriculture are segregated, with intensive farming and leaving the land fallow for five years advocated; in land sharing the same land is used for conservation and agriculture (Kremen, 2015). With intensification, agricultural production is increased by using inorganic inputs or with better resource use and without expanding usage of land. Further, expansion of croplands results in deforestation and environmental impacts whereas technology-driven intensification results in saving land (Byerlee, Stevenson and Villoria, 2014). Conversely, technologies that increase the returns to agriculture can reduce the need for subsistence-driven land clearing but could cause deforestation (Illukpitiya, 2006). Further, deforestation could increase if there are higher returns from agriculture with annual crops, and could decrease if longer-term perennial crops are planted (Abman and Carney, 2020). These findings show conflicting points of view, with some studies showing these practices could promote sustainable land use and others showing they will not. Further, they showed the importance of understanding their adoption and impacts in rural farms and prompted their inclusion in the approach to my thesis.

Finally, I explored the connectors between the environment and livelihood practices. In this regard, the available research showed the relevance of climate change impacts for my thesis. Rising temperature and oceans, increases in natural disasters and negative impacts on human activities are among the many indicators of climate change, with 76% of all disasters caused by oceanic disturbances, adverse weather conditions or climatic change. Second, CO₂ levels are increasing due to natural and anthropocentric origins, with changes to the natural environment predicted to cause changes in plant physiology; this in turn will affect agriculture (Nelson et al., 2014; Compant, Van Der Heijden and Sessitsch, 2010). Third, the warming of oceans is affecting the diversity of ocean life (Pörtner and Peck, 2010). As a result, there are negative economic impacts. These impacts are higher in poorer countries where farming and fishing are the main livelihoods (Tol, 2009). Second, climate change is affecting the manner and extent to which natural resources are being used due to changes in provisioning of ecosystem services. Third, the impacts can be differentiated according to gender, with women more affected (Thakur and Bajagain, 2019).

Fourth, climate change also impinges on cultural heritage, a needed constituent of tourism, by causing damage to sites that are important for local communities and tourism (Bosher et al., 2019; Jigyasu, 2019; O'Brien et al., 2015). The available literature has many articles with a global approach to gathering data on climate change (Abbass et al., 2022). However, first-hand knowledge gathered from locals of the changes they have observed in their natural environment can provide a far deeper understanding of climate change. Further, it can provide insights on changes in the climatic system (Little and Blau, 2019; Reyes-García et al., 2016). Based on these findings, climate change impacts from the perspectives of the environment, socioeconomic parameters and gender were assessed in my thesis.

Love and belonging needs

Love and belonging needs in Maslow's hierarchy can be thought of as social capital which plays a role in using human and natural resources through the establishment of social networks and promotes wellbeing (Wiesinger, 2007; Durston, 1998). Belonging needs facilitates connections among people in formal (such as clubs, cooperatives, and associations) and informal settings such as restaurants, pubs and walks in the park, and helps build trust and reciprocity in the community (Durston, 1998). Its fulfilment also helps build economic value among those in the network of rural villages, by people working cooperatively together, and contributes to bonding among homogenous groups (Giorgas, 2007). Belonging needs were lowest in the

middle class compared to lower classes (Gratton, 1980). In other words, people from lower income groups face a higher need for belonging. Tourism has also been shown to contribute to connectedness among residents (Wu et al., 2023). In the context of this thesis, these findings were relevant to understanding the nature and extent of leisure activities enjoyed by people in the study area.

Cognitive needs

Cognitive needs are learning needs such as formal and livelihood-related education. Rural communities have been shown to lack fulfilment of cognitive needs (Bello et al., 2017; Wishitemi et al., 2015; Manyara and Jones, 2007). Further, rural communities that do not have access to livelihood-related education are disadvantaged in the context of adoption of agriculture-related technology (Mgbenka et al., 2016; Torrez, 2011). However, rural households with a more educated head have higher per capita expenditure and better management skills (Silva and Mosimane, 2013; Apata et al., 2010). Further, people who fulfil deficiency needs have demonstrated a higher education level (Acton and Malathum, 2000). These findings showed the importance of measuring the nature and extent of access to education in the study area.

To bring about sustainability thinking, a person must progress sequentially in the hierarchy according to Smith (2011). However, this requirement to progress sequentially is contentious with studies showing it could be either non-sequential or sequential (Shi and Lin, 2021; Poston, 2009). However, studies show a linkage between fulfilment of deficiency needs (Safety needs and belonging needs) and growth needs, and the importance of self-esteem to motivate people to educate themselves (Shi and Lin, 2021; Noltemeyer et al., 2012; Ferkany, 2008). Therefore, physiological needs must be fulfilled first to progress to other needs (Noltemeyer et al., 2012; Rojas et al., 2023).

Without needs being fulfilled, the preservation of social-ecological systems is unlikely. Problems that deter this are apathy, human-wildlife conflict, use of forest resources and prioritisation of activities to meet basic needs (Bello et al., 2017; Hlaing, Kamiyama and Saito, 2017; Engel et al., 2014; Karanth et al., 2012; Chambers, 1986). In ecotourism, one such cause is that the needs of the community have not been fulfilled near PAs where it is practised (Bragagnolo et al., 2016; Wishitemi et al., 2015). Therefore, to understand whether a social-ecological system is working, we must understand both human influences on the ecosystem to

fulfil needs and the ecosystem on fulfilling human needs (Rounsevell, Robinson and Murray-Rust, 2012). Supporting this, there are examples of studies that show the linkage between the extent to which needs have been fulfilled and conserving the natural environment (Valizadeh and Bijani, 2017; Nepal and Spiteri, 2011; Rishi et al., 2008). Further, humans have growth needs which must also be fulfilled before this happens, with growth needs depending on each person's individual nature. Growth needs can be construed to be aspirations, with recent studies showing the importance of understanding aspirations in socioeconomic, agricultural and agritourism development (Mausch, Harris and Revilla Diez, 2021; Mausch et al., 2021; Verkaart, Mausch and Harris, 2018; Khamung, 2015).

The fulfilment of basic, safety and security, love and belonging and cognitive needs were important factors to be measured based on the available literature. Further, other higher levels of needs from Maslow's hierarchy were omitted due to several reasons. Initial scoping of the study area revealed that its inhabitants faced poverty, like examples from other parts of the world in the available literature. As a result, their main concern is the fulfilment of deficiency needs. Due to these factors assessing fulfilment of higher-level needs would have resulted in inaccurate and misleading results. However, cognitive needs were included since there is a formal education system in place, and there was a need for access to livelihood-related education to be assessed. Second, this thesis was limited to the relationships among livelihood choices, socioeconomic factors and the environment. Therefore, the approach taken in this thesis in the context of Maslow's hierarchy was limited to assessing the fulfilment of deficiency and cognitive needs.

2.4. Antecedents of hybrid tourism

Hybrid tourism is any one of four nexuses, as illustrated in Figure 1, with economies of scale a key requirement for the sustainability of the hybrid tourism model (Chapter 1). Several key concepts relevant to this thesis came to light in the recent literature on mass tourism, nature tourism and agritourism. Studies on nature tourism have been largely predicated on protecting the environment with linkages to a PA, after its formalisation by the International Union for Conservation of Nature (IUCN) in 1978, the announcement of the MDGs, and the launch of the SDGs (International Union for Conservation of Nature, 2025). Conversely, agritourism has been largely predicated on socioeconomic development. This has resulted in some key concepts, empirical knowledge and theories that are a common theme in tourism-led development and

research, and some that are different due to the inclusion of agritourism and hence agriculture; these key concepts are covered in section 2.4.2. Further, since hybrid tourism is a new paradigm posited by the author, its stakeholders, theories, and indicators were derived from its constituents of mass tourism and ecotourism in section 2.4.3.

2.4.1. The evolution of tourism

There was an evolution of tourism models due to changes in market behaviour over time after World War II to present day. Mass tourism was the first iteration of neoliberalism-led development after World War II, with packaged tourism for the masses with economies of scale (Wahab, and Pigram, 2005). Tourism in the 1950s through 1960s promoted modernisation with a Western way of life, and dependency with exploitation by a multinational tourism industry. Then in the 1970s and early 1980s came economic neoliberalism, with loans given by developed countries for tourism development in exchange for the recipient country opening the economy to world trade (Telfer, 2009). Next came alternative tourism in the 1980s and 1990s, with products that were not a part of mass tourism, due to its roots in dissatisfaction with negative aspects attributed to mass tourism (Butler, 1990). This was manifested in early renditions of sustainable tourism, particularly ecotourism. Ultimately came sustainable tourism, and remains one of its current iterations, a term coined in alignment with the UN MDGs and SDGs (Kumar, Kumar and Vivekadhish, 2016). From a developmental perspective mass tourism reaped financial benefits for many global destinations. Moreover, it enjoys economies of scale making it financially sustainable for the tourism enterprise and provides large scale employment opportunities, thus socioeconomic benefits (Weaver, 2001).

Based on these ideologies, mass tourism with packaged tours and economies of scale became a driver of economic growth (Wahab and Pigram, 2005). Further, tourism has been shown to spur economic growth in least developed countries (LDCs) and globally (Matthew et al., 2021; Ahmad, Menegaki and Al-Muharrami, 2020; Kumar et al., 2015; Kreishan, 2011; Dristakis, 2004). Unfortunately, the tourism industry went through a serious downturn due to the Covid pandemic in 2020 and 2021. But it has shown signs of recovery since 2022 with global tourism revenues of US\$ 1.4 trillion in 2023 and US\$ 2.0 trillion in 2024 (United Nations World Tourism Organization, 2025).

The demand for ecotourism has grown in the recent decade spurred by a growing preference for tourism that does not impact the natural environment and supports the SDGs, with three core aspects, local communities, biodiversity and tourism activities (Siregar and Selwendri, 2024). Ecotourism is an iteration of sustainable tourism that has been predominantly pursued via nature tourism (Fennell and Weaver, 2005). It is in essence enjoyment of wildlife and landscapes, and activities like hiking and mountain climbing. A PA is an area where wildlife, landscapes, and biodiversity are protected, typically by a national government, and contributes to environmental sustainability. The declaration of such PAs has been gradually rising and stands at 15% of terrestrial land and 7.8% of marine cover as of 2020 (MacKinnon et al., 2020). Nature tourism is practised in some of them in the belief that tourism revenues will facilitate conservation of natural habitats and fauna and provide an alternative income stream for the local inhabitants. However, research shows how local inhabitants are excluded from the traditional lands that they used for agrarian livelihoods. Instead, such traditional lands are taken over for parks. These parks, including their wildlife, are commoditised for attaining environmental sustainability goals, and such local inhabitants are expected to protect nature, imposing a financial burden on them. Further, this impinges on their sovereignty and on practicing their chosen livelihoods. Moreover, this pushes real estate cost up making it unobtainable for locals, causes destruction of forest ecosystems with replacement by commercial tree farms and excludes locals from participating in the benefits of tourism (West, Igoe and Brockington, 2008, Igoe and Brockington, 2007; Berlanga and Faust, 2007; Grandia, 2007).

Like nature tourism, agritourism (also called agrotourism) is an iteration of sustainable tourism. It is for the most part a more introverted approach, where visitors enjoy activities on a farm such as working with farm animals, learn about and experience planting and harvesting, and get the opportunity to stay and consume food on the farm. However, there is an element of rural tourism with villages, rural landscapes and the local community including farmers and villagers (Uğurlu, 2014). These rural landscapes with farms are as beautiful as the landscapes for nature tourism with examples including the rice paddy fields in Bali, Indonesia and the farms in Taiwan (Liang et al., 2020; Prasiasa and Widari, 2019). Further, agritourism has demonstrated the ability to foster positive socioeconomic outcomes for the rural economy in recent literature (Aoki, 2014; Eshun and Tettey, 2014; Choo and Jamal, 2009). Also, it has positive outcomes for farming livelihoods (Choenkwan et al., 2016; Mohamed Shaffril et al., 2015; Uğurlu, 2014).

There is an anti-mass position evident in framing literature on ecotourism historically (Marian, 2017; Scheyvens, 2011; Conway and Timms, 2010; Higgins-Desbiolles, 2008; Poon, 1994). This has led to a tendency to overstate mass tourism's impact on several environmental indicators including inappropriate use of land by changing its topography, overbuilding on it, polluting waterways, deforestation, destroying attractions and air pollution (Milano, Novelli and Cheer, 2019; Kuvan, 2010; Liu, 2005). Further, it has been blamed for overcrowding, sex tourism, hedonism and the deterioration of urban infrastructure (Chapman and Speake, 2011; Weaver, 2001; Teo and Chang, 1998; Doğan, 1989). However, studies show promoting any form of tourism without being aware of its impacts will not be the right approach, with the type of tourism being practised contextually relevant to when, where and how it takes place (Vainikka, 2013; Butler, 1990). Further, studies show that ecotourism has positive outcomes for environmental sustainability, but socioeconomically affects rural farmers (Kovács et al., 2015; Maekawa et al., 2013; Youdelis, 2013; Silva and Mosimane, 2013).

In this regard, the aspect of social-ecological justice is also evident in recent literature after the world faced the Covid pandemic and raised concerns about the negative social and ecological problems the pandemic caused. This is because biodiversity loss and climate change are impacting humanity, especially low-income communities (Rastegar and Ruhanen, 2023; Rastegar, Higgins-Desbiolles and Ruhanen, 2021). Concerns raised include the negative impacts faced by indigenous people due to intensifying demand for natural resources and climate change. Suggested steps in the right direction include recognising their land rights, reconciliation and socialising tourism. With this approach communities are participants in tourism which gives tourists an opportunity to understand their day-to-day struggle with social inequality (Higgins-Desbiolles, Doering and Bigby, 2021; Lee and Jamal, 2008). Despite the theoretical discourse on social-ecological justice in the available literature, there are no clear examples in the recent literature of tourism case studies linking this emerging concept. One of the main approaches is to link study findings with the SDGs (Rasoolimanesh et al., 2023). A plausible reason is that social and ecological objectives are contradictory, with environmental agendas causing social inequalities (Grossmann et al., 2022). However, as I will be exploring in section 2.4.3., limited nature tourism and agritourism research studies show how both social and environmental concerns have been addressed from the perspective of the SDGs. Therefore, I felt that a similar approach is more appropriate, and have explored the dichotomy between the two approaches in the next section.

2.4.2. The eco-centric versus the anthropocentric approach

In the context of ecotourism there are two methodological approaches evident in the available literature, those of ecocentrism and anthropocentrism (Kortenkamp and Moore, 2001). The anthropocentric approach looks at the intrinsic value of the environment for human beings whereas in the eco-centric approach there are two, the biospheric which values the environment for its own sake, and the ego-biocentric which places the human within nature (Amérigo et al., 2007). Studies on nature tourism have focused more on environmental parameters with lack of clarity or omission of socioeconomic parameters, reflecting a predominantly biospheric viewpoint which calls for the conservation of wildlife over and above anthropocentric needs (Burns, MacBeth and Moore, 2011). Further, most studies that are referred to in the ensuing paragraphs are unclear on research philosophy, especially the author's axiology (Biddle and Schafft, 2015; Sale, Lohfeld and Brazil, 2002).

Tourism has been shown to have impacts on the environment, especially in studies on land use change. Therefore, the impact on the environment is an indicator that is relevant to this thesis. Studies on nature tourism show mostly positive environmental outcomes, an eco-centric parameter, based on several examples in the available literature (Shie, 2020; Spenceley, Snyman and Rylance, 2019; Schmidt and Uriely, 2019; Carius and Job, 2019; Mondino and Beery, 2019; Swemmer, Mmethi and Twine, 2017; Xu et al., 2016; Wishitemi et al., 2015; Kovács et al., 2015; Youdelis, 2013; Silva and Mosimane, 2013; Maekawa et al., 2013). In contrast several examples from agritourism studies show lower positive outcomes (Little and Blau, 2019; Mohamed Shaffril et al., 2015; Uğurlu, 2014; Aoki, 2014; Choo and Jamal, 2009) or lack clarity on the subject (Ciolac et al., 2019; Su, Wall and Wang, 2019; Mura and Ključnikov, 2018; Marian, 2017; Choenkwan et al., 2016).

Relatedly, several nature tourism articles cover learning about the environment (Bhuiyan, Siwar and Ismail, 2016; Youdelis, 2013; Ross and Wall, 1999). Further, it is covered in studies on agritourism (Su et al., 2019; Nguyen et al., 2018). It is also reflected in other recent works (Newman et al., 2020; Prince and Ioannides, 2017; Bragagnolo et al., 2016; Ranaweera, Ranjeewa and Sugimoto, 2015). But it is not evident in articles on mass tourism. However, it is important for the person who provides the tourism experience to learn about the environment, for herself to build her capacity, and for the tourist so that he can learn from her to become more environmentally proactive (Blamey, 1997).

Studies on communities near a PA show a negative impact on livelihoods with displacement and conflicts with wildlife (Abukari and Mwalyosi, 2018; Clements et al., 2014; Bennett and Dearden, 2014; Coad et al., 2008). Also, there are studies showing resource use conflicts and poverty (Ayivor, Gordon and Ntiamoa-Baidu, 2013; Vedeld et al., 2012). In studies where ecotourism is also present in such areas, outcomes vary, with positive and negative socioeconomic and environmental outcomes (Stone and Nyaupane, 2016; Manyisa Ahebwa and van der Duim, 2013; Gurung and Seeland, 2011). In contrast, studies on agritourism consider socioeconomic parameters (Little and Blau, 2019; Uğurlu, 2014; Eshun and Tettey, 2014; Aoki, 2014; Choo and Jamal, 2009). But limited agritourism studies consider environmental parameters (Little and Blau, 2019; Mohamed Shaffril et al., 2015; Uğurlu, 2014; Aoki, 2014; Choo and Jamal, 2009).

Studies on nature tourism also lack clarity on whether there is an impact on farming, an anthropocentric parameter studied mainly in agritourism studies, as evidenced from several examples (Shie, 2020; Schmidt and Uriely, 2019; Wishitemi et al., 2015; Sarrasin, 2013; Maekawa et al., 2013). Or they show a negative impact on farming (Spenceley et al., 2019; Swemmer et al., 2017; Xu et al., 2016; Kovács et al., 2015; Youdelis, 2013; Silva and Mosimane, 2013). In contrast, many studies on agritourism show positive impacts on farming (Little and Blau, 2019; Su et al., 2019; Ciolac et al., 2019; Pangestuti, Hanum and Wahyudi, 2018; Mura and Ključnikov, 2018; Nguyen et al., 2018; Choenkwan et al., 2016; Mohamed Shaffril et al., 2015; Uğurlu, 2014; Eshun and Tettey, 2014; Aoki, 2014; Choo and Jamal, 2009).

Studies on nature tourism show a significantly lower positive impact on rural economies, an anthropocentric parameter, as shown in several articles (Schmidt and Uriely, 2019; Spenceley et al., 2019; Swemmer et al., 2017; Wishitemi et al., 2015; Kovács et al., 2015; Silva and Mosimane, 2013; Sarrasin, 2013; Maekawa et al., 2013) compared to those on agritourism (Little and Blau, 2019; Su et al., 2019; Pangestuti et al., 2018; Mura and Ključnikov, 2018; Marian, 2017; Choenkwan et al., 2016; Mohamed Shaffril et al., 2015; Uğurlu, 2014; Eshun and Tettey, 2014; Aoki, 2014; Choo and Jamal, 2009).

From the above findings first, nature tourism studies focus primarily on the impacts faced by the environment with mainly positive outcomes. Whereas, there is less evidence of the inclusion of environmental impacts in agritourism studies. Further, where included, there are lower positive outcomes for the environment. Second, both nature tourism and agritourism studies consider learning about the environment. Third, there are negative impacts on the

regional economy and the livelihoods of communities in the vicinity of PAs where nature tourism is practised. Whereas agritourism has positive impacts on these parameters. These findings show the dichotomy between the two approaches, nature tourism giving more weightage to environmental parameters and agritourism with more weightage on socioeconomic parameters.

In this regard, the study conducted in Mastatal, Costa Rica resonates with this thesis for several reasons (Little and Blau, 2019). First, using socioeconomic data it shows how agritourism can be a long-term sustainable solution for farming livelihoods and the local economy, both anthropocentric parameters. Second, it reflects a positive attitude towards ecotourism, an eco-centric parameter. Third, it shows how agritourism has contributed towards conservation of natural resources and facing climate change impacts, eco-centric and anthropogenic parameters. Fourth, it highlights how agritourism has contributed to the creation of social capital, an anthropogenic parameter. Fifth, it demonstrates how nature tourism and agritourism sites in close geographic proximity complement each other, the former offering related experiences and the latter offering farming experiences and accommodation. Sixth, it shows how there was a transition to organic farming methods over a period of fifteen years driven by agritourism. Collectively these findings show that, like what social-ecological justice espouses, both socioeconomic and environmental aspects have been sustainably achieved. The approach to studying hybrid tourism in this thesis has been similarly conceptualised encompassing both aspects. In other words, my thesis encompasses the dimensions of anthropocentricity and biospheric ecocentrism.

2.4.3. The stakeholders of hybrid tourism

Stakeholder engagement is a vital component of researching tourism development (Byrd, 2007; Bramwell and Lane, 2000). These stakeholders are the tourism industry, the government, the host environment and the host community (Timur and Getz, 2009; Byrd, 2007). My approach was to review several articles on agritourism and nature tourism to understand parameters covered in each, whether they are studied in both approaches, and if so, whether they are adequately captured. Further, a recent bibliometric study of sustainable rural tourism research showed that the key aspects assessed included its relationship to the environment, its impacts on rural communities, culture and its sustainability, community behaviour and resilience, social relationships, sustainable development, livelihoods, heritage

sites and local knowledge. This study showed the importance of considering social, natural and geographical perspectives in my approach to this thesis (Geng et al., 2025).

The rural villager

The local inhabitant is the primary stakeholder to evaluate hybrid tourism, with her acceptance and participation required for its long-term sustainability. In this regard there are several areas that came to light in the available literature on the approach taken to assess their acceptance and participation.

Community acceptance

Familiarity of the community with ecotourism is a factor that is visible in the available literature (Oviedo-García et al., 2017). There are studies that reflect inadequate familiarity. In a study covering several sites in Nigeria most respondents were unfamiliar with ecotourism (Ogunjinmi and Braimoh, 2018). Further, in a synthesis of ecotourism studies encompassing 38 destinations in Indonesia, the local community was not adequately familiar with ecotourism and its potential benefits (Kia, 2021). In a study in Ethiopia, most respondents were unfamiliar with tourism (Abuhay, Teshome and Mulu, 2023).

The recent articles on nature tourism have also measured acceptance by the community or attitude towards tourism. Results are diverse with most studies unclear on the subject. In a few studies a positive attitude towards nature tourism is shown (Carius and Job, 2019; Bhuiyan et al., 2016; Youdelis, 2013). In some, results are mixed or negative (Schmidt and Uriely, 2019; Mondino and Beery, 2019). In contrast, looking at agritourism through the same lens, several articles have measured community acceptance and presented outcomes that are largely positive (Ciolac et al., 2019; Little and Blau, 2019; Su et al., 2019; Pangestuti et al., 2018; Choenkwan et al., 2016; Uğurlu, 2014; Eshun and Tettey, 2014; Aoki, 2014; Choo and Jamal, 2009). There is lack of clarity and mixed results in a few (Mura and Ključnikov, 2018; Nguyen et al., 2018; Marian, 2017; Mohamed Shaffril et al., 2015).

Recent studies on community acceptance of mass tourism show varying results with low as well as high acceptance (Garau-Vadell, Gutierrez-Taño and Diaz-Armas, 2018; Lai and Hitchcock, 2017). Further, community acceptance is higher when perceived socioeconomic benefits are higher (Garau-Vadell et al., 2018; Gursoy, Chi and Dyer, 2010). The same outcomes can be seen in nature tourism studies. Where there was a positive impact on the

rural economy community acceptance was also positive in nature tourism (Shie, 2020; Carius and Job, 2019; Bhuiyan et al., 2016; Youdelis, 2013). This is also true in agritourism studies (Ciolac et al., 2019; Little and Blau, 2019; Su et al., 2019; Pangestuti et al., 2018; Choenkwan et al., 2016; Uğurlu, 2014; Eshun and Tettey, 2014; Aoki, 2014; Choo and Jamal, 2009). Therefore, measuring community awareness of tourism and acceptance in the context of socioeconomic development, with the provision of tourism goods and services, are important factors that were relevant to this research.

Collectivism versus individualism in tourism

Related to community acceptance, assessment of collectivism, the disposition to work together, is evident in recent studies on nature tourism. As one study shows, villagers must join nature conservancy groups to participate in socioeconomic benefits. However, despite evidence of accrual of such benefits over time, most inhabitants do not join due to the impact conservation has on their traditional livelihoods such as farming, with animal populations increasing over time and destroying their cultivation (Silva and Mosimane, 2013). Supporting this, collective community-based systems must fulfil basic needs such as food, clothing, and shelter, if not individuals will not be willing participants in conservation of the environment (Wishitemi et al., 2015). However, in the recent literature on nature tourism, there was limited evidence of a positive impact on sociocultural outcomes (Shie, 2020). Further, where collectivism in agritourism is concerned, examples of articles reflecting the same assumption, that a community-based approach is appropriate, are limited; most articles were silent on this approach (Ciolac et al., 2019; Eshun and Tettey, 2014).

Integrated Conservation and Development Projects (ICDP) is an overarching vehicle for such interventions for collective participation, with community-based enterprises (CBE), community-based conservation (CBC) and Community-based tourism (CBT) seen as subsets of ICDP (Bauch, Sills and Pattanayak, 2014). In all of them, the community members are owners of the initiative and participate in its revenues. In CBC the community participates in conservation, in some cases for tourism, in exchange for incentives paid by landowners and provision of training and development (Galvin et al., 2018). Similarly, the community participates in the provision of goods and services related to tourism in CBT. However, although poverty alleviation is expounded within the context of conservation using ICDP, poverty levels are shown as high as 70% across Kenya in areas where tourism activities are high, and significantly lower in areas where agriculture is practised (Manyara and Jones, 2007;

Hunter, 1997). Further, CBC is predicated on livelihoods that protect the environment, with a transformation of existing traditional livelihoods expected (Bauch et al., 2014; Coria and Calfucura, 2012). However, there is inadequacy of scale to combat poverty for entire communities (Goodwin, 2008; Manyara and Jones, 2007). Therefore, transforming livelihoods for their betterment will be meaningless unless the inhabitants benefit sustainably from the transformation, thus encouraging them to adopt such livelihoods. As an example, a recent study in Zanzibar, Tanzania on nature tourism shows a positive impact on a rural economy due to fair revenue sharing and adequate economies of scale. The main livelihood choice is farming with farmers groups that encourage their members to save money in a common fund and support them with financing (Carius and Job, 2019). Supporting this, in an aggregate study of 116 initiatives in CBT considered to have a positive impact according to investors, development workers and conservationists, fifteen met criteria to be called community-based, and only six were economically sustainable (Goodwin and Santilli, 2009). As elaborated above, CBT, ICDP and CBC have mainly been used in a nature tourism setting. Therefore, assessing the propensity of inhabitants to work collectively in provisioning for tourism was relevant to the purpose of this thesis.

Provision of goods, services, and experiences for tourism

In many of the articles on CBT with agriculture, the provision of goods and services for tourism is a common theme, including accommodation, food, experiences of farming activities, provision of tourism services and local cultural heritage (Ciolac et al., 2019; Little and Blau, 2019; Khamung, 2015; Phillip, Hunter and Blackstock, 2010; Choo and Jamal, 2009). The importance of local food prepared based on the area's cultural heritage is also evident (Derek, 2021; Robinson, 2021).

The sociocultural dimension largely addresses the "ability to fit in" (Ward and Kennedy, 1999; p. 660). In other words, this dimension includes acquiring cultural skills appropriate for the immediate environment to be a part of a host environment made up of other members. This has both tangible elements such as buildings and clothing, and intangible elements such as music, language, dance, religion, folklore, art forms, traditional knowledge, gastronomical traditions, social relations, rituals, hunting methods, and ceremonies (Ismail et al., 2014; Timothy, 2014). Further, recent studies show the importance of the ability to practise one's own culture to facilitate symbolic post-conflict healing (Giblin, 2014). Moreover, it is an important element of tourism, with the UN World Tourism Organisation (WTO) predicting that

cultural heritage tourism will be among the top five categories in the future, and can foster revival of traditional practises and restoration of historic artefacts (Ismail et al., 2014). Limited articles on nature tourism mention positive sociocultural impacts or show mixed sociocultural outcomes (Shie, 2020; Bhuiyan et al., 2016; Sarrasin, 2013; Youdelis, 2013). Further, most articles are unclear on the subject (Mondino and Beery, 2019; Schmidt and Uriely, 2019; Swemmer et al., 2017; Kovács et al., 2015; Sarrasin, 2013; Coria and Calfucura, 2012; Butcher, 2011). However, agritourism has largely demonstrated positive sociocultural outcomes in the recent literature (Little and Blau, 2019; Choenkwan et al., 2016; Mohamed Shaffril et al., 2015; Uğurlu, 2014; Choo and Jamal, 2009). Further, recent studies showed that a positive impact on this parameter produced a positive attitude towards tourism and growth in tourism (Ciolac et al., 2019; Little and Blau, 2019; Bhuiyan et al., 2016; Choo and Jamal, 2009). Therefore, assessing livelihoods and provision of goods and services rooted in cultural heritage that could potentially feed into tourism resonated with the purpose of this thesis.

The tourist and the tourism industry

The tourist is the second main stakeholder, whose level of satisfaction, resulting opinion and spending power contribute to the income of the other stakeholders in tourism (Correia, Kozak and Ferradeira, 2013; Schmallegger and Carson, 2008). Further, the industry has become highly segmented, with some segments opting solely for ecotourism products. Whichever the segment, the indicators tourists consider include the accommodation, the food and hospitality, the accessibility, attractions and tourist activities (Castellano et al., 2020; Hermawan and Wijayanti, 2019; Rajaratnam et al., 2014; Torres-Sovero et al., 2012).

The stakeholders in the tourism industry are the hospitality service providers including destination marketing companies (DMCs), hotels and travel agents that bring tourists into a destination as well as transport, entertainment and activity providers (March and Wilkinson, 2009; Sheehan, Ritchie and Hudson, 2007). Further, tourism stakeholders potentially include local government bodies, local businesses, and the local community. DMCs offer local services such as the provision of transport and tour guides in the destination and have relationships with hotels in the area, the city, travel agents and tourists. Thus, they provide the linkage among the goods and services needed by tourists.

The government's role in rural development

The government is an important stakeholder both at national and regional levels in formulating agrarian policies and in facilitating rural development. Government policies that support farmers for agrarian sustainability with reform in the redistribution of land and access to credit, technologies, health, education and social security are needed for farmers' wellbeing (Guzmán, González de Molina and Alonso, 2011; Torrez, 2011; Cousins, 2010; De Janvry et al., 2002). An aggregate study of 74 countries shows that democracy-led governments give better support to farmers (Olper and Raimondi, 2013). Illustrating this, a regime sensitive towards the nation's social needs in Brazil fostered positive land reform and growth in its agricultural sector from 2003 to 2010, but a subsequent regime change reversed the positive changes (Sauer, 2019). However, while land and agrarian reforms are important for poverty alleviation, such reforms could potentially increase class inequalities (Jacobs, 2013). Illustrating this, studies show how state-led land reform and regulation changes led to wealth redistribution, but with ownership largely shifting to large enterprises and government policies and state institutions providing inadequate support for small farmers. Ultimately, such changes as well as a range of government policies such as macroeconomic policies, subsidies and environmental regulations have impacts on rural livelihoods (Spoor, 2012; Sunding and Zilberman, 2001).

Giving land rights, a subset of government policy related to land reform, refers to the rights of the people in the local community to own land or to use public land. Further, in some situations it is the right to pass through a land to access another locality, for example through a beach to access the sea. There are many examples in the available literature of how, in the interest of development, indigenous people lose such rights or get evicted, are taken advantage of after natural disasters and are unable to buy land when commercial usage makes it unaffordable (Biddulph, 2015; Robinson and Jarvie, 2008; Manyara and Jones, 2007; Neumann, 1997). There is limited evidence of land rights being studied among the recent articles on nature tourism (Carius and Job, 2019). However, it is very evident in many articles on ecotourism that it is a serious problem (Milano et al., 2019; Dwyer, 2015; Daly, 1990; Crick, 1989).

Government role in tourism

The extent to which national government policies on tourism, in particular nature tourism, were shaped by local history, NGOs and international alliances is evident in the recent

literature (Forje, Tchamba and Eno-Nku, 2021). In Argentina, it had origins in the 1930s based on sites of 'patriotic' significance, followed by infrastructure development such as roads, railways and transport, and ultimately conservation via national parks and nature tourism (Piglia, 2011). Further, in the USA the national park has its origins in the nineteenth century, with the establishment of the Yosemite and Yellowstone National Parks.

In most countries with rich biodiversity such as tropical forests and wildlife, the PA for the purpose of nature conservation has been the precedent to nature tourism. Accordingly, with nature tourism, livelihood development to cater to tourism is an expected outcome for inhabitants to fulfil their wellbeing needs (Forje et al., 2021). The local and national governments and international bodies such as NGOs work together to lay down regulations in tourism destinations that are for socioeconomic, environmental and political outcomes (Roxas, Rivera and Gutierrez, 2020; Luo and Zhang, 2014). Further, several UN agencies and international environmental NGOs are engaged in promoting conservation and ecotourism including the IUCN, the WTO, the World Bank and the Worldwide Fund for Nature, with the SDGs being used as the connector for the agencies to work in unison (Neumann, 1997). There are over 100,000 PAs globally due to IUCN influence in over 150 countries (Gannon et al., 2019). Conservation with a PA and tourism have been promoted hand in hand with the same premise, and is evident in ecotourism deployed across the globe in hundreds of locations including Ethiopia, South Africa, West Africa, Malaysia, China and Brazil (Sanchez, 2018; Masud et al., 2017; Pegas and Castley, 2014; Wang et al., 2014; Satyanarayana et al., 2012; Chaminuka et al., 2012; Fetene, Bekele and Tiwari, 2012).

These findings showed that the key stakeholders for tourism-led development are the rural inhabitants, the tourists and the tourism industry. Their opinion on hybrid tourism to assess its veracity in sustainable development was an important factor to consider in my approach to this thesis. Further, the government plays a key role facilitating rural development. In this regard, it was important to assess the role it plays in tourism and in rural development in the approach I took.

2.5. The conceptual framework

The purpose of this thesis was to measure how hybrid tourism can influence sustainable land use practices. Further, it examined what the existing land use practices are and how these are influenced by the needs of the people in Puthukkudiyiruppu. Therefore, land use was selected

as the dependent variable. Further, as shown in this chapter, there are several socioeconomic and environmental indicators as well as other variables that influence land use practices. These have been used as the independent variables feeding into land use and influencing changes.

The conceptual framework used in this study fulfilled two requirements. First, it captured the needs of the individual from an anthropocentric perspective; except for the study by (Kovács et al., 2015), most articles on nature tourism are not indicative of such an approach. Further, most of the articles on nature tourism show there is an impact on farmers, whereas agritourism reflected mostly positive outcomes for them. Second, the conceptual framework considered environmental factors from an eco-centric perspective, particularly the perceptions of the community on sustainable change with alternative farming practices and hybrid tourism. In this regard, agritourism reflects mostly positive outcomes from an anthropogenic perspective and lacks clarity from an eco-centric point of view.

Based on this requirement, the key concepts and indicators in this chapter, and other key themes in the introduction, the conceptual framework is shown in Figure 6. In this conceptual framework land use (the dependent variable) is influenced by livelihood practices and as an alternative, hybrid tourism. Several independent variables influence livelihood practices to fulfil needs. First, assessing existing livelihoods and the extent to which they fulfil these needs will provide knowledge on what the status quo is and why it is being maintained. Second, assessing perceptions of alternatives with hybrid tourism and its connected livelihoods will provide knowledge on how these can influence an alternative development path and influence sustainable land use.

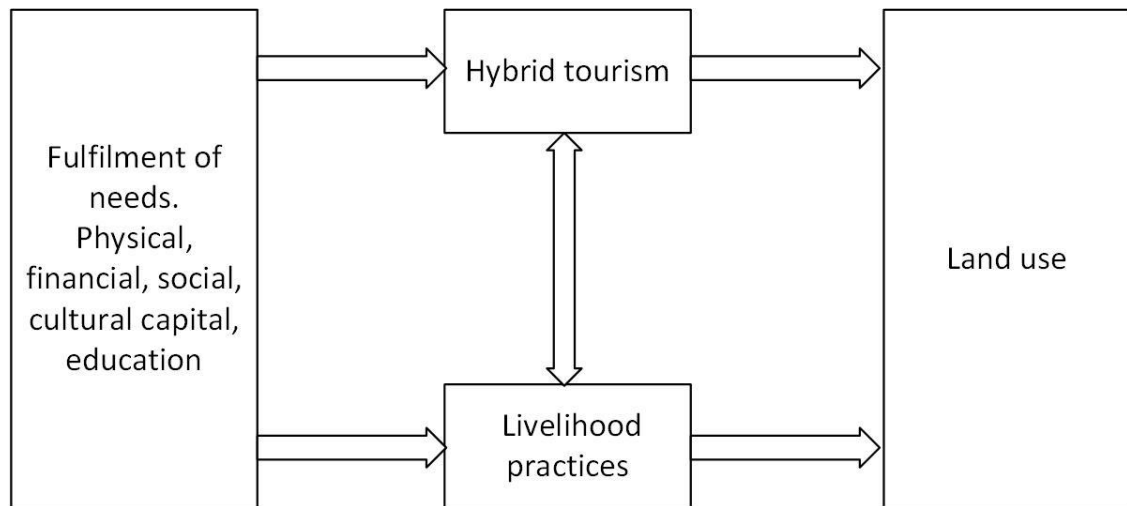


Figure 6 Conceptual framework applied for this thesis.

2.6. Summary

In sum, the approach I took based on findings from the available literature are first, I established the approach I would take to analyse land use and land cover prior to, during and after the conflict. Second, I decided to assess socioeconomic factors using Maslow's hierarchy of needs where usage warrants it, and environmental factors to achieve my second objective. Third, my approach to assess hybrid tourism, to meet my third objective, was to understand the perspectives of the local inhabitant, the tourist and the tourism industry. Further, I considered the role the government plays according to these key cohorts. Fourth, I developed the conceptual framework for my thesis in which the dependent variable is land use. In the next chapter, I will explain the methodology I used, which was based on my literature review, to achieve my three objectives.

3. Methodology

3.1. Introduction

This introduction presents the methodology adopted for this thesis covering my philosophy, approach to theory development, methodological choice and methods used to achieve my three key objectives outlined in my introduction. My positionality in deciding my approach to data collection is also covered in this chapter.

3.2. Philosophy and approach

The research paradigm is the set of theories and practices encompassing ontology, epistemology, methodology and methods within which research is undertaken (Scotland, 2012). In this regard I adopted a pragmatic epistemology, the philosophical framework within which I undertook my research. The reasons for this decision were first, my research aim was unambiguously clear, to understand whether hybrid tourism could be used to influence sustainable land use practices by improving wellbeing (Saunders, Lewis and Thornhill, 2019). Second, the region is of high interest to me as detailed in my worldview and positionality (see further below). Third, it was my hope that the research outcomes could be used meaningfully in the region. Not taking the appropriate approach would have defeated my purpose (Tashakkori and Teddlie, 2010; Tashakkori and Teddlie, 1998).

The fulfilment of needs is covered extensively in this thesis in the context of human wellbeing. Further, hybrid tourism is evaluated using knowledge from multiple resources. With subjective ontology, the nature of reality would be determined by the research participants as opposed to key concepts bearing a clear definition with clear plausible outcomes. Further, with subjectivism the nature of reality is in flux. This would have skewed outcomes since what individuals consider to be happy varies constantly, and happiness, vis-à-vis wellbeing, is an abstract concept. Due to these reservations I decided to adopt an objectivist ontological framework and to define key concepts (Saunders et al., 2019; MacLeod, 2015).

In arriving at this decision to use an objective pragmatic approach, I considered several other philosophical approaches in a process of elimination. Constructivism takes a bottom-up approach whereby the respondents' points of view are considered to develop subjective interpretations with reflexivity (Kaushik and Walsh, 2019; Sultana, 2007). However,

constructivism was not considered, since this thesis has limited subjective interpretations. Positivism looks at the world as external and objective, the researcher as independent, data as objective, and expects the researcher to reduce findings to their simplest components and to test them with hypotheses (O'Leary, 2004; Yefimov, 2004). Positivism has been used in many tourism studies (Stergiou and Airey, 2011; Wilson, Harris and Small, 2008; Botterill, 2001; Riley and Love, 2000; Decrop, 1999). However, such studies are largely qualitative, whereas this thesis has quantitative, semi-quantitative and qualitative datasets. Positivism would have been relevant only to my geospatial analysis which relies on numeric data. Further, positivism has been criticised for its inapplicability in social science research, which is qualitative, subjective, narrative-based and phenomenological (Mura and Sharif, 2017; Bowen, 2001; Goles and Hirschheim, 2000). Since this thesis also has narrative-based qualitative data, positivism was eliminated for this thesis's epistemology.

Interpretivism disassociates from the experience to maintain objectivity and reflects extreme dependence on the viewpoint of the insider with disregard for the influence of external factors (Guba and Lincoln, 1994; Schwandt, 1994). However, human behaviour sits on the scale between passive and active, with movement either way depending on individual, economic and social factors (Howe, 1992). Interpretivism has been used by some tourism researchers while many have used either qualitative or quantitative paradigms (Botterill, 2001). Therefore, a principle of interpretivism, which holds that human nature is determined by only how humans perceive themselves, is also applicable in this research. However, I did not consider interpretivism due to its disregard for external factors that I felt influence behaviour in the study area. Post-positivism is in essence an anti-positivist paradigm, with a combination of positivism and interpretivism (Panhwar, Ansari and Shah, 2017; Petter and Gallivan, 2004). Here again, post-positivism was rejected since I had already eliminated interpretivism.

In this regard, pragmatism as an epistemological philosophy accommodates the integration of subjective and objective data from multiple sources (Al-Ababneh, 2020). However, it has been criticised due to pragmatic researchers potentially overlooking the influence of their values (Maarouf, 2019). To mitigate this criticism I considered axiology, my worldview and values, which is detailed further below. Further, I decided that my analytical approach should be abductive. To reach this decision I first examined an inductive approach, whereby field data would be analysed to identify patterns and draw conclusions. This fitted well with the methods I have employed in this thesis, which were predominantly the collection of quantitative, and

semi-quantitative data. This meant that I could enumerate my data for analysis to a great extent. Second, I considered a deductive approach. Existing research related to tourism has given me a general idea of the positive and negative impacts from the different kinds of tourism that make up hybrid tourism (Chapter 2). I needed to understand the impacts hybrid tourism could have on sustainably developing a rural economy, with the knowledge that its constituents partially contribute to such impacts. Therefore, I decided that both inductive and deductive approaches were needed for my thesis and took an abductive approach to develop my theories (Melnikovas, 2018).

Since I had to play the role of researcher in a region where I was also involved as an investor and benefactor, I carefully contemplated my positionality and worldview. I also considered my working background. I am of Indian Tamil origin, a citizen of Sri Lanka, (a former British colony for nearly 150 years), lived mainly in the capital city Colombo during my formative years, was raised as a Christian and educated in a Catholic school as well as overseas, with no direct experiences in the Northern Province during my formative years (Wijewardena and Yapa, 1998). However, as a Tamil, I experienced firsthand the July '83 riots, with looters threatening my family home when I was a teenager, which made me acutely aware of issues minority communities such as my community faces.

I have for many decades, from young adulthood to present day, been engaged in businesses involved in manufacturing. Due to this I tend to be objective by making pragmatic decisions based on hard facts and figures. Further, I entered the Northern Province as soon as it became accessible after the conflict ended in 2009 with a desire to provide opportunities for a region coming out of thirty years of civil conflict and disruption. It was the same pragmatic approach from my work life that influenced me to start commercial ventures to create employment and to provide free education in the Northern Province. This effort began in Vavuniya in 2010, with the setting up of a free education centre to teach Sinhala language, English language, and Information Technology (Gnanam Education Trust, 2022). Thereafter, I made over 70 visits to Jaffna covering 900 kilometres by road on each round trip over ten years whereby several sites for a hotel, an agritourism project and related infrastructure were identified. With this came the commencement of a hotel, agritourism and agriculture in Jaffna, Northern Province, Sri Lanka from 2016 (Thinnai Group, 2024).

In 2019, my brother and I established a non-profit centre (Samuel Gnanam IT Centre, 2023) to teach software to young university graduates and to provide them with industry linkages. In

2021, I opened a second education centre in Jaffna, with more facilities to teach English, Sinhala, Information Technology, foreign languages, and the Northern Province Tourism Board License course. These centres provided their services free of charge and created a public awareness of engagement in charitable acts. Further, with these acts came a growing awareness of the difficulties people in this region face compared to other parts of the island, especially rural communities subjected to resettlement after war.

This led to a visit to some isolated resettlement villages in Puthukkudiyiruppu, Mullaitivu in March 2020, followed by outgrowing with ten farmers for organic poultry under a buyback agreement. What was gathered from their conversations during this visit was that they do not get to sell all that they cultivate, they do not get a fair price, and they have limited access to financial capital and markets. The reasons for this were many; among them, wholesalers buy from farmers closer to the main road rather than those in the interior. Second, due to their dependence on subsistence income, they face situations where immediate needs force them to sell at a low price, even at 5% of the retail price. Third, microfinance and other unscrupulous lenders give them loans at exorbitant interest rates with informal offers to buy back their produce but cheat them instead (Kadirgamar, 2017). This was the inspiration to study the bigger picture, as to whether and how meaningful sustainable development with tourism can be brought to such villages.

Four factors arose as to why my positionality could potentially affect the efficacy of my research. First, I am of Indian Tamil origin from Colombo, a large city, which is neither the same ethnicity nor origin as the respondents, who are mainly of local rural origin from the Northern Province and from other places of Sri Lanka due to displacement. Further, there are significant dialectal differences between spoken Indian Tamil and the Tamil in the Northern Province. Second, from a sociocultural and socioeconomic perspective, mine significantly differed from those in the cohorts. Most respondents were from poor backgrounds and were Hindu. Third, the household survey instruments were created in English and translated into Tamil. This process, if done incorrectly, could have caused misunderstandings and affected the quality of the answers. Fourth, I have a desire to influence positive socioeconomic change in the region and have ongoing involvement in related interventions for this purpose. I would have been considered a potential benefactor, and this would have influenced answers. Ultimately, these factors could have potentially strongly influenced responses to surveys, particularly the questions on socioeconomic status and interventions.

To mitigate these factors, I worked with CCH throughout the entire process, from reviewing household surveys, to identifying respondents and carrying out the household surveys. CCH has been deeply involved in the Northern Province since 2010 (after the conflict ended), with psychosocial engagement to help resettled villagers deal with post-conflict trauma and to assist them to build livelihoods. Due to their historic engagement in the region, the villagers considered CCH representatives to be insiders, and their familiarity with them was clearly visible during fieldwork. Also, the CCH team always included female research assistants since the household cohort had many female respondents. This approach proved particularly useful in minimising subjectivity and mitigating the potential pitfall of being considered a potential benefactor and skewing field data. Further, as an added precaution, I maintained the position of being an outsider, since shifting to that of an insider would have been impossible due to social differences and my historic and ongoing engagement in the region (Berger, 2015).

I mitigated the third factor related to language, by having surveys created in English translated into dialectal Tamil by CCH, thus avoiding potential errors that could have occurred with direct translation. Further, CCH participated in all interactions with the village households, an approach that ensured the correct Tamil dialect was used. Also, I mitigated the fourth factor of being viewed as a potential benefactor, by ensuring the CCH representative made it clear that the research being conducted was related to this thesis, not for any other purpose at the beginning of each engagement with respondents. Further, we were mindful that the communities interviewed had been affected by extended periods of conflict with many of their members having lost kith and kin. Questions that could potentially trigger emotional disturbance were avoided.

3.3. Choices

As a final step I selected mixed methods as the choice for my methodological approach. The use of mixed-methods for research has grown significantly since the turn of the century, with its recent use in tourism increasing (Truong, Xiaoming Liu and Yu, 2020; Khoo-Lattimore, Mura and Yung, 2019; Biddle and Schafft, 2015). Further, a mixed-method paradigm rooted in pragmatism has been successfully used in a research project on tourism (Pansiri, 2006).

With mixed methods, both quantitative and qualitative data are collected in a single study. This collection could occur simultaneously or sequentially in a specific order if required. Further, it involves the integration of data (Tashakkori and Teddlie, 2003). Second, it is a useful

choice for answering complex questions rooted in qualitative and quantitative studies (Johnson and Onwuegbuzie, 2004). Third, triangulation is an advantage of mixed methods whereby the same phenomenon is studied using two or more sources of data (Turner, Cardinal and Burton, 2017). Further, mixed methods resolve the “epistemological differences between qualitative and quantitative paradigms” with a premise that using triangulation would help establish the efficacy of the research (Symonds and Gorard, 2010; Decrop, 1999; p.3). In this regard, triangulation was highly related to this thesis, since several datasets with overlapping or similar questions were used to achieve this. For example, the LULCC analysis quantitatively established changes in land use over time and predicted land use and land cover for 2030. Using PGIS gave an opportunity for triangulation by obtaining a local perspective on why changes occurred or will occur. Similarly, a question as to whether hybrid tourism is appropriate for sustainable socioeconomic development was asked from multiple cohorts. In a process of elimination, I also evaluated mono-method and multi-method approaches. Mono-method, as the term implies, is a single method approach, either quantitative or qualitative (Hassard and Pym, 2012). With multi-method, several methods are used to measure the same phenomenon (Natoli, 2019). However, multi-method is appropriate for use with either qualitative or quantitative data, and there is ambiguity in this approach as to which data is suited (Saunders et al., 2019; Ahmed and Sil, 2012). Both approaches were inappropriate, since both types of data were produced in my research across several data sources. Therefore, I selected mixed methods as an appropriate choice for conducting my research.

Mixed methods approaches have been criticised based on an underlying philosophy of pragmatism, particularly for not defining research methods clearly (Hall, 2013). In this regard, it has been criticised for a deficiency in axiology by permitting the researcher’s values to influence research methods (Biddle and Schafft, 2015). Further, in a systematic literature review of its use in tourism studies, epistemological, ontological and axiological stances have largely not been declared (Khoo-Lattimore et al., 2019). Second, it has been criticised for its underlying assumptions in the context of such researchers selecting any method that suits them, without choosing one appropriate for the philosophy. Third, it has been criticised for not addressing the differing assumptions among qualitative and quantitative paradigms (Biddle and Schafft, 2015; Sale et al., 2002).

However, I became aware of the ways in which the diverse perspectives among researchers on the different models of tourism influenced their methods. Nature tourism studies were unclear

on or omitted socioeconomic parameters. Whereas agritourism studies were unclear or omitted environmental parameters (Section 2.4.2.). Based on this awareness, and having adopted a pragmatic philosophy, I ensured my methods were defined clearly and captured multiple perspectives. Second, as shown in section 3.2., I analysed my positionality and worldview and took appropriate mitigatory steps. Third, I wanted my research outcomes to be useful for society, and taking an inappropriate approach would have defeated my purpose. Fourth, since my philosophy is pragmatism, mixed methods was the most appropriate for considering both quantitative and qualitative data across multiple datasets (Maarouf, 2019; Biddle and Schafft, 2015; Hall, 2013).

3.4. Methods

I used several methods to collect information to achieve the three objectives of this thesis including geospatial analysis, survey instruments, a PSP workshop, key informant interviews and focus group discussions. These methods are detailed in the ensuing sections.

3.4.1. Geospatial analysis

I applied analysis of LULCC and relevant household data as the primary method to contribute towards answering my first research question on land use change. For the LULCC, I got assistance from Dr Pavithra Jayasinghe, an expert in this field. I gathered an understanding of the techniques used from Dr Jayasinghe and desktop research to ensure I had knowledge to analyse the geospatial data.

In this regard, we used GIS data from Landsat images to classify land use across ten land classes to produce LULCC over a 42-year period between 1979 and 2020. Further, we used data from 2010 and 2020 to predict LULCC in 2030. I included related questions in the household surveys (section 3.4.2.) to understand the social and environmental drivers of land use change. I also used the maps produced from the methods elaborated in this section in the PSP workshop (section 3.4.5.) to engage participants in a participatory mapping exercise. Moreover, I used this approach to triangulate findings from the LULCC analysis (Chapter 5).

The Northern Province is composed of five districts, Jaffna peninsula being the largest (Northern quadrant), Mannar (South-Western quadrant), Kilinochchi (Central quadrant),

Vavuniya (Southern quadrant) and Mullaitivu (Eastern quadrant) (Figure 7). The study area Puthukkudiyiruppu is in the Mullaitivu district as depicted in Figure 8.

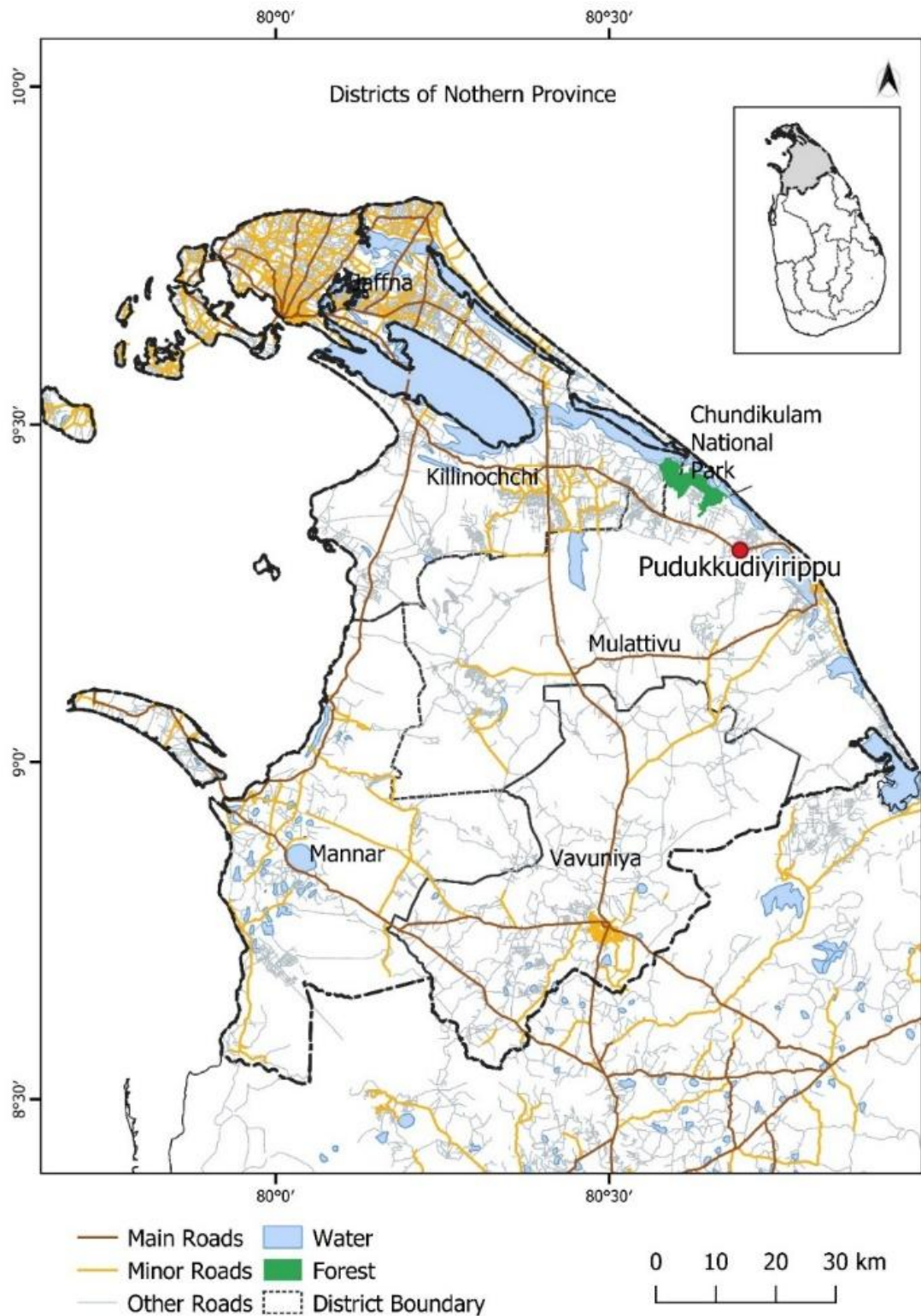


Figure 7 Map of the Northern part of Sri Lanka showing the key districts in the Northern Province, namely Jaffna, Killinochchi, Mannar, Mullaitivu and Vavuniya.

Mullaitivu is a district that was created in 1978 and covers an area of 269,300 Ha. It had a population of 92,200 in 2012 which grew to 137,511 in 2019. The population density is 34.24

per square kilometre. Puthukkudiyiruppu is the second largest among Mullaitivu's main divisions with a population of 41,139.

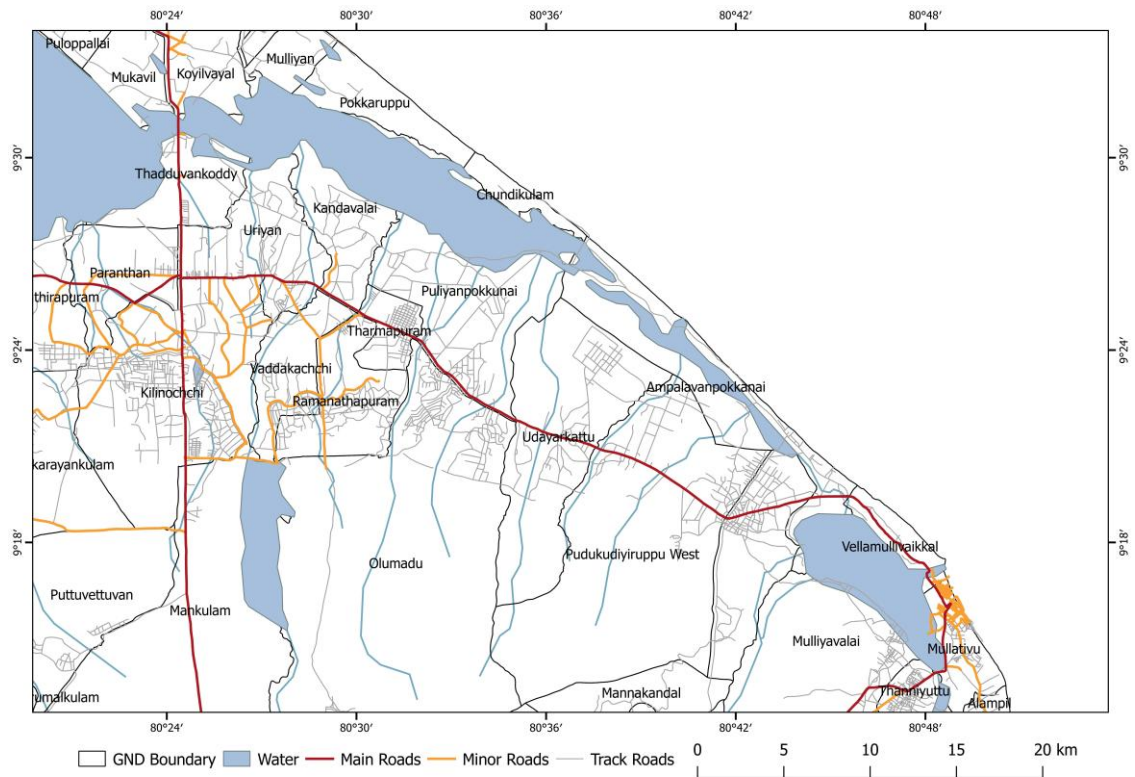


Figure 8 Map of the geospatial study area Puthukkudiyiruppu.

The landscape in Puthukkudiyiruppu is a mixture of large extents of forest land, cleared areas dotted with settlements that have home gardens with palm trees and vegetables, paddy fields, soil, vegetable gardens and bushes. The cleared areas are noticeably dry and parched during the dry season and green and lush during the monsoons. The area is populated by post-conflict settlements, urban townships and farmers engaging mainly in rice paddy, fruit, coconut, vegetables, and livestock. It is also home to palm tree varieties, particularly palmyra, endemic to the Northern province, and coconut trees, a palm variety that is predominant in most parts of the country's lowlands. The area abuts the ocean, with 70 km of coastline, where the main livelihood is fishing. The region is in the dry zone and has the lowest rainfall in the country (Villholth and Rajasooriyar, 2010). It is dependent on monsoon rains, with an average rainfall of 1340 mm and the inter-monsoon average rainfall reaching 650 mm during the North-East monsoon (Piratheeparajah, 2015). The temperature ranges from 28 to 34 C (Selvananthan et al., 2023).

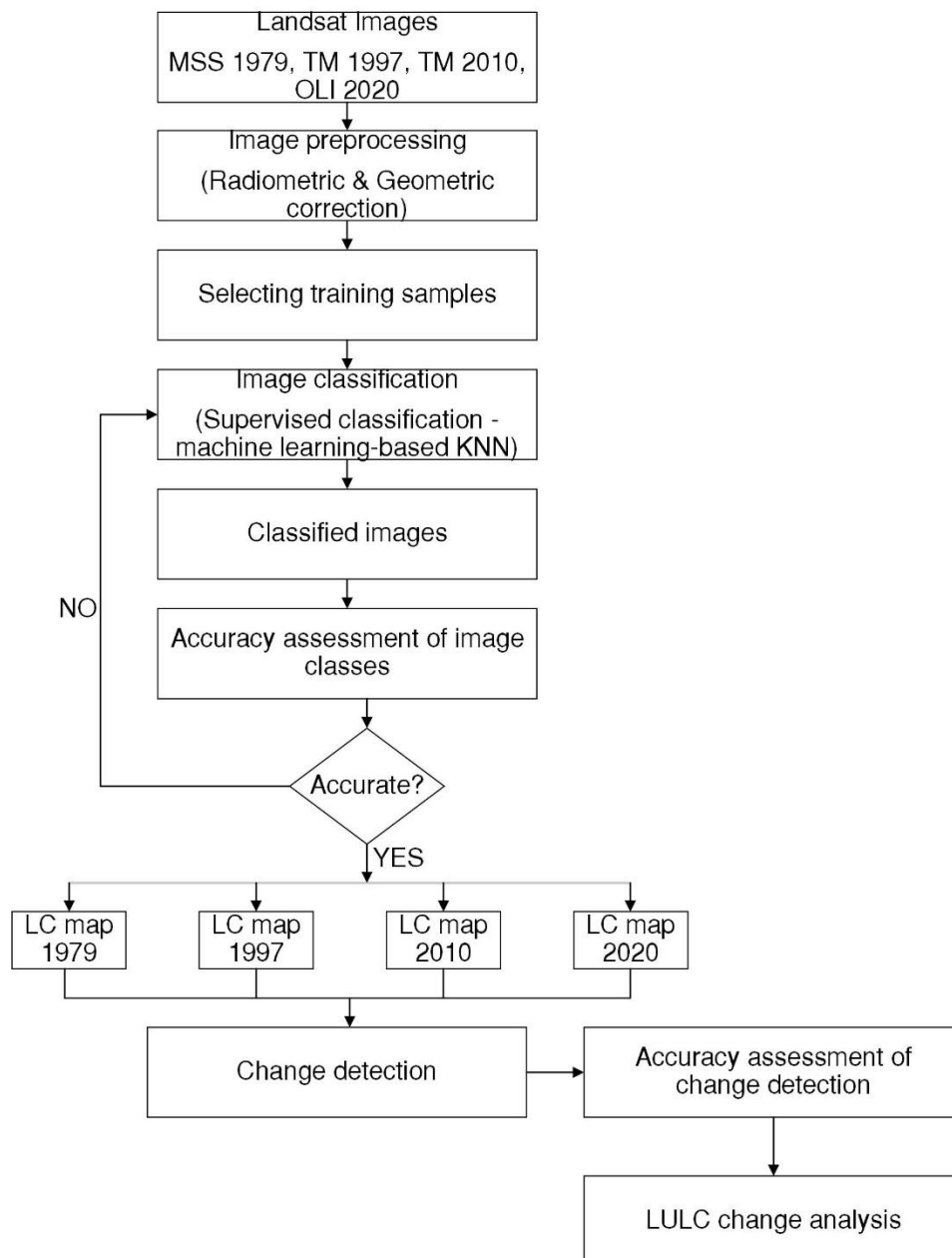


Figure 9 Flowchart of key steps taken representing the method applied for classification of satellite data in the preparation of the LULCC maps.

Table 1 Sensors, date acquired and sun elevation for remote sensing.

Year	Sensor	Date acquired	Sun elevation
1979	Landsat 3 Multispectral scanner (MSS)	1979-10-04	54.30237101
1997	Landsat 5 Thematic mapper (TM)	1997-05-30	55.87671112
2010	Landsat 5 Thematic mapper (TM)	2010-06-03	60.28365331
2020	Landsat 8 Operational land imager (OLI)	2020-10-04	63.76779675

The key steps that were taken to prepare geospatial maps over time are shown in Figure 9. We used ArcGIS for data preprocessing, preparation, geoprocessing and data handling. We accessed and downloaded Landsat images with remote sensing using the multispectral scanner (MSS), thematic mapper (TM) and the operational land imager (OLI) with RS as shown in table 1 (Toth and Józków, 2016). The periods for which images were remote sensed were the years 1979, 1997, 2010 and 2020.

We then classified these images using the methods maximum likelihood (ML), random forest (RF) and k-nearest neighbour (KNN) using the machine learning module in GRASS-GIS (Thanh Noi and Kappas, 2018). The Geographic Resources Support Analysis System (GRASS) is an open-source geographic information system (Neteler et al., 2008). To evaluate the performance of each method, we assessed accuracy using Kappa statistics and selected the best classification technique. Since KNN outperformed ML and RF in the land cover classification for the 2020 map with a Kappa value of 91.6%, we generated land cover maps for 1979, 1997 and 2010 using this technique. We digitised and used a minimum of 100 training samples for each class in the classification. Thereafter, we visually inspected the initially

classified land cover maps by carefully and rigorously comparing them with the original and Google Earth images. After identifying prominent land cover classes, we carried out classification to derive the ten selected land cover classes namely, water, forest, rice paddy, settlements, built-up, soil, palm, wetland, other vegetation, and salt pans and generated land use and land cover maps for the selected periods (Table 2).

Table 2 Land use and land cover classes.

Land use and land cover classes	Description of classes
Forest	Areas where evergreen trees grow naturally.
Water bodies	Inland freshwater bodies including rivers and lakes.
Rice paddy	Land used for rice paddy cultivation.
Settlements	Land occupied by settlements. This was differentiated from use for built-up areas based on the scattered nature of settlements and how this was reflected in the image data as opposed to more dense area coverage of image data for built-up areas.
Built-up	Areas which are more densely covered by built elements indicative of townships and larger structures.
Soil	Bare land without vegetation cover.
Palm	Palmyra trees, coconut trees and other palm tree varieties.
Wetland	“Areas of marsh, fen, peat land, or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish, or salty, including areas of marine water the depth of which at low tide does not exceed six meters” (Hu, Niu and Chen, 2017; p2).

Other vegetation	Shrubs, chena cultivation with small crops (Sandika and Withana, 2010) and smaller vegetation that did not fall under palm, forest, and rice paddy.
Saltpan	Land where there are salt pans.

With change detection the class of pixel data points which represent the topography can be measured at two different points in time. This will show the transformation between these two points in time (such as forest cover transformed to use for agriculture) and can be quantified and analysed (Attri et al., 2015). We analysed classified land use and land cover maps and generated change detection maps using GRASS-GIS for the selected time spans to determine which classes went through significant transformation. The time steps we selected during the period for this study of 42 years were wide enough to show changes and trends in LULCC. QGIS is a geographic information system software that is free and open source that supports viewing, editing, printing and analysis of geospatial data in a range of data formats. We used the Module for Land Use Change Simulations (MOLUSCE), a plugin for QGIS, to prepare the change detection maps (Kamaraj and Rangarajan, 2022; Jayasinghe et al., 2021).

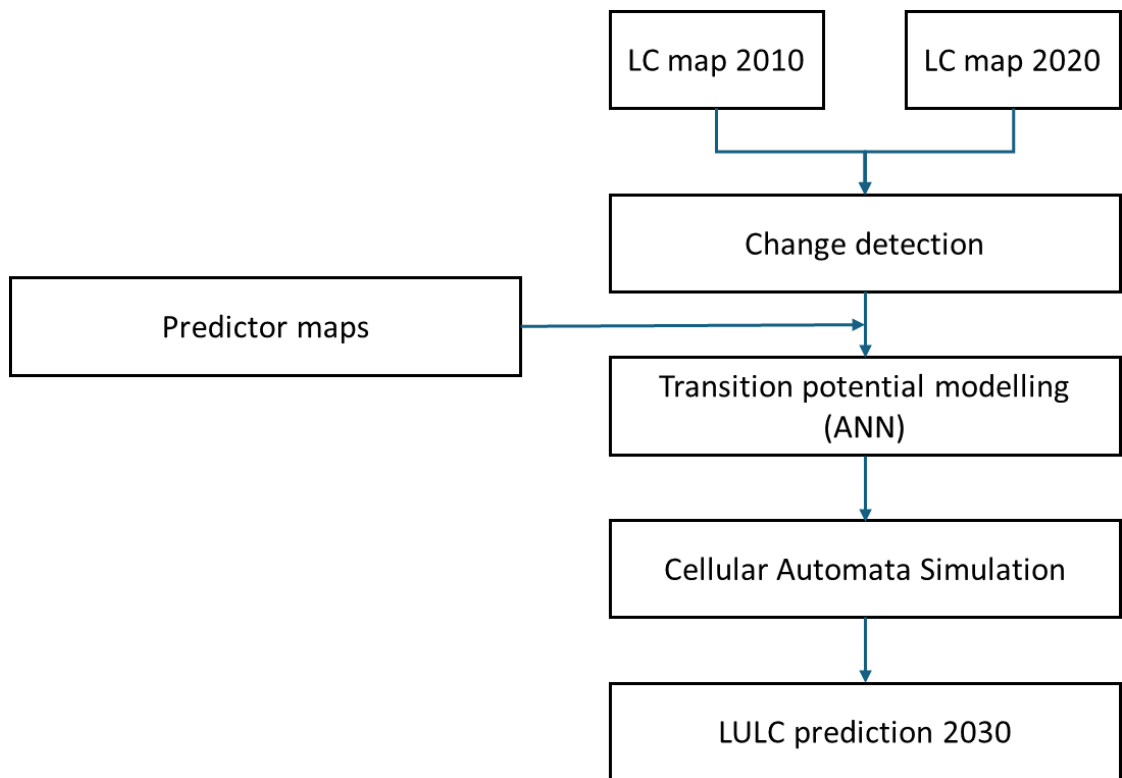


Figure 10 Flowchart of steps taken to prepare change detection and predictive geospatial maps.

We observed a significant upward trend in land use for settlements, rice paddy and built-up areas with a reduction in soil, wetlands and other vegetation between 1997 and 2020. Due to this we decided to prepare a predictive map for 2030 to assess how continued land use into the future would impact land cover change (Petty et al., 2012). For this purpose, we used the MOLUSCE plugin since it also facilitates predictive modelling. MOLUSCE is based on Cellular Automata and Artificial Neural Network and provides a platform for simulating future land use and land cover using historical data and explanatory variables as input (Basse et al., 2014). Initially, the model is applied to a known period for validation purposes. Following successful validation, the model is then applied to predict future LULCC with the expectation of achieving similar performance as observed during validation. 2030 was selected to align the results with the year targeted by the UN for achieving the SDGs (Diaz-Sarachaga, Jato-Espino and Castro-Fresno, 2018). In this study, we first utilised the plugin to predict land use and land cover for 2020 using data from 1997 and 2010. Alongside these maps, we gathered a set of potential explanatory variables, including distance to roads, water bodies, proximity to existing town centres, environmentally sensitive areas, population density, road density, and slope. Subsequently, we used the plugin to calculate transition probabilities from one land cover class to another over the specified period. These probabilities are crucial in understanding the

likelihood of changes occurring between different land cover types based on the identified explanatory variables. Achieving 93% accuracy during validation, we subsequently employed the model to forecast the land use and land cover for 2030 using land use and land cover maps from 2010 and 2020 as input data. The key steps taken to prepare the predictive map for 2030 is shown in Figure 10.

3.4.2. Household surveys

I undertook household surveys in four villages of Puthukkudiyiruppu, namely Suthanthirapuram, Thevipuram, Theravil and Vallipuram with the head of household as well as spouses using survey instruments (See Appendices). I selected this approach of using semi-qualitative survey instruments for households, (as well as local tourists and the tourism industry participants as detailed in sections 3.4.3., and 3.4.4.), based on the same approach in available studies on nature tourism and agritourism (Jitpakdee et al., 2025; Little and Blau, 2019; Choo and Jamal, 2009). Further, this approach facilitates gathering detailed information with multiple data collection methods. However, key weaknesses are the use of open-ended qualitative questions which could lead to misrepresenting results, researcher's subjectivity and whether findings can be generalised (Mwita, 2022). To mitigate these weaknesses, particularly for the household surveys for which there was a significant amount of data to be collected, I initially conducted a pilot survey with twenty households. This helped me to refine my survey instrument and reduce open-ended questions by incorporating responses that were a common theme into other questions. Moreover, most of my survey instruments used semi-quantitative scalar questions. Second, I reduced the risk of researchers' subjectivity with this approach, as well as my philosophy and approach as explained in section 3.2. By taking these mitigatory steps, I was confident my results could be generalised to be applicable to the entire study area.

I analysed results from household surveys to contribute to my second research objective of studying the socioeconomic drivers of land use change and my third of assessing hybrid tourism as a potential vehicle for sustainable development and land use. The results are detailed and discussed in Chapters 6 and 8. For this purpose, I framed relevant questions to gather information that could be analysed with Maslow's hierarchy of needs. For this purpose, as a first step, I included questions for key demographic data encompassing gender, age and marital status of primary respondents and the gender and age of spouses.

Second, I included questions on income covering the quantum, the main income earner in the household and whether primary respondents and spouses are employed by others, self-employed or unemployed. Further, I included their nature of employment, whether contribution is made to a state-sponsored safety net is available, whether their income is adequate to meet basic needs, whether they have the required skills for the job and the number of years practising their chosen livelihood. These questions are related to safety and security needs.

Third, Chapter 6 assesses what goes unfulfilled due to inadequate income. For this the questions I asked were 1) "What do you end up missing due to inadequate income?", 2) "to what extent do you feel you have adequate income to meet your basic needs such as food, clothing and shelter?", and 3) "to what extent do you feel you have adequate income to enjoy additional needs you have from time to time such as buying something special for yourself, pursuing a hobby or going on a holiday?". I used the term 'additional needs' for this purpose instead of 'growth needs,' to simplify the question. Further, to understand whether they have safety nets to mitigate shortfalls in income during shocks, I included questions to determine access to savings and insurance. Finally, they were asked "do you feel your children will be interested in continuing your livelihood?" I asked this question since, if the parent was not happy with his or her chosen livelihood, he or she would not wish it for their child (ren). These questions are related to safety and security needs.

Fourth, this chapter discusses to what extent basic needs such as food, clothing and shelter are met. To capture this, I included questions on the nature of their shelter encompassing the number of rooms, the materials used and whether the house has a toilet. To gain a deeper understanding, I asked questions as to whether the house is completed, and if not, the causes of delay, how long it is being built, whether it was financed, how much was borrowed, and whether they are dependent on income to complete it. Further, the things that go unfulfilled must be understood when they borrow for their homes. For this, the question I asked was "what goes unfulfilled due to loan payments?" Their perception on how nutritious they felt their meals were and whether they felt they led a healthy life were included by me to understand the extent of their food security. These questions are related to basic as well as safety and security needs.

Fifth, I included questions to understand whether safety needs were being met regarding access to health facilities including perceptions on affordability and access to specialised

treatments and the occurrence of conflicts within the community. Sixth, to understand whether love and belonging needs were being met, I included questions encompassing leisure activities, time spent on them and freedom to enjoy their cultural practices. Seventh, I asked questions on their children covering their perceptions on the cost of educating them, the reasonableness of the cost and their level of satisfaction. As a key exercise to rank several responses I asked the question “As a parent how would you rank the options below if they were available to your children?”

Eighth, I included questions covering the livelihood practiced, the farming method practised, whether chemical-based fertilisers and herbicides are used and whether the farm is for commercial purposes, subsistence income or both. Further, I included questions on the barriers to adapting organic farming were included to understand why if at all conventional farming is practised. Intensification, organic farming, land sparing and land sharing were explained and the likelihood of adopting these practices was asked. In this regard, a key question I asked was “based on the four farming practices above, would you be more likely to adopt any of them if you earn adequate income from your other cultivation or livestock?” Finally, I included questions on the extent to which households have access to markets and the market difficulties they face. These questions are related to safety and security needs.

Ninth, I included questions to understand the social impacts on the environment, the impacts of climate change and on provision of ecosystem services. These covered the source and quality of water and the source of firewood. Moreover, to understand the respondents’ perceptions of biodiversity changes, I included questions on whether they have observed deforestation, soil erosion and loss of wildlife species. In addition, to understand the impacts of climate change I added several questions on changes in crop cycles. These included what the number of cycles were before, whether there is an increase or decrease, the reasons for it and the number of years they have been inconsistent. Further, I included questions on their familiarity with climate change and its impact on farming output. These questions are related to safety and security needs.

Tenth, I included questions related to education, livelihood training and livelihood needs covering their education level, and whether they have received training in their chosen livelihood to understand fulfilment of cognitive needs. Eleventh, to understand whether livelihood needs were being fulfilled, I included questions on whether they have access to technical assistance, livelihood capital such as technologies, buildings and tools and financial

capital for their livelihood development. Here again, to understand the impact of repaying loans, the question I asked was “what did you give up due to loan repayments?” These questions are related to safety and security needs.

Twelfth, I included questions on land ownership, efficiency of land use and challenges faced to using their land efficiently. To understand the role the government plays in helping respondents use their lands efficiently, I asked the question “how satisfied are you with the government or any other national body coming up with alternative solutions for such problems?”. Further, I asked “how conveniently are you able to access other government services such as education, welfare, livelihood assistance and protection?” These questions are related to safety and security needs.

To contribute to achieving my third research objective as to whether hybrid tourism can become a pathway for sustainable development, I included questions related to tourism in the household surveys. The same questions were asked from primary respondents and spouses.

To understand willingness to adapt tourism, I included questions on the respondents’ likelihood to learn and become providers of activities related to nature tourism, agritourism and hybrid tourism. For this purpose, each type was orally and visually communicated. Then for each of the three types of tourism, respondents were asked to what extent they felt that they would enhance their wellbeing. Finally, respondents were asked whether these types of tourism would be suited for Puthukkudiyiruppu.

Second, to understand adoption of tourism-related livelihoods, I included questions on the respondents’ likelihood to take part in tourism as a livelihood choice, and which of several services such as being a guide, providing a place to stay and providing cultural performances respondents would undertake. Further, I included questions to assess to what extent respondents felt they would be able to cooperate with other villagers to offer tourism experiences to understand willingness to work together in CBT.

Finally, respondents were asked questions linking hybrid tourism with the environment and sustainable livelihoods. I included questions as to what extent respondents felt hybrid tourism would help them better coexist with the environment, and to what extent hybrid tourism would encourage them to take on sustainable methods of farming such as organic, intensive, land sparing and land sharing. Finally, I included questions for respondents to rank which type

of tourism among nature, agritourism and hybrid tourism would suit them based on the geographic area, livelihoods and culture.

3.4.3. Tourist surveys

To contribute to achieving my third research objective, to assess whether hybrid tourism can become a pathway for sustainable development, two pilot tourist groups composed of 22 people travelled from the Western Province, Sri Lanka in November 2019 and January 2020. The aim of using pilot groups was to understand their perceptions in the context of experiences with nexus four of hybrid tourism (Figure 1) whereby mass tourism and agritourism are combined. Participants were transported by train or bus and stayed two nights at The Thinnai, Jaffna, Sri Lanka. In the evening of the first day, participants visited Thinnai Organic, a sustainable agritourism site, and a presentation was made on sustainable farming activities. On the second day, the participants visited farms in Puthukkudiyiruppu. Participants planted and irrigated the seedlings on the farmers' land for two hours.

Following this, we surveyed participants via email after they returned home. First, I asked which province they came from and how convenient it was to travel to Jaffna. Convenience was polled since among main tourism destinations, the Northern Province takes the longest to get to from Colombo. Second, hybrid tourism was described to them, and I asked them to what extent this would encourage farmers to adapt organic farming methods. I also asked to what extent they felt hybrid tourism would promote sustainable practices. Next, I asked whether they would go if hybrid tourism were available in the same destination and how much more likely they are likely to go if there was a beautiful beach nearby.

Third, I asked them whether they are familiar with the SDGs, how important they thought they are for development, whether people would embrace environmental goals, socioeconomic goals or both and which of these goals should be the starting point of economic development. I also asked them whether they practice habits that are sustainable and what they are. Finally, I asked them their level of satisfaction with the overall experience.

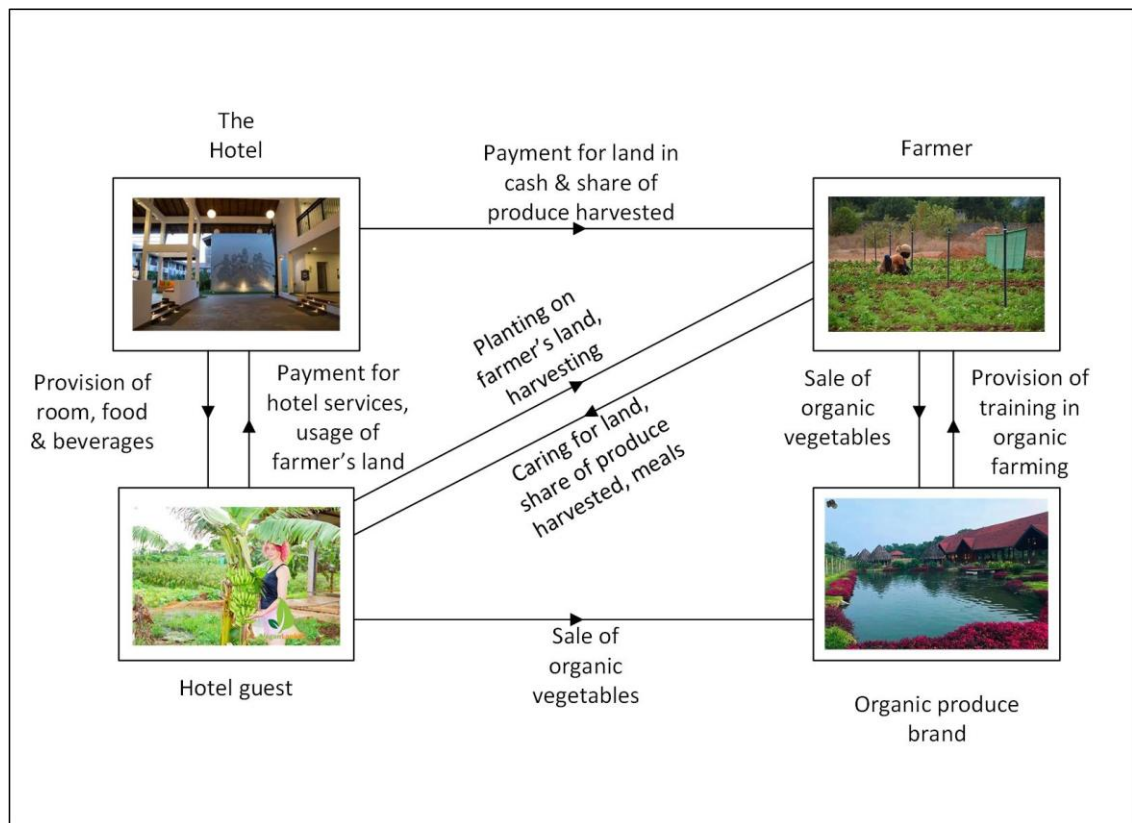


Figure 11 Conceptual model of hybrid tourism with mass tourism and agritourism.

3.4.4. Tourism industry interviews

To contribute to my third objective as to whether hybrid tourism can achieve sustainable development in the study area, I conducted interviews with tourism industry stakeholders. Interviews were conducted by sharing a survey form and ten of them responded. I conducted these interviews between November 2023 and March 2024.

I asked questions on which tourism products the respondents offered, years of experience in the industry and whether respondents get adequate ecotourism visitors to sustain their businesses. Second, I asked respondents to what extent they were familiar with the Northern Province, and to what extent respondents promote tourism and ecotourism in the Northern Province and in other parts of Sri Lanka. Third, to understand perceptions of hybrid tourism, I asked respondents to what extent they felt hybrid tourism would promote sustainable practices and encourage sustainable agriculture to improve human-nature relationships. Fourth, to understand commitment to sustainable practices, I asked whether they have sustainability goals in their vision, whether they felt this is important for the country, to what

extent respondents work with rural villages to provide tourism products and services and to what extent respondents have observed any changes in sustainable practices in such villages. In this context I also asked respondents whether rural people are more likely to embrace environmental goals, socioeconomic goals, or both.

Fifth, I asked whether they felt people living on subsistence income would embrace environmental goals. Further, I asked questions about the participant's policies on capacity building including whether they have a policy to recruit locally, what they do to build capacities among local communities, what they do to provide livelihood opportunities to local communities and what they do to educate such communities in new technologies related to ecotourism, agriculture and sustainability.

Sixth, I asked "what checks and balances are in place to regulate the hospitality industry in terms of monitoring and enforcing sustainability goals?" Then, I asked whether they play a role in protecting and regulating national parks and reserves and whether they play a role in promoting agroforestry. Next, I asked questions about the key challenges they face in implementing conservation and sustainability objectives and the main external barriers are to implementing them. Finally, I asked them what changes they would like to see by 2030 and by 2063.

3.4.5. Participatory scenario planning workshop

I conducted a two-day workshop from 27-28 February 2023 at the Thinnai Organic, Jaffna, Northern Province Sri Lanka to envision futures related to hybrid tourism. Participatory scenarios, participatory mapping and the Three Horizons Framework were used to elicit qualitative and semi-quantitative feedback from participants (Sharpe et al., 2016).

A core organising team with Dr Jessica Thorn, T. Mayuran Director of CCH and myself held a series of online meetings to plan this workshop. We broadly agreed on a workflow using narratives and participative groupwork and was followed in the workshop. The design had ten steps as shown in the workflow (Figure 12). Scenario construction aims to engage multiple stakeholders participatively in thinking about the future, and their feedback on desirable and undesirable states were used (van Notten et al. 2003). The workflow we designed was based on the works of several research articles (Schaal et al., 2023; Thorn et al., 2021; Sharpe et al., 2016)

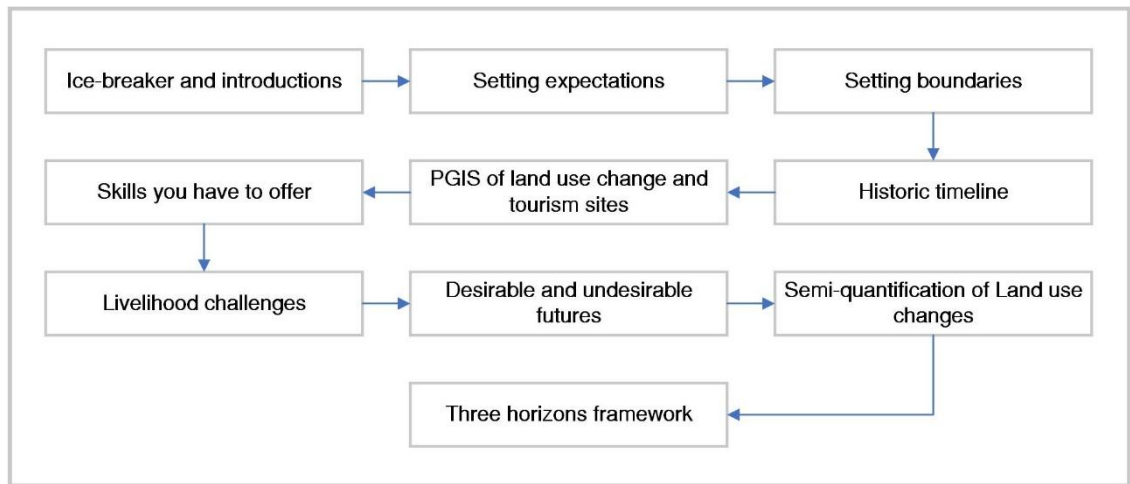


Figure 12 Flowchart for the workshop.

The workshop commenced with an icebreaker session and self-introductions. For this purpose, we threw a stuffed toy from one person to the next to introduce ourselves and to create a convivial atmosphere. Also, we used the opportunity presented during breaks for food and drinks to speak with participants which facilitated openness in the participation. We introduced participants to scenario planning and how it is applied in different countries in diverse sectors. We obtained oral and written consent from all participants, and recordings as well as written content were retained including those from individual groups. We gathered expectations from the participants with notes on post its and clustered them.



Figure 13 Photographs of group work (L) and presentations (R) made during workshop

Then in a boundary setting exercise participants jointly identified their understanding of hybrid tourism with nature tourism and agritourism (van Notten et al., 2003). Participants decided if the scenarios were normative or explorative, the goal of the scenarios, and the spatial and temporal scale of the scenarios. Further, participants set the workshop's aims, who would be

the end users of its findings and how these findings would be communicated. Participants then decided on the temporal scope of the scenarios (e.g., the year in the future participants would look at) and the justification for this selection (Thorn et al., 2021; Folke et al., 2010).

Following this, in a storytelling exercise, we divided participants into four groups and each group worked independently on producing and presenting their personal stories. Storytelling is a popular tool used for PSP workshops and has been extensively used in environmental and social-ecological studies (Liguori et al., 2021; Lowery et al., 2020; Oteros-Rozas et al., 2015). In this process, imagination plays a key role in envisioning futures (Moore and Milkoreit, 2020; Milkoreit, 2017). We employed an inductive bottom-up approach whereby stories were dissected to elicit local understandings on the past and the present, and to construct plausible futures (Bowman et al., 2013). This approach provided a useful method to draw on multiple viewpoints of the status quo and imagination for the future to infuse positive systems change (Schaal et al., 2023; Pigott, 2018). It furthermore helped individuals to speak freely about their experiences and offered a deeper understanding of complexity (Amer, Daim and Jetter, 2013; Bowman et al., 2013).

Participants then identified the skills that they have to offer for their livelihoods. We clustered skills under nature, agriculture, cultural sites, livestock, fishing, employment, and home-based tourism. Thereafter, participants identified livelihood challenges, such as transportation, psychosocial wellbeing, climate change, gender, and land related challenges. Additionally, participants identified key assets such as tools and technology, infrastructure facilities, local and international markets, capital and financial facilities, vocational training, and education. This was followed by participants identifying normative desirable futures using a clustering and ranking exercise.

We then conducted an exercise in participatory mapping using LULCC maps and data from Chapter 5 to explore drivers of topographic changes that took place over the three periods 1979-1997, 1997-2010, 2010-2020. Participants provided their perspectives on the drivers of change in the three maps including where and why these changes occurred. They also identified potential sites that are suitable or unsuitable for tourism. This method allowed for triangulation, i.e., corroboration of knowledge from other sources, and gaining context and issue-based local knowledge, instead of quantitative, solely technical knowledge using spatial information (Brown et al., 2017; Dunn, 2007; Craig and Elwood, 1998). For the next exercise in semi-quantification of land use change, we divided participants into three groups – each

reflecting on the scale at which different drivers of change might be felt across Puthukkudiyiruppu by 2030. We gave each group a map of the area, and an associated table with predicted changes by 2030 across ten land classes. We tasked participants to identify where they believed LULCC would occur, what would drive the land transformation, to indicate the extent of change, and the likelihood of occurrence of each change (high, medium, low) by 2030 according to maintaining the status, incremental change and transformative change.

Using insights from the preceding segments of the workshop, we then generated three narrative-driven storylines to understand the drivers of the existing status quo and envision how hybrid tourism could foster positive systems of incremental and transformative change. In this regard, future scenarios help envision future changes that can influence positive systemic changes to improve a social-ecological system whose constituents are not working cohesively together (Hodgson and Midgley, 2014). We aimed to understand how various constituents would make decisions to formulate strategies to regain equilibrium. We developed the Three Horizons Framework with the contribution of participants to answer the questions listed in Table 3 (Sharpe et al., 2016). The answers were written by the participants on post it notes and placed on the framework during the workshop. I subsequently digitised the framework.

Table 3 Overarching questions used to prepare the Three Horizons Framework adapted from (Sharpe et al., 2016). A-L correspond with the grids used in the framework given in the results

A	What is the current status of organic agriculture-based agritourism in Vanni?
B	What values, culture, laws have brought us to where we are today?
C	Why does the current situation not create an opportunity for agritourism?
D	What issues that need help now should be discussed in 2030?
E	What will people like about hybrid tourism with nature and agritourism in 2030?
F	What are the things that need to be developed in the next 3 years?
G	Who is the current model in organic agriculture mixed tourism?

H	What changes would you like to see in tourism in the next 5 years?
I	What are the things that others want to achieve in 2030 that stand in the way of what you want to achieve?
J	What are the changes we want to achieve but can't even imagine?
K	What factors are present to achieve these unimaginable changes?
L	With whom would you like to achieve the changes you want to achieve in the next 5 years? How and through what methods?

We held an open discussion at the end of the workshop to evaluate and understand the utility of the Three Horizons approach regarding the following themes, based on the current literature on futures studies. The first theme was supporting past, present and future sustainable land use change. The second was dealing with diverse perspectives from farmers, IDPs, villagers in Puthukkudiyiruppu, NGOs, business and tourism representatives and students (Pereira et al., 2018). The third was influencing the sense of urgency of participants (Sharpe et al., 2016). The fourth was fostering futures thinking or literacy to navigate towards futures, and the fifth was providing a space for creativity and imagination (Wyborn et al., 2021; Pereira et al., 2019, 2018).

We recorded and transcribed workshop discussions, translated them from Tamil to English, and then tabulated and coded them. We took an inductive approach to cluster themes from workshop activities and scenarios generated using the Three Horizons Framework. We then wrote up storylines the groups had presented using workshop recordings, and gave each a name based on the descriptions and expressions used by participants during their presentations. We shared summaries of workshop outcomes among the key facilitators such as representatives of CCH and Dr Jessica Thorn for feedback to ensure the results were representative of the groups' understandings (Schaal et al., 2023).

3.4.6. Village focus group discussions and key informant interviews

Both the village focus group discussions and key informant interviews were largely open-ended reflexive interactions, guided by several key areas listed to touch on. For the village groups the key subjects were related to village history in the context of resettlement and conflict, agriculture, livelihoods, hybrid tourism and climate change. However, the actual questions I asked varied from one group to another. For example, there was one village group in particular who were seasonal fishermen and farmers which influenced the addition of questions. For the key informants, subjects I covered varied depending on the expertise of the interviewee, but largely focused on land rights, farming practices, tourism and sustainability. For example, to get a deeper understanding of the drivers of palm cultivation, I interviewed key informants in the palmyra and coconut boards. Further, I approached the Divisional Secretariat in the study area to clarify land allocation practices when data on the nature of land ownership in household surveys differed from common knowledge. Here again, the approach I took was to use a list of subjects and guiding questions and to reflexively pose additional questions depending on the responses from interviewees. I conducted key informant interviews over the phone or using online video calls with respondents in three locations, Colombo (where many government offices are), Jaffna (the gateway city for the Northern Province) and Puthukkudiyiruppu.

3.4.7. The linkages between data and the conceptual framework

The following table broadly depicts the linkages between the data collected across the cohorts with the chapters and the objectives of this thesis.

Table 4 Linkages between the conceptual framework, chapters, and the datasets.

Chapter	Key objective	Main source of data	Other sources of data
5	Analysis of LULCC	Geospatial maps	Household surveys, village focus groups.
6	Analysis of socioeconomic activities and drivers	Household surveys	Village focus groups.

7	Analysis of hybrid tourism	PSP workshop	Geospatial analysis.
8	Analysis of hybrid tourism	Pilot tourist, household, tourism industry participant surveys	Village focus groups.

With my approach for Chapter 5, I established a baseline for LULCC. Thereafter, with my analyses in Chapters 6 and 8, and my PSP detailed in Chapter 7, I was able to understand how existing socioeconomic activities have influenced LULCC and assess how hybrid tourism could potentially influence an improvement in wellbeing and sustainable land use practises. I analysed the quantitative and semi-quantitative datasets from surveys using IBM SPSS software as well as Microsoft Excel. I thematically analysed the data obtained from focus groups discussions and the PSP workshop to identify common themes to meet the related objectives of my thesis. Further, I analysed data from key informant interviews to contribute to inferences made from the preceding analysis.

3.5. Sampling

I used non-probability purposive sampling to select respondents for the household, tourist and tourism industry stakeholder surveys. With this approach, I selected twenty households and conducted a pilot survey among them. Both primary respondents and spouses were interviewed to obtain a gendered perspective. The pilot survey helped me understand that the variability of data among the cases was low. The complete lists of household survey questions are provided in the appendices. Based on this I refined my survey instrument and adopted critical case sampling for my entire sample (Saunders et al., 2019).

Based on my sampling approach four villages were selected and their populations as of 2019 are provided in table 5 below.

Table 5 The populations and households of the selected villages

Village	Population	Number of households
Suthanthirapuram	2,598	859
Thevipuram	2,853	962

Theravil	1,417	470
Vallipunam	1,917	651
Total	8,785	2,942

The four villages which are populated by resettled IDPs were selected due to their proximity to the Chundikulam National Park. With a confidence level of 95% and a margin of error of 10%, the data was collected based on the sample sizes in Table 6 below by engaging the services of CCH.

Table 6 Sample sizes for the selected villages.

Village	Households	Number of surveys
Suthanthirapuram	859	87
Thevipuram	962	88
Theravil	470	80
Vallipunam	651	84
Total	2,942	339

For the tourist interviews, I selected former guests of The Thinnai hotel who live in or near the Western Province with heterogenous sampling. For this purpose, the management staff of the hotel independently selected 22 participants. For the tourism industry interviews, I adopted purposive sampling and selected 20 interviewees drawn from a list of companies that had won an award from a private sector alliance to build and promote sustainable tourism in Sri Lanka (Sri Lanka Tourism Alliance, 2022).

I adopted self-selection and purposive sampling for the PSP workshop with assistance from CCH. The workshop involved 28 participants from diverse socioeconomic and cultural backgrounds (Table 7). Participants were drawn from those who responded to household surveys or participated in focus group discussions, students in tourism based in the Jaffna district, representatives of Thinnai Organic which engages in agritourism, and CCH. Overall, 16

males (57%) and 12 females (43%) participated in the workshop. This sample represented a diverse range of perspectives to envision desirable futures (Schaal et al., 2023).



Figure 14 Group photograph of workshop participants.

Table 7 List of workshop participants.

Type of Participants and Area of knowledge	Number of attendees	Male	Percent	Female	Percent
Agriculture, Home based industry	16	9	56%	7	44%
Hospitality, Travel	2	2	100%	0	0%
Community Work (CCH)	3	1	33%	2	67%
Media	1	1	100%	0	0%
Organic Farm	3	2	67%	1	33%
Tourism students	3	1	33%	2	67%
Total	28	16	57%	12	43%

I used purposive self-selection sampling for the focus group discussions in collaboration with CCH and planned to conduct seven of them. Some of the participants in focus group discussions included respondents to the household surveys. I also used self-selection to decide

key informants. I took this approach to select informants who had an intrinsic knowledge of the Northern Province from the perspectives of the government, industry and local.

I faced many problems related to sampling due to external factors beyond my control. First, the Covid pandemic occurred from April 2020 until early 2022 followed immediately by an economic crisis in Sri Lanka (Perera, 2022). The pandemic caused immense challenges for planning and executing data collection due to impositions of bans on travel between provinces and quarantines. Due to these factors, I could not complete the household data sampling that commenced in 2021.

Second, the economic crisis started while the remaining interviews were conducted. I felt that there would be a marked difference between the data sampled in 2021 and in 2023 due to changes in the economy. Therefore, we conducted fresh interviews with households in 2023. Ultimately household surveys were conducted with 281 primary respondents and 202 spouses.

Third, my original plan was to conduct interviews with tourism industry stakeholders in 2021. However, these could not be conducted as planned since many of them were struggling or went out of business due to the mentioned crises. Therefore, finding adequate respondents was challenging. To resolve this problem, I took the approach of selecting them from the private sector alliance as mentioned above and conducted interviews with them from mid-2023 to early 2024. 16 of them responded to my surveys. However, nine of them only responded partially to the survey and were rejected, leaving seven for analysis. For focus group discussions, my original plan was to conduct seven of them, but I was able to conduct five.

Fourth, I had to arrange pilot tourist groups with 22 local participants to understand acceptance of hybrid tourism. International tourists were intended but this was not possible. Finally, I could not interview several key informants in the government to verify results from household surveys. Particularly, I could not reach reliable representatives of the wildlife and forestry departments to understand impacts imposed by settlements and farming from their perspective.

3.6. Ethics

I followed protocols stipulated by the University of York in collecting data. In this regard, I ensured all participants were informed that their participation was voluntary, that their

responses would be anonymised and that they could withdraw at any time. Second, I ensured all approvals required to conduct household surveys were obtained from relevant local authorities. Third, all data collected such as survey data were backed up securely.

3.7. Summary

In sum, I adopted an epistemology of pragmatism, an ontology of objectivism and mixed methods for my thesis. I used geospatial analysis for achieving my first objective. For my second objective I used surveys that were answered by households. For my third objective, I used surveys answered by households, pilot tourists and tourism industry participants. In addition, I used focus group discussions with participants drawn from households in the study area and key informant interviews. I also used a PSP workshop to add value to my thesis and to corroborate findings that fed into all my objectives.

4. Thesis context

4.1. Social, political and economic background

Sri Lanka's population is primarily composed of the Sinhalese (74%), Tamils (18.2%) and Muslims (7%). The Tamil population is concentrated in certain geographic areas including the Northern, Central, and Eastern provinces, and are predominantly Hindu, as opposed to the Sinhalese who are mainly Buddhist. Further, there is ethnic division within the Tamils, with Jaffna Tamils (Northern Province) and Indian Tamils (migrants from South India that settled in the Western Province). With this additional ethnic division, there are 12.7% local Tamils and 5.5% of Indian Tamils (DeVotta, 2009).

The country was affected by civil war from the late 1970s until the turn of the century, with several historic events that occurred leading up to its commencement. In 1956, a newly installed nationalist government composed mainly of the Sinhalese replaced English with Sinhala as the country's official language. Further, it stationed the military from 1961 in the Northeast to suppress peaceful protests. This led to the humiliation of Tamils in a region where they constitute the main populace. Over the next two decades governance by the majority giving preferential treatment for the majority escalated with diminishing minority participation and benefits. The country's universities are owned by the state. In 1971, the government introduced a quota system whereby Sinhalese students with lower marks could enter universities. This policy with favouritism for Sinhalese youth alienated Tamil youth. Further, a new constitution was introduced in 1972 in which Buddhism was given primary importance and created a perception that the religion of other ethnic groups was less important. Second, Sinhalese civil servants were employed in areas that are mainly Tamil, and Tamils were required to interact with them in Sinhala. Further, Tamil civil servants had to learn Sinhala to be considered for promotion. Third, the government made Sinhala the official language for the court system. In 1974, 11 Tamilians participating in a conference were killed. There was also denial of citizenship for Tamils of Indian origin, colonisation of land in Tamil areas, and the limitation of development funding in Tamil areas. The nation became polarised ethnically, with a Sinhalese Buddhist nationalist ideology claiming descent from Aryan immigrants and a Tamil nationalist ideology claiming Dravidian descent long before the Sinhalese. These geopolitical events led to disillusionment among the Tamilians. These ethnic, ideological, social, and educational differences led to conflict with the government from the 1970s, ethnic violence

against the Tamils in July 1983 (referred to as the '83 riots) and over three decades of civil war between the country's armed forces and several separatist groups from the Northern and Eastern Provinces. Ultimately the war ended in 2009 after bloody clashes between government forces and the largest separatist group, the LTTE (Ganguly, 2018; Saparamadu and Lall, 2014; DeVotta, 2009; Perera, 2001; Stokke, 1998; Kearney, 1985).

Of relevance, the Jaffna Tamils had access to a superior education, particularly in the English language due to the presence of the American missionary schools (AMS) from 1816 exclusively in the Northern Province (Rajashanthan, 2015). Bearing testimony to their influence in the North, by 1911, there were 118 schools in the Northern Province with around 14,000 students, and today many of the leading schools still carry the acronym AMS (Arunthavarajah, 2014). The ruling British allowed this without interference since the focus of the American missionaries was on propagating Christianity and gave preference to the educated Jaffna Tamils for employment in their civil administration (Rajashanthan, 2015). This preference by the British, during their rule for over 150 years from 1796 to 1948, contributed to the constitutional changes with favouritism for the Sinhalese majority and the growing discord between the Sinhalese and Tamils (Arunthavarajah, 2014; Sivasundaram, 2010; Kearney, 1985).

The war lasted over three decades and ended in May 2009 with the government forces overpowering the LTTE. Further, the government called for fresh elections after the war ended and returned with a two-third parliamentary majority. It used this majority to increase the powers of the president and did not devolve power to the provinces. (Athukorala and Jayasuriya, 2015). The extended war had already caused the polarisation of the Sinhalese and Tamils. This polarisation continued after the war. A primary reason was that the government maintained a strong military presence in the Northern and Eastern provinces with many checkpoints for civilians to pass through. Second, the government did not address the issue of people who went missing due to the war. Third, it did not address the return of land belonging to the people including land taken over by the military for high security zones. Further, the armed forces engaged in non-military activities such as hotels and restaurants in the Northern and Eastern provinces. Fourth, it turned a blind eye to land grabbing for Buddhist temples and established several war memorials. In 2015, a new coalition government was installed. Despite election promises, the new government did not strive for full reconciliation to reduce the inequality felt by minority communities (Mittal, 2015). Moreover, the party that won the war

returned to power after the Easter bombings in 2019 (Chapter 1) with a landslide victory (Vitharana and Abeysinghe, 2020). This effectively ensured that the polarisation remained even a decade after the war ended.

Recent events under this new government had a major impact on the economy. The country faced an economic crisis due to mishandling of the economy from 2019 onwards. This increased foreign debt, reduced foreign reserves, reduced the value of the local currency and increased inflation. Ultimately the economy virtually collapsed in 2022 with hyper-inflation (George et al., 2022). Due to the foreign currency crisis in April 2021, the government announced an overnight ban on the import of agrochemical-based fertilisers and herbicides. The government announced that this sudden change was to keep an election promise made by the President then, Gotabaya Rajapaksa (Herath, 2021). Within months rice production that was dependent on use of agrochemicals fell twenty percent, forcing the government to compensate farmers. Further, the production of tea, a key export crop, also fell, compelling the government to reverse the ban, not only for tea, but also for rubber and coconut. Subsequently, limited import of agrochemical fertilisers was permitted but supply was erratic due to the country facing a financial crisis, followed by a complete reversal of the ban. These ad-hoc policy shifts by the government and the impacts of the Covid crisis caused the addition of 500,000 people to below the poverty line while substantially affecting the agricultural sector (Ellis-Petersen and Soysa, 2022).

The crisis caused a popular uprising which ousted President Gotabaya Rajapakse from power as the country's President in May 2022. A caretaker government was installed, external debt was rescheduled, and additional external funding was obtained (Samarakoon, 2024). Further, in elections held in 2024 a new government with its majority held by a party with socialist ideologies was installed.

4.2 Implications of the war for national tourism

The protracted war had several implications for the tourism industry. First, the opportunities for economic growth were less, resulting in poor gains in per capita income and wellbeing. Government spending was allocated for the war effort, peaking at as much as 5.3% of Gross Domestic Product (GDP) in 1995 (Wijeweera and Webb, 2009). Second, tourism infrastructure was developed with the exclusion of the Northern Province due to terrorist activities and limited accessibility. As a result, the tourism routes that were adopted by the industry were

limited to the rest of the provinces with the exclusion of the Northern Province; Anuradhapura in the North-Central Province was the furthest North tourists visited. The primary destinations were Colombo, the Southwest coast, the hill country (Nuwara Eliya), Kandy, Yala National Park, Ella, Wilpattu National Park and the cultural triangle composed of Anuradhapura, Dambulla and Sigiriya (one of the eight world heritage sites) (Figure 2). Further, as shown in the introduction, tourism accommodation is limited in the Northern Province when compared to other provinces.

Tourism numbers were severely affected during the years of conflict, following the escalations and reductions during periods of negotiated peace and dropped to as low as 182,620 arrivals in 1987 (Fernando, Bandara and Smith, 2013). Further, due to the addition of numerous mass tourism products along the Southwestern coastal belt from Colombo to Galle during the period of conflict, supply became excessive and concentrated in this area. This had the negative impact of low pricing due to oversupply and overcrowding (Samarathunga, 2016; Buultjens et al., 2005).

Despite the concentration of tourism in parts of the island, tourism earned substantial foreign exchange for the country after the conflict, with tourist arrivals peaking at 2,333,779 visitors with earnings of US\$ 4,380.6 million in 2018. Unfortunately, the country's tourism was impacted by April 2019's Easter bombing (Chapter 1) which brought these numbers down to 1,913,702 visitors and US\$ 3,606.90 million in earnings in the same year. Further, the global Covid pandemic brought these figures down substantially in 2020 and 2021. However, the tourism industry recovered in 2022 with 719,978 arrivals. Further, it grew significantly thereafter with 1,487,303 tourist arrivals in 2023 growing to 2,053,465 in 2024. (Sri Lanka Tourism Development Authority, 2025).

4.3. Implications of the war for the Northern Province

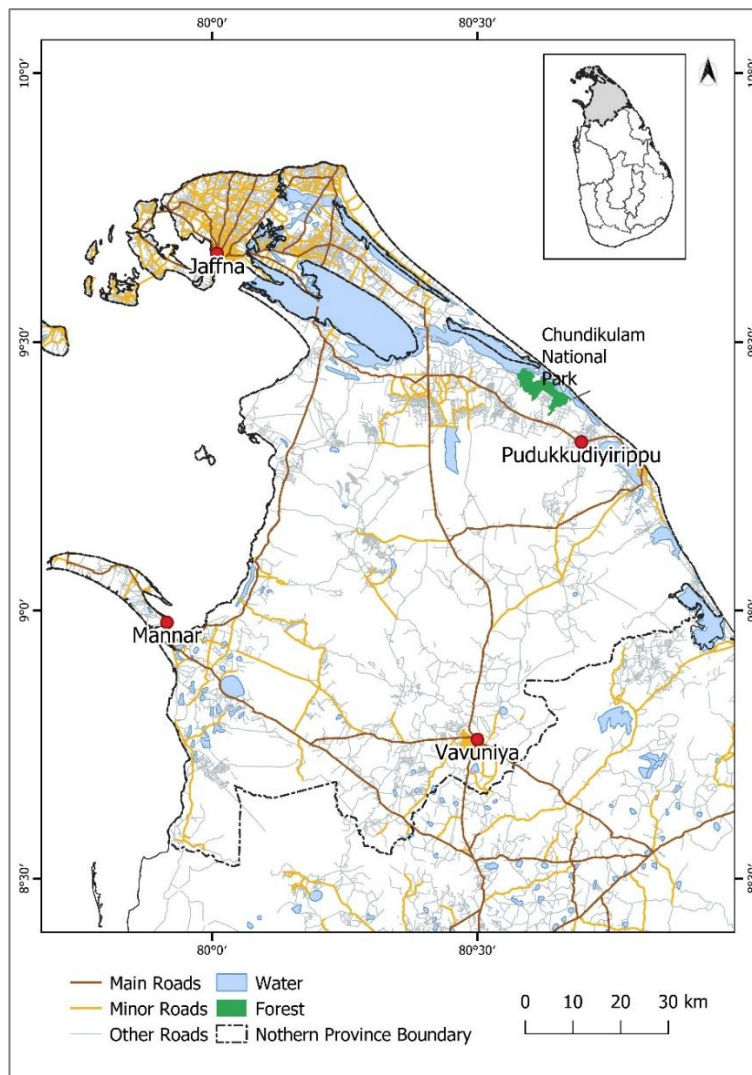


Figure 15 Map of the Northern Province, Sri Lanka showing Puthukkudiyiruppu in the Mullaitivu district.

The protracted conflict caused the displacement of over 5% of the country's population (Buultjens, Ratnayake and Hapugoda, 2016), and over 300,000 IDPs were placed in a resettlement camp in the Northern Province called Menik farm located in Vavuniya (Figure 15) after the conflict ended in 2009 (Somasundaram, 2010). The government claimed they had resettled 236,429 IDPs by January 2012, in many parts of the Northern Province, including the district of Mullaitivu. (Saparamadu and Lall, 2014) These displaced people were either resettled in their original homes or given state-owned land entitled 'permit land,' with no outright ownership.

The extended conflict had several additional implications for the Northern Province of Sri Lanka. Other provinces steamed ahead with modernisation due to better access to financial capital. Emigration by inhabitants of the Northern Province grew to as much as 800,000 Tamil diaspora (Sriskandarajah, 2002). Private sector investments were inadequate, with infusion mainly in the service and apparel sectors. Also, due to several factors including inward remittance from the Tamil diaspora, stringent social and cultural norms enforcing specific study areas for children, an overcrowded education system and a preference for government jobs many youths do not actively look for work or do not get opportunities for employment (Bowden and Binns, 2016). Public investment for development of the Northern Province was limited to large infrastructure projects such as railroads, roadways, power, and water supply and in fisheries harbours without due consideration for the specific needs of post-conflict communities such as employment and reparations for victims of the civil war (Sarvananthan, 2016). Supporting this, between 2009 and 2013 the government spent US\$ 1,703 million on such infrastructure and just US\$ 178 million on livelihood development (Kadirgamar, 2017). Further, failures due to limited development funding cited include non-utilisation of small-scale producers, non-capitalisation of available skills and the vulnerability of people coming out of an extended war not being adequately addressed for them to develop (Central Bank of Sri Lanka, 2018).

The implications of the conflict are reflected in the Northern Province's macroeconomic figures. Its share of the national GDP was 4.6% in 2018 and worsened to 4.1% in 2022. Second, in 2016 its GDP per capita was US\$ 2,831 compared to the national average of US\$ 3,578, 21% lower and the second lowest among the nine provinces. In 2022, its GDP per capita stood at US\$ 2,289, whereas the national average was US\$ 2,970, 23% lower. Third, in 2016 it had the third highest Poverty Headcount Index at 10.9% compared to the lowest, in the Western Province at 2%. This worsened to 23.8% in 2022. Fourth, the province's poor household percentage, which was at 6.3% in 2016, worsened to 19.9% in 2022 (Central Bank of Sri Lanka, 2023).

The same situation of underdevelopment is visible in the agriculture and fisheries sectors from limited literature. Output of green chilies, which was 22% of the national total in the North before the conflict, was a mere 6% in 2010 (Sarvananthan, 2016). Further, despite the province having the longest coastline, fisheries dropped from 49% of the national output to 9% in 2010. Also, 8,344 Ha (68%) of 12,270 Ha of home gardens are underutilised due to lack of water, lack

of capital, wild animal threats, adverse physical conditions of the land, malfunctioning lift irrigation structures and labour shortage (District Secretariat - Mullaitivu, 2020). From the perspective of market access, the national government has several collection centres for agricultural produce with the main one in Dambulla, 220 kilometres away. However, there are no centres in the North, and based on initial scoping it was gathered that market access is limited due to dependence on sporadic visits by wholesale buyers. The available research shows that the Northern Province faces many problems. These problems include the quality of the groundwater due to climate change, access to markets and financial capital, poor education, alcoholism, and lack of employment for youth (Kavitha and Shivany, 2020; Lojana and Sivakumar, 2019; Gunaalan et al., 2018; Tharmine et al., 2018; Harshan et al., 2016; Bowden and Binns, 2016; Tyriakidis, Guganesharajah and Ouki, 2009).

The same underdevelopment is evident in tourism in the Northern Province due to several factors, although the primary reason remains the extended conflict which pushed the region behind the other provinces for three decades. These factors include faster expressway access to other destinations, an international airport in Jaffna that after protracted delays only commenced operations in November 2022, inadequate inclusion by the government in tourism planning, inadequate tour routes for the North and near exclusion in government and private sector tourism promotions (Ranasinghe, 2018; Kamble and Bouchon, 2014). Further, many heritage tourism sites remain unrehabilitated due to heritage politics whereby their history has been ignored (Timothy and Boyd, 2006). Moreover, as detailed in my introduction, many sites related to conflict history were destroyed and tourism facilities are limited.

The Northern Province had a population of 1,058,762 as of 2012 representing both genders almost equally. The weather is warm and temperate with heavy rainfall occurring during limited monsoonal periods (Piratheeparajah, 2015). The province is one of nine provinces in Sri Lanka and covers an area of approximately 8,890 square kilometres (13.54%). It is made up of five administrative districts, namely Jaffna, Kilinochchi, Mannar, Mullaitivu and Vavuniya (Bharathy et al., 2024). The region has an estimated 49% land cover with dense forest inclusive of protected national parks and nature reserves. The province also has a long coastline with wetlands, unspoilt beaches and many small, inhabited islands. Further agriculture and home gardens are prevalent. (Bharathy et al., 2024; Sasitharan and Premaratna, 2022; Aloysius et al., 2022). The Northern Province of Sri Lanka has a rich cultural and historic heritage (Davis et al., 2018; Kalimuththu et al., 2017; Sriramachandran, 2017). Further, there are extensive natural

resources and stunning landscapes (Madawala et al., 2019; Jeyavanan, Sivachandiran and Pushpakumara, 2017; Piratheepa and Suthakar, 2014).

There are several recent research studies illustrating the potential for tourism in the Northern Province due to its natural capital and its people. Such studies include the potential and challenges of ecotourism in Delft Island based on a range of tourism products available covering biodiversity and cultural heritage and the potential for cultural and heritage tourism (Piratheepa, Chan and Suriati, 2021; Ranasinghe, 2018; Mathivathany and Sasitharan, 2012). Further, there are studies that show the potential of ecotourism in the Chundikulam National Park and for community-based tourism to foster rural development (Rajkumar and Wijesundara, 2021; Samarathunga, 2016). However, as mentioned in the introduction, the use of tourism for developing the Northern Province has been negligible.

In summary, the historic geopolitical information in this chapter shows how the government mainly supported the interests of the Sinhalese population from 1956 onwards. This led to the civil war which lasted for over three decades and ended in 2009. The Northern Province, due to the prolonged war and unfair treatment, is disadvantaged socioeconomically. Further, tourism development has been minimal in comparison to the rest of the country.

5. Assessing land use and land cover change and its drivers in Puthukkudiyiruppu, Northern Province, Sri Lanka

5.1. Introduction

The global extent of IDPs caused by natural and human-induced factors is estimated at 33.3 million (Eweka and Olusegun, 2016). Recent studies show how their resettlement influenced increased land use transitions for settlements and agriculture with a reduction of forests, wetlands and other natural land cover types (Younes et al., 2023; Kilama Luwa et al., 2021; Gbanie, Thornton and Griffin, 2015; Wilson, 2014). Further, resettled communities have an impact on biodiversity due to expanding land use for agriculture and homesteads across the world (Bhattarai et al., 2017; Torri, 2011; DeFries, Karanth and Pareeth, 2010).

Recent studies on LULCC in Sri Lanka show how land use for agriculture and urbanisation is affecting forest cover (Premakantha et al., 2021; Ratnayake and Ranaweera, 2017; Lindström, Mattsson and Nissanka, 2012). Further, they show how climate change is affecting biodiversity, ecosystems and agriculture due to floods and droughts (Wickramasinghe et al., 2021; Kottawa-Arachchi and Wijeratne, 2017). Moreover, land use for settlements, agriculture and urban development in the Northern Province has increased since the conflict ended (Saranya and Suthakar, 2018; Raveendran and Tharani, 2014). Confirming this, recent LULCC studies in Mullaitivu district show how forest cover has reduced between 1997 and 2016 and between 1994 and 2022 (Rajeevan et al., 2023; Pathmanandakumar, 2020). As found in the wider literature, both global and local (Chapter 2), resettlement of IDPs affected by the prolonged conflict has taken place in the study area since 2009. These resettled isolated villages depend on agriculture, livestock, and fishing for their livelihoods, with these activities influencing land cover change and potentially affecting biodiversity.

The objectives for this chapter are to: (1) Determine changes in and drivers of land cover and land use before, during, after the war, and a decade after the war covering the years 1979, 1997, 2010 and 2020 respectively, (2) Assess the social and climate drivers of LULCC, and (3) Predict and assess LULCC by the year 2030.

5.2. Results

This section provides the results of the study on land use and land cover change over the timespan of 42 years (1979 to 2020), and the key changes that were observed. It also provides change detection maps between 1997 and 2020 and a predictive map for 2030. Further, key social factors from the household surveys that are connected to LULCC are also provided to understand the social drivers of change.

5.2.1. LULCC results

The kappa values of the land cover classification results were 91.6%, 87.7%, 92.2% and 80.7% for 2020, 2010, 1997 and 1979 respectively (Table 8). The accuracy level for 1979 was low in comparison to the other years, due to the absence of high-resolution reference images.

However, the value was between 0.61 and 0.80 indicating near substantial agreement (Cohen, 1960). Therefore, the land cover map derived for 1979 was deemed acceptable for change detection analysis due to its substantial accuracy level.

Table 8 Kappa values and overall accuracy of land classification results.

	1979	1997	2010	2020
Kappa	80.7%	92.2%	87.7%	91.6%
Overall Accuracy	82.1%	94.3%	91.1%	93.9%

Table 9 Share of land use and land cover classes for 1979, 1997, 2010 and 2020. The total area is 2,392 km²

Land Cover Class	Sq km 1979	Percentage of total in 1979	Sq km 1997	Percentage of total in 1997	Sq km 2010	Percentage of total in 2010	Sq km 2020	Percentage of total in 2020
Forest	549.7	22.9%	553.8	23.1%	542.5	22.6%	553.0	23.1%

Waterbodies	1092.3	45.6%	1085.8	45.3%	1086.1	45.3%	1095.2	45.7%
Rice Paddy	258.8	10.8%	339.6	14.2%	342.1	14.3%	325.3	13.6%
Settlements	281.3	11.7%	79.8	3.3%	71.0	3.0%	152.6	6.4%
Built-up	5.2	0.2%	2.5	0.1%	3.9	0.2%	22.7	0.9%
Soil	41.9	1.7%	96.1	4.0%	48.7	2.0%	35.8	1.5%
Palm	57.0	2.4%	71.9	3.0%	63.9	2.7%	94.9	4.0%
Wetland	96.0	4.0%	118.5	4.9%	142.4	5.9%	87.6	3.7%
Other veg	7.1	0.3%	40.6	1.7%	82.8	3.5%	19.5	0.8%
Salt pan	6.6	0.3%	7.4	0.3%	12.6	0.5%	9.4	0.4%

Table 10 LULCC change analysis for the years 1979, 1997, 2010 and 2020.

Land Cover Class	Area change from 1979 to 1997	Change (%) from 1979 to 1997	Area change from 1997 to 2010	Change (%) from 1997 to 2010	Area change from 2010 to 2020	Change (%) from 2010 to 2020	Area change from 1979 to 2010	Change (%) from 1979 to 2010	Area change from 1979 to 2020	Change (%) from 1979 to 2020	Area change from 1997 to 2020	Change (%) from 1997 to 2020
Forest	4.0	0.0	-11.3	0.0	10.5	0.0	-7.3	0.0	3.3	0.0	-0.7	0.0
Water bodies	-6.6	0.0	0.4	0.0	9.0	0.1	-6.2	0.0	2.8	0.0	9.4	0.1
Rice Paddy	80.9	0.3	2.4	0.0	-16.7	0.0	83.3	0.2	66.6	0.3	-14.3	0.0
Settlements	-201.5	-0.7	-8.8	-0.1	81.6	1.2	-210.3	-3.0	-128.7	-0.5	72.8	0.9
Built up	-2.7	-0.5	1.4	0.6	18.8	4.8	-1.3	-0.3	17.4	3.3	20.1	8.0
Soil	54.3	1.3	-47.5	-0.5	-12.8	-0.3	6.8	0.1	-6.1	-0.1	-60.3	-0.6
Palm	14.9	0.3	-8.0	-0.1	31.0	0.5	6.9	0.1	37.8	0.7	23.0	0.3
Wetlands	22.5	0.2	23.9	0.2	-54.8	-0.4	46.4	0.3	-8.4	-0.1	-30.9	-0.3
Other vegetation	33.5	4.7	42.2	1.0	-63.3	-0.8	75.7	0.9	12.4	1.7	-21.1	-0.5
Salt pan	0.8	0.1	5.2	0.7	-3.2	-0.3	6.0	0.5	2.8	0.4	2.0	0.3

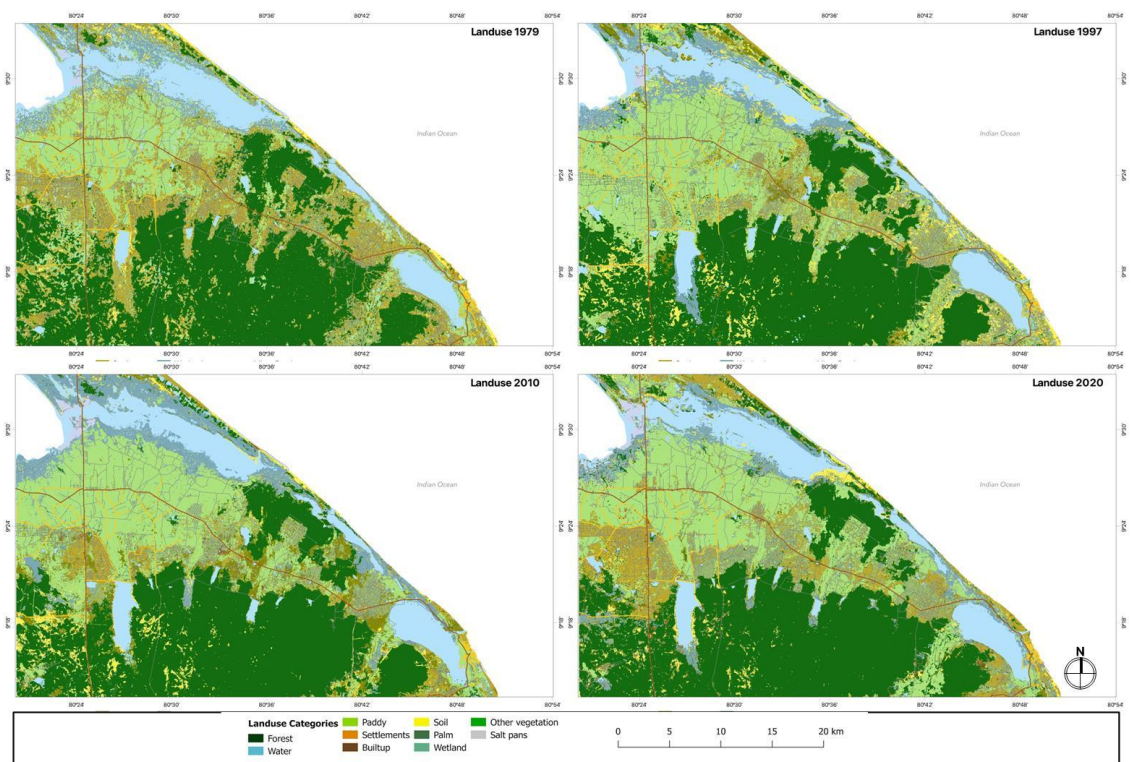


Figure 16 Geospatial maps depicting the selected land use and land cover classes for 1979, 1997, 2010 and 2020.

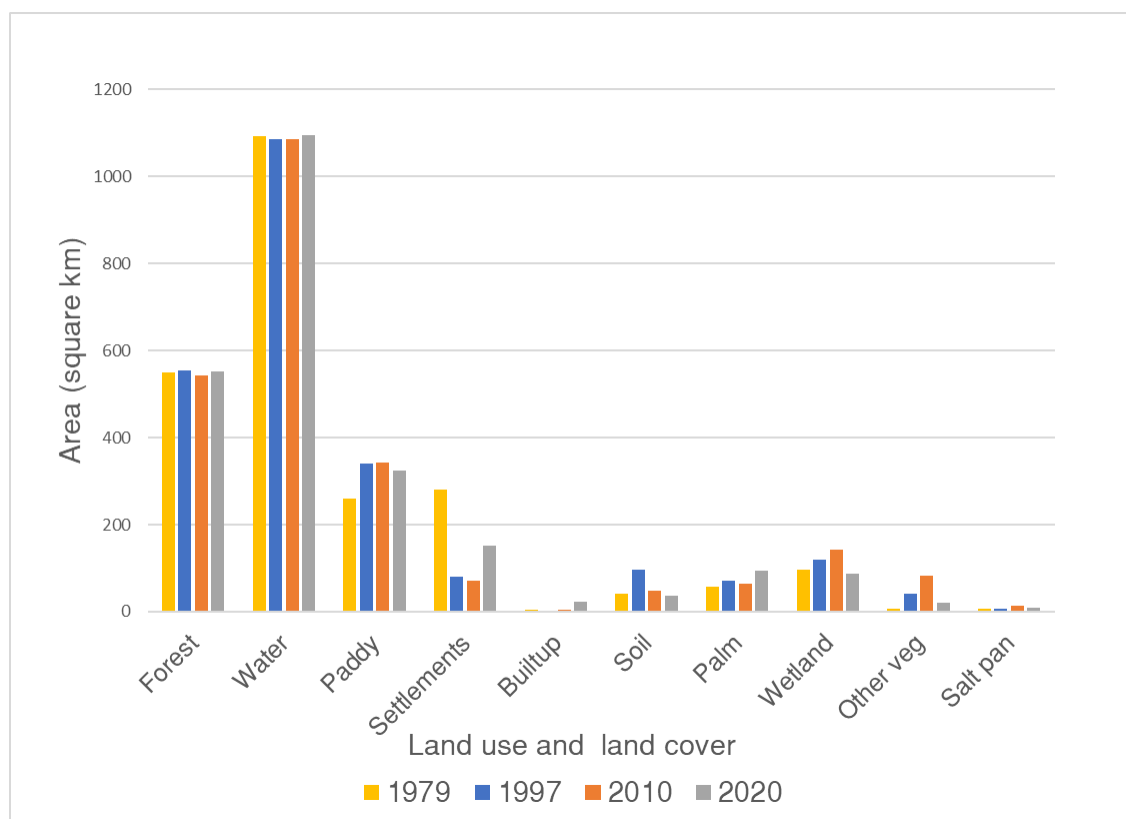


Figure 17 Bar chart of LULCC in square kilometres for the years 1979, 1997, 2010 and 2020.

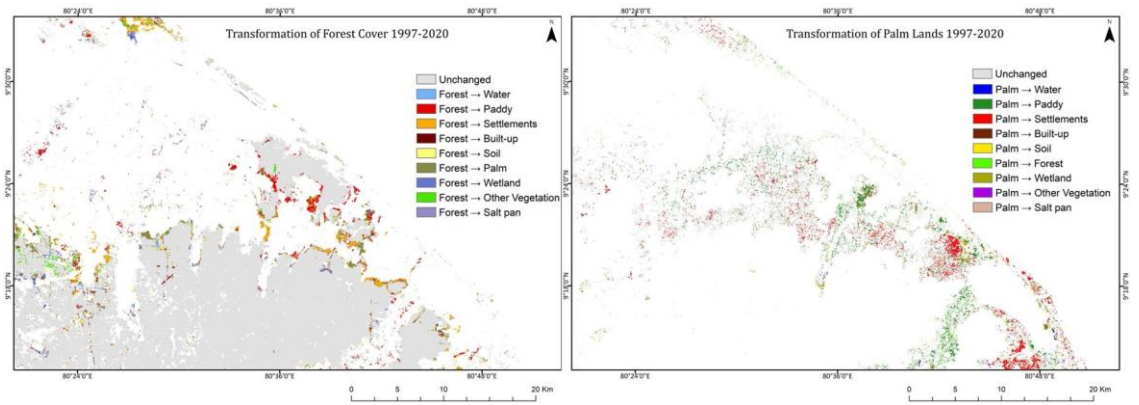


Figure 18 Change detection maps of forest and palm cover for the period 1997 to 2020.

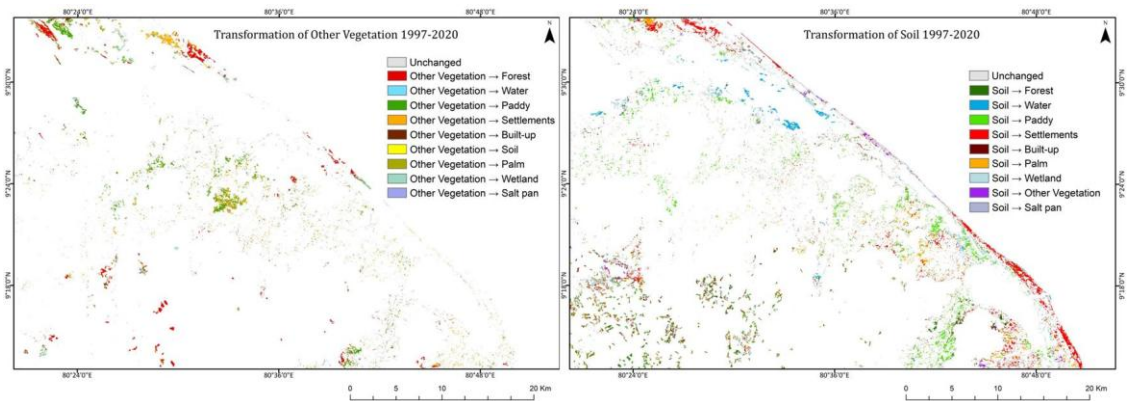


Figure 19 Change detection maps of other vegetation and soil cover for the period 1997 to 2020.

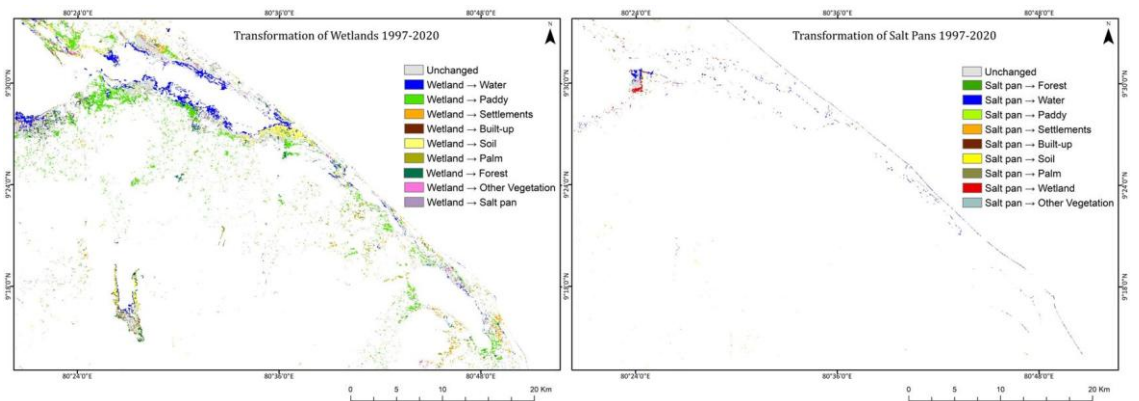


Figure 20 Change detection maps of wetlands and saltpans cover for the period 1997 to 2020.

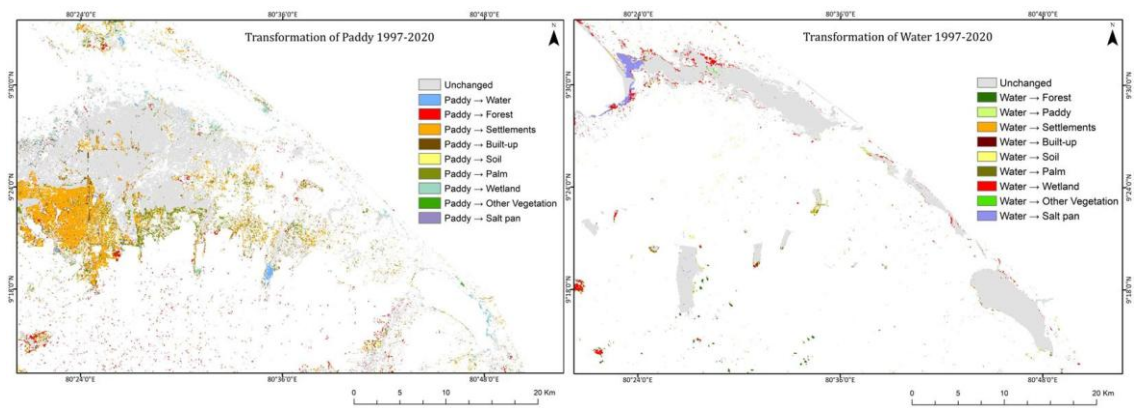


Figure 21 Change detection maps of land use for rice paddy and water cover for the period 1997 to 2020.

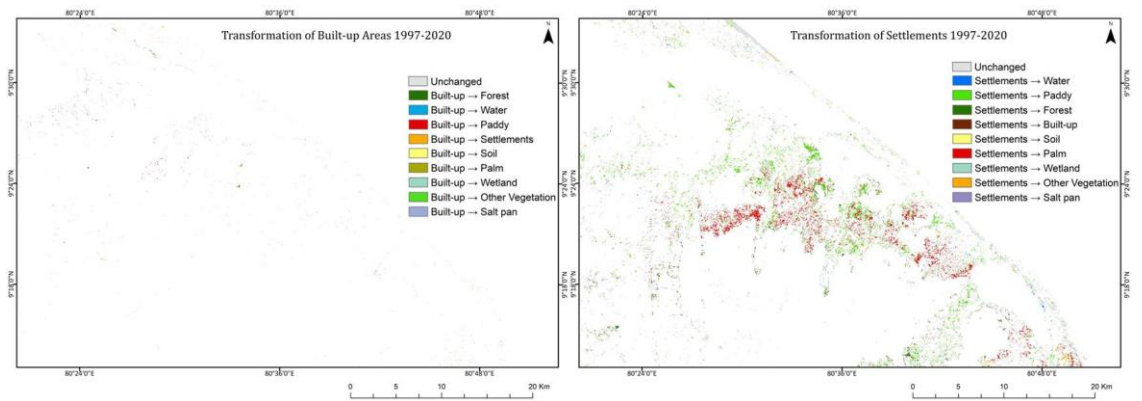


Figure 22 Change detection maps of land use for built up areas and settlements for the period 1997 to 2020.

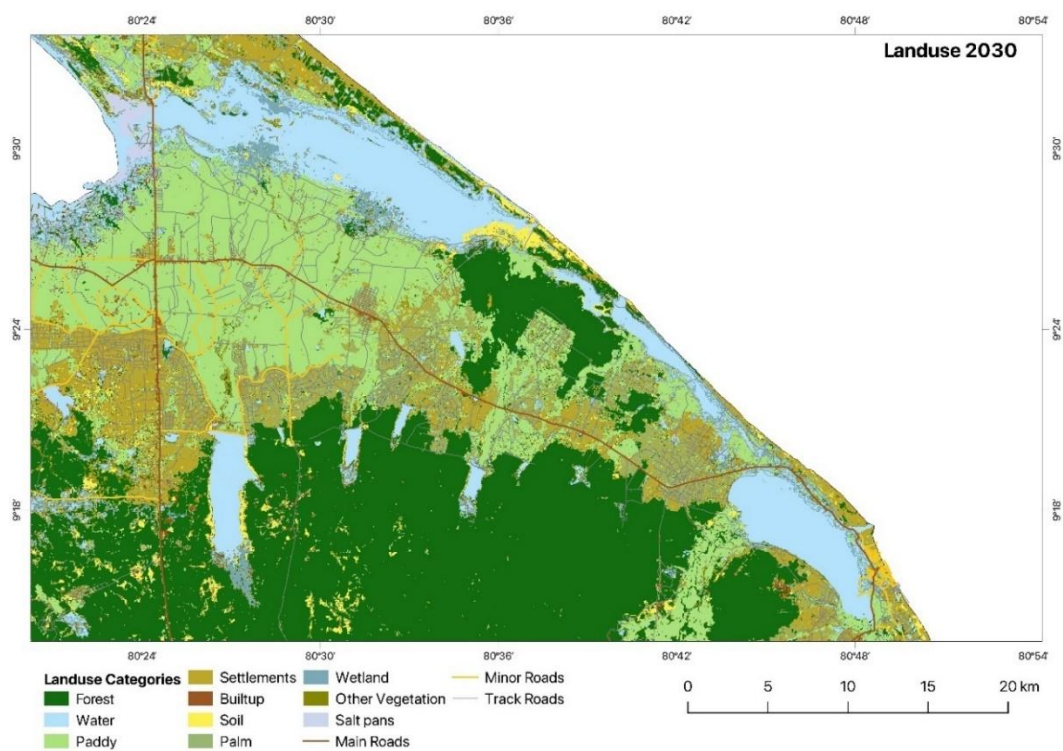


Figure 23 Predictive land use and land cover map in the ten classes for 2030.

Table 11 Predicted changes in LULCC between 2020 and 2030.

Land cover class	2020	2030	Area change from 2020 to 2030	Change % from 2020 to 2030
Forest	553.0	551.9	-1.1	-0.2%
Water	151.0	171.3	20.3	13.4%
Paddy	325.3	321.9	-3.5	-1.1%
Settlements	152.6	180.8	28.2	18.5%
Builtup	22.7	22.3	-0.4	-1.6%
Soil	35.8	35.3	-0.5	-1.4%
Palm	94.9	77.0	-17.9	-18.8%
Wetlands	87.6	67.5	-20.1	-23.0%
Other veg	19.5	14.5	-5.0	-25.7%
Salt pan	9.4	9.4	0.0	-0.4%

Among the selected land use classes, the most significant changes influenced by anthropogenic activities were observed in conversions to settlements, built-up areas, and rice paddy (Tables 9 and 10). Among them, the reduction of settlements from 1979 to 2010 represents the largest percentage reduction in land use followed by a sharp increase of between 2010 and 2020. However, the area used for settlements remains far below 2020 when compared to the base year of 1979. Built-up areas declined between 1979 and 1997, increased between 1997 to 2010, and increased substantially between 2010 and 2020; ultimately, in 2020 built up areas were significantly higher than 1979. Rice paddy increased over the 42 years with a slight decrease between 2010 and 2020. The land cover classes that remained consistent across the 42 years are forest and water bodies. Forest cover increased marginally. Water body cover dropped in the years 1997 and 2010 and increased in 2020.

The land cover classes that significantly gained ground are palm, saltpan and other vegetation over the 42 years. Palm lost ground during the conflict from 1997 to 2010 and substantially regained ground between 2010 to 2020. Overall, palm cover gained significantly over the 42 years. Saltpan cover gained ground during the conflict from 1997 to 2010. Further, saltpan cover gained over the 42 years. Other vegetation gained ground between 1979 and 2020, with a much higher increase between 1979 to 2010. Other vegetation increased between 1997 and 2010.

The land cover classes that lost ground over the 42 years are soil and wetlands. Cover with soil, wetlands, other vegetation, and saltpans reduced substantially between 2010 and 2020 which is the period after the conflict. Land use for settlements is predicted to grow substantially between 2020 and 2030. Land cover with other vegetation, wetlands are predicted to reduce considerably. Land cover with forest, saltpans and soil are predicted to reduce marginally, whereas water bodies will increase moderately.

5.2.2. Social indicators

The results from household interviews that have linkages with land cover change are given in this section.

5.2.2.1. Livelihoods

Data on the main livelihoods, the types of farming, the varieties of farming and the varieties of livestock are given in this section.

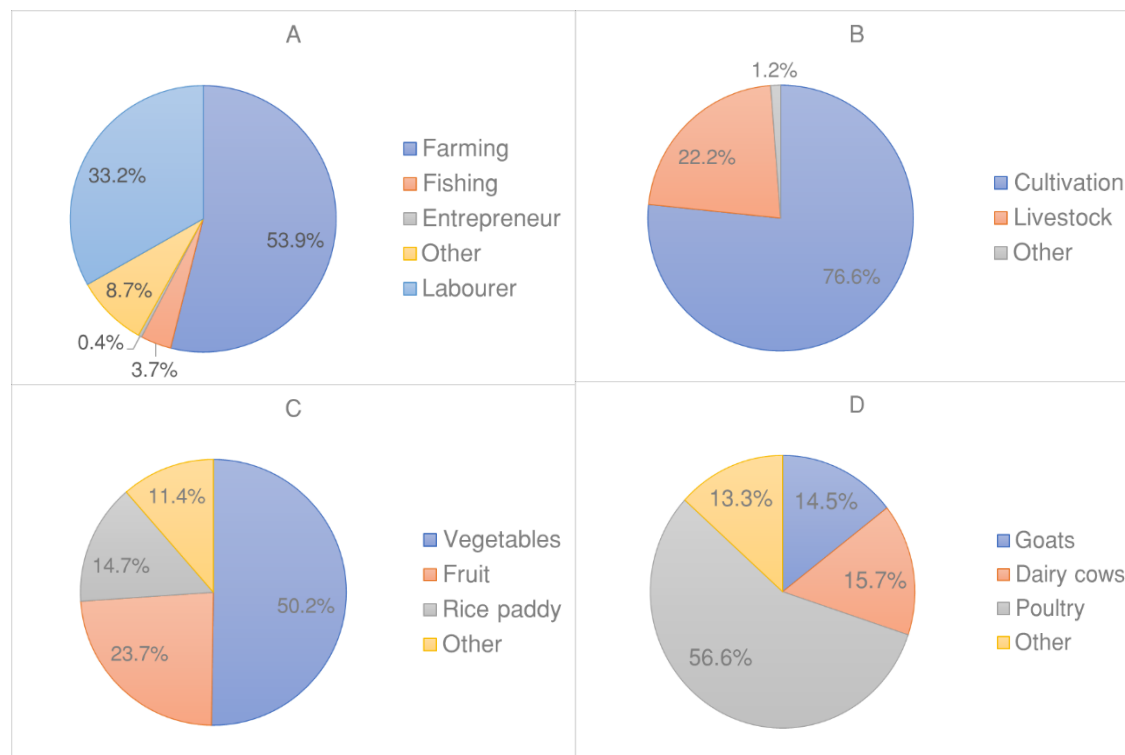


Figure 24 Pie charts of the main livelihoods of primary respondents (A), the types of farming they practice (B), the varieties of cultivation (C) and the varieties of livestock (D) they use.

The main livelihoods among primary respondents are farming and work as a labourer. The main types of farming are cultivation and livestock. The main varieties of cultivation are vegetables, fruit and rice paddy. The main varieties of livestock are poultry, dairy cows, and goats.

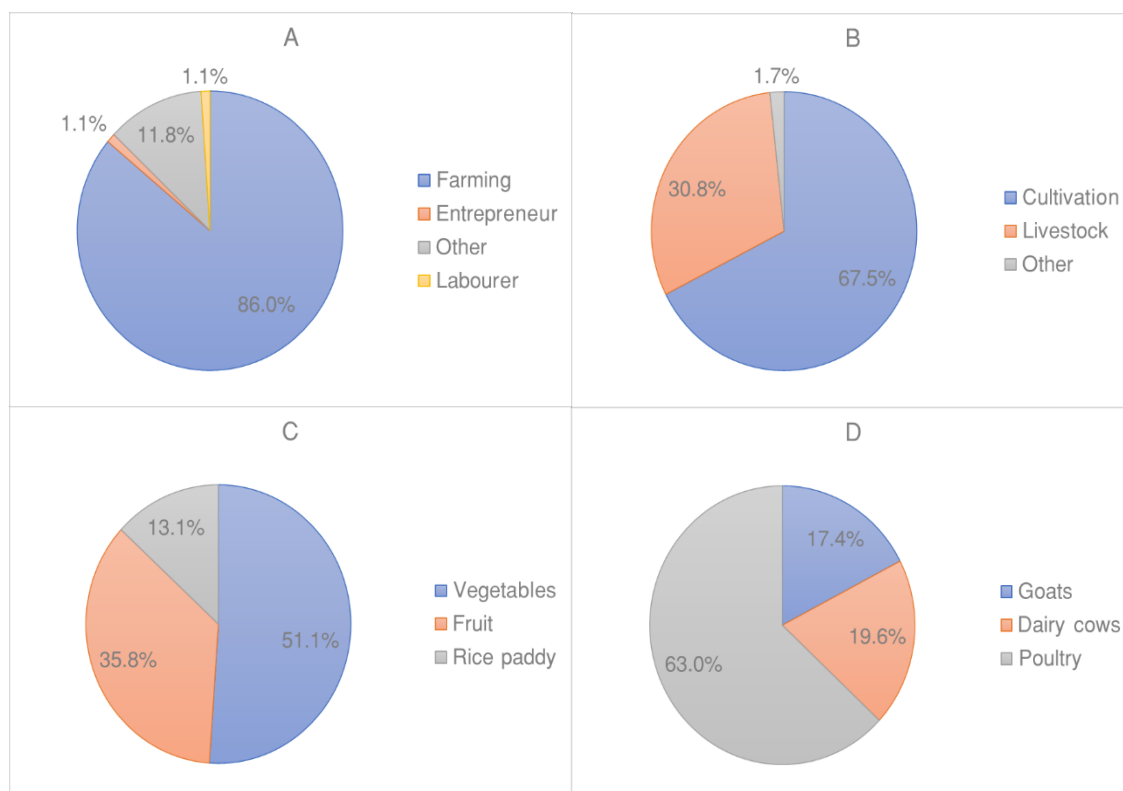


Figure 25 Pie charts of the main livelihoods of spouses (A), the types of farming they practice (B), the varieties of cultivation (C) and the varieties of livestock (D) they use.

These results show that spouses mainly practise farming. The main types of farming are cultivation and livestock. The main varieties of cultivation are vegetables, fruit and rice paddy. The main varieties of livestock are poultry, dairy cows, and goats.

5.2.2.2. Environmental indicators

This section provides the perception of households on water quality, the source of water, the energy source for cooking and the source of firewood. Second, it shows the perceptions of the households on deforestation, soil erosion and loss of species.

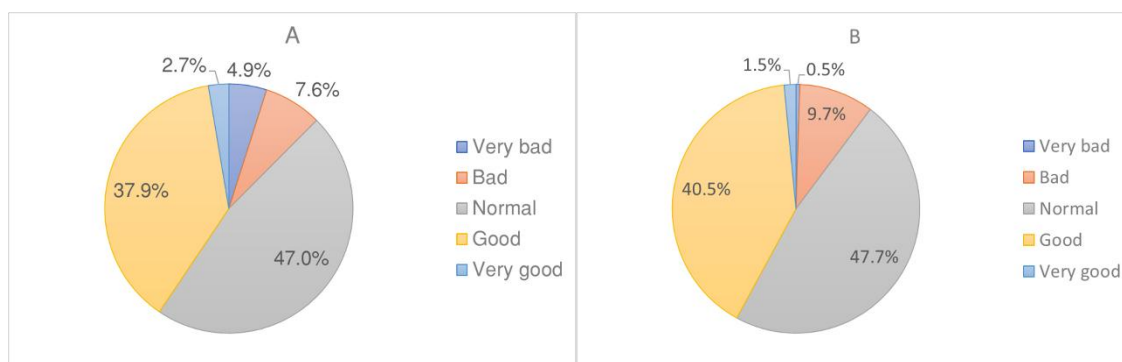


Figure 26 Pie charts of the perception of water quality according to primary respondents (A) and spouses (B).

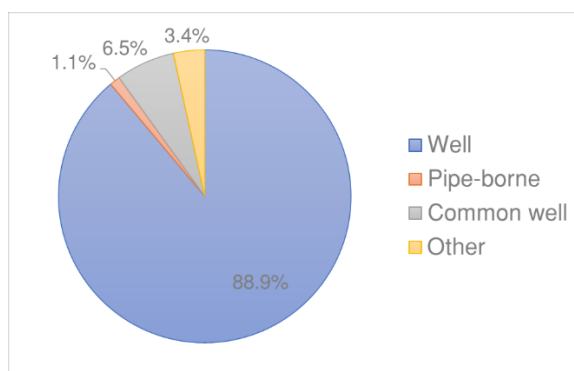


Figure 27 Pie chart of the source of water according to households.

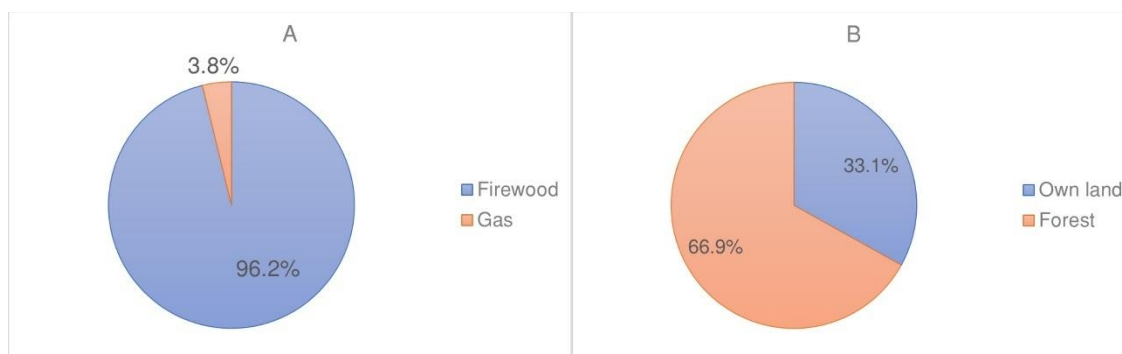


Figure 28 Pie charts of the energy source for cooking (A) and the source of firewood (B) according to households.

Table 12 Responses to questions on deforestation, soil erosion, loss of wildlife species and whether respondents felt climate change has caused these changes.

Question	Primary respondent		Spouse	
	Yes	No	Yes	No
Have you observed deforestation?	72.9%	27.1%	71.3%	28.7%
Have you observed soil erosion?	65.8%	34.2%	94.9%	5.1%
Have you observed loss of wildlife species?	70.6%	29.4%	69.3%	30.7%
Do you feel climate change has caused these changes?	84.7%	15.3%	86.0%	14.0%

Most households felt the quality of water was good. A small proportion felt it was not of good quality. Most households depend on groundwater drawn from wells and on firewood from the forest for cooking. Most primary respondents and spouses have perceived deforestation and loss of wildlife species. Most of them have perceived soil erosion; a higher proportion of spouses have perceived this compared to primary respondents. Most primary respondents and spouses felt that climate change was responsible for the observed impacts.

5.2.2.3. Crop cycles

This section provides data on the crop cycles per year, whether they have reduced or increased, the causes for the change and the number of years these changes have been occurring.

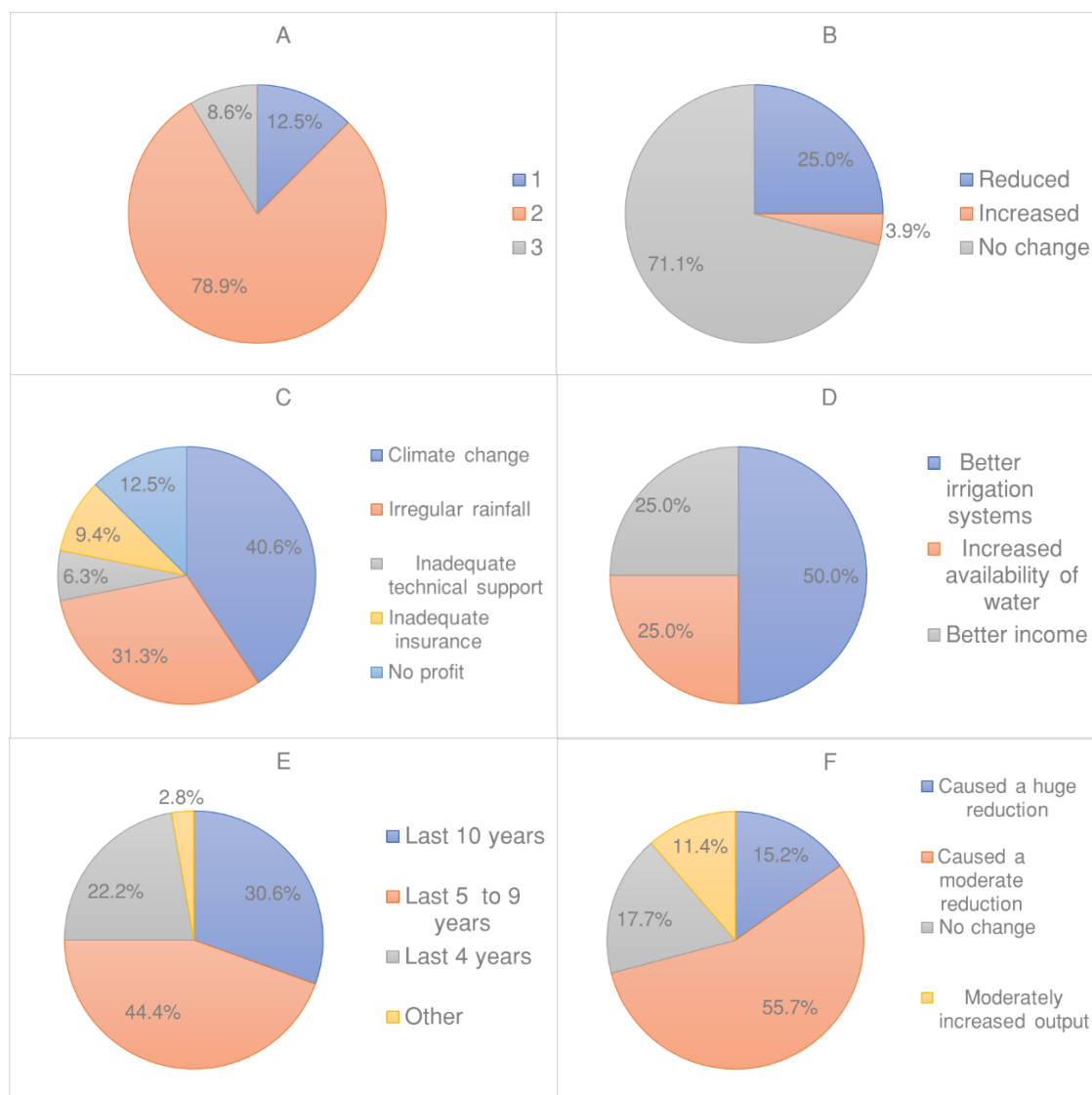


Figure 29 Pie charts depicting crop cycles per annum (A), whether they have increased or decreased (B), the reasons for reduction (C), the reasons for increase (D), the number of years

of crop cycle inconsistency (E) and the extent to which climate change induced changes in crop cycles have changed output in the last ten years (F) according to primary respondents.

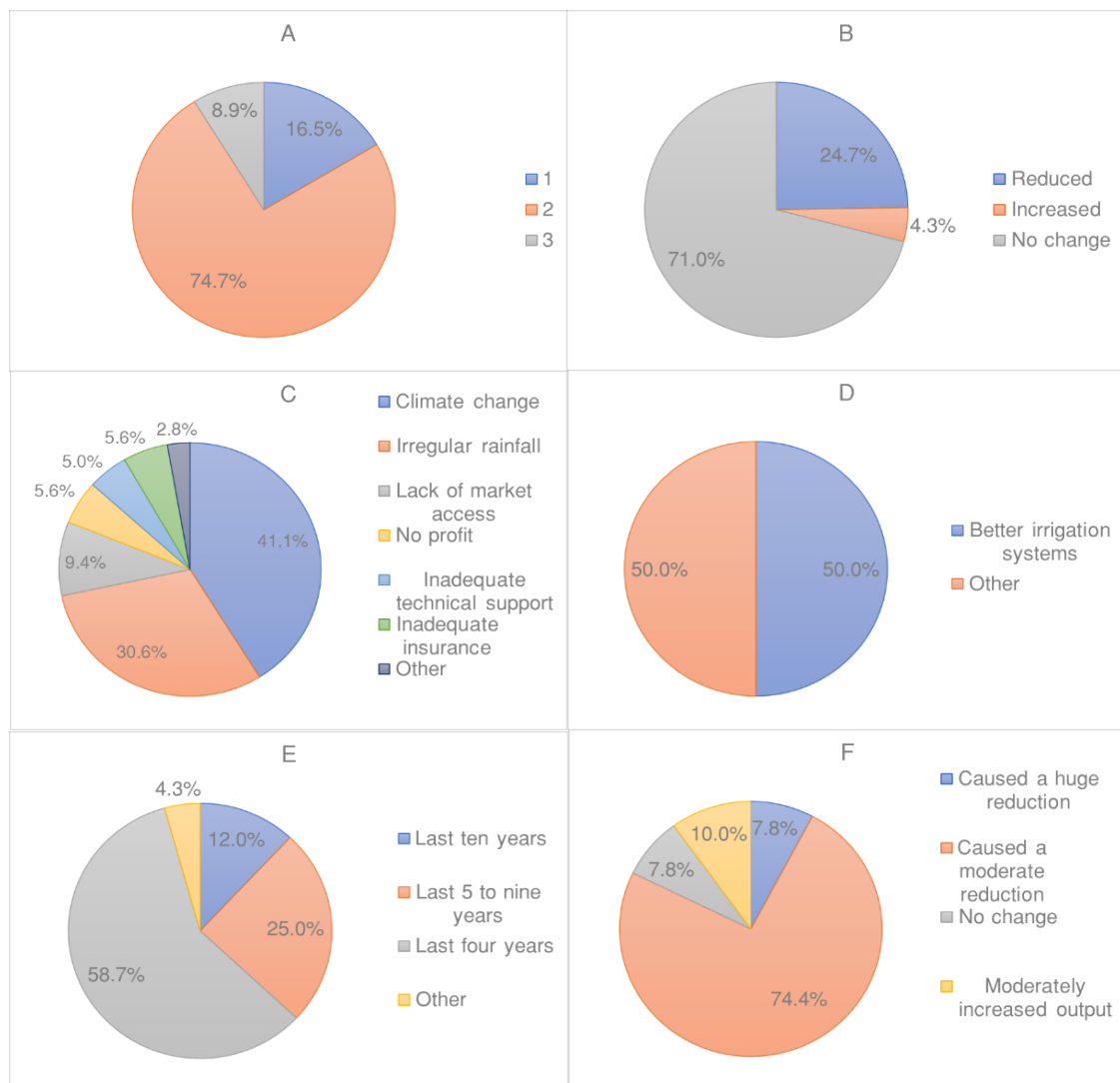


Figure 30 Pie charts depicting crop cycles per annum (A), whether they have increased or decreased (B), the reasons for reduction (C), the reasons for increase (D), the number of years of crop cycle inconsistency (E) and the extent to which climate change induced changes in crop cycles have changed output in the last ten years (F) according to spouses.

Most primary respondents and spouses felt there has been no change in crop cycles but 25% of them felt they have reduced. Primary respondents felt the main causes were climate change, irregular rainfall and lack of profits. Spouses felt the main causes were climate change, irregular rainfall and lack of market access. The number of respondents who felt crop cycles have increased was insignificant. Most primary respondents felt the changes have occurred in the recent 9 years. Most spouses felt the changes have occurred in the recent four

years. Most primary respondents felt that climate change had induced a change in crop cycles and their agricultural yield in the last ten years. A higher proportion of spouses felt the same way.

5.2.2.4. Knowledge of climate change

The results in this section show the knowledge of the household on climate change and how severe they felt its impacts had been.

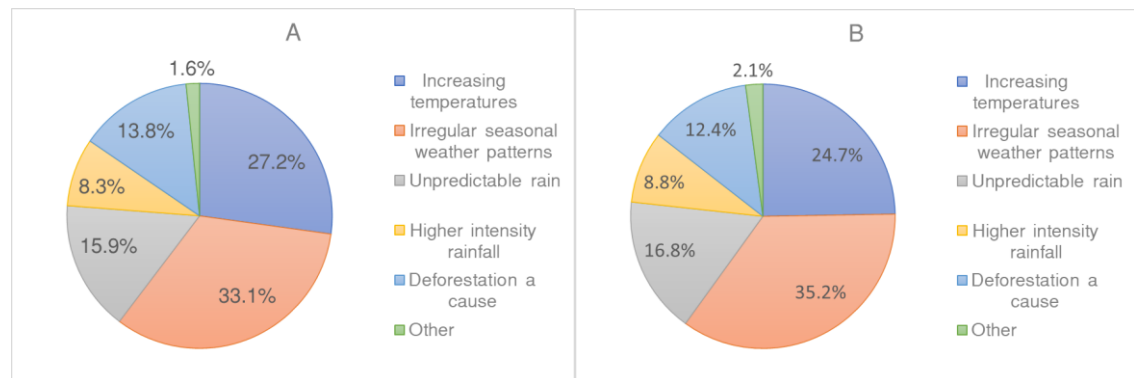


Figure 31 Pie charts of knowledge of climate change according to primary respondents (A) and spouses (B).

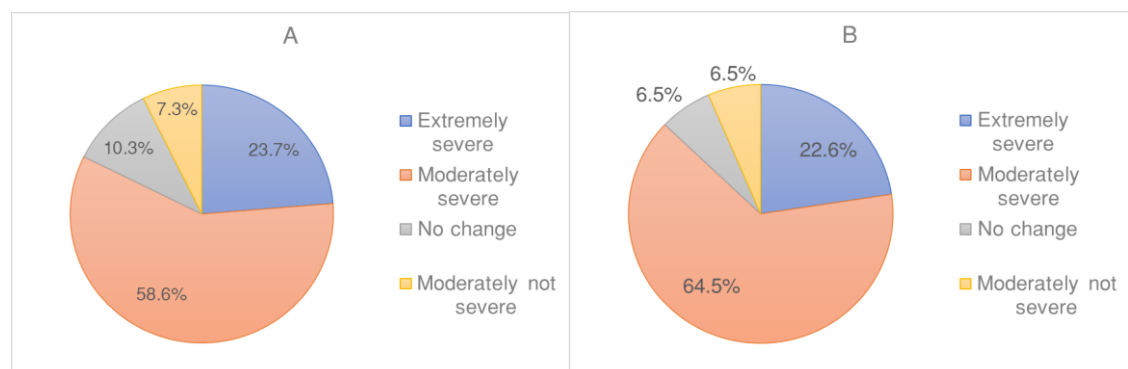


Figure 32 Pie charts of the perceived severity of climate change impacts according to primary respondents (A) and spouses (B).

Both primary respondents and spouses gave similar indicators of climate change including increasing temperatures, irregular seasonal weather patterns and unpredictable rain. Most primary respondents felt the impacts of climate change have been severe. A higher proportion of spouses were of the same opinion.

Further elaborating in household surveys, one respondent commented:

“One of the worst [causes] is deforestation.”

Another commented:

“Uneven conditions make it impossible to cultivate properly.”

A third observed:

“Climate change is also caused by human activities.”

5.2.2.5. Focus group discussions

The focus group from Piramanthanaru, a village in Kannainagar near Chundikulam National Park, told us how migration affected their livelihoods:

“We were relocated from Elephant Pass (in the Vavuniya district) in 1990 due to the conflict. We were farmers and were forced to become fishermen, and we still practise agriculture in Elephant Pass for half the year, during the North-East monsoon, when fishing is not possible.”

Another focus group from Udaiyaarkaadu said:

“We came here in 1977 due to riots from Kandy, Matara, Kekirawa, Anuradhapura and Ratnapura. In 2004 we faced the tsunami. In 2009 we were forced to leave because of the war.”

On agricultural yields, the focus group in Vallipuram had this to say:

“Our yields in rice paddy, groundnuts and purple yam are decreasing.”

The focus group in Suthanthirapuram said:

“It rained unexpectedly in April (2023) when it is not expected, and it affected our groundnuts and black gram.”

The focus group in Piramanthanaru said:

“The weather is getting drier and warmer and there is less catch in the sea.”

The focus group in Manikapuram explained:

“We planted after the rainy season ended and within days it rained again. Whatever we planted got destroyed. It stopped raining and we planted once more. Again, the rain started, and we lost our crops once more.”

On loss of biodiversity the focus group in Manikkapuram said the whole area was forestland when they first came in 1997 and that:

“There are outsiders who come into the forest just five kilometres from here and cut down trees for furniture and home building.”

On the quality and availability of water respondents from Manikkapuram and Vallipuram said:

“Our well water has become yellow and cannot be used and we feel it is because of the war.”

The focus group in Udaiyaarkaadu had this to say:

“There is water, but we don’t have ways to extract it. Also, there are no ponds nearby and we depend on well water.”

On climate change, the results of focus group discussions can be summarised as follows. Heat patterns have reduced between April and June, there is less rainfall during the monsoon season, mornings are colder and there is less catch in the sea. Moreover, there was unexpected rainfall in April which affected production of groundnuts and black gram. There was also excessive rain in 2022 and insect attacks for maize and coconut trees. On land cover change, they have observed increased deforestation and that there is destruction of the environment with no efforts towards preservation.

5.3. Discussion



Figure 33 Photograph of the landscape in Puthukkudiyiruppu

The key drivers of LULCC change over the 42 years between 1979 and 2020 will be discussed in section 5.3.1. This will be followed by a discussion of the social and climatic drivers of LULCC in section 5.3.2. and the identification and assessment of future LULCC between 2020 and 2030 in section 5.3.3.

5.3.1. The drivers of land use and land cover change

Land use for settlements

Settlements are the main driver of change with the largest change in land use. Their outward migration between 1979 and 2010 due to conflict in the Mullaitivu district caused their reduction and lower land use. However, from 2010 to 2020, IDPs were resettled in Puthukkudiyiruppu, influencing changes in land cover. Corroborating this, census data shows the population of Mullaitivu district grew from 92,200 in 2012 to 137,511 in 2019, an increase of 49% within eight years. This influence of shifting population is highly visible in the land use

maps (Figure 16) which reflect the reduction of settlements due to conflict in 1997, limited conversion for settlements in 2010, and significant conversion in 2020. In the change detection maps, these changes are visible in the Southwest quadrant in 2010 during the early stages of resettlement. Thereafter, this is visible clearly in 2020, with increases in the same quadrant, as well as the Northern, Northeastern and Southeastern quadrants. Also visible is the intrusion of settlements into forest cover in the same quadrants. The conversion of other land classes to settlements between 1997 and 2020 is also evident in the change detection maps, of forest cover, palm, soil, and rice paddy (Figures 18,19 and 21).

Land use for agriculture

Agriculture is a key driver of LULCC, with the majority (77%) of the primary respondents in Puthukkudiyiruppu engaged in farming. Rice paddy is the main type of grain grown in Sri Lanka due to domestic food preferences with per capita consumption of 100 kgs per annum (Senanayake and Premaratne, 2016). Among households, 13.1% engage in rice paddy, and it is a key driver of land cover change, with 22.4% of land usage in 2020 as shown in Table 7. How agriculture influenced LULCC can be seen in the changes between 1997 and 2020 to land use for agriculture with transformation of cover with forest, palm, other vegetation, soil and wetlands, and settlements to rice paddy (Figures 18, 19, 20 and 22). Among them, the classes most visibly affected are forest, palm, settlements, soil, and wetlands. These changes also confirm the findings that soil, and wetland cover have reduced during this period (Tables 9 and 10).

Land use for built-up areas

Built-up areas scattered across the study area constituted 1.6% of the total land cover in 2020 and has grown significantly between 1997 and 2020. The slight growth of built-up areas between 1997 and 2010, can be explained by the addition of war-related installations such as armed force camps and high security zones during and after the conflict and the construction of infrastructure after it ended (Saparamadu and Lall, 2014; Correspondent, 2012). The sharp increase between 2010 and 2020 reflects the increase in commercial buildings and government expenditure on infrastructure in major towns that were inaccessible during the war. Such towns include Puthukkudiyiruppu, which was the theatre of war in the final months of conflict (Tikku, 2016). Corroborating this, increase in urbanisation with potential impacts caused by unplanned construction is reflected in post-war studies (Mathivathany, 2016;

Raveendran and Tharani, 2014). Further, clusters are visible in the Southwest quadrant close to the settlements, and in the Southeast quadrant in the map for 2020, that were not there in 2010 (Figure 16).

Forest cover

Forest cover has remained consistent between 1979 and 2020. However, resettlements have caused conversion of forest cover in the period 2010 to 2020 (Figure 15). Further, there was conversion of forest lands to paddy and settlements between 1997 and 2020 (Figure 15). Second, the land use map for 2020 shows how post-conflict resettlements have taken place in the periphery of land with forest cover (Figure 18). Most households in Puthukkudiyiruppu depend on firewood sourced from the forest (Figure 28). This could impact forest cover and requires further investigation with studies from other parts of the world indicating this could result in loss of biodiversity (Nascimento et al., 2019; Epilla, 2014). Further, corroborating the loss of biodiversity, most primary respondents and spouses have observed deforestation, soil erosion and loss of species with similar findings in focus group discussions (Table 12).

Palm trees cover

This cover class includes palmyra and coconut trees and other palm varieties since they could not be differentiated in the GIS analysis. The extent to which palm has driven land cover change is evident in the tables providing data on land use maps and the change detection maps. Its planned planting and importance of usage in enhancing livelihoods has influenced its increase between 2010 to 2020, resulting in an overall increase of 66.3% over the 42 years. Its growth is evident in the conversion of other vegetation (Figure 19), rice paddy (Figure 21) in the central area (Figure 16) and in significant replacement of settlements spreading from the central area towards the East and Southeast (Figure 19). This growth is also highly visible in the geospatial maps for 2010 and 2020 (Figure 16). Conversely, palm has also been displaced significantly by settlements and paddy in the same regions (Figure 18).

Palm trees have been a significant constituent of positive land cover change, with several key factors responsible for the growth. First, it is traditionally used by villagers in cottage industries to produce a range of products (Section 5.3.3.). Second, a key informant from the Palmyra Development Board stated that they actively develop products and licence them to private companies to encourage the propagation of the palmyra industry and create employment, and that palmyra tree planting campaigns occur annually with technical

guidance as well as seeds and small plants. Third, there have been palmyra tree planting efforts by the local government of Mullaitivu reflected in their annual reports (District Secretariat - Mullaitivu, 2020). As mentioned in Chapter 2, coconut tree plantations reduced significantly due to the war in the Northern Province (Vaikunthavasan, 2018). However, recent encouragement of planting coconut trees in the region by the national government also explains the growth in palm tree cover (Presidential Secretariat of Sri Lanka, 2024).

Soil cover

Soil is open ground and was selected to represent data that did not fall into any of the other nine classes. Figure 19 shows there is a shift in soil cover from 1997 to 2020. Further, there has been conversion of soil to palm and inland water bodies. From a negative perspective, anthropogenic activities have been a key driver of change, with soil being transformed to paddy and settlements.

Wetlands and saltpans cover

Wetlands was the land cover class that was most significantly affected. Between 1997 and 2020, there has been a transformation of wetlands to rice paddy and seawater ingress which can be seen in the Northern quadrant of the study area (Figure 16). Wetlands have also been transformed to soil which is visible in the North-Eastern and Eastern quadrants. For saltpans, the primary driver of positive change was between 1997 and 2010 due to minimal anthropogenic activities along the coastline during the conflict. The subsequent reduction in saltpans cover between 2010 and 2020 was caused by human activities as well as rising sea levels due to climate change. These influences are evidenced by the transformation of salt pans to wetlands in the change detection maps in the Northern quadrant near the sea (Figure 20).

Other vegetation cover

Other vegetation was selected as a class to represent plant life, small crops and bushes that do not reflect the characteristics of forest, palm, and rice paddy. Among these changes, from a positive perspective, other vegetation has been transformed into forest and palm cover, reflecting the regeneration of forest cover over time. These changes are visible in the Northern, Southern and Central quadrants. From a negative perspective, anthropogenic activities have been a key driver of change, with other vegetation being transformed to paddy, small crops and settlements (Figure 16).

Water bodies cover

Cover with water bodies is the largest constituent of land cover (45.7% in 2020) and has remained consistent over the 42 years. However, the conversion of water bodies to salt pans and wetlands is visible near the coast especially in the Northern quadrant (Figure 21). This change indicates that seawater intrusion is occurring.

5.3.2. The social and climate drivers of LULCC change

Ecosystem services provide natural capital such as water and land for human wellbeing (Costanza et al., 2017; Carpenter et al., 2009). Climate change is driven by both natural and anthropogenic factors, affects ecosystem services and impacts livelihoods. From a LULCC perspective, climate change influences the way people use land which in turn influences climate change (Malhi, Kaur and Kaushik, 2021; Deng et al., 2013).

From a livelihood perspective, the findings show climate change is affecting the people in the study area by influencing changes in crop cycles. Second, there is variation in water quality, as pointed out by two of the five focus groups, which is also affecting livelihoods. Further, focus groups spoke of reduction in agricultural yields, unpredictable rains which affect their planting seasons, warmer and drier weather and less catch in the sea. Third, there is reliance on firewood for energy needs. From the perspective of biodiversity there is loss of species, loss of forest cover and soil erosion. Second, climate change with rising levels of seawater is influencing changes in land cover near the coast between 1997 and 2020. Due to this, wetlands, soil and saltpan cover have lost ground. Meanwhile, water quality is diminishing in areas abutting the ocean and other water bodies. As a result, there is a shifting and unplanned use of land over time for settlements and rice paddy evident in the change detection maps. A large extent of land used for rice paddy has been converted to settlements (Figure 21). Second, palm cover and wetlands have been displaced by settlements and rice paddy (Figures 18 and 20). These changes of land use locations are being influenced by climate change. Further, these factors could contribute to ecosystem services being compromised and to climate change.

Local studies substantiate these findings by showing problems faced in the Jaffna peninsula with the increasing levels of seawater and the abandonment of rice paddy fields over time due to increasing salinity near the coast (Gopalakrishnan, Kumar and Mikunthan, 2020;

Gopalakrishnan and Kumar, 2020). Other studies show that water quality has deteriorated and that periods of drought are increasing (Meegahakumbura and Nanayakkara, 2023; Nagamuthu et al., 2022). Wetlands play a vital role in regulating the quality of water, preventing droughts and controlling floods and in climate regulation, support of biodiversity and carbon sequestration (Verhoeven and Setter, 2010; Mitsch and Gosselink, 2000). Further, they contribute to livelihoods such as fishing and shrimping (McNally, Uchida and Gold, 2011). Therefore, their reduction will have environmental and anthropogenic consequences. Further, reduction in wetlands and other natural capital will have consequences for tourism. This is elaborated further in the next section.

5.3.3. Predicted land use and land cover by 2030

As discussed so far, social drivers have influenced land use changes between 1997 and 2020. Further, climate change is causing seawater intrusion and influencing changes in land use and over-extraction of water. These anthropogenic activities are in turn contributing to climate change.

As the predictive map and accompanying table show (Figure 23, Table 11), settlements will increase substantially by 2030. Due to population growth, natural land cover with other vegetation, wetlands and palm will reduce considerably, while cover with forests, soil and saltpans will reduce marginally. Second, other vegetation includes regenerating trees and chena cultivation whereby small areas of forest are cleared for cultivating small crops. The reduction of palm and other vegetation for unplanned agricultural use will hamper the regeneration of forest cover and affect livelihoods. Third, as discussed in section 5.3.2., the social and climate drivers of LULCC are causing shifts in use of land for settlements and agriculture. Further, there will be an increase in water bodies (13.4%), reduction of wetlands (23%) and a reduction of other vegetation (25.7%) by 2030. Climate change will contribute to these changes with seawater ingress reflected by the predicted increase in water bodies. The influence of these climate and social drivers with climate change and population growth will escalate, rendering failures in ecosystem services to provide natural resources such as arable land and water by 2030. As a result, the livelihoods of the people in the study area will be affected due to deterioration of natural capital. This impact on livelihoods will create a vicious cycle whereby people will convert more land with natural cover for agriculture. Therefore, there is an urgent need for land and resources to be planned and used more sustainably to

rebalance social-ecological systems for the regeneration and growth of natural capital. If not, ecosystems will further erode by 2030.

From a tourism perspective, wetlands play a crucial role in an emerging trend of wetland-based nature tourism which provides tourist activities such as boating, fishing, viewing the natural habitat and wildlife and permits local community participation and has been successful in Sri Lanka and in other parts of the world (Marasinghe et al., 2021; Ma et al., 2018; Lee and Hsieh, 2016; Chiu, Lee and Chen, 2014). Moreover, forest-based tourism has been shown to be successful in increasing tourism with natural attractions, wildlife and hiking (Chen and Nakama, 2013; Kuvan, 2005). Forest and wetland systems are interlinked due to their influence on surface water retention, with changes in one affecting the other (Mallick and Chakraborty, 2018). Therefore, the predicted reduction of wetlands in the study area has serious implications for the preservation of biodiversity and ecosystem services. This, in turn, will influence the introduction of tourism economies that use wetlands and forests. Second, land cover with palm composed of palmyra and coconut will reduce substantially (18.8%). Palm trees play a vital role in carbon sequestration (Gnanavelrajah et al., 2023; Bhagya, Maheswarappa and Bhat, 2017). Further, palm trees contribute to livelihoods that in turn contribute to tourism with palm-based products such as the fruit and handicrafts. This also reflects the local culture in the sustainable products made from its dry leaves and fruit, and the cottage industry it supports (Jitpakdee et al., 2025; Elsamanoudy, Mahmoud and Alexiou, 2024). The Northern Province has a large population of palmyra trees that can support sustainable livelihoods and tourism. While the social benefits of coconut have been well established, similar studies on palmyra's benefits are limited (Sivaji and Aheeshan, 2021; Deen et al., 2021; Kumarasinghe, Subasinghe and Ransimala, 2016; Nilushiny et al., 2015; Agyemang-Yeboah, 2011). Further, the cottage industry for palmyra based products such as jaggery (a natural sugar made from the sap), flour and fruit drinks is underdeveloped in terms of product development and market access, and shows potential to develop livelihoods (Karthigayini, Sahana and Sinthujan, 2020). Therefore, its preservation must be addressed.

The findings suggest that alternative pathways are needed that contribute towards achieving the SDGs targeted by the UN for 2030 by influencing sustainable land and resources (Kariuki et al., 2022). In this regard, nature tourism and agritourism were developed in Mastatal, Costa Rica to influence sustainable farming practices (Little and Blau, 2019). Further, as shown in the Introduction and Chapter 2, nature tourism supports positive environmental outcomes and

agritourism socioeconomic ones. Therefore, hybrid tourism, which I will assess in Chapter 8, may have the potential for sustainable land use in the study area with the adaptation of the relevant eco-centric and anthropogenic SDGs.

The reduction of land cover to support settlements and agriculture discussed in this chapter has been observed in other studies (Kilama Luwa et al., 2021; Gbanie, 2015; Wilson, 2014). Further, the discussion on LULCC broadly agreed with studies using LULCC analysis in Mullaitivu. In a region next to Puthukkudiyiruppu, a study of LULCC between 1997 and 2016 shows marginal conversion of forest cover and bare land over time with increases in water bodies and agriculture (Pathmanandakumar, 2020). In a study of Mullaitivu with LULCC analysis between 1994 and 2022, forest cover has reduced marginally, and bare land and water bodies have increased (Rajeevan et al., 2023). However, the study shows reductions in farmlands and built-up areas which differs from the results in this chapter. This difference can be attributed to the variation in the number of land classes and temporal and spatial differences. Agricultural output is predicted to decline globally in studies from other parts of the world (Malhi et al., 2021; Calzadilla et al., 2013). Further, climate change is influencing soil degradation, reduction of nutrients and an increased reliance on groundwater for agriculture (Yang et al., 2024). It can be inferred that climate change is affecting agricultural output based on the lower crop cycles and water quality like these studies. To mitigate these impacts, reforestation must be undertaken of endemic trees and palm, and wetlands must be restored. This will contribute to rebalancing the ecosystem over time. Further, it will result in socioeconomic benefits through a palm-based cottage industry and fishing livelihoods with improved shrimping and fishing. Moreover, it will provide protection from disasters such as floods and improve surface water (Mallick and Chakraborty, 2018; McNally et al., 2011; Verhoeven and Setter, 2010; Mitsch and Gosselink, 2000).

5.4. Summary

In sum, climate and social drivers of LULCC have accelerated and influenced LULCC since the war ended in 2009. If similar LULCC continues, several land cover classes such as wetlands, palm and other vegetation that make up the study area's natural capital will reduce substantially by 2030. The study area, with the Chundikulam National Park and significant wetland cover, has potential for both wetland and forest resources to be used for nature tourism with hybrid tourism. However, the predicted conversion of land cover with natural

capital due to social drivers such as land use for settlements and agriculture, and climate change influencing land cover with seawater ingress could affect this potential. This could have wider implications for Sri Lanka since wetlands tourism is an emerging trend that could be used to increase sustainable development with tourism. (Farkic et al., 2021; Lamsal et al., 2016; Sharma et al., 2015)

6. Results and Discussion: Socioeconomic activities and drivers for regions affected by conflict

6.1. Introduction

Globally, land use by smallholder farmers is estimated at 24% of available agricultural land with a crop production of 28-31% of world demand (Ricciardi et al., 2018). Smallholder farmers depend on agriculture for self-sustenance and for subsistence income, with poverty and resettlement influencing land use (Ge et al., 2019; Gbanie, 2015; Wilson, 2014; Kostov and Lingard, 2002). Studies also show how agriculture alleviates people from poverty (Christiaensen, Demery and Kuhl, 2011; Cervantes-Godoy and Dewbre, 2010). Sustainable tourism could contribute to the wellbeing of such people in Sri Lanka with tourism-related linkages to livelihoods such as agriculture for supply of produce and agritourism. Therefore, it was important to understand the existing livelihoods and how they could be linked to tourism.

In Sri Lanka, 54% of land is used for agriculture with 22% used for home gardens and 14% for rice paddy (Mapa, 2020). Like the rest of the world, the country is facing climate change which is affecting the agricultural sector (Eeswaran, 2018; Esham and Garforth, 2013). 10 years after the war, the people in the Northern Province are still among the poorest in the country with inadequate access to capital, markets, infrastructure and education (Kavitha and Shivany, 2020; Tharmine et al., 2018). The resettled inhabitants in the study area occupy land in the periphery of the Chundikulam National Park for their home gardens. Limited studies on Mullaitivu show income is affected, and that there is poverty, lack of access to finance, markets, good quality land and land ownership and savings (Thayaparan, Neruja and Godwin, 2022; Shalton and Umashankar, 2018).

My aims in this chapter are to build on the findings in the preceding chapter by examining the drivers of socioeconomic activities after the war ended, and the manner this influences and is influenced by natural capital. In this regard, the indicators related to Maslow's hierarchy and other factors will be analysed in the context of the fulfilment of the basic needs, food, clothing and shelter and growth needs. This analysis will provide insights on how fulfilment of needs influences existing livelihood and land use practices and to what extent these practices are sustainable. This knowledge will then be used in my assessment of hybrid tourism in Chapter

8 to understand whether hybrid tourism could influence sustainable livelihood and land use practices.

The objectives for this chapter are to understand: (1) The needs that drive existing livelihoods, (2) How these needs influence land use practices, and (3) Whether livelihoods can shift to sustainable land use practices in agriculture.

6.2. Results

The results of the socioeconomic indicators in the household surveys for primary respondents and spouses and from focus group discussions are presented in this section.

6.2.1. Household surveys

6.2.1.1. Key demographics

This section provides the key demographics including gender, age, and marital status of primary respondents and spouses.

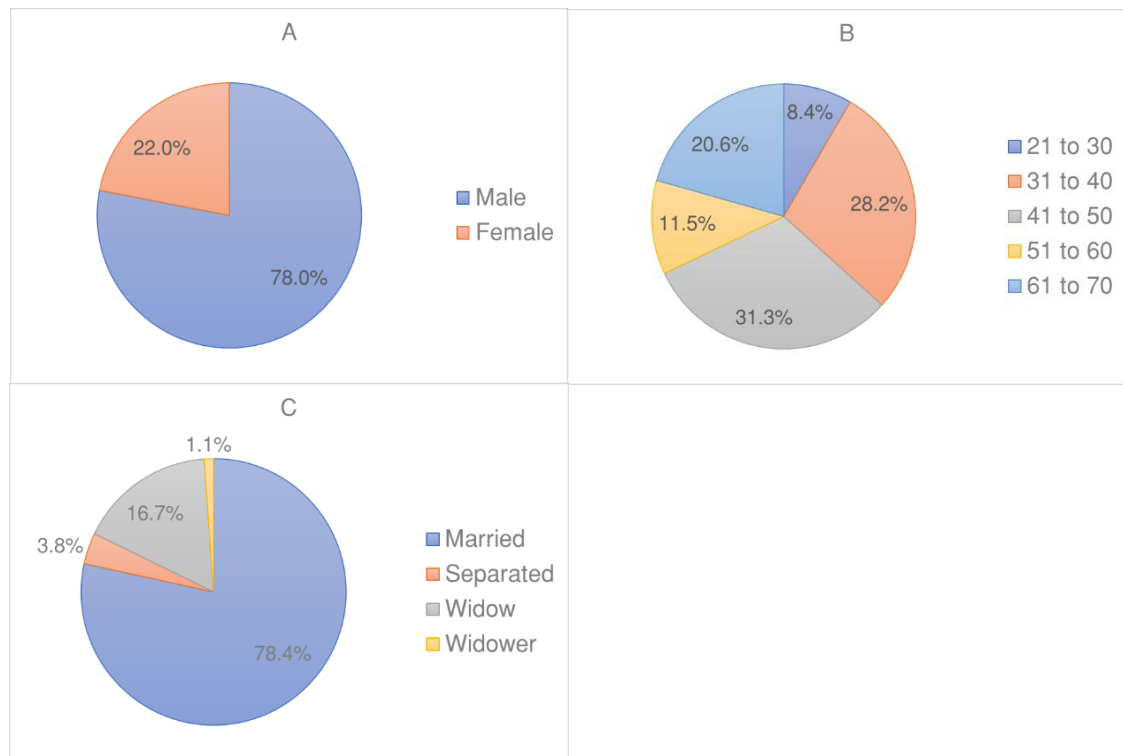


Figure 34 Pie charts showing the gender (A), age (B) and marital status (C) of the primary respondents.

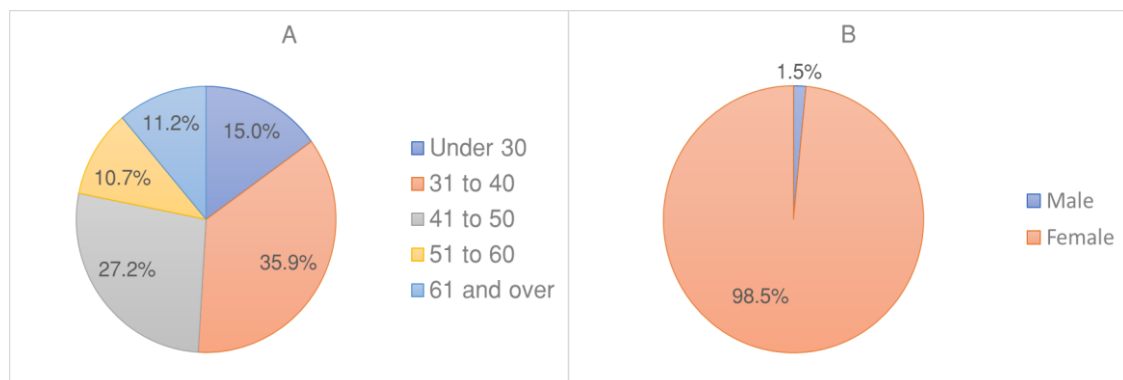


Figure 35 Pie charts showing the age (A) and gender of spouses (B).

The gender of primary respondents was mainly male in the age group 31 to 50. The gender of spouses was almost entirely female in the age group 31 to 50. Most primary respondents were married. A significant proportion of primary respondents were widows.

6.2.1.2. Fulfilment of basic needs

This section presents results on the fulfilment of basic needs in the context of Maslow's hierarchy of needs.



Figure 36 Photograph of a typical partially complete home in Puthukkudiyiruppu, its home garden with palm trees and a ground well.

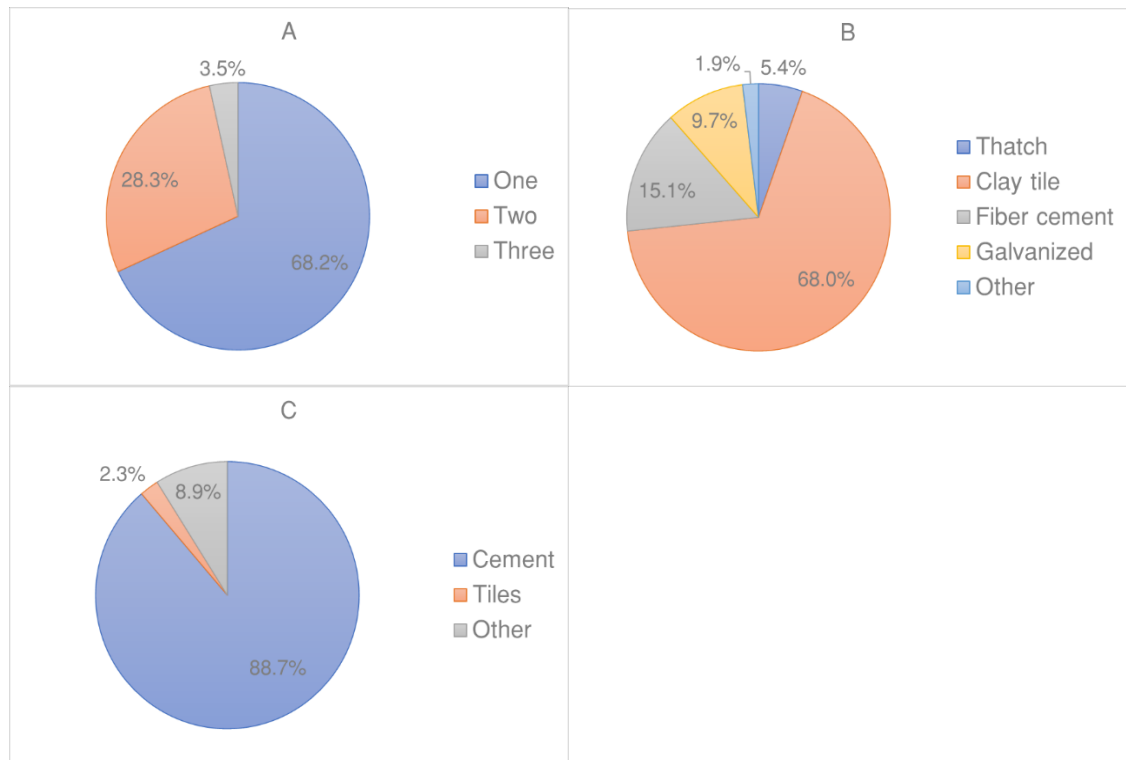


Figure 37 Pie charts showing the number of bedrooms in their home (A), its type of roof (B) and its type of floor (C) according to households.

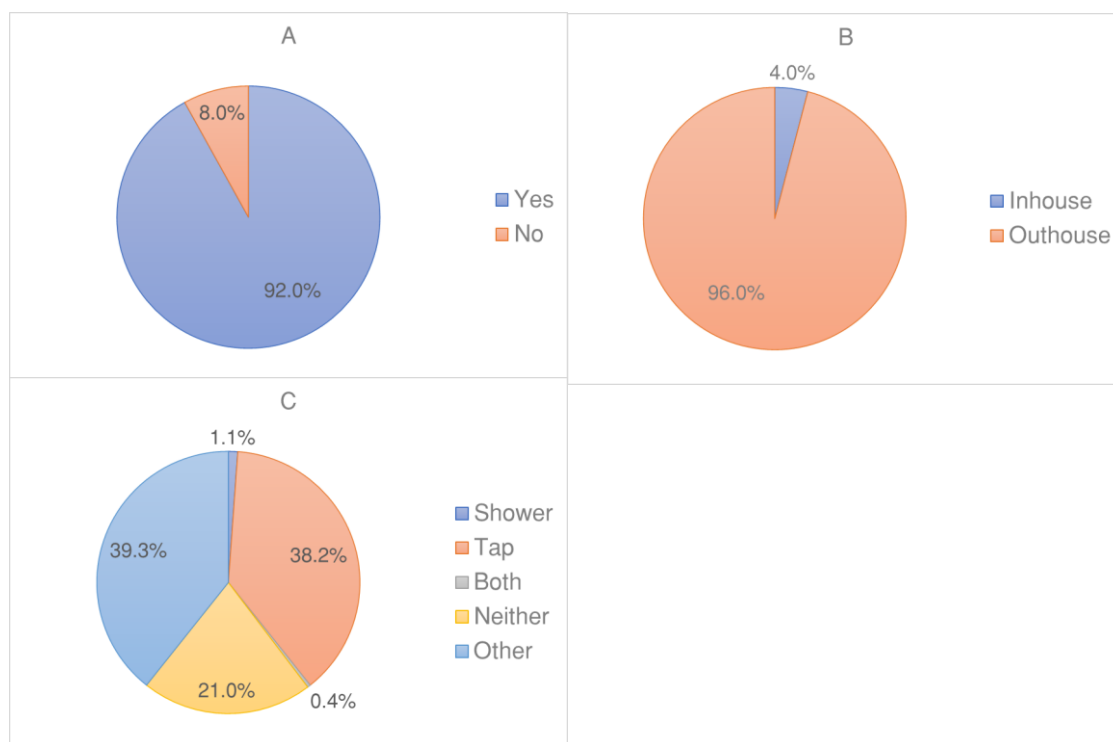


Figure 38 Pie charts showing whether the house has a toilet (A), whether the toilet is inhouse or outhouse (B) and whether there is a shower and/or tap (C).

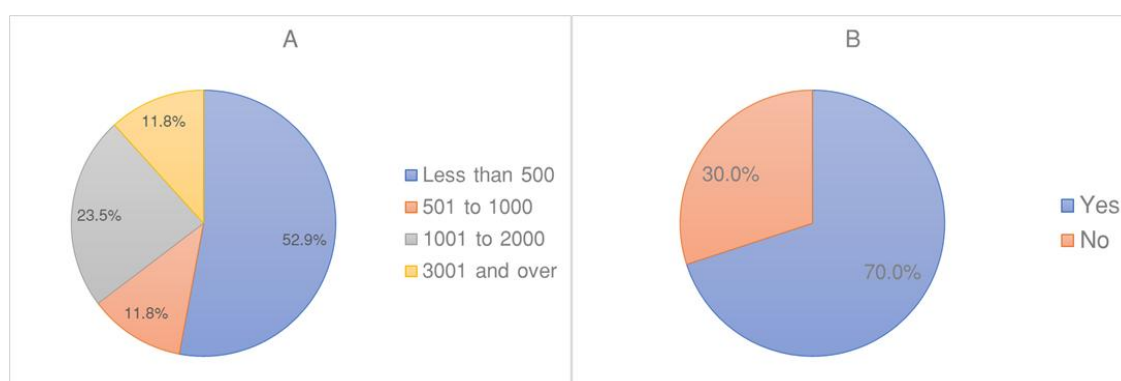


Figure 39 Pie charts of the average electricity bill in LKR (A) and the availability of a television (B).

Most homes have one bedroom, cement flooring, clay tile roofing and outhouse toilets as shown in the results. Some homes have thatch and galvanised (tin) roofs. Some homes have taps. Most homes have televisions, and their monthly electricity bill is mostly less than LKR 500 (US\$ 1.50). Despite having televisions, in focus discussions participants mentioned that they use their televisions and lighting sparingly due to the high cost of energy.

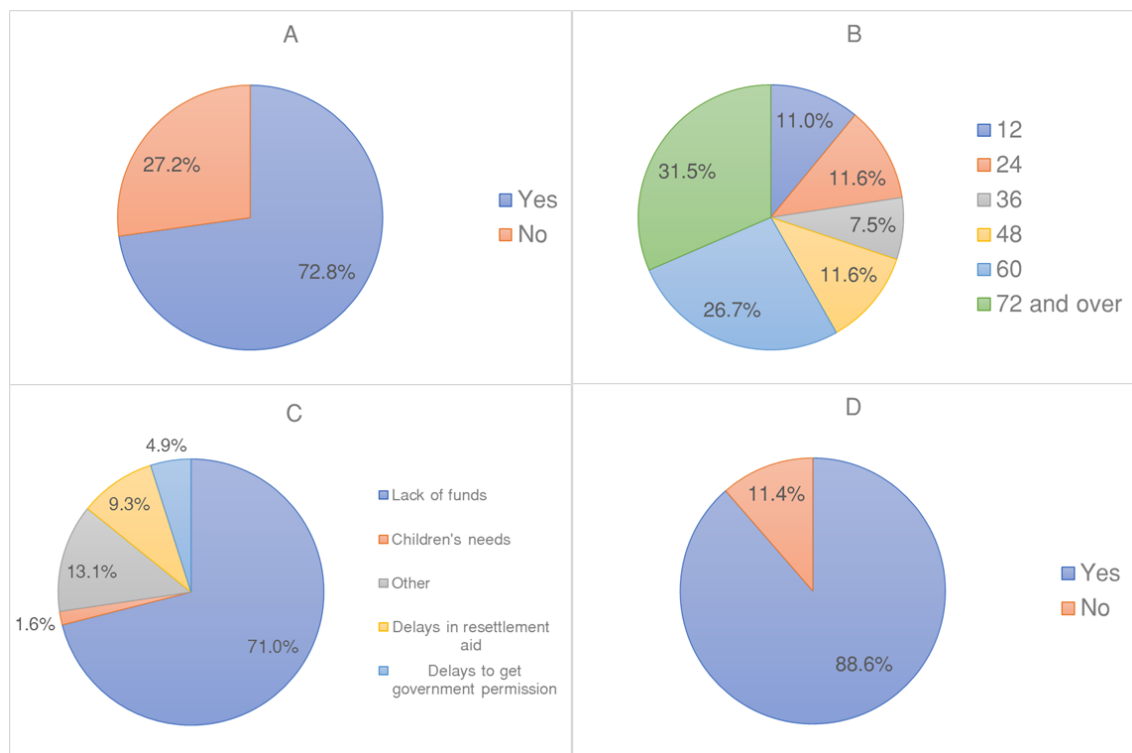


Figure 40 Pie charts showing whether the home is completed (A), the period in months they have been building their home (B), the cause of delay (C) and whether there is dependence on income (D) to improve the home according to the household.

Some households have borrowed to build their homes from mainly banks. Most home loans were under LKR 100,000 (US\$ 300) followed by loans up to LKR 200,000 (US\$ 600). Most households that borrowed were still repaying their loans and were unable to make their loan repayments. Most respondents said they forego livelihood development followed by leisure and meeting children's needs due to loan commitments. These results show that with income being reduced due to home loan repayments, livelihood needs are compromised. Further, foregoing leisure shows that love and belonging needs are unfulfilled in the context of Maslow's hierarchy of needs. Some homes were still incomplete with dependence on income to complete them. Most respondents have taken 5 years and above to complete their homes, with lack of funds cited as the cause of delay. This shows that basic needs in the context of Maslow's hierarchy of needs are not being adequately fulfilled.

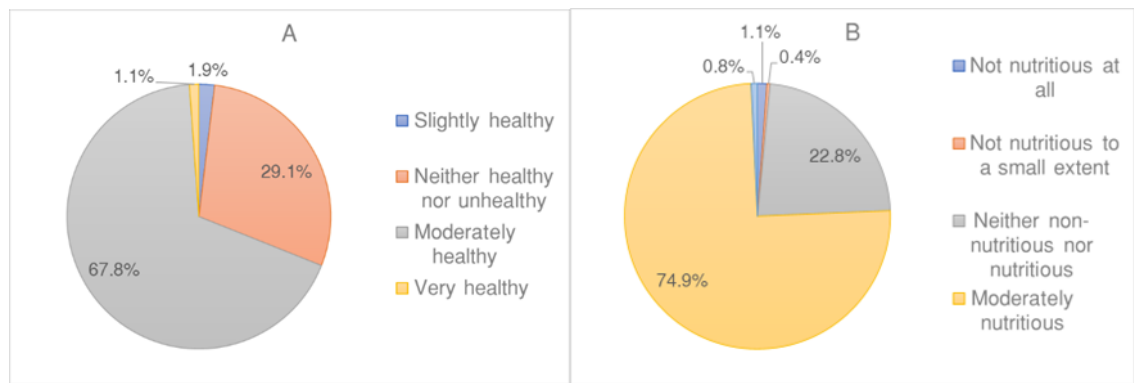


Figure 41 Pie charts showing the extent to which he/she leads a healthy life (A), and the nutritiveness of meals (B) according to primary respondents.

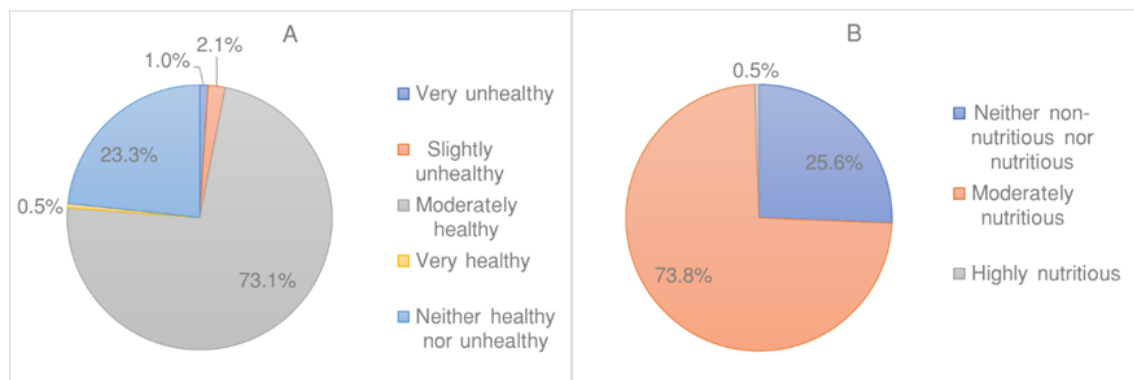


Figure 42 Pie charts showing the extent to which he/she leads a healthy life (A) and the nutritiveness of meals (B) according to spouses.

These results show that most primary respondents and spouses felt they live a moderately healthy life and that their meals are moderately nutritious. However, a significant proportion of primary respondents (29.1%) and spouses (23.3%) were neutral on this question. Further, a significant proportion of primary respondents (22.8%) and spouses (25.6%) were neutral on the nutritiousness of their meals. This suggests that food security is not being met for all respondents and physiological needs in the context of Maslow's hierarchy are not being adequately met.

6.2.1.3. Fulfilment of safety and security needs

This section presents results on the fulfilment of safety and security needs in the context of Maslow's hierarchy of needs.

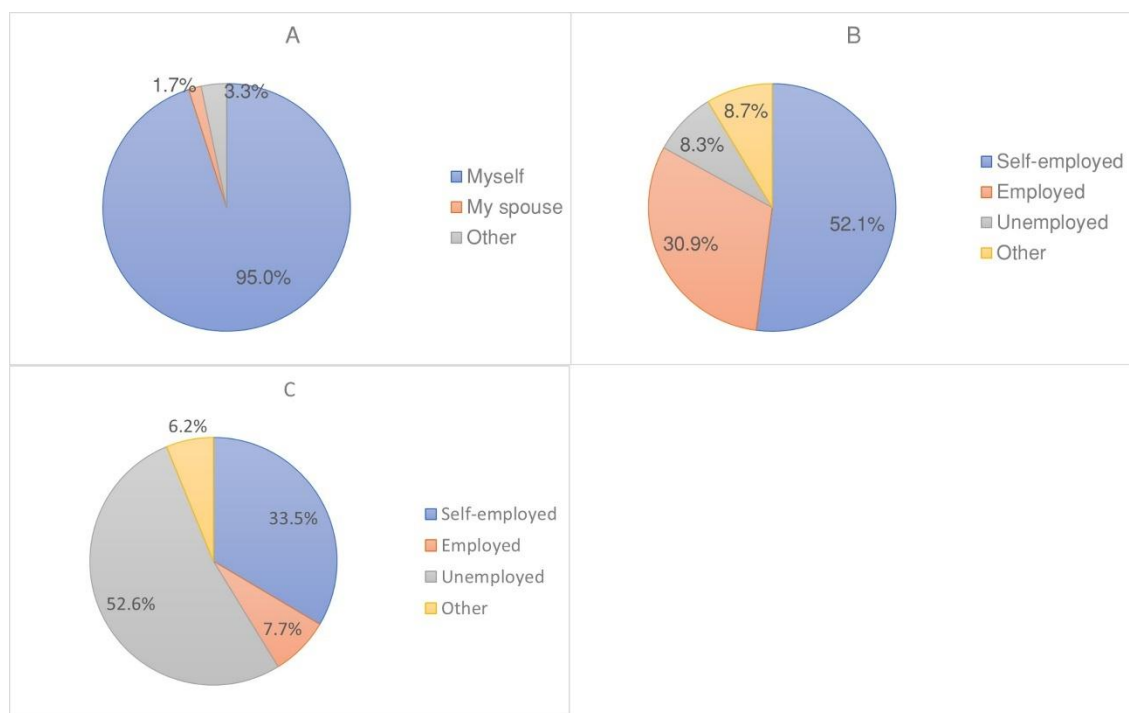


Figure 43 Pie charts showing the main income earner (A) and their type of employment (B) according to primary respondents, and the type of employment of spouses (C).

Table 13 Household income and expenses in Sri Lanka Rupees according to primary respondent.

Category	Minimum	Maximum	Mean	Standard deviation
Income	5000	70000	24393	9391
Expense	2000	70000	23233	9508

Table 14 Household income and expenses in Sri Lanka Rupees according to spouse.

Category	Minimum	Maximum	Mean	Standard deviation
Income	8000	70000	26109	9508

Expense	8000	70000	26703	9391
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These results show that most primary respondents felt they were the main breadwinners including women who were widows. Most primary respondents were mainly self-employed, and most spouses were unemployed. Among the self-employed spouses, there were two working as seamstresses, one as a beautician, and one running an agriculture-related business. The average income earned and expenditure according to primary respondents was LKR 24,393 (US \$81) and LKR 23,233 (US\$ 77). According to spouses these are LKR 26,109 (US\$ 87) and LKR 26,703 (US\$ 89) respectively. This result shows that there is a deficit in income to meet expenditure according to spouses.

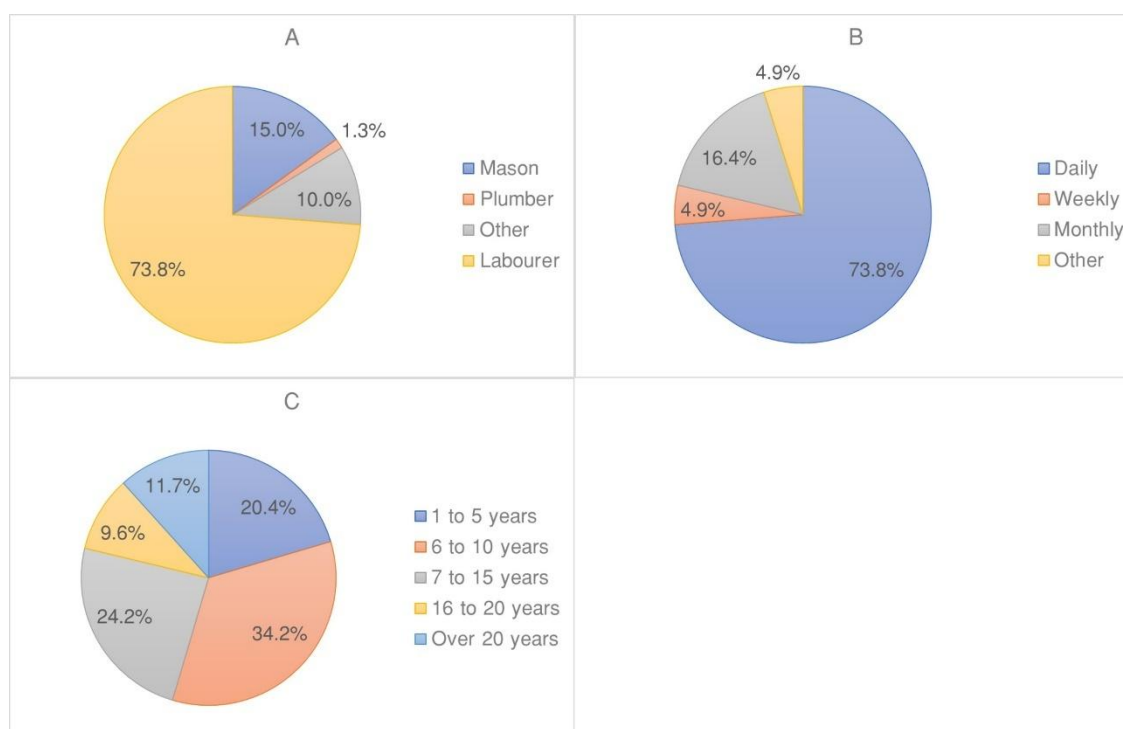


Figure 44 Pie charts showing the nature of employment as a labourer (A), the frequency of wage payments (B) and the number of years of practising their livelihood (C) according to primary respondents.

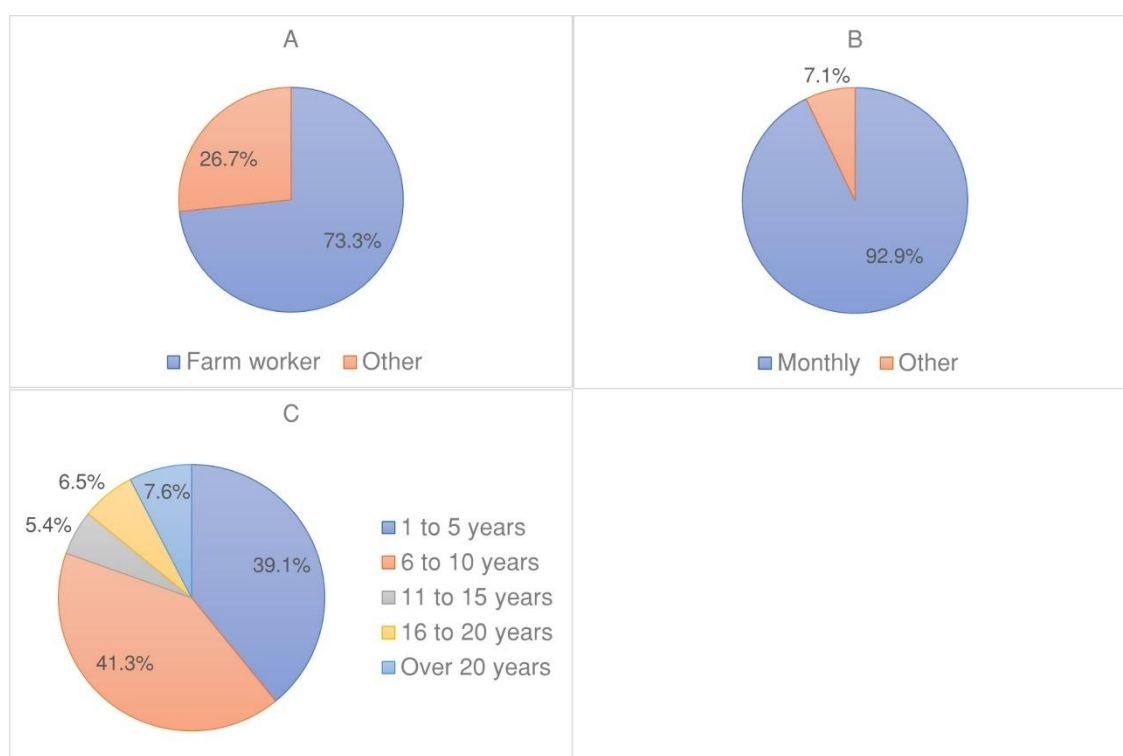


Figure 45 Pie charts showing the nature of employment (A), the frequency of wage payments (B) and the number of years of practising this livelihood (C) according to spouses.

Table 15 Whether respondents were on the employer's payroll with contribution to EPF and ETF, whether income is adequate to meet basic needs and whether they have the required skills for their job.

Question	Primary respondent		Spouse	
	Yes	No	Yes	No
Are you on the employer's payroll with EPF and ETF?	6.1%	93.9%	66.7%	33.3%
Is your income adequate to meet basic needs?	24.6%	75.4%	84.6%	15.4%
Do you have the required skills for your job?	81.5%	18.5%	93.3%	6.7%

Most primary respondents who are employed by others (as opposed to self-employed) work as labourers and are paid daily. Based on results included in Chapter 5, most primary respondents work as farmers and are self-employed. Most spouses work as farmers in their home gardens. Most respondents felt they have the required skills for the work they do and have been practising their chosen livelihoods for up to 10 years. EPF and ETF contributions were being made by their employer for a significantly higher proportion of spouses who were

employed compared to primary respondents. Most primary respondents felt their income was inadequate to meet basic needs whereas most spouses felt it was adequate.

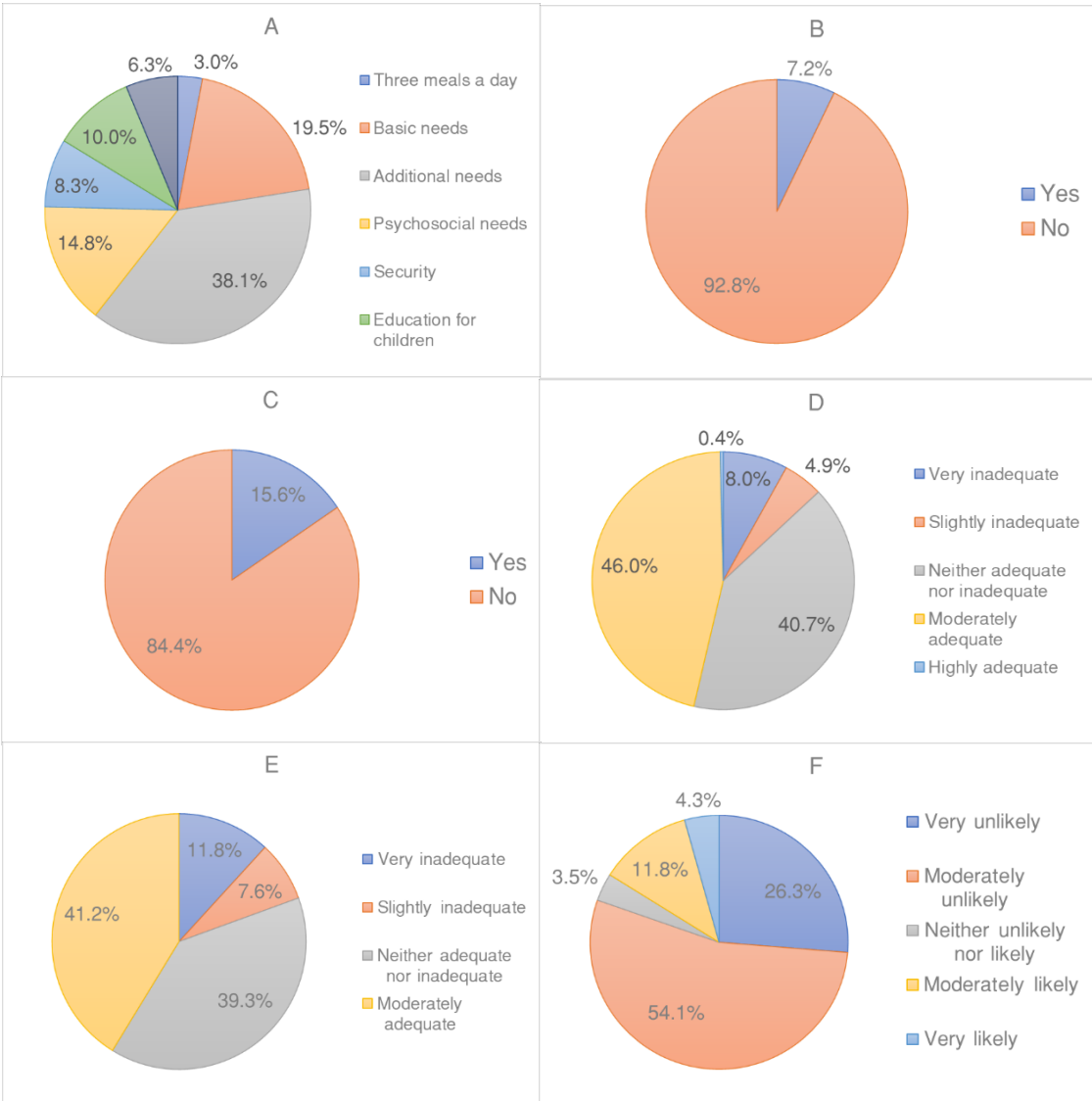


Figure 46 Pie charts showing things unfulfilled due to inadequate income (A), whether there is access to insurance to mitigate loss of income (B), whether savings are available to access during disasters (C), whether income is adequate to meet basic needs (D), whether income is additional needs (E), and the likelihood of their children continuing the same livelihood (F) according to primary respondents.

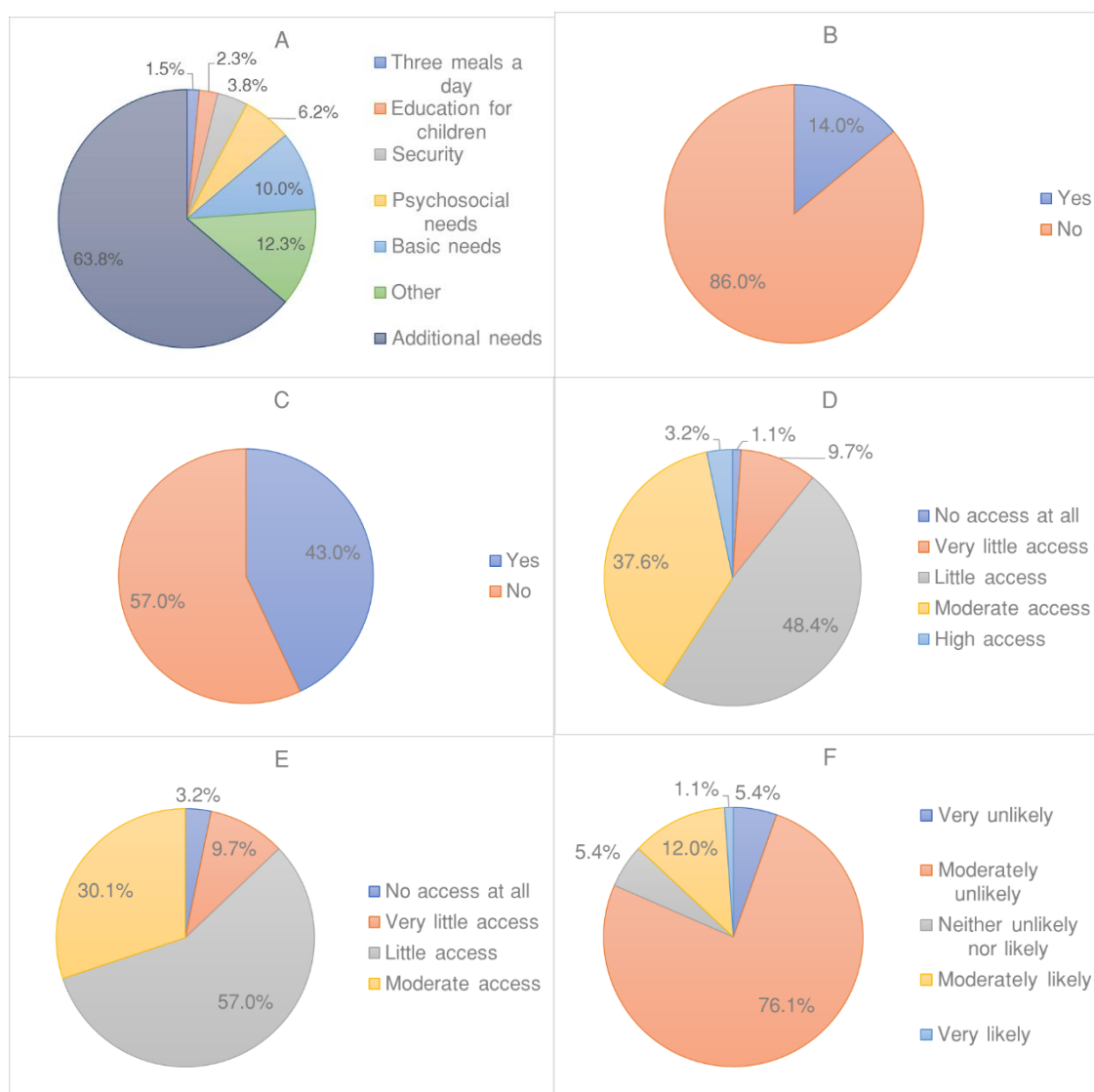


Figure 47 Pie charts showing things unfulfilled due to inadequate income (A), whether there is access to insurance to mitigate loss of income (B), whether savings are available to access during disasters (C), whether income is adequate to meet basic needs (D), whether income is adequate to meet additional needs (E), and the likelihood of children continuing the same livelihood (F) according to spouses.

As per these results, most primary respondents felt their additional needs go unfulfilled due to inadequate income followed by basic needs and psychosocial needs. Among spouses, additional needs go unfulfilled followed by other needs and basic needs. Most primary respondents felt their income was moderately adequate to meet basic needs and additional needs. Most spouses felt they had adequate access to income to meet basic needs and additional needs. Most respondents did not have access to insurance to mitigate loss of income. These results show that most primary respondents and a larger proportion of spouses

cannot meet growth needs in the context of Maslow's hierarchy of needs. Most primary respondents do not have savings whereas a larger proportion of spouses have savings. These results show that the safety needs have not been met in the context of Maslow's hierarchy of needs. Most primary respondents and spouses felt it was unlikely that their children would carry on their livelihoods.

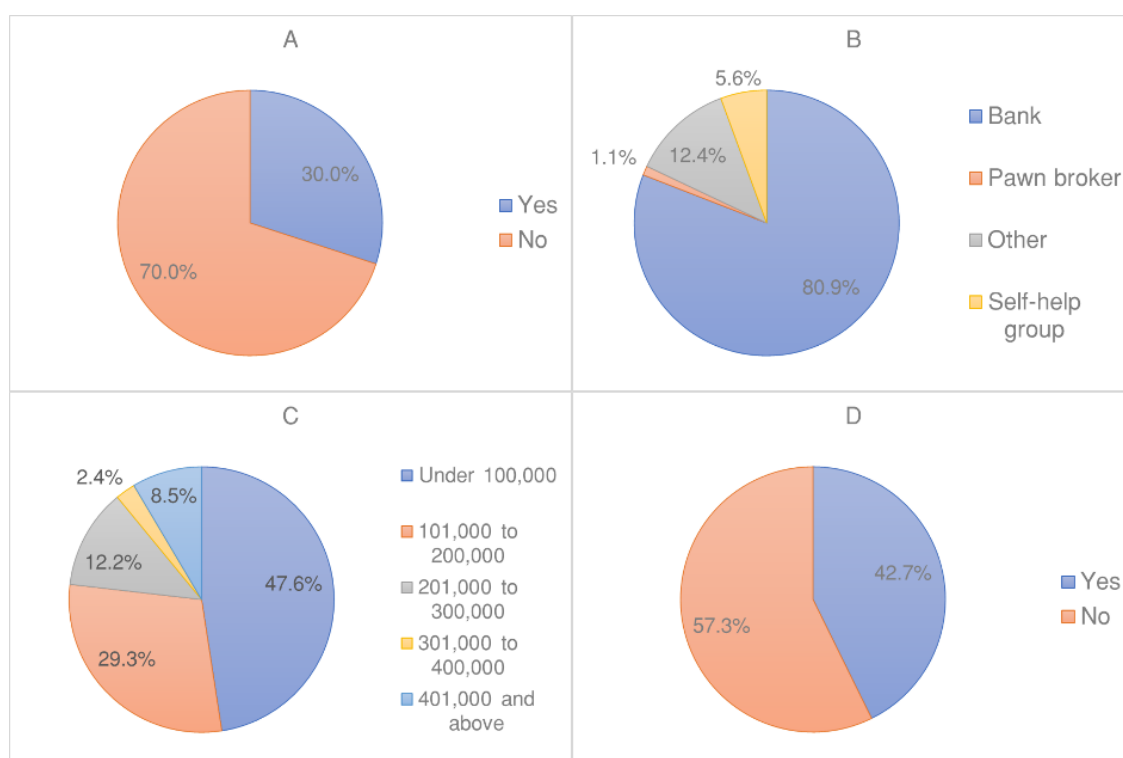


Figure 48 Pie charts showing whether a loan has been taken to build their home (A), the source of the loan (B), the loan amount (C), whether the loan has been fully repaid (D) according to households.

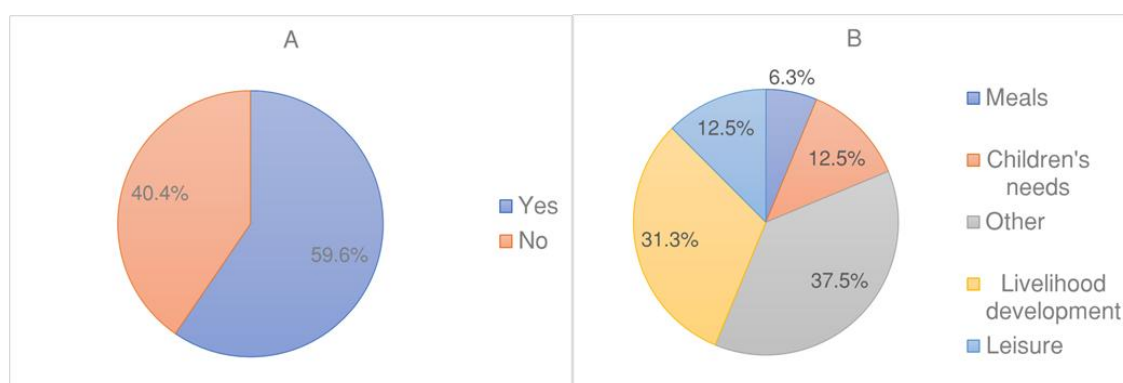


Figure 49 Pie charts showing the ability to make loan repayments (A) and the unfulfilled needs due to loan repayments (B).

Table 16 Access to health facilities including ease of access and whether payments are required for medical assistance, medicines and for surgeries and treatments.

Question	Primary respondent		Spouse	
	Yes	No	Yes	No
Do you have easy access to a hospital for treatment?	94.9%	5.1%	95.3%	4.7%

Do you have to pay to get medical assistance?	10.0%	90.0%	11.0%	89.0%
Do you have to pay for medicines?	11.5%	88.5%	9.9%	90.1%
Do you have to pay for surgery or other treatments?	42.5%	57.5%	39.9%	60.1%

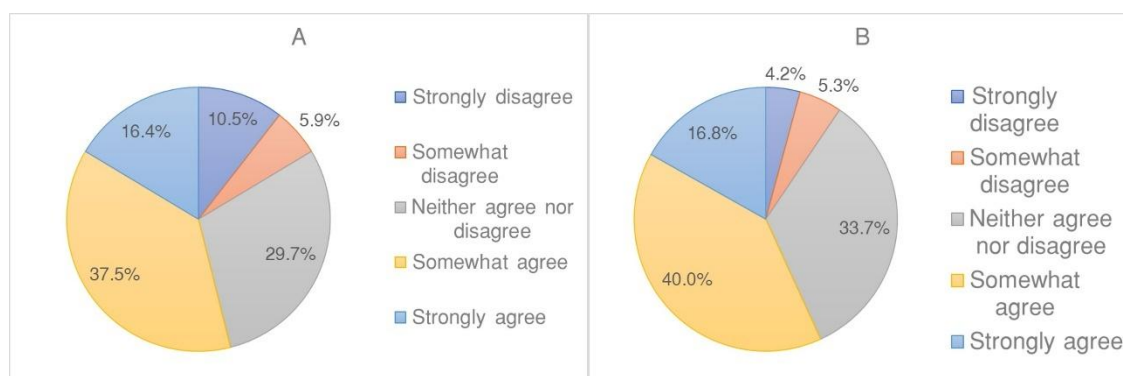


Figure 50 Pie charts showing the perceptions of affordability of medical payments according to primary respondents (A) and spouses (B)

These results show that both primary respondents and spouses felt they have easy access to hospitals and that payment for medical assistance and medicines are mostly not required. Most of the primary respondents and spouses felt payment for surgery and specialised treatments is not required. Overall, most primary respondents and spouses felt that medical payments were affordable. A significant proportion of primary respondents (29.7%) and spouses (33.7%) were neutral on the affordability of medical payments. Further, 16.4% of primary respondents and 9.5% of spouses felt that medical payments were not affordable. This suggests that safety needs are not being met adequately in the context of Maslow's hierarchy.

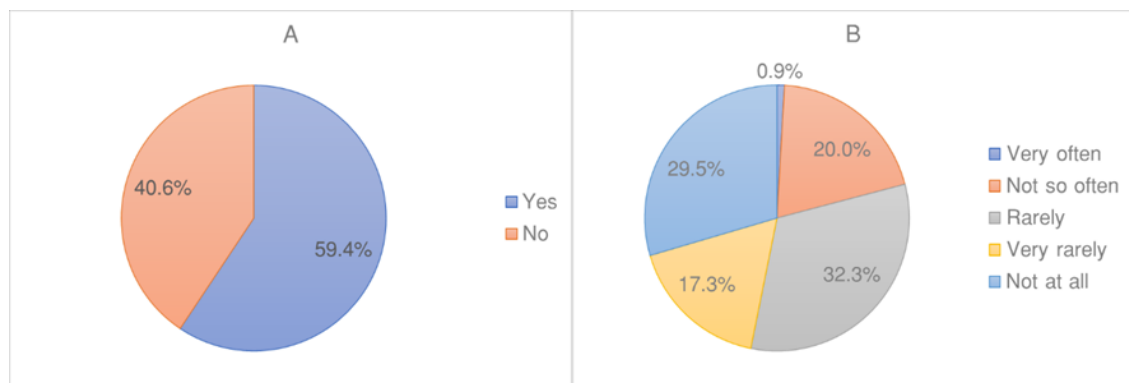


Figure 51 Pie charts showing whether conflicts occur within the community (A) and how often they occur (B) according to primary respondents.

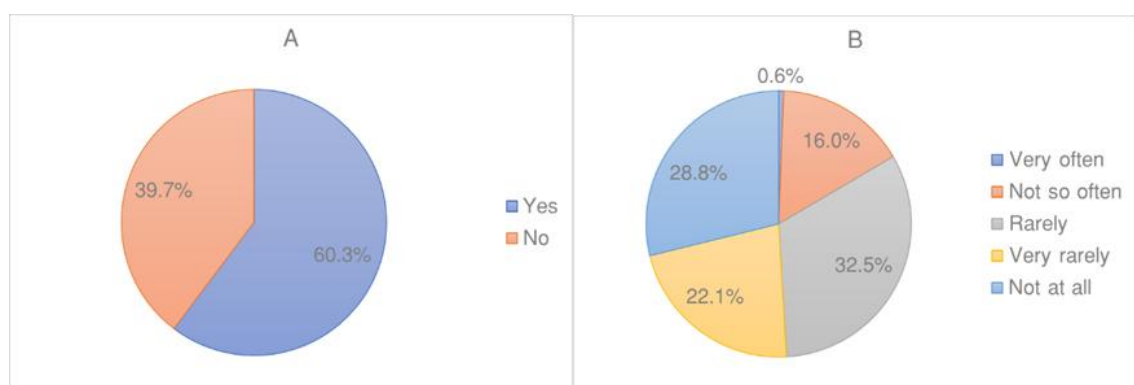


Figure 52 Pie charts showing whether conflicts occur within the community (A) and how often they occur (B) according to spouses.

Most respondents felt that they face conflicts within the community. Further, only 29.5% of primary respondents and 28.8% of spouses felt there are no conflicts at all. These results show that safety needs are not being met in the context of Maslow's hierarchy.

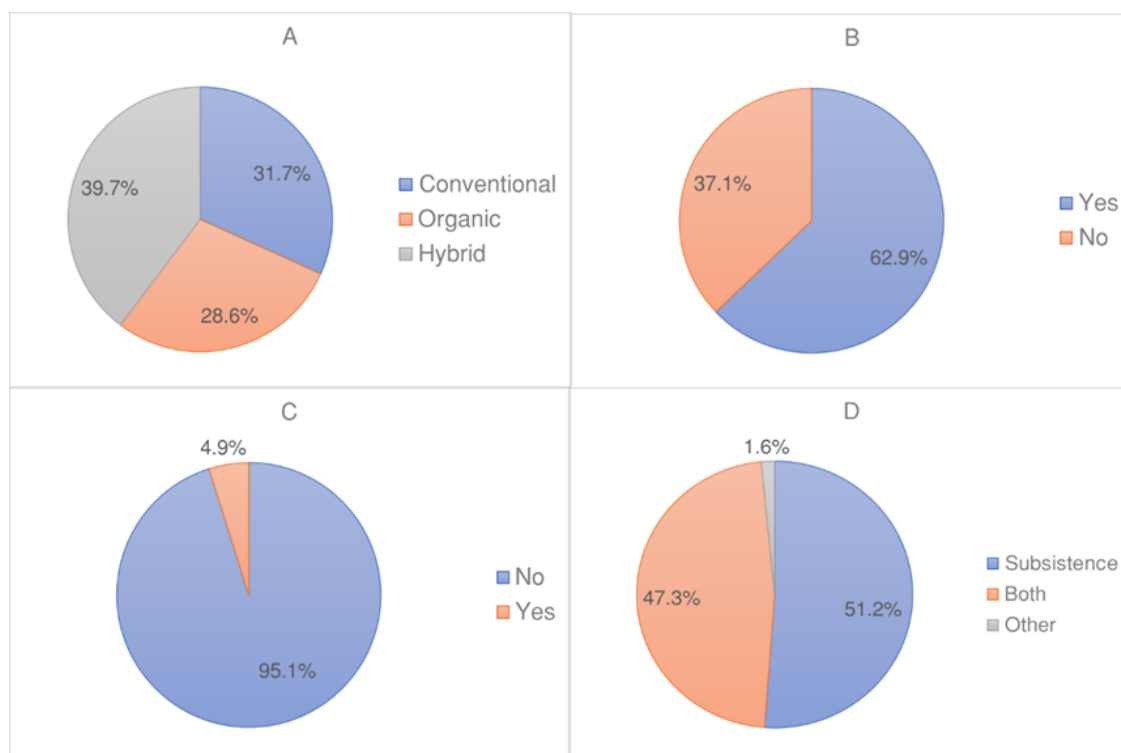


Figure 53 Pie charts showing the cultivation methods practised (A), whether organic fertilisers are used (B), whether chemical herbicides are used (C), and whether the farm is for subsistence or for commercial purposes (D) are according to primary respondents.

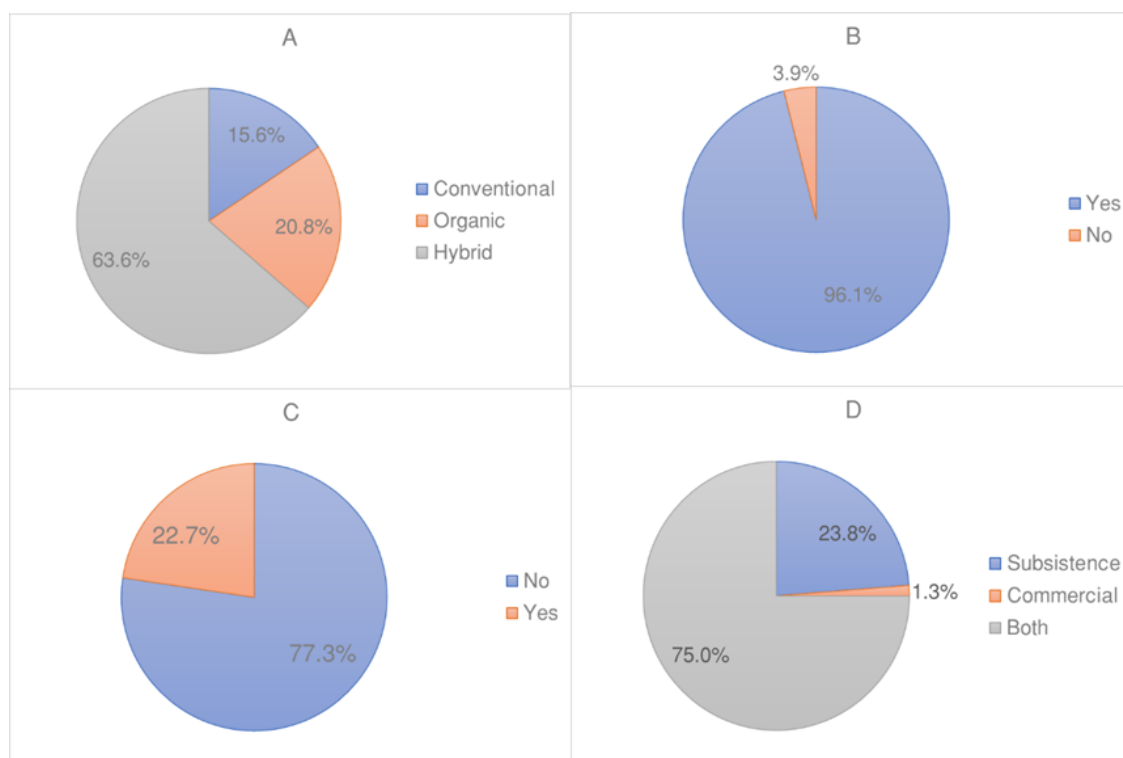


Figure 54 Pie charts showing the cultivation methods practised (A), whether organic fertilisers are used (B), whether chemical herbicides (C) are used and whether the farm is for subsistence or for commercial purposes (D) according to spouses.

The cultivation method practised is mainly conventional or hybrid. In hybrid farming organic fertilisers are used with chemical-based herbicides or vice-versa as per these results. The result that most farms are using organic fertilisers and are not using chemical-based herbicides contradicts the result that most farms are conventional or hybrid. Further, in focus group discussions, most groups said they had problems with obtaining fertilisers and herbicides due to an import ban. Therefore, it was assumed that chemical-based farming is practised to a greater extent than claimed in the survey results. The farms are mainly for subsistence according to primary respondents, whereas they are for both subsistence and commercial purposes according to spouses.

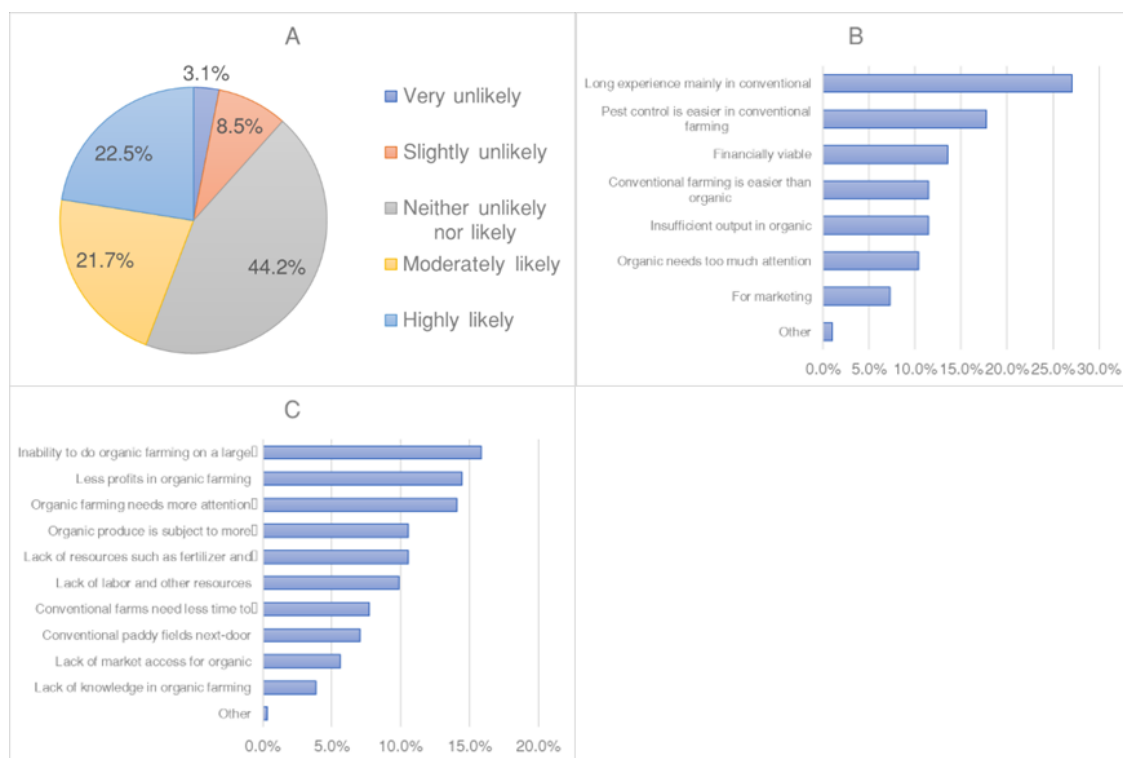


Figure 55 Pie charts showing the likelihood of adapting conventional farming (A), the reasons why they practise conventional farming (B) and a bar chart of the barriers for organic farming (C) according to primary respondents.

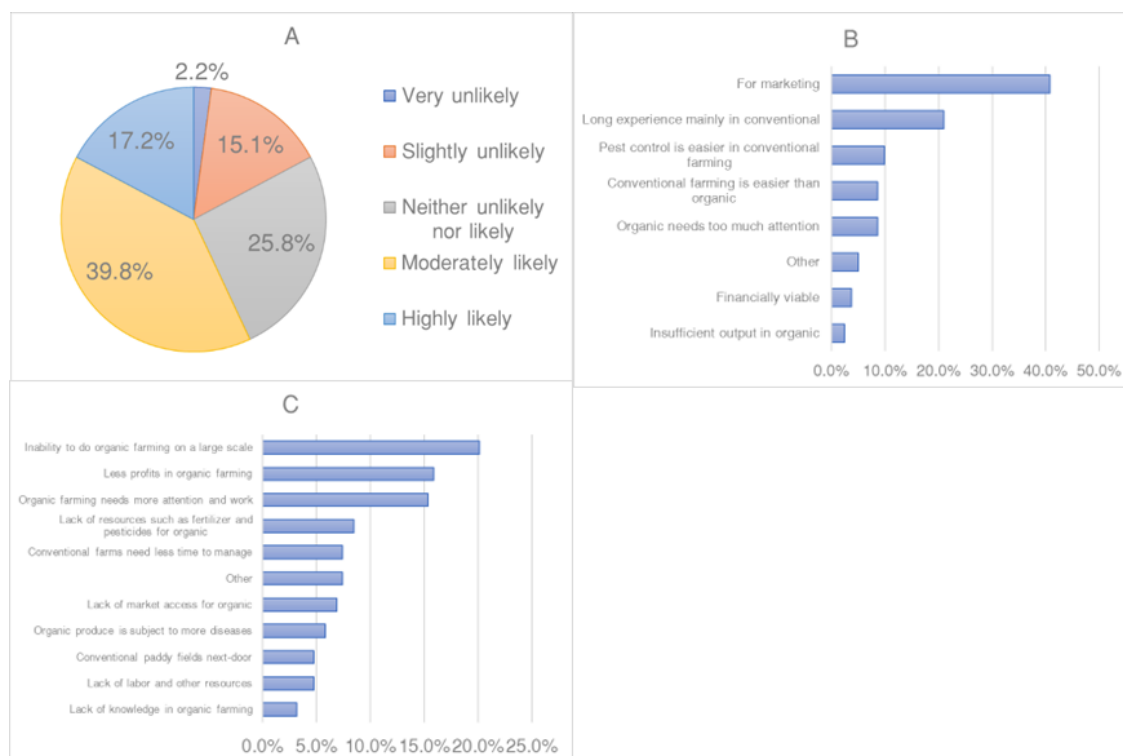


Figure 56 Pie charts showing the likelihood of adapting conventional farming (A), the reasons why they practise conventional farming (B) and a bar chart of the barriers to organic farming (C) according to spouses.

The results above show that most primary respondents were neutral on the likelihood of adapting conventional farming whereas the women were mostly likely. The primary reason given by primary respondents for doing conventional farming was long experience, whereas among spouses it was ease of marketing. The inability to practise organic farming on a large scale was the primary barrier to its adaptation given by both cohorts. These results indicate that there is a preference to practise conventional farming rather than organic farming.

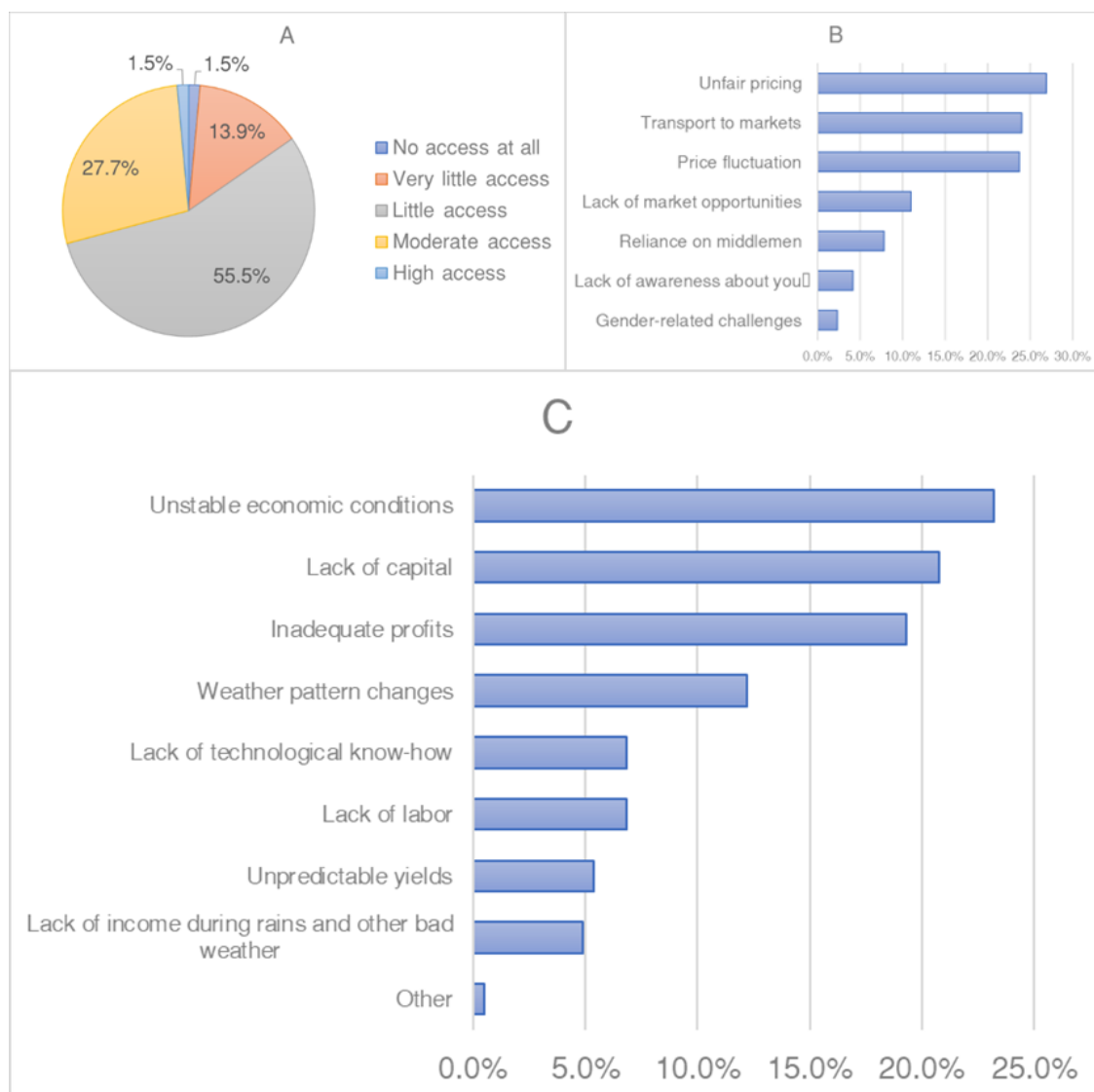


Figure 57 Pie chart showing the extent of market access to sell products (A) and bar charts of the difficulties faced with access to markets (B) and other factors affecting market access (C) according to primary respondents.

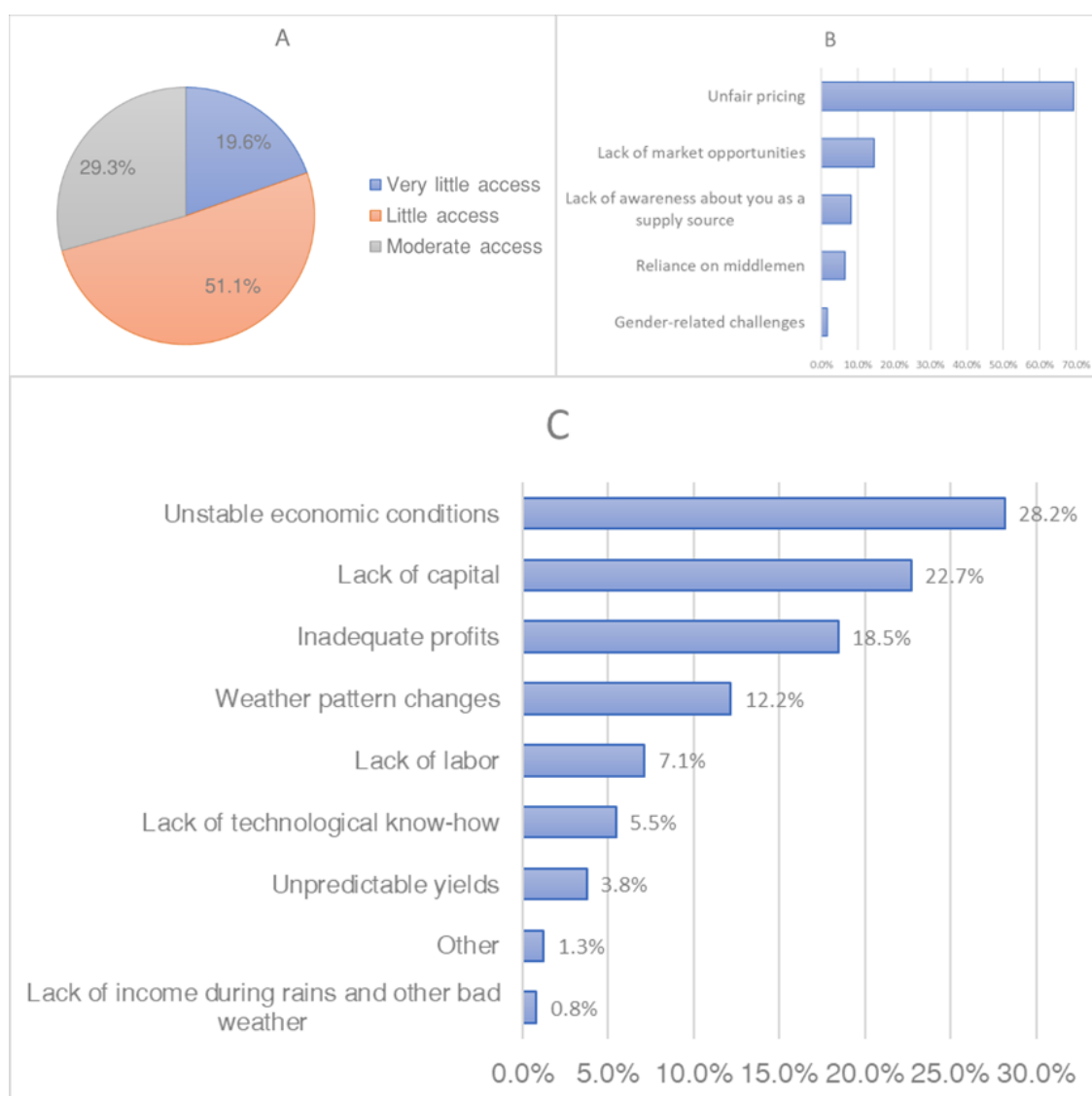


Figure 58 Pie chart showing the extent of market access to sell products (A) and bar charts of the difficulties faced with access to markets (B) and other factors affecting market access (C) according to spouses.

As per these results, most primary respondents and spouses felt they have little access to markets. Most primary respondents felt that unfair pricing was the main difficulty faced in market access followed by price fluctuation and transport to markets. Most spouses felt difficulties faced are unfair pricing followed by lack of market opportunities and lack of awareness about them being a supply source. Three additional reasons given for inadequate access to markets were unstable economic conditions, lack of capital and inadequate profits. Unstable economic conditions is a primary additional reason due to the economic crisis Sri Lanka faced when the surveys were conducted.

Table 17 List of questions and responses related to livelihoods and loan repayments

Question	Primary respondent		Spouse	
	Yes	No	Yes	No
Have you received technical assistance for your chosen livelihood?	26.8%	73.2%	39.8%	60.2%%
Are there items such as buildings, tools, equipment you need?	37.7%	62.3%	27.7%	72.3%
Are technological inputs needed for your work?	28.70%	71.3%	35.4%	64.6%
Have you easy access to such technologies, buildings, tools etc?	19.70%	80.3%	39.1%	60.9%
Have you borrowed or need to borrow for your needs?	25.4%	74.6%	7.7%	92.3%
Do you think the terms of the loan have been fair?	72.6%	27.4%	60.0%	40.0%
Are you able to comfortably make the loan payments and live a normal life?	33.8%	66.2%	50.0%	50.0%

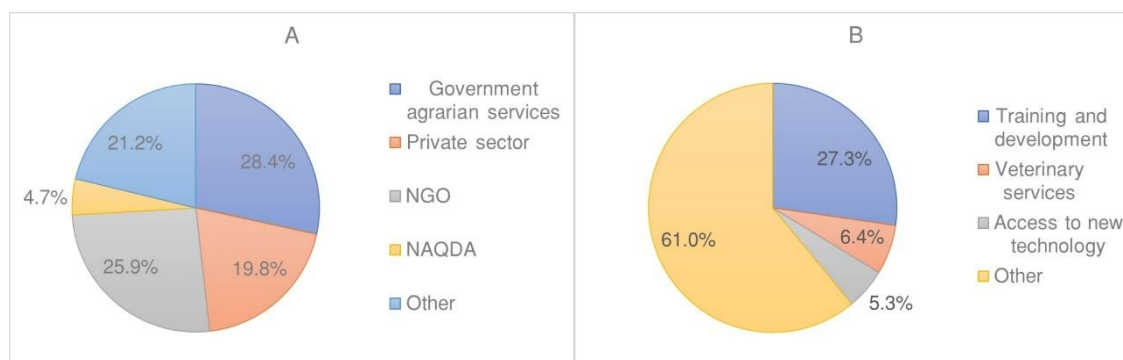


Figure 59 Pie charts showing the source of technical assistance (A) and the type of technical assistance received (B) according to primary respondents.

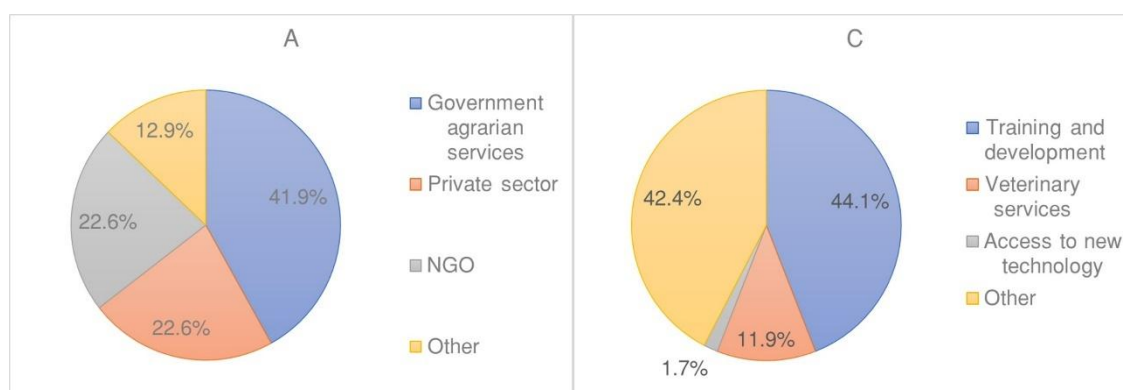


Figure 60 Pie charts showing the source of technical assistance (A) and the type of technical assistance received (B) according to spouses.

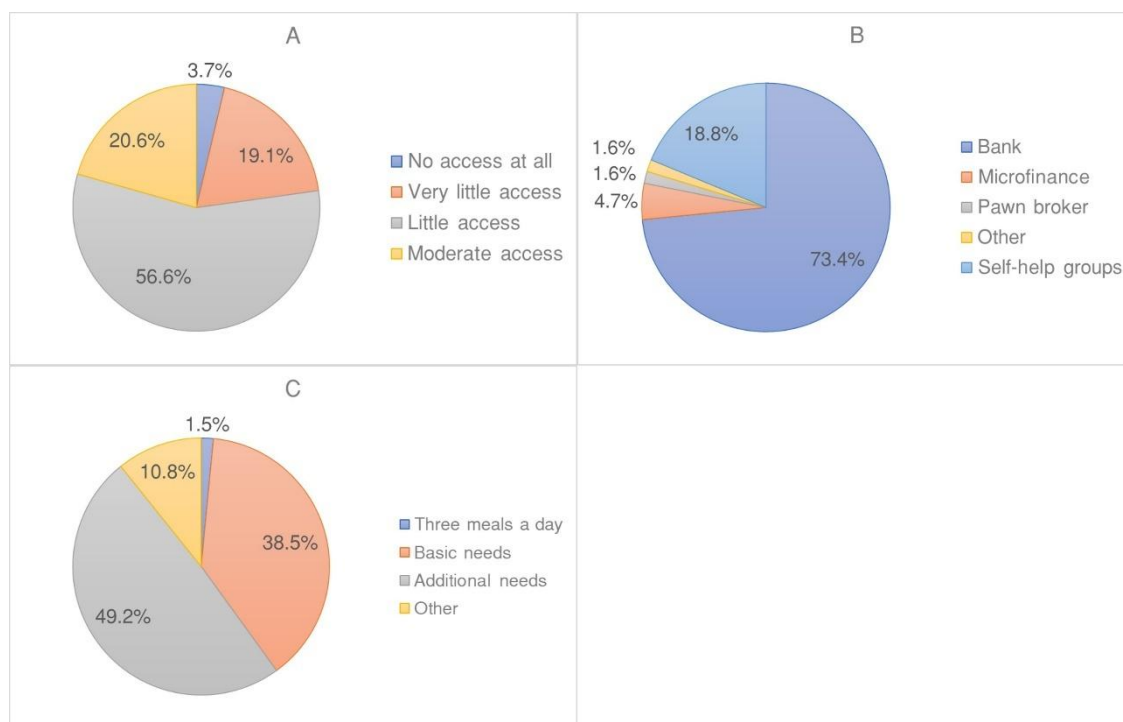


Figure 61 Pie charts showing the ease of access to livelihood loans (A), source of livelihood loans (B) and what items are given up due to loan repayments (C) according to primary respondents.

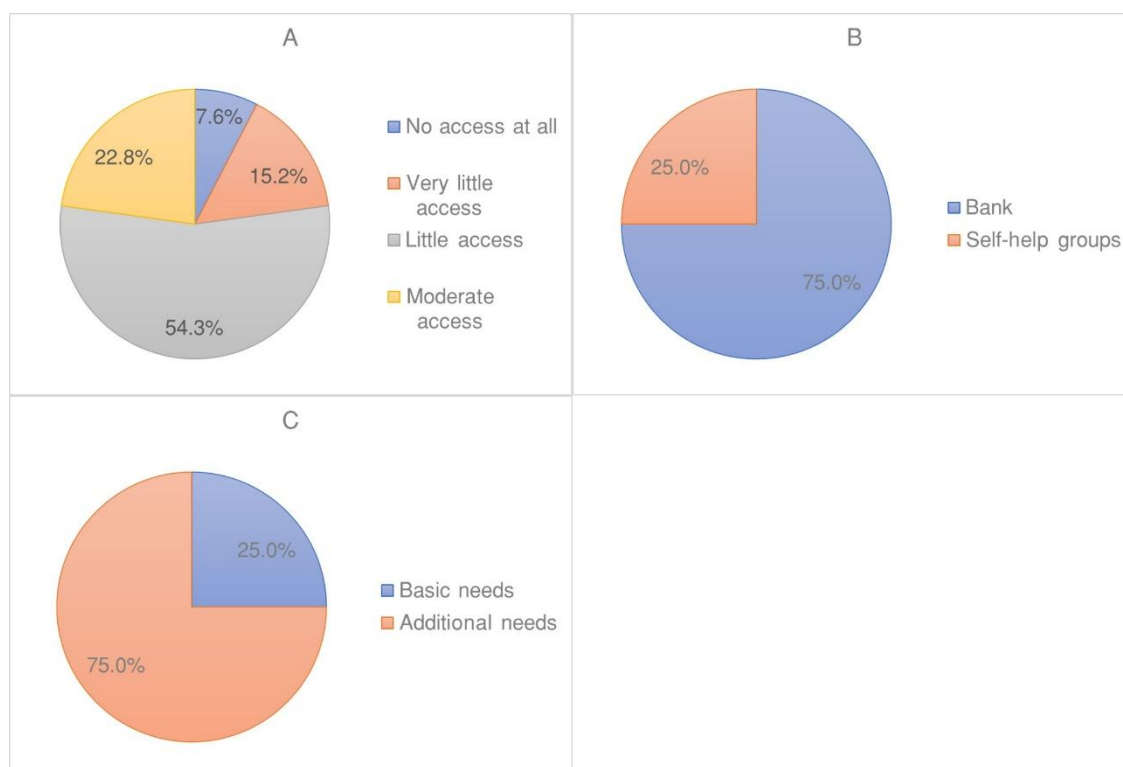


Figure 62 Pie charts showing the ease of access to livelihood loans (A), source of livelihood loans (B) and what items are given up due to loan repayments (C) according to spouses.

The results above show most households do not have access to technical assistance. Those that do among primary respondents and spouses have received it from government agrarian services, NGOs and the private sector. The assistance received was mainly training and development and veterinary services.

Most primary respondents felt they do not have access to livelihood capital such as technologies, buildings, equipment and tools and access to financial capital to purchase these. A few primary respondents mentioned they need weeding systems, water pumps, harvesting equipment and irrigation systems. Most of those who borrowed are unable to make loan payments comfortably and give up additional needs. Among primary respondents the additional needs given up due to loan repayments were education, hobbies, health requirements, recreation, travel, long-distance travel, clothes, favourite foods, entertainment, and fulfilment of their children's needs, A larger proportion of spouses have access to livelihood capital and no access to financial capital for livelihood development. Half of them were unable to make loan payments comfortably. Most spouses give up additional needs due to this. These results indicate that physiological needs and growth needs are not being met in the context of Maslow's hierarchy.

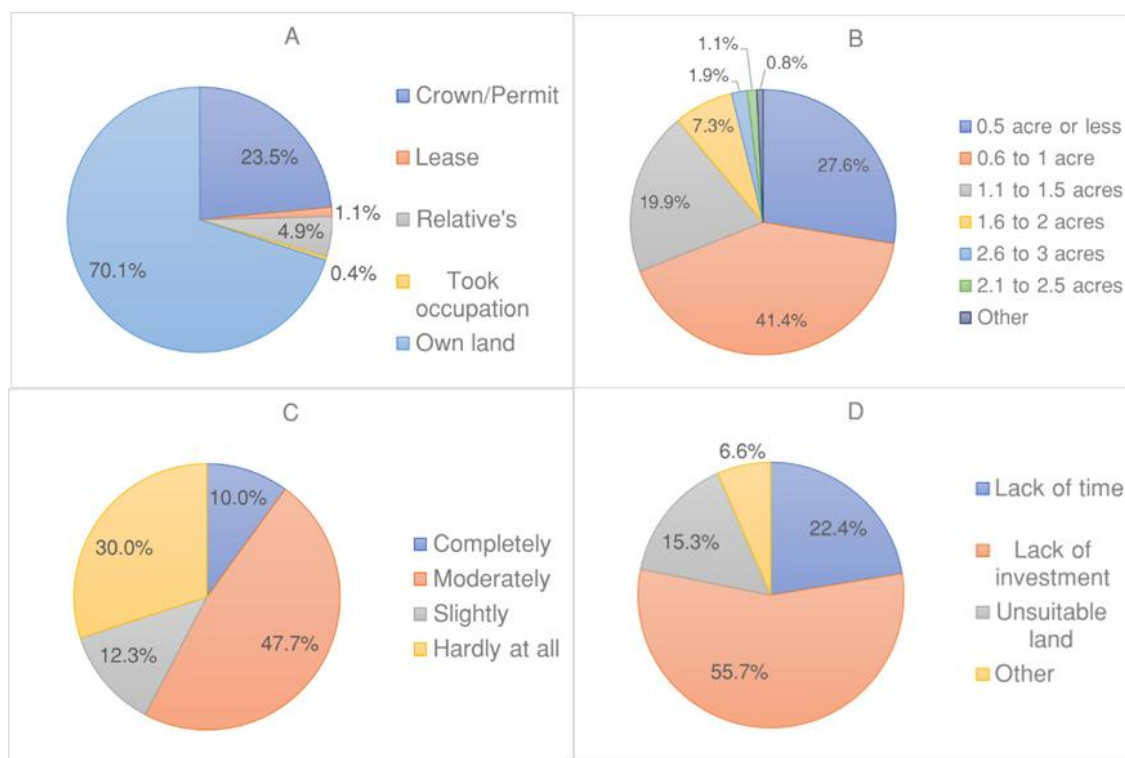


Figure 63 Pie charts showing the type of land ownership (A), extent of land in acres (B), efficiency of land use (C) and the challenges to efficient land use (D) according to primary respondents.

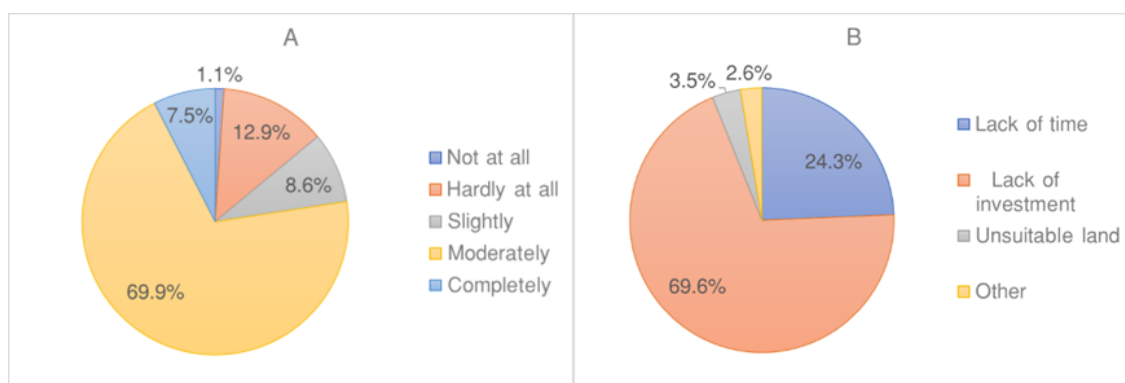


Figure 64 Pie charts showing the efficiency of land use (A) and the challenges to efficient use of land (B) according to spouses.

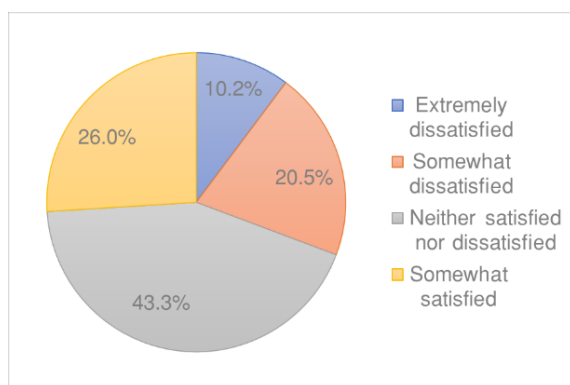


Figure 65 Pie chart showing the satisfaction level with the government or other national bodies providing solutions for problems with efficient land use according to households.

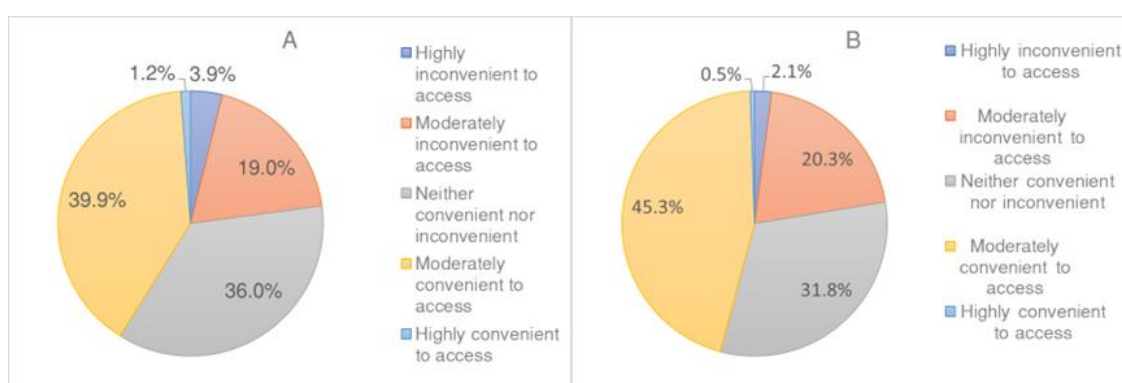


Figure 66 Pie charts showing the level of convenience for accessing other government services such as education, welfare, livelihood assistance and protection according to primary respondents (A) and spouses (B).

Based on these results, most households have land ownership followed by crown/permit land. However, the Divisional Secretary who was a key informant said that most lands are permit lands. Such lands are owned by the state and permission is given to use the land for a specific purpose and can be transferred to their next of kin. Therefore, the true nature of land ownership is unclear. Second, most women perceive they use their lands efficiently in comparison to men. Third, most households face the challenges of lack of investment and time. Fourth, most households are neutral or dissatisfied with the government in resolving problems with inefficient use of land. Fifth, both primary respondents and spouses were neutral on or felt that accessing other government services such as education, welfare, livelihood assistance and protection was moderately inconvenient. Among government policies that affect them, respondents listed high electricity charges, the ban on imports, price escalation, economic inflation, tax procedures and tax increases.

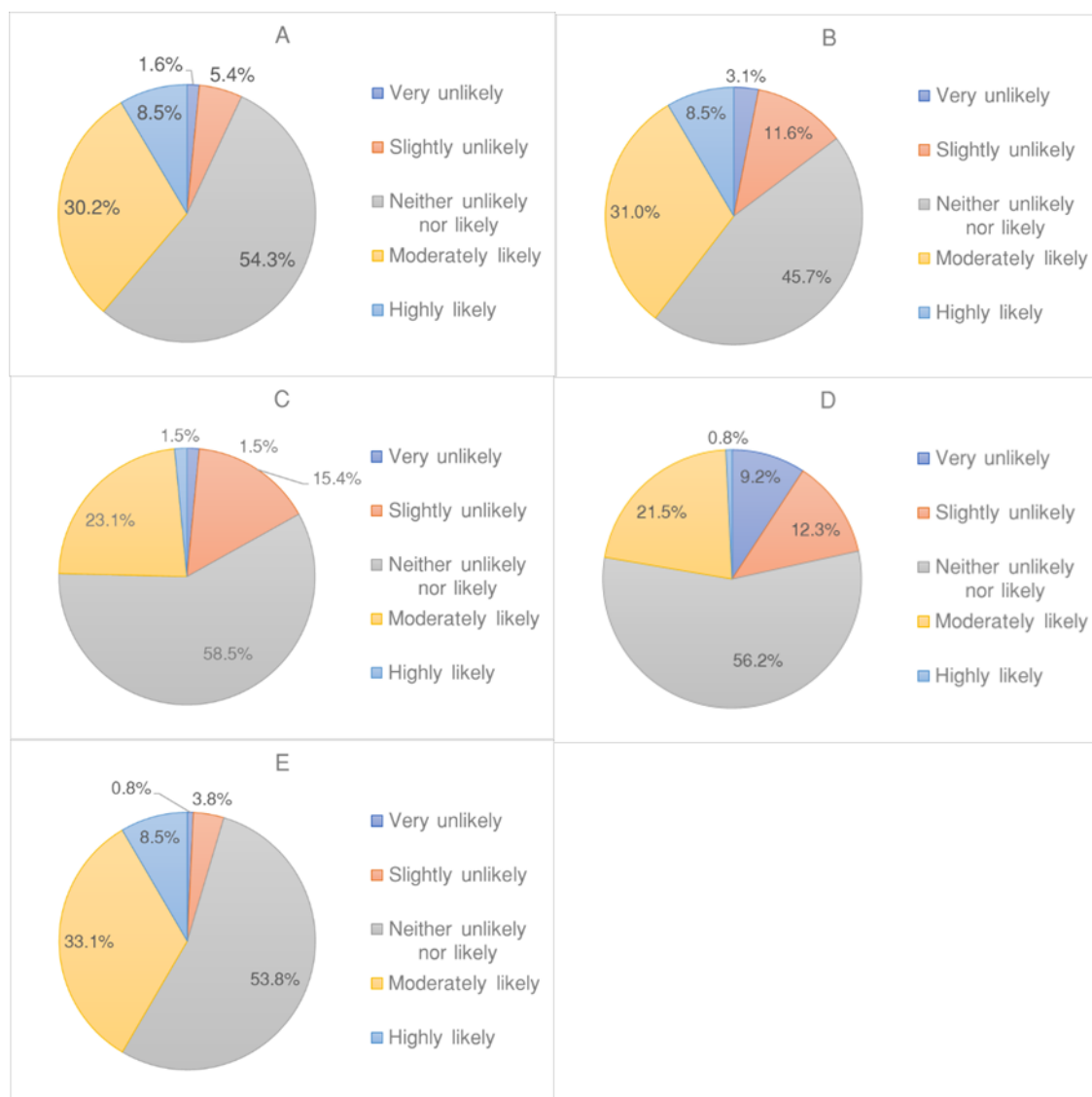


Figure 67 Pie charts showing the willingness to adopt intensive farming (A), land sharing (B), land sparing (C), organic farming (D) and the likelihood of adapting these practices if they earned income from their other cultivation and livestock (E) according to primary respondents.

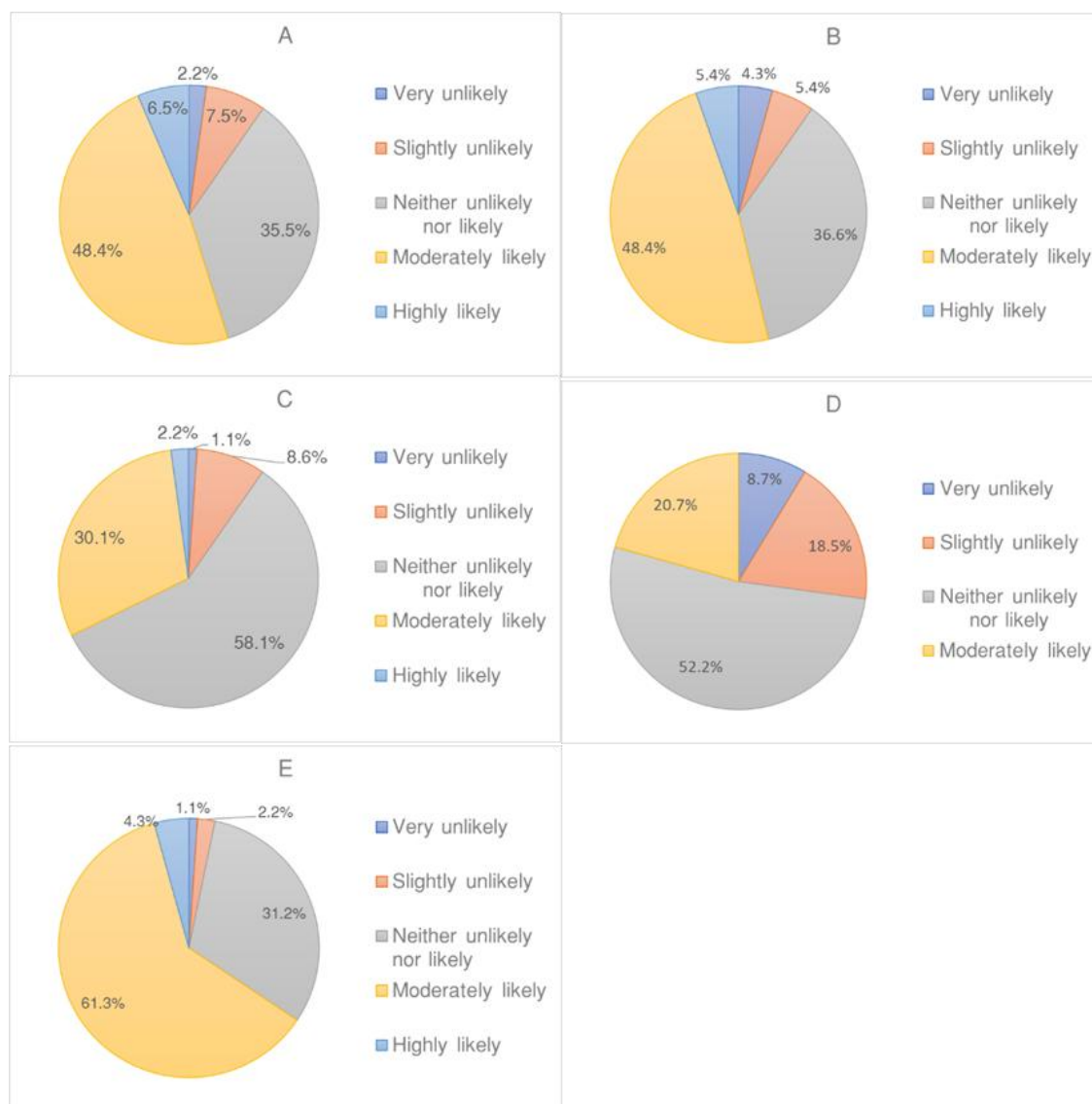


Figure 68 Pie charts showing the willingness to adopt intensive farming (A), land sharing (B), land sparing (C), organic farming (D) and the likelihood of adapting these practices if they earned adequate income from their other cultivation and livestock four practices to better co-exist with the environment (E) according to spouses.

These results show that most primary respondents were neutral on the adoption of the four practices. Spouses were likely to adopt intensive and organic farming but were neutral on adopting land sparing and land sharing. Primary respondents were mostly neutral, and spouses were mostly likely to adopt all four practices if they earned adequate income from their other activities such as cultivation and livestock.

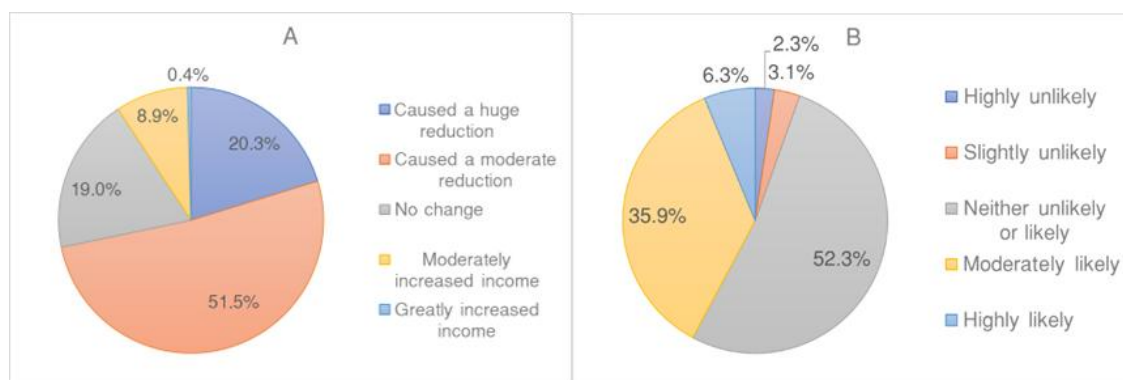


Figure 69 Pie charts showing the extent of climate change impact on livelihood income (A) and the likelihood of sustainable farming practices intensification, organic, sparing and sharing reversing the negative impacts of climate change (B) according to primary respondents.

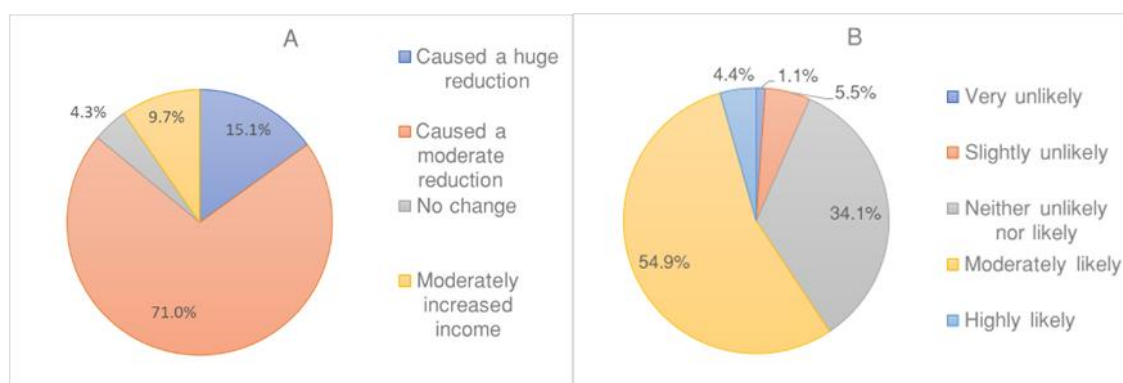


Figure 70 Pie charts showing the extent of climate change impact on livelihood income (A) and the likelihood of sustainable farming practices intensification, organic, sparing and sharing reversing the negative impacts of climate change (B) according to spouses.

Most primary respondents and spouses felt that climate change has had an impact on their livelihood income and that its impacts have been severe overall as per these results. A higher proportion of spouses felt this way compared to primary respondents. Most primary respondents were neutral on the potential of reversing climate change impacts with sustainable farming practices. Most spouses felt that reversing climate change impacts is possible with sustainable farming practices. These results indicate that there is a potential for women to drive sustainable change by adopting sustainable farming practices.

6.2.1.4. Fulfilment of love and belonging needs

This section presents results on the fulfilment of love and belonging needs in the context of Maslow's hierarchy of needs.

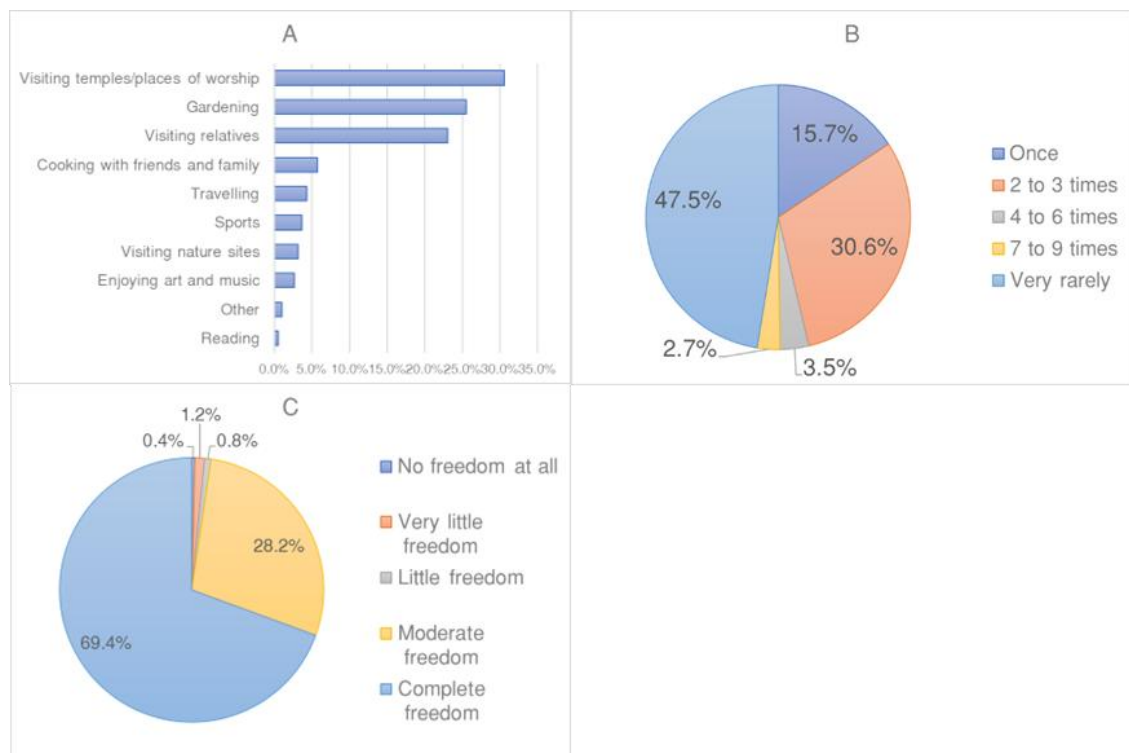


Figure 71 Bar chart of the leisure activities enjoyed (A) by primary respondents, and pie charts showing how often they get to enjoy them (B) and the extent of freedom they have to enjoy their cultural practices (C).

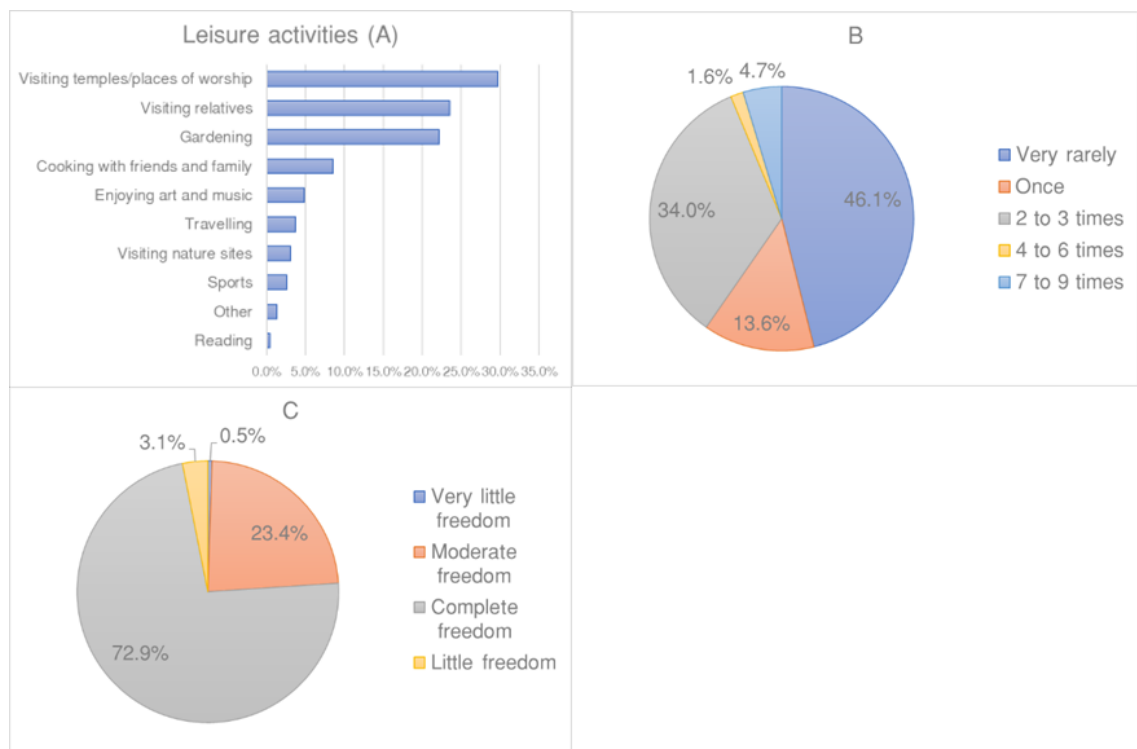


Figure 72 Bar chart of the leisure activities enjoyed (A) by spouses, and pie charts showing how often they get to enjoy them (B) and the extent of freedom they have to enjoy their cultural practices (C).

Both primary respondents and spouses had similar interests in leisure activities including visiting temples and other places of worship, visiting relatives and gardening. Most primary respondents and spouses very rarely got time to spend on leisure activities followed by 2-3 times a month. These results show that love and belonging needs are not being adequately met in the context of Maslow's hierarchy. Both primary respondents and spouses felt they have the freedom to enjoy their own culture.

6.2.1.5. Fulfilment of cognitive needs

This section presents results on the fulfilment of cognitive needs in the context of Maslow's hierarchy of needs.

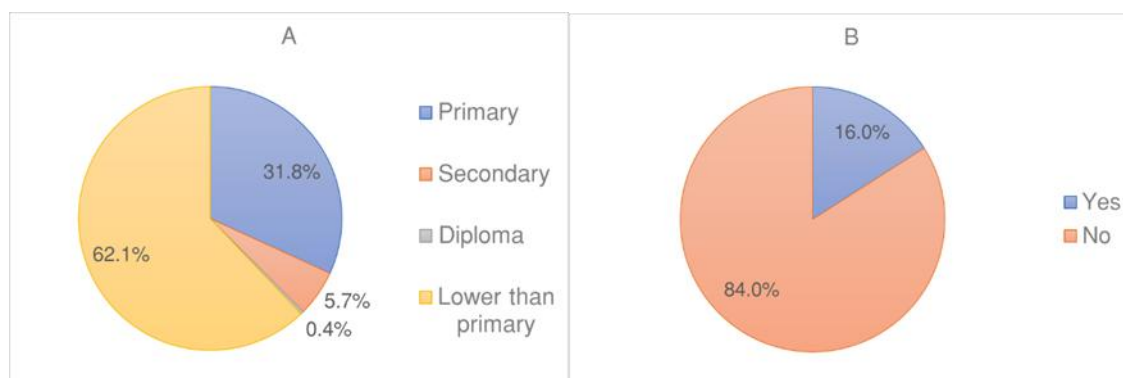


Figure 73 Pie charts showing the education level of primary respondent and whether training received for chosen livelihood.

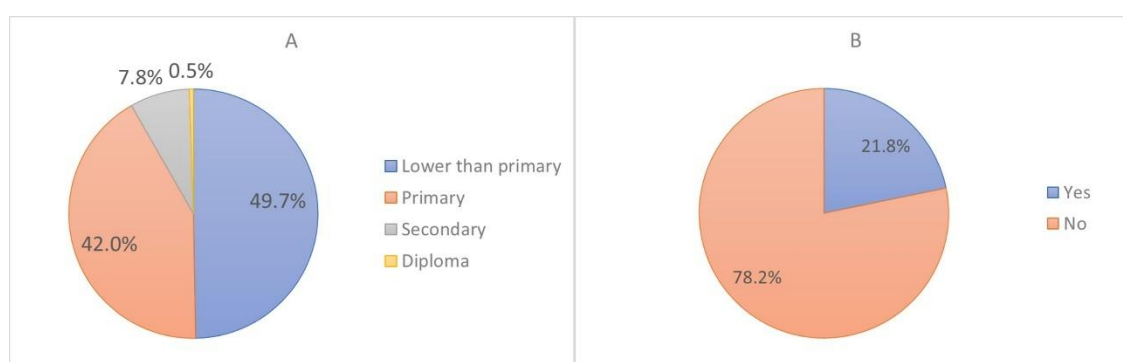


Figure 74 Pie charts showing the education level of the spouse and whether training received for chosen livelihood.

Most primary respondents have not completed their primary education. A higher proportion of spouses have completed their primary and secondary education. Most primary respondents and spouses have not received training in their chosen livelihoods. The results indicate that cognitive needs have not been fulfilled in the context of Maslow's hierarchy.

Table 18 Households with children still going to school and whether payments are made for school fees, tuition classes and schoolbooks and stationery.

Question	Household responses	
	Yes	No
Do you have children that are still going to school?	57.1%	42.9%
Do you have to pay for your child's school fees?	50.0%	50.0%
Do you pay extra for tuition classes?	97.3%	2.7%
Do you pay for schoolbooks and stationery?	96.0%	4.0%

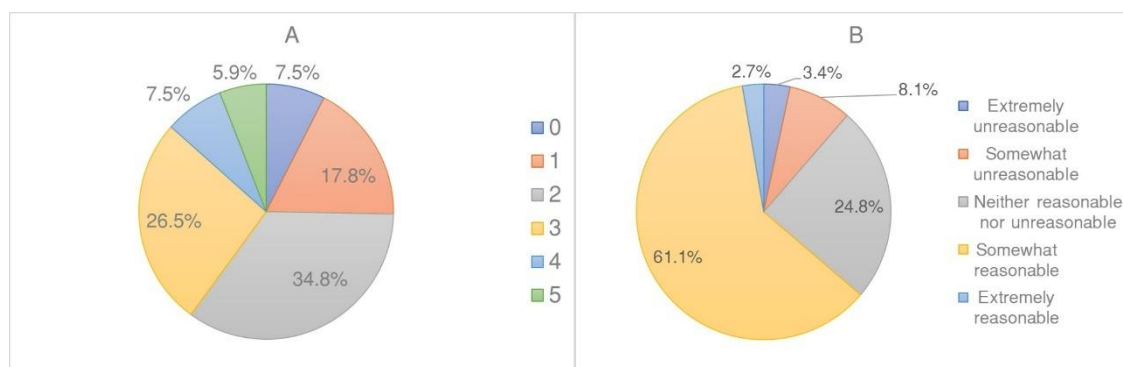


Figure 75 Pie charts showing the number of children (A) in each household and the reasonability of the cost of educating their children (B) according to households.

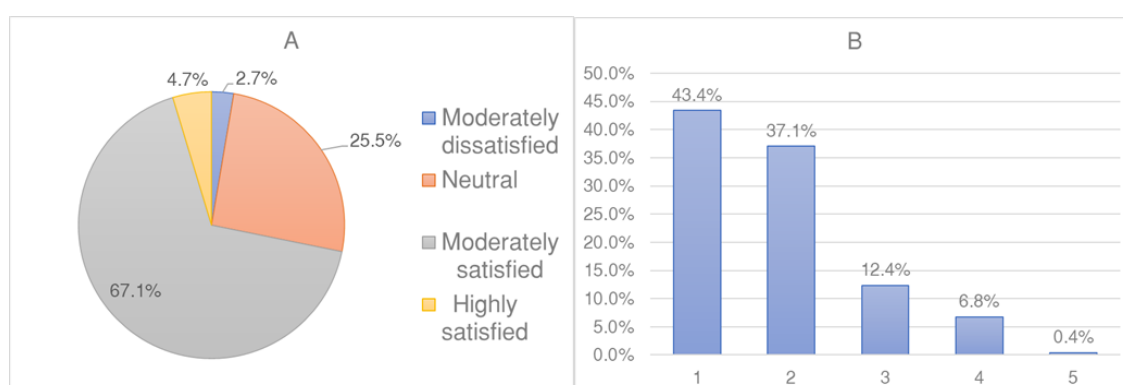


Figure 76 Pie charts showing the level of satisfaction with the education standard (A) and a bar chart of their ranking of facilities if available for children according to households (B). For this ranking 1= provision of advice on career choices and the related education required, 2= access to learning new computer technologies 3= the availability of vocational training in areas such as carpentry and plumbing, 4= access to new technologies in their chosen livelihood, and 5=other.

Most households had children attending school as per these results. Half of them must make payments for school fees, books and stationery, and extra tuition. Most parents felt that the cost of educating their children was somewhat reasonable and were moderately satisfied with the education standard. However, 24.8% were neutral and 11.5% felt costs were unreasonable for educating their children.

If such facilities were available, parents ranked one that offered career advice and the provision of the related education the highest. This was followed by a facility to learn new computer technologies and then a facility for vocational training in areas such as carpentry and plumbing. Access to new technologies in their chosen livelihood ranked the second

lowest. These results indicate that the cognitive needs of the children are not being adequately fulfilled in the context of Maslow's hierarchy.

6.2.2. Focus group discussions

In focus group discussions, the people said that they have inadequate income to meet their basic needs. The focus group in Udayaarkaadu said:

"We are unable to meet our basic needs. We have even pawned our jewellery at the bank,"

and,

"We received LKR 550,000 from the Indian government in stages to build our homes, but some payments were not made, and I had to borrow from my relatives."

The focus group in Bremananthanaaru said:

"Our food is not nutritious, and we are unable to meet our basic needs."

The focus group from Manikapuram said:

"There is no water in some wells, and our groundnuts cultivation was affected."

"We face problems with free-range cattle, elephants, wild boar, monkeys and polythene waste."

"Our children don't get enough food and other items."

The focus group from Udayaarkaadu said:

"I got a well and special support because my husband was a combatant."

"I got a water pump and tools from a NGO."

"We have no insurance. We have savings schemes through women's societies but the maximum we can get is 10,000 rupees (US\$ 35)."

"We would like to have our children with us, but our children are seeking government jobs elsewhere."

The focus group in Manikkapuram said there is a shortage of wells and there are no ponds nearby.

Findings from focus group discussions on fulfilment of basic needs can be summarised as follows. The children don't get enough food and other items due to lack of adequate income. Jewellery has been pawned and cannot be recovered. There is also lack of nutritional food and the children's education is getting affected.

On fulfilment of livelihood needs transport costs have increased, and customers cannot buy their full output within the region due to the economic crisis. Therefore, their produce must be transported to Kilinochchi and Puthukkudiyiruppu town. Second, when efforts fail it is hard to start again since funds are needed; private partnerships are needed to solve this problem. Third, limited help has been given to develop their livelihoods by Karitas, the World Food Programme, World Vision and NGOs. Fourth, the sudden ban on imported chemical-based fertilisers caused lower yields with organic farming since their lands have been used for conventional farming for many years.

On human-wildlife conflict the groups said that their poultry and goats are killed by wild animals, and their rice paddy farms are affected by elephants, monkeys and wild boar during the season. Further, free-range cattle are a problem for farms with cultivations. There are social problems with consumption of illicit liquor and drugs by teenagers and adults, violence against women and teen pregnancy. The vision of the focus groups for 2030 was fulfilment of livelihood needs via local value addition with partnerships so marketing could be managed within the region, employment opportunities, the improvement of agriculture with tourism, and a coconut fibre factory to be set up in their region. Second, their youth should be educated to get better employment and to employ others. Third, roads to the beaches should be improved, there should be playgrounds for the children and schools that only provide primary education should have secondary education.

6.3. Discussion

Three key areas will be discussed in this section. First, the needs that drive existing livelihoods will be explored, with a focus on the basic needs of food and shelter, and growth needs.

Second, how these needs influence land use practices will be explored followed by third, the willingness to undertake sustainable farming practices.

Through the ages, the prioritisation of meeting human needs based on Maslow's hierarchy has evolved. In the early ages physiological needs and safety needs were prioritised due to a harsher environment and threats from wildlife and other civilisations. With the Middle Ages came social, religious, geographic and political stratification. The diversity of needs increased due to higher economic growth among some members of the society such as the royalty, merchants and artisans. The industrial revolution brought factories, mechanisation, urbanisation and demand for resources such as coal and iron. This led to an escalation of resource extraction and caused environmental degradation as countries across the world prioritised economic growth influenced by colonialism (Altan, 2023). This period saw priority being given to fulfilment of human needs beyond just physiological needs and safety needs due to spreading consumerism (Hall, 2011; Kaynak, 1985). Further, it saw an increasing divide between the haves and have-nots globally (Altan, 2023). To reduce this growing divide, the MDGs were established by the UN to improve health and education and to reduce poverty by 2015. This was followed by the SDGs which established 17 goals to be attained by 2030. These goals were formulated from the perspective of sustainably fulfilling human needs with environmental sustainability. While there have been successes in some areas such as reducing poverty and better access to water and sanitation, inequality has increased and efforts to mitigate climate change have not been successful (Altan, 2023). This discussion will help us understand why people continue their existing livelihood and land use practices despite their potential impact on them and the environment in the future and where attainment of the SDGs stands in the context of existing livelihoods and farming practices.

6.3.1. Fulfilment of needs

Fulfilment of basic needs

Based on Maslow's hierarchy of needs, an individual's physiological needs encompassing food, clothing and shelter must be fulfilled first. These needs are fundamental, inborn and universal

for all human beings, with inadequate fulfilment affecting overall health, social harmony, production and income (Yongmei, 2023; Desmet and Fokkinga, 2020). The results show that the physiological need of shelter is not being adequately met with a significant proportion of homes incomplete and overcrowded. Further, there are some houses that have tin roofs unsuited for the climate and lack running water.

Although there is adequate food security, borrowing led to its compromise. Further, a significant proportion of survey respondents were neutral on whether they lead a healthy life and on the nutritiousness of their food. In focus group discussions, concerns were raised about the supply and quality of water. Further, they said they had to pawn their jewellery to meet their basic needs and that their children don't get adequate food and other items. Moreover, in the PSP workshop (Chapter 7), participants expressed a need for clean surface water and to divert water going to the sea. Accessing financial capital for livelihood needs also compromised fulfilment of basic needs. Many households do not have adequate food and clothing, cannot buy their favourite foods and clothes and avoid longer trips due to loan repayments. When asked to explain why they made their livelihood choices and the associated risk with them, many respondents said they were made to survive and to meet their cost of living. Therefore, the basic needs of the people in Puthukkudiyiruppu are not being adequately fulfilled. Similarly, resettlement has led to food insecurity in other parts of the world (Gbanie, 2015). Further, the poor quality of groundwater is reflected in several local studies (Gopalakrishnan and Kumar, 2020; Rajeevan and Mishra, 2020; Gunaalan et al., 2018).

Fulfilment of safety and security needs

The main livelihood practised in the study area is farming among primary respondents and spouses (Chapter 5). First, income earned from their livelihoods is barely adequate to meet expenses. Therefore, there is barely anything left to spend on other needs. This is despite most respondents feeling they have adequate experience after practising their farming livelihoods for as much as 20 years. Further, only a small proportion of spouses have permanent employment. Most households depend on daily paid subsistence income from farming and other labour-related work. There is also inadequate access to markets for households to sell their products primarily due to unfair pricing and unstable economic conditions. The focus groups from Udayaarkaadu and Manikkarapuram mentioned many barriers for market access like the results of the household surveys such as the long distance to markets, middlemen, price fluctuations and unfair pricing.

Second, there is inadequate access to safety nets such as EPF and ETF, savings and insurance to meet expenses during difficult times and when they grow old, and disasters like floods and droughts. The lack of insurance and limited access to funding through women's societies were also highlighted by focus groups. Third, there is, however, adequate access to healthcare, although a small proportion felt medical payments were not affordable. Fourth, there should also be access to technical assistance related to their livelihoods to develop socioeconomically, with fulfilment of such livelihood needs contributing towards meeting basic and growth needs (Mphande, 2016). The results show there is difficulty in accessing technologies, buildings and tools as well as technical assistance for their livelihood needs.

Fifth, there are conflicts within the community with problems such as consumption of illicit liquor and drugs by teenagers and adults, violence against women and teen pregnancy. Sixth, there is inadequate access to the government for education, welfare, livelihood assistance and protection. Further, the government does not play a proper role in making land use more efficient. Also, there are many government decisions that affect them including increases in electricity charges, the ban on fertilizer imports, inflation due to the poor economy, tax procedures and tax increases. Sixth, focus groups revealed livelihood problems faced due to human-wildlife conflict, with poultry and goats killed by wild animals and rice paddy destroyed by monkeys, elephants and wild boar. These findings agree with studies from other parts of the world on human-wildlife conflict (Bello et al., 2017; Karanth et al., 2012; Dickman, 2010).

Due to barely surviving, most parents felt their children would not continue their livelihoods. Some further elaborated in focus group discussions with comments such as their children are not interested, that they study and go for other jobs and that they should get higher education and better jobs. Their vision for 2030 was local value addition, partnerships for marketing their produce within the region to generate employment, a coconut fibre plant to be set up and improving agriculture with tourism. This clearly shows that the respondents are not satisfied with their existing livelihoods and want something better for their children. Overall, these results show that some aspects of security and safety needs such as insurance and savings are not met adequately. These findings broadly agree with findings in other parts of the world (Mgbenka et al., 2016; Khapayi and Celliers, 2016; Saxena, 2012; Torrez, 2011).

Fulfilment of love and belonging needs

Good relationships and religious involvement contribute to the satisfaction of psychological needs (Ivtzan et al., 2013; Demir and Özdemir, 2010). Respondents ranked visiting temples and other places of worship and relatives as the top two leisure activities they enjoy. But the results show that the respondents rarely get an opportunity to enjoy these leisure activities. Households also said they avoid unnecessary trips, leisure travel, hobbies, recreation, entertainment, buying luxury items and celebrations when they have commitments for loans taken for their livelihoods. Therefore, belonging needs are not being adequately fulfilled.

Fulfilment of cognitive needs

Primary respondents and spouses

Free education is provided by the state (Alawattegama, 2020). However, most primary respondents have not even completed studies until the primary level, whereas women have fared better, with a higher completion of both primary and secondary education. Further, most of them have not received training in their chosen livelihoods. A key contributing factor to this was the war, during which the people faced repetitive disruption to their lives. Many respondents mentioned they could not meet their education needs as well as their children's when they have livelihood loans to repay. Therefore, education is a key area in which respondents' cognitive needs have not been fulfilled. The finding of inadequate access to livelihood-related education is visible in other literature (Mgbenka et al., 2016; Apata et al., 2010).

Children's education

Most parents felt that education costs were affordable but felt they had to pay extra for tuition classes, books and stationery. While they expressed satisfaction with the education system, they felt in an ideal world their children should be able to get advice on their careers and to obtain the appropriate education for it. Further, some parents are unable to fund their children's education when they have loans to repay. This shows that there could be a better education system in place.

In sum, in the context of Maslow's hierarchy of needs, the physiological needs of food, clothing and shelter are not being adequately fulfilled for all households. Second, livelihood

needs and safety nets that would contribute to both basic needs and safety needs are unfulfilled. Third, education as a constituent of cognitive needs has only been fulfilled for a small proportion of households and they felt the need for a better approach for their children's education. One contributing factor for this was the war which has deprived the adults of completing their primary education. Fourth, belonging needs are not being fulfilled. Due to the nonfulfillment of needs, natural capital will not be sustainably used in Puthukkudiyiruppu. Its use will be prioritised to fulfil needs to sustain human existence, as highlighted by other studies of post-conflict settlements (Suarez et al., 2018; Wilson, 2014). Further, these findings agree with those on a community near a PA that most needs are inadequately fulfilled (Rishi et al., 2008).

6.3.2. The influence of basic needs fulfilment on land use practices

Food security is a constituent of basic needs and is a fundamental requirement for human wellbeing requiring land. Meeting food security needs leads to a trade-off between the environment and livelihoods (Meyfroidt, 2018). Studies in other parts of the world show that agriculture-based livelihoods drive the way land is used (Zhou, Li and Liu, 2020; Kamwi et al., 2015). Further, while some of the SDGs have been partially achieved such as access to water and sanitation, the world has failed in reducing greenhouse gases to mitigate climate change and inequality (Altan, 2023). One key reason is that conventional and other forms of chemical-based farming continue to be practised. The use of chemical-based fertilisers and herbicides has many negative environmental impacts whereas organic farming is a sustainable practice as shown in Chapter 2.

Most households practise conventional and hybrid farming which give them better pest control and access to markets. Second, they depend on their farms for subsistence income but face the challenges of lack of time and investment to use their lands efficiently. Third, the non-fulfilment of human needs in the context of Maslow's hierarchy, climate change and inadequate market access are affecting the households in Puthukkudiyiruppu. Fourth, women have felt the impacts of climate change more than men, including its effect on crop cycles (Chapter 5) and on income. Due to these factors, most women were likely to adopt conventional farming. Accordingly, land use practices will continue in the same manner, causing further soil erosion and expansion into land with natural capital such as forests and

wetlands to compensate for less production and a growing population. This will become a vicious cycle for the detriment of the people and the environment.

6.3.3. Adaptation of sustainable farming practices

Climate change is a recent occurrence that has affected agriculture in the study area, associated with weather changes and impacts on crop cycles (Chapter 5). With no other avenue for income, the people depend on existing livelihoods; building adaptive capacity is needed for the people to adopt alternative livelihoods and sustainable land use practices (Berman, Quinn and Paavola, 2012).

But the households already face challenges with their time to practise conventional and hybrid farming. There will be additional risk with switching to organic farming, since studies on organic farming show there are lower yields, and increased use of land (Reganold and Wachter, 2016; Tuomisto et al., 2012). Some studies show yields comparable to conventional farming, but this is contentious with a meta-analysis showing lower yields (Smith et al., 2019; Lotter, Seidel and Liebhardt, 2003) (Chapter 2). Further, although organic farming commands better pricing, Puthukkudiyiruppu is far from large markets such as the Western Province, where consumers are more likely to purchase organic produce. But the transport cost to such markets is too high (Ramesh et al., 2010). Second, the people are already facing market access problems with their conventionally farmed produce. Third, the farms are smallholder with less than 1.5 acres of land, making harvests low to begin with. Switching to organic farming would potentially reduce harvests further, reduce income to unsustainable levels and increase demand for land. Factoring in transport cost and lower harvests would also lower profits significantly, making organic farming unsustainable for the resident. In other words, the fulfilment of their needs would not improve, and they would end up worse off than they are now.

Making an unplanned transition to organic farming will also have environmental ramifications. As shown in Chapter 5, there has already been a decline in natural capital. Further, as shown in Chapter 2, there is ambiguity on the extent of agricultural output with organic farming compared to conventional farming. Shifting to organic farming could increase demand for land to compensate for lower yields. This could increase demand for water which is already in short supply and is saline. Further, there are other barriers to overcome, particularly access to

markets that are too far from the study area. Undertaking organic farming could lead to loss of market access.

The results concerning gender show that women in Puthukkudiyiruppu were more likely to adopt sustainable farming practices, are more open to change with sustainable farming such as intensive and organic farming and are better at using their land efficiently. Further, they are better educated and are better able to manage their income in the context of savings and repayment of livelihood loans. Results from the focus group discussions also reflected these findings. Women also said they are members of societies to which they contribute LKR 100 (US\$ 3) per week and can draw LKR 10,000 (US\$ 30) for livelihood development and emergencies. Therefore, while there is great potential for adopting the right development pathway to influence sustainable farming practices, there are barriers as well. Overcoming these barriers will potentially make the women change agents for sustainable change. However, such a pathway cannot be achieved with existing livelihoods. A transformation of livelihoods that overcomes the barriers of limited market access, inadequate fulfilment of needs and can adapt to climate change in the right sustainable direction is required.

The findings also show that the existing status quo in the context of livelihood-related land use practices will not contribute whatsoever to meeting any of the SDGs by 2030 from both socioeconomic and environmental perspectives. What is needed is a paradigm shift with a pathway that brings the market to Puthukkudiyiruppu, fulfils needs and thereby meets the SDGs that are appropriate for the study area. In the next chapter, hybrid tourism will be discussed as one such development pathway to bring the market to the study area, influence sustainable change and to contribute towards meeting SDGs.

With similar results, a study shows how people's basic needs in the context of Maslow's theory are not being fulfilled due to proximity to a national park (Rishi et al., 2008). Further, another shows how basic and safety needs are not being fulfilled after a natural disaster (Yawson et al., 2015). Studies also show how inadequate access to markets causes the endurance of rural poverty (Ellis and Bahiigwa, 2003; Khan, 2001). Further, studies in the Northern Province show similar problems the region faces with market access (Kavitha and Shivany, 2020; Vaikunthavasan, Velnampy and Sivarajah, 2019).

Recent studies show how climate change is affecting food security in Sri Lanka, among children in the Jaffna district and in Mullaitivu after the Covid pandemic (Singh et al., 2023;

Esham et al., 2018; Kandeepan, Balakumar and Arasaratnam, 2016). Similarly, one study shows apathy and lack of community participation in ecotourism due to factors such as inadequate financial resources, education and training, with prioritisation of fulfilling basic needs (Bello et al., 2017). Another shows how aspirations influence livelihoods, with natural disasters reducing such aspirations (Nandi and Nedumaran, 2021). Other studies in the Northern Province show similar problems faced accessing financial capital (Vaikunthavasan et al., 2019; Tharmine et al., 2018).

6.4. Summary

Maslow's hierarchy and statistical analysis were used to understand the human needs that drive existing livelihoods, how these influence land use practices and whether agriculture-based livelihoods can shift to sustainable land use practices. The discussion showed that basic and growth needs are not being fulfilled in a significant number of households in Puthukkudiyiruppu. With no alternatives, these households continue to practise their existing livelihoods with unsustainable farming methods partially fulfilling their needs simply to survive. Further, climate change has caused serious disruption to their livelihoods in recent years. But the people have developed coping capacity, although most women felt that its impacts could be reversed by adapting sustainable farming practices. Moreover, women were more educated and were more open to adopting sustainable farming practices. Despite this, they employ conventional farming methods due to the ease of its practice and market access. An alternative pathway that influences the adaptation of sustainable farming practices, provides market access and helps the people meet their needs is needed to bring about sustainable change. In this regard I will assess hybrid tourism, which is a potential choice, in Chapters 7 and 8.

7. Results and Discussion: Hybrid tourism in resettled communities

7.1. Introduction

Scenarios are not predictions but are hypothetical constructs used to evaluate how various trends, uncertainties, and events might unfold and interact in the future. Scenario planning, with initial groundwork credited to Herman Kahn is a framework that takes elements of current situations to hypothesise what future situations could possibly be based on alternative courses of action (Amer et al., 2013). Its origins lie in initial usage by the Shell company since the 1960s after Kees van der Heijden oversaw its use from 1957 to 1991, eventually authoring several publications on its use (Bradfield et al., 2005; Heijden, 2005). Scenario planning is “working with complexity and with the future” (Sharpe et al., 2016; p 2; Leicester and O’Hara, 2009). Further, it studies present human actions to understand how these influence future land use for agriculture-based livelihoods and food security (Ramirez et al., 2015; Câmpeanu and Fazey, 2014). Second, it brings related stakeholders into one space, without limiting engagement in a stakeholder-by-stakeholder one-on-one fragmented approach (Bohunovsky, Jäger and Omann, 2011). Third, scenarios allow stakeholders to participate in building visions of the future comfortably and actively, over time. Fourth, scenarios support a buy-in, legitimacy and ownership by the stakeholders and broadly produce forecast plans, roadmaps and pathways (Sharpe et al., 2016). Finally, scenarios help to render visible and tangible futures as to how rural communities might experience and respond to changing and converging sociopolitical, socioeconomic, agricultural and environmental conditions (López-Rodríguez et al., 2023).

PSP is a popular method employed in a range of studies including climate change and policy decisions, pastoralism, agriculture, biodiversity conservation, environmental sciences, and businesses (Jiren et al., 2020; Cui et al., 2018; Flynn et al., 2018; Star et al., 2016; Oteros-Rozas et al., 2015; Wilkinson, Kupers and Mangalagiu, 2013; Groves and Lempert, 2007). Scenario planning complements other accepted forms of research and analytical tools such as surveys, case studies and statistical analysis (Ramirez et al., 2015). Its use is limited in tourism studies with a focus on the impact of climate change on existing tourism, the future impacts of growing tourism and in assessing the social-ecological impacts of a PA where tourism is practised (Welling et al., 2019; Pizzitutti et al., 2017; Malek and Boerboom, 2015; Palomo et al., 2011).

Land has gone through significant transformation to accommodate settlements and agriculture in Puthukkudiyiruppu, Northern Province, Sri Lanka as discussed in Chapter 5. If the same pattern of land use continues several ecosystem services will be compromised. Further, Chapter 6 showed that physiological, growth and love and belonging needs remain inadequately fulfilled. Hence, there remains a need to bring diverse actors in isolated and fragmented rural communities together to understand present livelihoods, their drivers and how they drive land use, and to look at plausible sustainable futures in a collaborative setting.

While PSP has been used extensively in other parts of the world in the context of social and climatic drivers of land use change, the use of natural resources for livelihoods and urban planning, such studies have not been conducted in Sri Lanka (Broto, Boyd and Ensor, 2015; Santoro et al., 2013; Carrero et al., 2013). Participatory mapping has been used in demarcating boundaries near a national park, the apparel industry and the energy sector (Hettiarachchi et al., 2021; Bolonne, 2020; Withanaarachchi, Nanayakkara and Pushpakumara, 2015). Further, in the study area, while limited studies on tourism in the Mullaitivu district have been conducted (Chapter 4), these have used mainstream tools such as focus groups, key informant interviews and household surveys (Piratheepa et al., 2021; Aloysius, Yousaf and Saira, 2020; Vipulan, Weng and Ghazali, 2020).

The Three Horizons Framework is a structured practice to explore plausible futures, understand how transitions to future states might occur, and identify actions that can be taken today that may shape the future. The first horizon represents the current state of an existing system, encompassing dominant practices, technologies and ways of thinking that are prevalent. It is characterised by stability and incremental change. The second horizon is the transitional phase, where innovations emerge with the potential to replace the current system. This horizon is marked with uncertainty, competition between old and new paradigms and significant changes in technologies or practices. The third horizon represents the long-term vision of a future system. It represents ideas and innovations which are radically different to the current system and have the potential to create new ways of operating (Sharpe et al., 2016).

The Three Horizons Framework has several advantages. The focus is on integrative scenarios, recognising that no single disciplinary approach is sufficient to capture major uncertainties of futures. Therefore, perspectives from diverse stakeholders such as farmers, tourism operators, businesses, community members and researchers can be included in the process.

Second, it provides for three distinct scenarios covering the status quo, incremental change, and transformative change. This approach considers changes to maintain the status quo, positive changes that could help reconstitute the status quo incrementally, and transformative change that could either work positively or lead to collapse (Hodgson and Midgley, 2014). This simplifies the workshop process since there is no need to formulate the number of scenarios and what they should be before embarking on visioning. Third, it works well in situations where uncertainty is high (Sharpe et al., 2016; Hodgson and Midgley, 2014). Fourth, it makes participants think in terms of jointly prioritising resource use, minimising trade-offs, planning systematically, working together, building trust, and maintaining a wide social network (Thorn et al., 2021).

My purpose in this chapter is to use a participatory setting to understand social and climate drivers of historic and predicted LULCC detailed in Chapters 5 and 6, to envision sustainable socioeconomic development futures and strategies with hybrid tourism and to identify change agents for driving a transformative change.

7.2. Results

The results of the workshop covering those that were recorded or tabulated during the event and those that were subsequently translated have been summarised in this section.

7.2.1. Boundary setting

The overarching aims agreed to among participants were to explore how hybrid tourism could support long-term development with employment for young people who lack awareness of tourism, reduce cultural assimilation to preserve the uniqueness of their local culture and foster engagement by young people in after school activities.

The participants decided that the type of scenarios should be normative, i.e. based on the social norms and standards in the study area. These norms and standards are based on what constituents of a society believe to be normal and appropriate and are made up of the values, beliefs, attitudes, and behaviours shared by them. Further, normative scenarios work well in rural land use settings and work backwards based on a collectively envisioned future based on shared values (Star et al., 2016). The scenarios were created to examine futures according to their desirability with no preset policy in place (van Notten et al., 2003).

The goal was to develop scenarios that would support the long-term development of hybrid tourism in the Northern Province of Sri Lanka, particularly for young people who lack employment, lack awareness of tourism and are experiencing cultural assimilation and migration to other parts of the country and overseas.

The geographic scope was Puthukkudiyiruppu, which borders a PA, the Chundikulam National Park, and the ocean. The region is characterised by large extents of forests, interspersed with cleared areas for settlements, agriculture and built-up areas. The settlements have home gardens ranging from half an acre to two acres, with palm trees, fruit trees, vegetable cultivation and rice paddy. The livelihoods are agrarian with agricultural cultivation (e.g., groundnut, rice paddy, vegetables), livestock (e.g., cattle, poultry, goats) and fishing with limited nature tourism, horticulture, tailoring and hospitality (cooking), a small amount of mushroom production, and the sale of palmyra and coconut products. From a climatic perspective, Puthukkudiyiruppu is in the dry zone. Rainfall reaches 1340 mm and 650 mm during the monsoon and inter-monsoonal periods respectively (Piratheeparajah, 2015). The periods of drought have increased in recent decades (Nagamuthu, 2024).

This region faced over thirty years of war, during which the war influenced migration patterns, and the related agrarian livelihoods largely drove land use. Further, in the post-conflict period after 2009, government sponsored resettlements created permanent settlements and the expansion of built-up areas in the vicinity of the Chundikulam National Park. The temporal scope defined was that the past would include the period 1979-2010, the present 2010-2020 and the future 2030. This aligned with pre-war, war and post-war conditions, and the LULCC analysed in decadal increments in Chapter 5. This timeline further ensured participants had recent memories about events during these periods, which is important for storytelling (Kariuki et al., 2022). The year 2030 was agreed as the target end year for multiple reasons. First, it coincided with the year selected for forecasting LULCC. Second, it aligns with the SDGs (Diaz-Sarachaga et al., 2018). Third, a significant reduction in natural capital due to urban expansion is predicted by 2030. Fourth, this was an appropriate year to plan opportunities for the next generation with reduced emigration, preservation of culture and changing resource access. Fifth, this was the right year to plan for economic goals such as domestic and international tourism, the development of new food products and substitute products for those being brought from other regions in Sri Lanka.

The participants identified that communication tools most appropriate for the scenarios would comprise letters, proposals, news media, documentaries and meetings. End users would include society leaders, the agrarian department, the forestry department, the land department, the coconut and palmyra development boards, other government agencies, donors, Sri Lankans living overseas and potential investors in Sri Lanka and internationally.

7.2.2. Storytelling

Several common themes emerged from the storytelling segment of the workshop (Appendix 2). The first theme was the war and its impacts. The war displaced many people who lost their land and homes, and many lives were lost. Life in the rehabilitation camp Menik farm had inadequate hygiene facilities, a lack of privacy and residents were mistreated by armed forces. Children could not continue their studies due to the war, and a lack of literacy, especially in the English language, persists today.

The second theme was the environment. Deforestation caused unfavourable conditions, poor harvests and loss of habitats for biodiversity. Agriculture and livestock production were affected due to wildlife predation and climate change with droughts, floods, water scarcity and water salinisation due to subsistence and groundwater intrusion. Participants faced many hardships and the loss of thousands of lives during the tsunami in 2004.

The third theme was basic needs and livelihoods. After the war, people who had lost their livelihoods, had a lack of job opportunities, inadequate infrastructure facilities, and higher cost of inputs tried to rebuild their lives peacefully. However, most people's homes were not in a liveable condition or destroyed, and resettlement schemes were not properly implemented with delays in releasing funds. Soon after the war ended, many foreign and local companies gave financial assistance to rebuild. Many people became self-employed and tried to educate themselves. Unemployment has increased psychosocial problems and the incidence of drug and alcohol abuse. Others dependent on agriculture faced challenges associated with access to financial capital to buy sprinklers, drip irrigation systems and fertilisers. Moreover, poor seed quality affected harvests. Also, middlemen paid unfair prices and made more money than the farmers. Following this, the Covid pandemic and the Sri Lankan economic crisis from 2022 onwards affected people's quality of life, with farmers unable to access fertilisers and herbicides due to import restrictions.

7.2.3. Key events that shaped past and present LULCC patterns

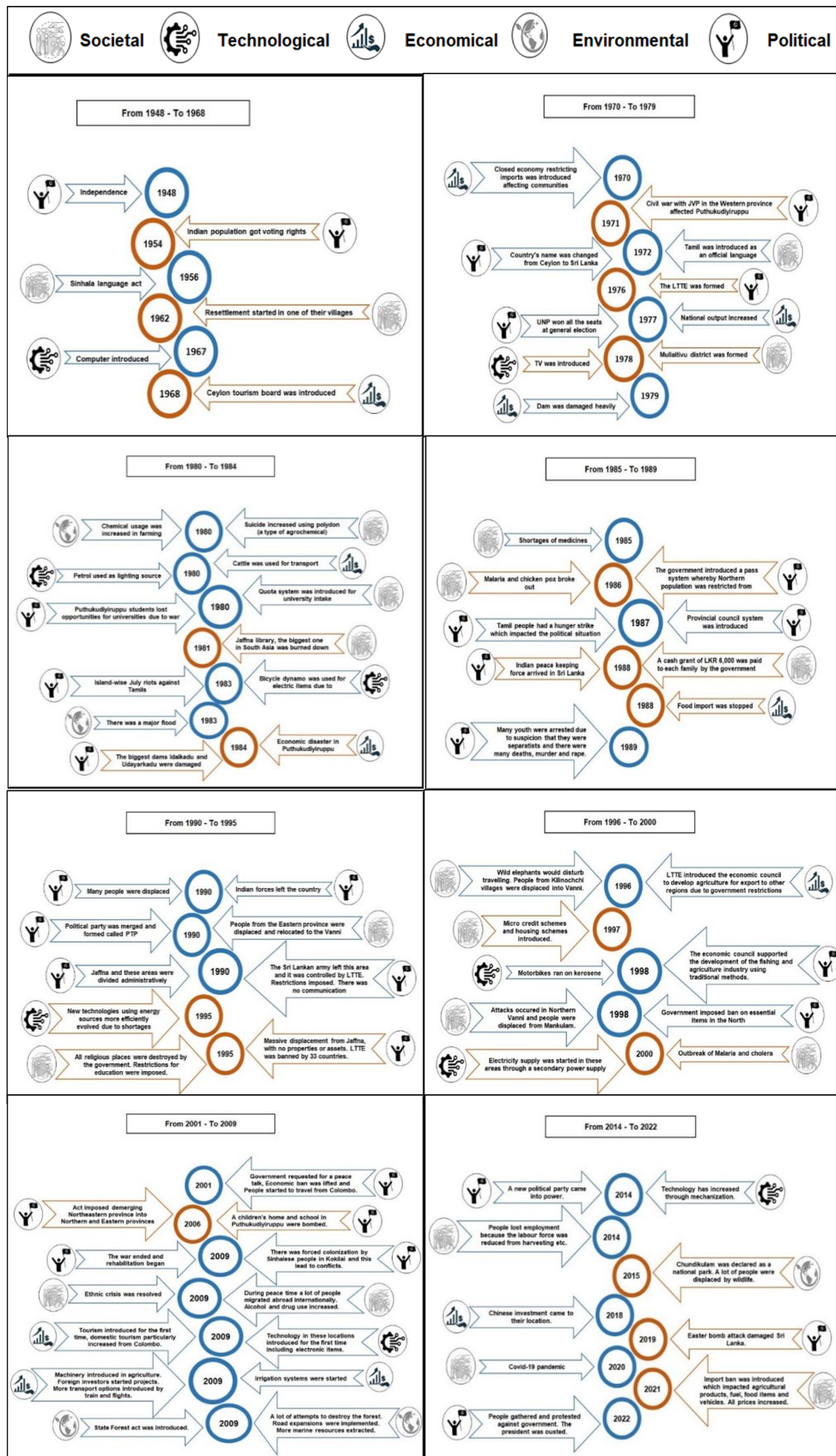


Figure 77 Societal, Technological, Economical, Environmental and Political (STEEP) analysis of the region from 1948 to 2022

The participants recalled how political events dominated the region during the decade before and during the war (Figure 77). First, the country shifted to an open economy with a change of government in 1977. In 1983, there were riots, with atrocities committed against Tamils across the island. This sparked the start of war between the government and separatist groups. Participants recalled escalating emigration, as people fled the Northern Province to other parts of the country and overseas.

The war shaped LULCC until 2009. Participants recalled several events that drove the changes over time. The movement of goods into the Northern and Eastern provinces and the movement of people within and without were restricted. People from the Eastern Province were displaced and relocated in the Vanni, within which Puthukkudiyiruppu is located. The LTTE controlled their area after it was abandoned by the Sri Lankan armed forces. There was massive displacement from the Jaffna peninsula to their region without any assets. These events, participants said, led to increasing land use for rice paddy and other crops and a reduction in land for settlements as people emigrated within the province or elsewhere.

After the war ended in 2009, social factors shaped LULCC. Participants said improvements were made for agriculture, with irrigation systems and mechanisation leading to increased use of land for agriculture. From an environmental perspective, participants mentioned that the State Forest Act was introduced in 2009 and Chundikulam was declared as a national park in 2015. Participants said this enactment and declaration caused the displacement of many people by wildlife and that there were also attempts to destroy forests soon after the war ended.

7.2.4. Participatory mapping of perceptions of the drivers of land use

Between 1979-2009, disruptions due to the protracted war were commonplace. These disruptions have shaped the reduction of land use for settlements in Puthukkudiyiruppu. The need for increased food production resulted in the expansion of rice paddy production. The war meant less timber was required to develop infrastructure with people leaving the area, which somewhat increased the forest cover area. Climate change was associated with both

increases and decreases in soil cover and loss of topsoil with greater erosion caused by natural disasters including flooding.

Between 2010-2020, the growth in settlements after the war resulted in illegal land-grabbing, increased foreign investment and increased agricultural production with the introduction of modern technologies such as irrigation systems. The increase in forest cover is associated with reforestation during the war and new laws on deforestation. The decrease in wetlands is attributed to climate change with high temperatures. The increase in palm trees is attributed to home coconut cultivation schemes by the government and development of oil palm and coconut resource systems (President's office, 2023).

Land use is predicted to increase between 2020 and 2030 due to urban expansion, population growth and lower mortality rates due to improved medical facilities. Palm and wetlands are predicted to decline due to destruction for settlements and rice paddy. The predicted reduction of saltpans is associated with their conversion for agriculture using crops that can withstand high salinity.

Table 19 Participatory mapping giving reasons for LULCC during the periods 1979-1997, 1997-2010, 2010-2020 and 2020-2030

Land use	Area (km ²) 1979	Area (km ²) 1997	Reason for change	Area (km ²) 1997	Area (km ²) 2010	Reason for change	Area (km ²) 2010	Area (km ²) 2020	Reason for change	Area (km ²) 2020	Area (km ²) 2030	Reason for change
Forest	550.4	553.8	Due to war migration, forest has increased due to less deforestation	553.77	542.5	Deforestation has been carried out for developing infrastructure facilities	542.5	553	Reforestation during the war, the introduction of laws on deforestation	553.03	551.9	Increased migration, climate change
Water	1095	1086	Water levels have decreased with deforestation	1085.75	1086.1	New ponds for agricultural development and old ponds were developed into massive ponds	1086	1095	Irrigation system renovations, high rainfall, rise in sea level	1095.2	1115.4	Climate change, increases in rainfall, increase in catchment areas

Paddy	256.7	339.6	The rice paddy fields have increased since people are engaged in agriculture causing deforestation.	339.63	342.1	Conversion of bare lands into fields to increase food production	342.1	325.4	Brackish water table is high, lack of effort, high costs, climate change	325.4	321.9	The number of people working in agriculture has declined
Settlements	282.2	79.8	Settlements have decreased due to the destruction of many buildings, deaths due to the war and migration to other parts of the country and overseas.	79.77	71	Rural population migrated to urban areas for shelter and employment	70.96	152.6	Increase of population, illegal land grabbing	152.6	180.8	Increase in population, birth rates and medical facilities, low mortality rates, monogamy
Built-up	5.9	2.5	Deaths due to the war, the economic situation and emigration.	2.51	3.9	Increase in population	3.9	22.7	Foreign investments, the advent of modern technologies, productivity increases	22.7	22.3	People have migrated
Soil	42	96.2	Soil erosion is caused by climate change	96.15	48.7	Excavation activities for infrastructure development, soil erosion due to natural disasters like tsunamis and floods	48.66	35.8	Soil erosion, deforestation and flooding	35.8	35.3	Excavation of soil

Palm	55.4	71.9	Their rate of destruction is low due to less usage for timber.	71.89	63.9	Due to the war and use for infrastructure	63.91	94.9	Development of oil palm and coconut resource systems, home coconut cultivation schemes	94.9	77	Destruction of palm for settlements
Wetlands	95.2	118.5	Wetlands have increased due to decreased cultivation	118.5	142.4	Movement of sea water towards land with coastal soil erosion	142.4	87.6	Climate change, high temperatures, settlements	87.6	67.5	Increase of settlements and buildings
Other vegetation	7.4	40.6	Vegetable production has increased due to increased cultivation causing deforestation.	40.64	82.8	Demand for food increased with population growth causing agricultural activities on a larger scale	82.83	19.5	Alcoholism, herbal and other requirements	19.5	14.5	Urban expansion
Saltpans	6.9	7.4	Saline land has increased due to increasing temperatures due to climate change	7.37	12.6	Sea water intrusion due to tsunami and activities causing soil erosion	12.61	9.4	Water saving in farming, artificial interventions	12.6	9.4	Cultivation of crops suited for highly saline conditions

7.2.5. Tourism sites and skills that could be offered for tourism

Participants have an intrinsic knowledge of their region and highlighted potential sites for tourism and sites to avoid for hybrid tourism (Figure 35). For instance, Chundikulam National Park and Thondaimanaru have rich birdlife making them suited for nature tourism. Further, Thondaimanaru has a historic underground building built by Arya kings and ancient temples, and Poonakary (Pooneryn) has an ancient fort built by the Portuguese in the fifteenth century that has not been taken advantage of for tourism. Both the underground building and the fort must be repaired for which the government must get involved.

Skills for nature tourism participants could offer included knowledge of birdlife and activities such as boating, camping or fishing. In agritourism, participants said they could share knowledge on rice paddy, groundnuts, mushrooms, and other crops, experiences such as planting, harvesting, and bullock cart rides to tourists, and locally prepared culinary experiences with dairy, fish, shrimp and meat products. For cultural tourism, several historic sites were proposed including temples and a fort. Activities could include performing music, dramas and celebrating the Nagar Kovil, a town in the Northern Province, and a ship festival. In home-based tourism participants offered homestay, traditional foods, selling palmyra-based handicrafts and coconut-based handicrafts. Palmyra-based products and handicrafts are unique to the Northern Province since the trees are endemic (Chapter 5). Residents could work as tour guides, as information providers and in restaurants.

Music and drama are intertwined in the culture of the Northern Province with influence from South India. These forms of music and drama encompass Bharatanatyam and Koothu. Further, there is Sanganatham, a new form of drama unique to the Northern Province to express the horrors of war experienced by them (Thavachchelvi and Sharma, 2021; Katrak, 2013; John, 2008; O'Shea, 2003). Participants felt this expression of their culture was suppressed by the war for over thirty years and that tourism would give them an opportunity to bring their culture to the limelight again.

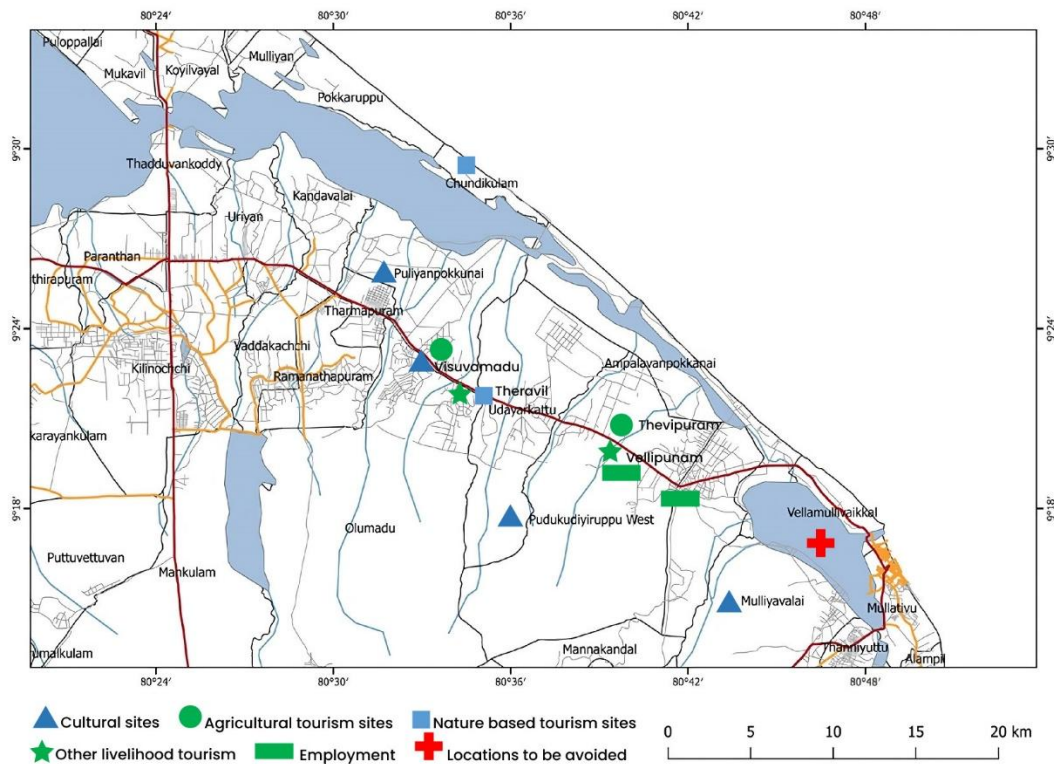


Figure 78 Map of potential sites for tourism and sites to be avoided developed in a participatory mapping exercise.

7.2.6. Livelihood challenges

The livelihood challenges participants faced were categorised into special needs for psychosocial wellbeing, climate change, gender-related challenges, land-related challenges, tools and technology, infrastructure facilities, local and international markets, capital and financial facilities, vocational training and children's education. Key challenges that are relevant to the discussion for this chapter have been extracted and grouped.

The challenges related to land use were not enough land for agriculture, soil excavation, illegal land capture, contaminated soil due to the war and water issues. Second, the challenges related to climate change were destruction of crops, destruction by insects, loss of domestic animals, and communicable diseases among animals. Third, challenges related to psychosocial wellbeing included impacts on mental health due to losses in agriculture, impacts due to the war with loss of limbs, malnutrition, suicides due to inability to pay loans, conflicts between families and drug abuse. Fourth, there were many challenges related to livelihoods for which the main categories tools and technology, local and international markets, capital and financial facilities, and vocational training are adequate for this chapter. Fifth, there are

challenges for their children due to lack of good educational institutions, drug abuse, misuse of mobile devices and lack of employment opportunities after studies are completed.

7.2.7. Desirable futures

Sustainable income for women and youth was a top priority in desirable futures among participants. This was followed by mechanisation and modernisation of agriculture, the development of small and medium enterprises (SMEs) to produce food products and to grow herbs. Next, participants felt nature tourism could be in a desirable future with increased vegetation, wildlife and the refurbishment of ponds for tourism-related activities. Among undesirable futures the participants ranked not earning enough income to meet their needs in first place. This was followed by the inability to create opportunities for the youth to remain with them instead of emigrating in second place. In third place was lower harvests due to poor access to water and climate change.

7.2.8. The Three Horizons Framework

Participants discussed a range of interconnected issues with the current system and expressed aspirations for desired futures. Based on these discussions, participants then developed three scenarios related to business as usual, incremental, and transformative. Six cross-cutting themes emerged during the workshop, namely socioeconomic, geopolitical, environment, education, tourism, and culture. Each pathway represents a unique combination of these themes, highlighting the diversity of future aspirations (Schaal et al., 2023).

Horizon 1 – Maintaining the status quo

The first horizon represents the status quo, how the region is currently going about business the population is familiar with, and changes that would usually occur. Settlements have more than doubled, attributed to population growth and illegal land grabbing. There is loss of habitats from deforestation and livelihoods due to a lack of agricultural land, with significant socioeconomic impact. There is excessive use of chemical fertilisers and illegal sand mining by the sand mafia causing soil erosion. Poultry is not well managed, leading to sanitation issues and a bad odour which affects neighbouring farms. Livelihood challenges have arisen from contaminated soil after the war. Soil on organic farms is also contaminated from chemical use on neighbouring farms. There is no soil research institute to study these problems and to look for alternatives.

There is a lack of government involvement in planning and the provision of infrastructure. Moreover, none of the tourism sites in the area such as Chundikulam National Park have been restored or promoted for tourism by the government, in part because there is no designated department responsible for developing tourism in the study area. There is bias on tourism sites by the government. The government laws on divorce and the minimum age for marriage go against the freedom of women and local culture. The government offers no assistance or system for compensating people who lost land during the war, or getting their legal rights to the land returned to them.

There is lack of exports and no investments from the private sector and the government in the region to develop exports. There is a lack of awareness about organic agriculture. There is scarcity of herbicides due to the economic crisis which is also causing high price volatility for produce. Livelihood challenges arise from lack of tools and technology, local and international markets, infrastructure facilities, financial capital and vocational training. Further, the economic crisis from 2022 onwards has increased the burden and there is difficulty to maintain savings.

Climate change impacts are being felt, with flooding, droughts, erratic rainfall patterns, lower yields, unpredictable weather, higher temperatures, increased salinity of groundwater, soil erosion and water scarcity. Crops are affected by insect infestations and animals face more communicable diseases. These factors lead to growing pressure on ecosystem services. Also,

there are human-wildlife conflicts and social conflicts due to wild animals and free-range livestock such as goats and cattle eating farmed produce in areas adjacent to forests.

There are social problems to contend with. Cultural assimilation is caused by Sinhalese people from other parts of the country, by the emigration of youth and by the growing influence of Western culture. This is causing increased ethnic divisions between the Sinhalese and the Tamils building up on differences due to the prolonged war.

Education is inadequate, and drug and alcohol abuse are predominant. There are psychosocial and mental health issues due to losses in agriculture, impacts due to the war with loss of limbs, malnutrition, suicides due to unpayable loans and family conflicts. Young people who cannot find jobs once they have completed their studies abuse drugs and misuse mobile devices.

Youth emigrate for employment due to less local job opportunities. This results in less support for households engaging in agriculture and a small labour workforce. Moreover, there is a growing and high dependence on overseas remittances which reduces motivation to work productively and to look for employment. There are gender-related challenges for women with male dominance, violence against working women, lower wages compared to men and lower access to financial capital. In this scenario, corrupt politicians can grab land, and military bodies occupy fertile land that belonged to the people.

By 2030, Horizon 1 becomes unmanageable. The population continues to grow, face the same social problems and continue the same livelihood practices. There is increased pressure on the resource base that cannot be sustained.

Horizon 2 – Incremental change

In this scenario, incremental change occurs to conserve the environment with a beautiful coastline, ponds with storage of freshwater and national parks. Factories are built to process moringa and coconut, to produce coconut-based products and glass from silica sand. The chemical-based fertiliser factory in the Northern Province is restarted and supplies affordable fertilisers. Product pricing is fair with lower cost of fertilisers and with less middlemen.

Agricultural product development is supported by research by investors and the government, such as coconut leaves for export. Village irrigation systems and nurseries are subsidised, which supports the development of more home gardens for cultivation. Freshwater flowing

into the sea is diverted into storage tanks for agricultural use, including aquaculture farming. There is inclusion of modern technology in the school curriculum, and there are quality vocational training centres and universities for education.

To promote tourism, more beach hotels are built, and cultural and heritage sites are upgraded through investments by the private sector and the government. Permanent medical facilities are built, resourced with more qualified doctors that reduce the need to travel far for treatment. Roads are upgraded, a sports stadium is built, and road lights are installed. There is investment by the private sector in hotels and marketing with social media and bloggers creates awareness about Puthukkudiyiruppu and the tourism it has to offer. The government provides adequate compensation to residents for their losses with land allocation or legal documents to get back land.

However, incremental change comes with the loss of wetlands near ponds, rivers and canals and other vegetation to make way for villages and cities. Climate change impacts with destruction of crops and loss of livestock continue. With growing water scarcity, desalination plants are built, and groundwater and surface water is filtered with these plants. However, factories and beach hotels increasingly use precious resources, especially water which is already inadequate to support human existence. The concerns grow on overuse of raw materials like silica sand for factories and supply of water for hotels and the diminishing saltpans. Conventional farming is favoured due to easy supply of fertilisers from the factory within the province. There is short-term socioeconomic gain, but this is accompanied by incremental pressure on ecosystem services due to additional consumers of the resource base. Ecosystem services are unable to meet demand for water in this scenario, which is inadequate even now.

By 2030, the social-ecological system will become imbalanced. Incremental change becomes unmanageable with inadequate access to ecosystem services in this trajectory.

Horizon 3 – Transformative change

Chundikulam National Park and Thondaimanaru have rich bird life making them suited for nature tourism, and local people provide their expertise in birdlife and activities such as boating, camping or fishing. Ponds are refurbished. Home-based tourism offers homestay, traditional foods and palmyra-based handicrafts which are unique to the Northern Province

since the trees are endemic (Chapters 2 and 5). Residents work as tour guides, as information providers and in restaurants. In agritourism, tourists are provided with experiences in planting and harvesting, bullock cart rides and locally prepared culinary experiences with dairy, fish, shrimp and meat products. Residents provide their knowledge on the production of rice, groundnuts, mushrooms, and other crops.

For cultural tourism, Thondaimanaru has a historic underground building built by Arya kings and ancient temples, and Poonakary (Pooneryn) has an ancient fort built by the Portuguese in the 15th century. These sites are restored by the government for tourism. Cultural activities offered include celebrating the Nagar kovil ship festival in a town in the Northern Province. Music and drama encompass Bharatanatyam and Koothu. Tourism also gives inhabitants the opportunity to showcase Sangathanam which was suppressed by the war for over 30 years.

Support from the government is provided in terms of training in linguistics and communication skills, traditional huts, resting and hygiene facilities for tourists and sustainable agritourism, nature tourism and hotel sites near religious places. There are also aspirations for agricultural development fulfilled with integrated farms, the development of SMEs, drip irrigation, improvements in marketing, investment in the private sector, and greenhouses. The diaspora helps improve education, especially for women and children in linguistic and communication skills.

There is still growth in population but living standards improve. Needs are better fulfilled leading to less pressure on natural capital. This is partly due to the enforcement of anti-litter regulations, and training on climate smart, sustainable, organic agriculture. Young people are guided and provided opportunities to be employed in agriculture and tourism and aid social development. Religious institutions are maintained which helps to conserve cultural practices. This leads to its integration in tourism with culture showcased via religious practices, music and drama. The desire of the people to preserve local culture and create opportunities for their youth is fulfilled.

However, wetlands continue to reduce and there is soil erosion due to rising sea levels and seawater intrusion inland. Pressure on natural habitats and agricultural land for rice paddy continues due to growth in settlements and climate change. But over time aspirations embrace sustainable practices as needs are better fulfilled, with many of the aspirations linked to tourism. Hybrid tourism influences a change of mindset, making people adopt new

ways of working with the natural environment. The current production of palmyra and moringa expands which creates new opportunities in cottage industries for supply of products related to tourism. This contributes to the environment by influencing the planting of palmyra and moringa trees. The government prioritises the installation and maintenance of urban green spaces and parks. Renewable energy is supported through solar pump irrigation, solar power for homes as well as biogas for cooking instead of firewood. This reduces the demand for firewood mainly sourced from the forest for cooking (Chapter 4). There is a desire to rehabilitate and conserve the natural environment due to more livelihood opportunities with hybrid tourism.

Partnerships aid hybrid nature tourism, facilitated through the involvement of the Ministry of Agriculture, the department of agrarian services, agricultural societies, NGOs and Thinnai farms. There is also the support of remittances and skills from the diaspora, labour, land and skills from local communities, and organisations which support proposal development.

There are items that other people want that need to be addressed with transformative change. The culture allows for mainly vegetarian food due to Hinduism. This affects some hotel sites near temples. There is still a feeling of ethnic division due to the war. There is deforestation, illegal sand mining and free-range livestock. Further, there is large use of land for rice paddy with chemical-based inputs. The military presence is high, and it has occupied sites that are suited for tourism, and it has introduced tourism, thus depriving local livelihoods (Ratnayake and Hapugoda, 2016; Correspondent, 2012). These get addressed over time.

Vegetarian hotels tend to be located near religious places to balance them with local culture. Ethnic divisions reduce, as tourism creates opportunities for all communities. The government increases controls on sand mining and deforestation as the region's contribution to national tourism revenue grows. There is investment by the community in natural fencing to limit the movement of free-range livestock. Religious places become sites for the preservation of and education of young people in cultural practices. The armed forces have relinquished key sites over time to local communities due to increasing tourism revenue from CBT. Tourists visit these sites to participate in local culture. Hygiene facilities are installed in tourism sites, along with resting sites and shading structures. Luxury transport is developed, and a local airport is built to visit religious places. Traditional huts with local materials that regenerate such as palmyra are built in PAs for tourists to limit intrusion and conserve wildlife and vegetation.

Agricultural development includes refrigeration, and other methods of food preservation along with saving schemes for water access. Markets for palmyra, moringa and jasmine export are developed. More people own property to build their businesses. SMEs for snacks, herbs, and mushrooms are also developed with private investment and knowhow. Price controls are implemented by the participation of the Ministry of Agriculture and the private sector. NGOs come forward with funding to mitigate high transport costs from Puthukkudiyiruppu to the Western Province for produce. The government invests in a veterinary officer for livestock, whilst the University of Jaffna plants trees in the entire region. The government subsidises climate smart irrigation and boreholes for water and provides machinery for moringa processing.

Women's cooperatives become more active, participating in growing hybrid tourism with more cottage industries and sustainable agriculture. Loans from companies like Nestle and Milco grow for the dairy industry as demand for tourism grows. Other agricultural products evolve such as pomegranate, ginger and turmeric with training and planting facilitated by the department of agrarian services and funding by the diaspora and the private sector. The role of women increases in agriculture and hybrid tourism, paving a path for more independence.

Overall, with the emerging conditions of climate change, and the largely agriculture-based socioeconomic needs in Puthukkudiyiruppu, hybrid tourism flourishes. With it there is a paradigm shift in how people take care of the natural environment and make sustainable use of natural capital.

7.2.9. Semi-quantification of future land use by 2030

The participants felt that maintaining the status quo would increase land use for settlements and built-up areas due to population growth, foreign remittances and investment. This, participants felt, would increase land use for rice paddy driven by the people's own interests with reductions in forest cover and palm. Second, participants felt the high degree of saltpan conversion would be due to seawater inflow and the increase in water bodies would be due to rainfall and reconstruction of ponds. Third, participants felt wetlands would reduce by a low degree with high temperatures and settlements. Fourth, participants felt reduction of other vegetation would be by a lower degree due to immigration and urbanisation.

With incremental change of the status quo, the participants felt that water bodies and rice paddy would reduce by a greater degree due to lower rainfalls and increasing drought. Second, participants felt that settlements would increase by a moderate degree and built-up areas by a low degree in higher ground due to water stagnation in low lying areas. Third, participants felt wetlands and other vegetation would lose ground to settlements, and that saltpans would go through a high degree of transformation with seasonal high temperatures.

With transformative change, the participants felt that forest cover would go through a high degree of conversion due to increase in population driving increased demand for resources. Second, participants felt water bodies would reduce by a moderate degree driven by deforestation. Third, participants felt rice paddy would influence a moderate reduction in land use due to lack of fertilisers. Fourth, participants felt settlements and built-up areas would grow, driven by population growth and an improved standard of living. Fifth, participants felt soil, palm, wetlands and saltpans would go through moderate degrees of conversion driven by soil erosion, resource requirements, rising sea levels and lands becoming saline due to misuse of water respectively. Sixth, participants felt other vegetation would face a high degree of conversion near rivers.

Table 20 Semi-quantification of perceptions on future land use if continued in the same manner. For column "May change in 2030," ++=strongly agree, +=moderately agree, 0=no change. For column "Degree of certainty," ++=high, +=medium, -=low and 0=no change

Land class	May change in 2030	Where does this change occur?	Why does this change occur?	Degree of certainty (High, Medium, Low)
Forest	+	Devipuram, Muththaiyankattu, Thandikulam	Deforestation, animal proliferation	0
Water	+	Udayarkattu, Edaikattu, Marudhamadu	Pond re-construction, rainfall	++
Paddy	++	Murasumoddai, Kalliadi, Kumulamunai	People's interest, self-interested economy	++
Settlements	++	Puthukkudiyiruppu, Mullaitivu	Population growth	++
Built-up	++	Puthukkudiyiruppu	Foreign earnings, investors	++
Soil	--	Moongilaru, Devipuram, Manjal Palam, Udayarkattu	Illegal dumping	++
Palm	-	Kaiveli, Vattappalai	Household requirement	++
Wetlands	-	Udayarkattu, Kaiveli	High heat, settlement	0

Other vegetation	-	Devipuram, Visuvamadu	Immigration, urbanisation	0
Salt pans	+	Thandikkulam, Mathalan	Seawater inflow, Non-entitlement of lands	++

Table 21 Semi-quantification of perceptions on future land use for incremental change. For column "May change in 2030," ++=strongly agree, +=moderately agree, 0=no change. For column "Degree of certainty," ++=high, +=medium, -=low and 0=no change

Land classes	May change in 2023/ 2030	Where does this change occur?	Why does this change occur?	Degree of certainty (High, Medium, Low)
Forest	-	Rural areas, field area	-	-
Water	-	Ponds, Udayarkattu	Rainfall is low	+
Paddy	-	The land	More drought	+
Settlements	0	Through organisations	Renovations of ponds	++
Built-up	0	On the high terrain	Water collection	-
Soil	0	Visuvamadu, Udayarkattu where farming is done	Water to stagnate	+
Palm	-	Devipuram, Jaffna	Production is low	0
Wetlands	+	Pond, river, canal	To make building development	+
Other vegetation	+	Villages, cities	To promote economic development	0
Salt pans	+	Elephant Pass	Heat according to the season	++

Table 22 Semi-quantification of perceptions on future land use for transformative change. For column "May change in 2030," ++=strongly agree, +=moderately agree, 0=no change. For column "Degree of certainty," ++=high, +=medium, -=low and 0=no change

Land classes	May change in 2023/ 2030	Where does this change occur?	Why does this change occur?	Degree of certainty (High, Medium, Low)
Forest	++	Forests near villages are being destroyed on a large scale	Increase in population and consequent increase in demand for inputs (Nedunkerny, Oddusuddan)	++
Water	+	Areas dependent on rainfall are close to deforestation	Due to deforestation (Puthukudiyiruppu)	+
Paddy	-	Fields are the most common places	Climate change, lack of fertilizer (Kilinochchi)	+

Settlements	+	In the suburbs	The standard of living of the people becoming modern (Mulivaykaal)	+
Built-up	+	Areas of high population growth in the suburbs	Population growth (Kilinochchi), increase of new industries	+
Soil	+	In coastal areas, near rivers	Soil erosion (Puthukudiyiruppu), excavation of soil (Chundikulam)	++
Palm	+	In the fertile lands, on the streets	To produce new items, the need for new wastelands (Devipuram), for building construction	++
Wetlands	++	On the beaches	Due to rising sea level and seawater intrusion inland	++
Other vegetation	0	Near rivers		++
Salt pans	++	On the beaches	Good lands have become saline due to excessive misuse of water	++

7.2.10. Workshop evaluation

Overall, the participants felt that the workshop process of creating the Three Horizons Framework was positive. Participants felt that the workshop gave the opportunity for them as a people from various walks of life to speak openly about themselves. Further, participants understood the need for agency to rethink and transform existing livelihood practices. The workshop further improved system understanding and helped planning for future action. For instance, the workshop illuminated how maintaining the status quo would increase land use and the provision of natural resources. Participants understood that incremental change would make socioeconomic and environmental situations worse, since this would influence incremental unsustainable farming practices. Moreover, they clearly understood that a transformative development pathway with hybrid tourism would encourage sustainable farming practices and promote biodiversity. In this regard participants felt that futures thinking was a novel approach to envision sustainable land and resource use.

7.3. Discussion

This research contributes to a growing body of literature on local or regional normative future visioning. Combining the Three Horizons Framework with storytelling, trend analysis, participatory mapping and other PSP techniques helped elicit pathways towards future visions and anticipated changes. The Three Horizons Framework provides a structured approach to

talk about different dynamics that give rise to plausible, diverse, storytelling. This helped participants connect their ideas into narratives of change, while semiquantitative analysis with participatory mapping helped them understand how their actions are influencing natural capital and their futures. The flexibility of our approach offered the opportunity for a broader range of different pathways to emerge (Schaal et al., 2023). Moreover, the approach offers insights into plural values and local perspectives in a region which is underrepresented politically. Futures thinking is a technique whereby participants predict alternative plausible futures, both desirable and undesirable, considering factors that affect or could affect them. The selected factors are relevant to the participants and purpose of a futures thinking exercise and could include gender, livelihoods, culture and the immediate environment. Further, participants also formulate the steps to be taken to achieve a desirable future (Schaal et al., 2023; Sharpe et al., 2016; Inayatullah, 2008). Applying 'futures thinking' for the first time was highly relevant for the people living in Puthukkudiyiruppu, allowing them to explore in a neutral setting the interactions between livelihoods, climate change, and adaptation and coping mechanisms (Berman et al., 2012). Futures thinking helped make participants more aware of the need to move beyond coping to formulate long-term plans to face challenges such as climate change and resource problems (Oteros-Rozas et al., 2015). The research shows implications for conservation, climate adaptation and tourism research, creating actionable knowledge and the role of policy and governance, as well as the private sector in the future development of Sri Lanka.

The workshop participants were enthusiastic about the role hybrid tourism could play in the creation of socioeconomic value for them and how it could influence a transformation to sustainable farming methods. In this regard, empowering women, pluralism, inclusivity and formulating governance systems will help Puthukkudiyiruppu contribute towards the SDGs with SDG 5 (Gender equality), SDG 10 (Reduce inequality) and SDG 17 (Partnership for the goals) (Kumar et al., 2016).

Like these findings, a study that applies the Three Horizons Framework shows existing poor soil quality, farming practices and climate change were constituents of the first horizon. Further, features to keep were related to farming technology. Biodiversity and improvement of farming featured in the third horizon. In the second horizon there were improvements with sustainable technology and education. While many of the aspects were different due to differences in the objectives and the study area, some of the aspects were comparable to this

workshop where existing livelihood practices were concerned (Schaal et al., 2023). Another comparable study using PSP contained drivers of change such as gender inequality, population growth, agricultural practices and climate change. Further, with four scenarios the study showed that adaptation of sustainable farming practices and conservation will result in transformative change (Jiren et al., 2020). Finally, a study shows that a future scenario (among five) with sustainable tourism driven by technology, participation, climate change and emigration, and with aspects such as water, biodiversity and agriculture will be sustainable. This is also comparable to the outcomes of this chapter and shows relevance in using PSP and futures scenario planning to study how tourism could be used for sustainable development (Palomo et al., 2011).

The results broadly agree with studies in other parts of the world where participatory mapping was used to establish causality (Oteros-Rozas et al., 2015). In this regard, the results show that the drivers of LULCC are like those shown in other locations, with the degree of influence of these drivers specific to each location (Rivas-Tabares et al., 2022; Adhiambo et al., 2017; Geist and Lambin, 2002). The same approach of using participatory mapping to identify causality with local knowledge, can also be seen in other studies with similar results (Adhiambo et al., 2017; Houet et al., 2017). For example, the drivers of LULCC with participatory mapping were settlements and agriculture, with their reduction occurring when water supply was inadequate to sustain agriculture. Further, wetlands have already reduced substantially due to water abstraction and forest was converted for croplands (Adhiambo et al., 2017). Similarly, the participatory mapping in this workshop associated increases in wetlands with decreased cultivation and decreases with increase in settlements.

Change agents who are educated in sustainable practices are an important part of initiating and managing change for sustainable outcomes (Heiskanen, Thidell and Rodhe, 2016).

Women in Sri Lanka historically have been denied opportunities in rural settings (Gunawardane, 2016). However, women played a significant role as combatants in the LTTE and in the army during the long-drawn civil war. Women are also more likely than men to adopt sustainable farming practices for climate change adaptation (Goli et al., 2023; Haque, Kumar and Bhullar, 2023; Ngigi, Mueller and Birner, 2017). Further, the civil war created many widows who became the breadwinners supporting their families (Harris, 2004; Rajasingham-Senanayake, 2004). This transformed the agency of women.

The scenarios suggest that the society is patriarchal. Gender-related challenges faced by women included male dominance, households headed by men, unfulfilled special needs in psychosocial wellbeing due to the conflict, a lack of independence, violence against working women, gender pay gap for similar work, less offer for women in workplaces, and issues on obtaining loans (Chapter 6). Second, among their desirable futures, sustainable income for women and youth ranked the highest. Third, the need for women's societies featured in the workshop process leading to the Three Horizons Framework. Fourth, participants raised a concern on the existing divorce laws which alludes there is difficulty faced by women in leaving a bad marriage.

Transformative change involving hybrid tourism that changes market dynamics to encourage women to adopt sustainable farming practices is needed for several reasons. As shown in Chapters 5 and 6, women are predominantly engaged in agricultural livelihoods. Second, compared to men, a higher proportion of them are familiar with organic farming methods and are willing to switch to organic farming. Third, the main reason they prefer conventional farming is due to ease of marketing. However, a higher proportion of women were willing to adopt other forms of sustainable farming if hybrid tourism was available. Fourth, women were more willing to adopt sustainable farming practices than men if there was hybrid tourism. Women also felt that they can use their lands more efficiently compared to men. Further, they have felt the extent of the challenges of climate change more than men.

Studies in other parts of the world show how rural women have successfully engaged in agritourism (Suryawati et al., 2021; Duarte and Pereira, 2018; Acharya and Halpenny, 2013). Further, local studies show how women are employed in mainstream tourism and in tourism as SMEs (Hettiarachchi, 2022; Rasanjali, Sivashankar and Mahaliyanaarachchi, 2021). However, rural women still face barriers such as voicelessness in making decisions in family matters, lower recognition for promotions and being recognised as only homemakers, although they play an active role in contributing to the household income (Wijewardhana and Dias, 2021). Similarly, women in Puthukkudiyiruppu play an active role in their household gardens amidst climate change, livelihood and gender challenges. Therefore, helping women overcome barriers, and finding the ways and means to transfer knowledge about sustainable practices in farming and hybrid tourism to empower them, could make them the change agents to influence transformative change and adopt the third horizon in Puthukkudiyiruppu.

Adopting new transformative practices requires the participation and buy-in of multiple stakeholders with varied points of view and agendas (López-Rodríguez et al., 2023; Cornell et al., 2013). The inhabitants of Puthukkudiyiruppu face challenges with climate change and sustainable livelihoods, and depend on ecosystem services for livelihoods, such as groundwater and soil. Here, the community, religious groups, cooperatives and schools work to maintain the stability of ecosystem services depending on access to natural resources, as well as their protection and management. The community is also a key provider of land, skills, market linkages, and labour. Private sector engagement is critical to garner investment in hybrid tourism. The government operates at the national and local levels with several departments involved in socioeconomic and ecological development, such as the Central Environment Agency, Forestry Department, Department of Wildlife, Ministry of Agriculture, Department of Agrarian Development, Sri Lanka Tourism Development Authority, Ministry of Tourism and Lands, Ministry of Land and Land Development, Land Settlement Department, and the Survey Department, as well as local and provincial bodies and the divisional secretariat. Many of these bodies work together. For example, for matters related to land title, four government departments are involved (Kirubananthan, 2013). Integration requires governance systems to be applied in the various sectors that participate in social-ecological systems (López-Rodríguez et al., 2023).

Inclusivity is an important element, whereby underrepresented stakeholders are identified and included in adopting transformative practices (López-Rodríguez et al., 2023; Abbott, Wallace and Sapsford, 2017). Transformative governance is needed to reorganise the way key stakeholders formulate governance mechanisms to maintain social-ecological systems for the continuity of ecosystem services, in the face of unpredictable climate change (Nagamuthu et al., 2022; Visseren-Hamakers et al., 2021). Further, there is a need for predictive tools with constantly evolving anthropogenic and environmental drivers of land use changes. In other words, changes will constantly take place over time and need to be addressed with new learning and changes in governance systems (Visseren-Hamakers et al., 2021; Hijmans and Graham, 2006).

Moving forward, it is vital that the relevant government agencies who were not in this PSP workshop become participants for adopting horizon 3. This will require more research to ascertain which government stakeholders must participate using appropriate methods for

their selection (Reed et al., 2010). Results further indicate the need for an ongoing effort for more inclusiveness, with pluralistic representation in Puthukkudiyiruppu.

7.4. Summary

In view of the envisioned futures of the impact of anthropogenic land use practices and climate change on social-ecological systems and the provisioning of ecosystem services, novel, inspirational and positive futures are urgently needed to help build momentum for collective action. The viability of a transformative scenario and pathway narratives towards hybrid tourism that improves biodiversity and social outcomes was confirmed by combining the Three Horizons Framework, storytelling, semi-quantification of drivers of change and PGIS.

In this chapter, we applied our approach to Puthukkudiyiruppu in Northern Sri Lanka. We unpacked that governance mechanisms must be formulated with the correct stakeholders represented for long-lasting evolutionary transformative change. Moreover, women were more open to transformative change and could play a role as change agents driving transformative change with hybrid tourism and sustainable land use practices. Finally, there is a need for pluralism and integration using a multi-stakeholder approach for cooperative sustainable development with appropriate regulations and practices. Although the pathways are specific to the Sri Lankan post-conflict context, they highlight opportunities for improving tourism and conservation outcomes in similar farming communities. By fostering collective sensemaking about key challenges, drivers of change and envisioned normative desirable futures, our research approach may help the rural community in our study area to prepare more proactively for change – depending on the local climatic, social-ecological, governance and policy context (Schaal et al., 2023). The workshop was highly beneficial in bringing multiple stakeholders to one table to discuss present problems and envisage plausible futures. Further, the gender-related issues women face and the need to preserve the region's culture were highlighted during the workshop process. This is highly relevant to hybrid tourism due to the potential role women could play in tourism and the importance of culture in providing tourism-related goods and services.

8. Results and Discussion: Hybrid tourism as a means of transformative change

8.1. Introduction

In this chapter my aim is to assess whether hybrid tourism can be used to create sustainable livelihoods and land use practices in Puthukkudiyiruppu. For this purpose, interviews with households, tourism industry participants and pilot hybrid tourism groups were conducted to understand their perceptions of hybrid tourism. Nature tourism on its own has been shown to meet eco-centric needs by improving biodiversity and helping maintain social-ecological systems by limiting anthropogenic activities (Carius and Job, 2019; Spenceley et al., 2019; Maekawa et al., 2013). However, it has a lower impact on improving rural economies (Schmidt and Uriely, 2019; Swemmer et al., 2017). Agritourism has been shown to meet the socioeconomic needs of rural communities (Little and Blau, 2019; Mohamed Shaffril et al., 2015; Choo and Jamal, 2009). But it has lower positive outcomes in environmental sustainability (Aoki, 2014; Uğurlu, 2014). These differences in perspectives between nature tourism and agritourism have been detailed in Chapter 2. Hybrid tourism was conceived as an alternative sustainable development pathway that combines mass tourism, nature tourism and agritourism to achieve both environmental and socioeconomic sustainability (Chapter 1).

In Sri Lanka, ecotourism is mainly practised in PAs with wildlife tourism and in the tea industry (Fernando, Rajapaksha and Kumari, 2017; Jolliffe and Aslam, 2009; Buultjens et al., 2005). However, there are limited studies showing conservation-led small-scale tourism initiatives with shared community benefits (Wickramasinghe, 2013). Further, while there are studies on the potential for agritourism there are limited studies of its outcomes (Mahaliyanaarachchi et al., 2019; Kumari, 2016; Malkanthi, 2011). Recent studies also show the potential for ecotourism in the Northern Province (Aloysius et al., 2022; Aloysius, Madushanka and Chandrika, 2022; Piratheepa et al., 2021).

This chapter builds on what was discussed in the preceding chapters on LULCC, the fulfilment of socioeconomic needs predicated on Maslow's hierarchy of needs and future scenarios. In this regard, the results in Chapter 5 show that land use practices in Puthukkudiyiruppu are unsustainable and will lead to reductions that are critical for hybrid tourism in natural land cover and resources. In Chapter 6 we learnt that the existing livelihoods and the connected

land use practices are being driven to fulfil basic needs such as food, clothing and shelter and growth needs and that these needs are only being partially fulfilled. Further, most respondents were neutral on the adaptation of sustainable farming practices and preferred the continuation of conventional farming. In Chapter 7, the Three Horizons Framework showed that ecosystem services will not be able to support future scenarios that maintain the status quo with a growing population and existing farming practices or are built with incremental change. However, a transformative scenario can be achieved with hybrid tourism. My aim for this chapter was to understand whether hybrid tourism can help bring sustainable development to Puthukkudiyiruppu to fulfil the community's needs and influence sustainable land use practices for farming.

The objectives of this chapter are to: (1) Assess the perceptions of local tourists who experienced hybrid tourism, (2) Assess the awareness of tourism industry participants on the Northern Province and the acceptance of hybrid tourism and (3) Assess the potential of hybrid tourism to improve fulfilment of local community needs and to drive sustainable livelihood practices.

8.2. Results

The results from the household surveys, pilot tourist groups and tourism industry participants are given in this section.

8.2.1. Pilot tourist experience

8.2.1.1. Reaching the Northern Province

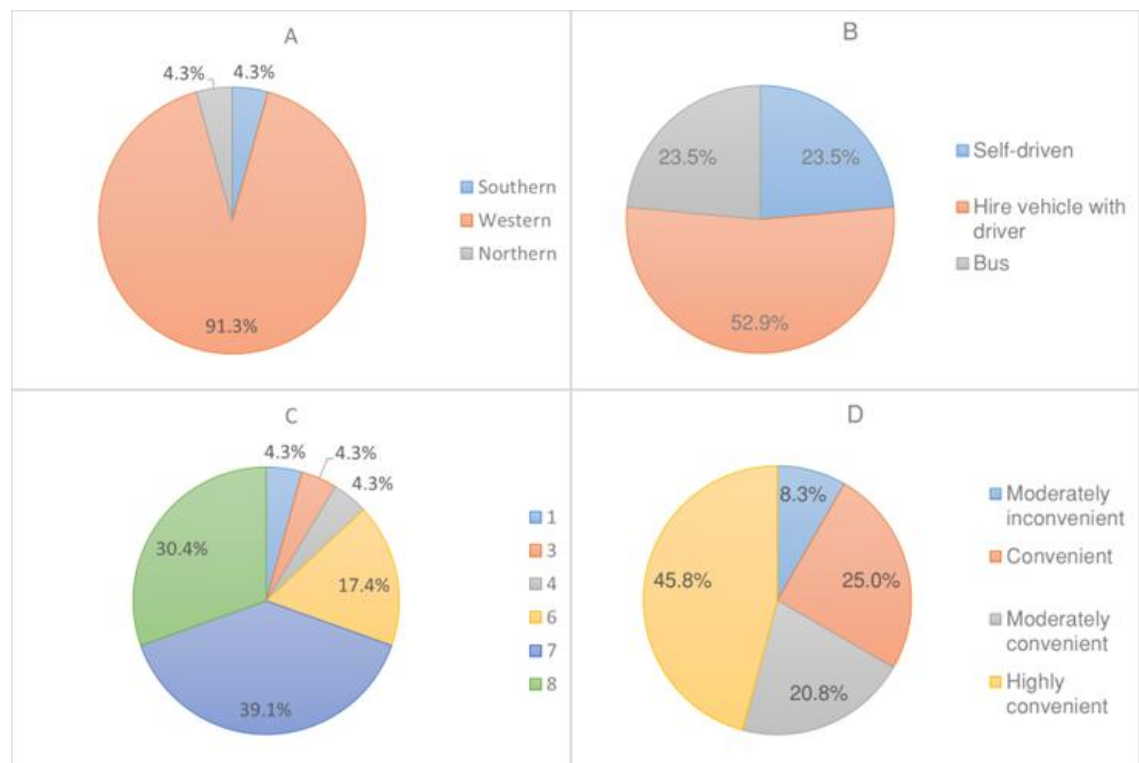


Figure 80 Pie charts of province of point of origin (A), mode of travel (B), time taken in hours (C) and extent of convenience to travel (D).

Most participants began their journey from the Western Province, travelled by car or bus for seven to eight hours and most of them felt the travel was convenient.

8.2.1.2. Perceptions of sustainability

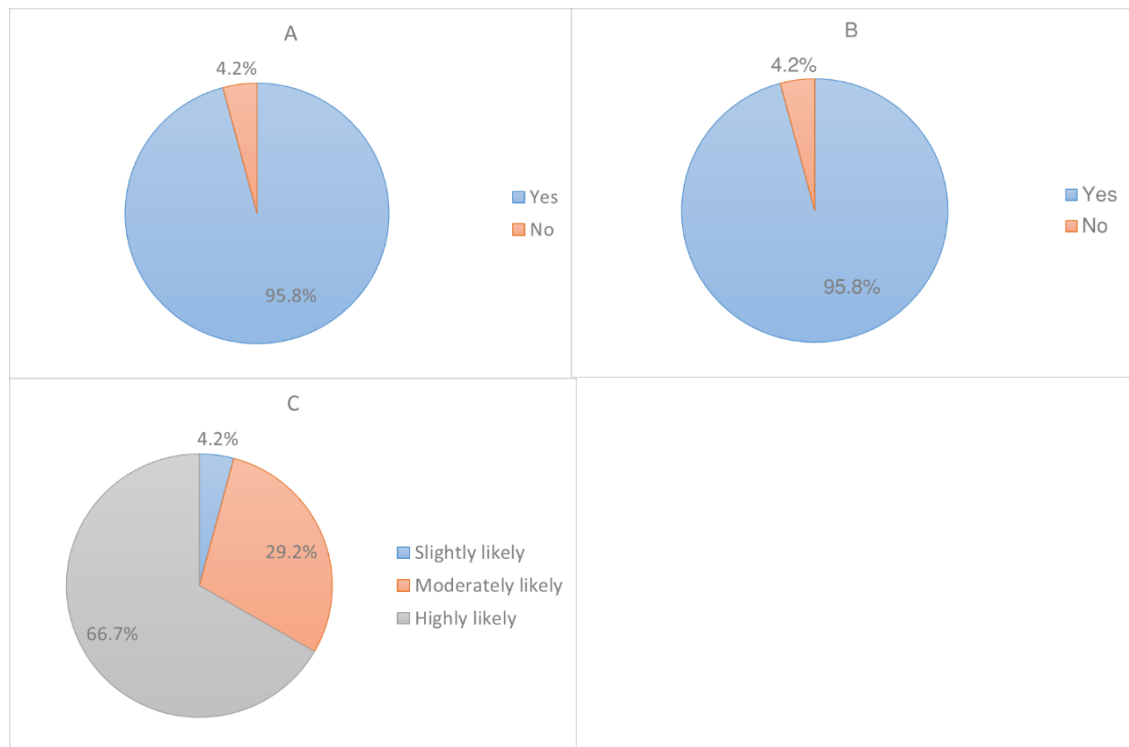


Figure 81 Pie charts of whether they felt the experience was environmentally sustainable (A), benefited the local community and was socioeconomically sustainable (B) and whether hybrid tourism would promote sustainable practices (C).

Most respondents felt the experience was environmentally sustainable, that it benefited the local community and was socioeconomically sustainable and that hybrid tourism would be highly suited to promote sustainable practices.

8.2.1.3. Likelihood of visiting again

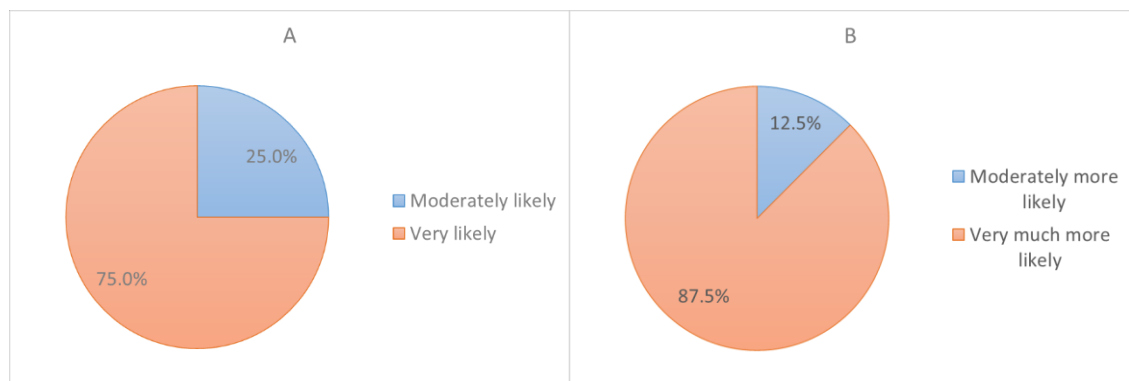


Figure 82 Pie charts of the likelihood of visiting the same destination if it had hybrid tourism (A), and the additional likelihood of visiting if there was a beautiful beach nearby (B).

75% of respondents were likely to visit again for hybrid tourism and 25% were moderately likely. 87.5% of respondents were much more likely to visit if coastal tourism and a beautiful beach were also available.

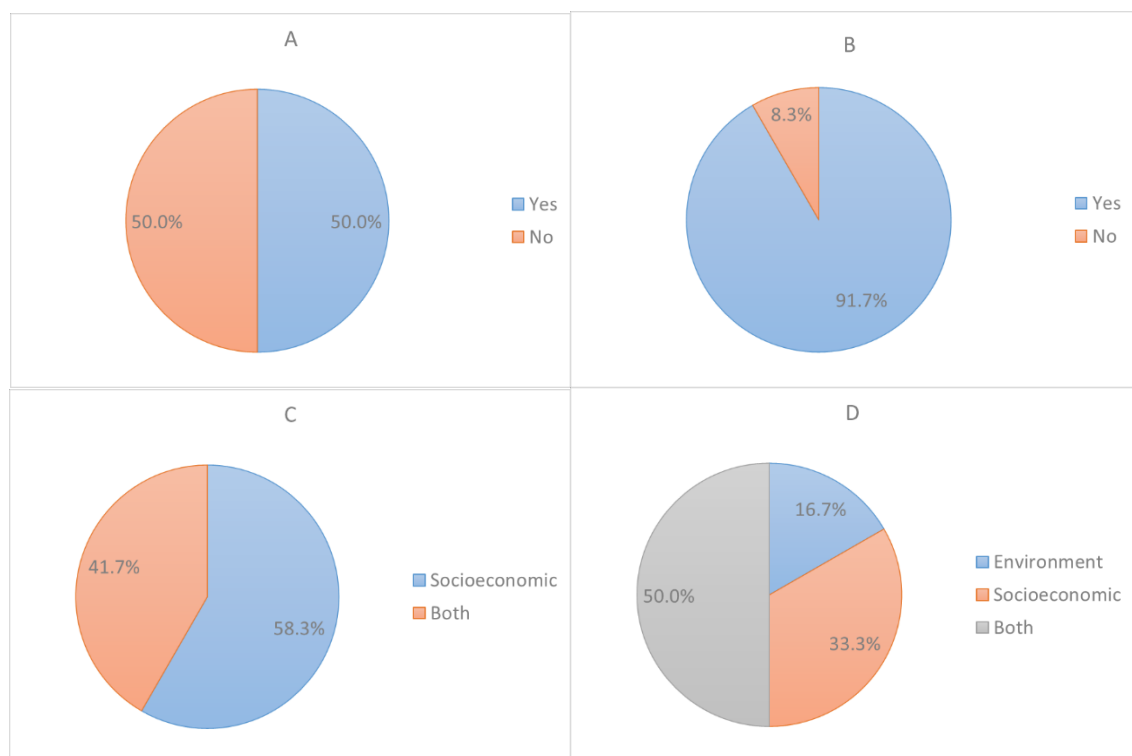


Figure 83 Pie charts of familiarity with the sustainable development goals (A), its importance for development (B), opinion on whether people will embrace environmental or socioeconomic

goals (C), and opinion on whether environmental goals, socioeconomic goals or both should be the starting point of development (D).

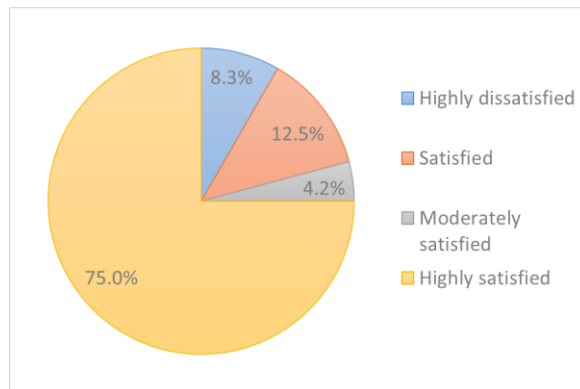


Figure 84 Pie chart of overall satisfaction with the tourism experience.

The results above show that half of them were familiar with the SDGs, that most of them felt they are important for development and that most felt people would embrace socioeconomic goals. Most of them felt that both environmental and socioeconomic goals were important followed by socioeconomic goals. The results show that most of them were satisfied with the overall experience.

To summarise, most participants in the pilot felt that hybrid tourism would promote sustainable practices and that visits by tourists like them would encourage more farmers to adopt organic farming methods. Supporting these results, one respondent commented:

“They were creating ecological balance to protect the environment and the earth for our next generations.”

A second respondent felt that:

“it was targeted as agritourism, and experience received also linked to that. It was the best way to remind someone what organic farming is and the efforts taken by farmers to get the crop out. I still remember the breakfast served at the farm which reminds me of my childhood in a farmer’s family.”

Most of them felt that having hybrid tourism with nature tourism and agritourism in the same place would encourage them to visit. However, a higher proportion felt that having a beautiful beach nearby would make them more likely to visit. Therefore, developing coastal tourism in the vicinity of Puthukkudiyiruppu could potentially attract tourists even more.

Most of them felt that the tourism experience benefited the local community and was socioeconomically sustainable. Supporting this, one respondent commented that:

"We had the opportunity to connect directly with the farmer and I was satisfied that they will directly benefit from it."

Another thought that:

"Helping hand to needy public is a wish of many people. However, we don't get the opportunity or do not allocate adequate time and energy to help people. Connection between Farmers who need help and Tourist who need a change of their lifestyle together with win-win model are not promoted by many organisations today. This model has identified ecosystems that connect everyone's happiness regardless."

A third participant felt:

"It has contributed to sustain the local community through jobs, farming, location hiring, seed selling etc. where they can uplift the living standards from current level to moderate level."

A fourth thought that:

"Most of the peoples are Jaffna Tamil peoples. We are Sinhalese. First time in my life I worked with a Tamil farmer, and we shared our experience with them, that is very valuable to be socioeconomically sustainable."

Most local tourists also felt that local people would embrace socioeconomic goals solely and not embrace environmental goals. Two respondents who felt people would embrace socioeconomic goals felt that:

"Economic goals are important at the moment,"

and that:

"People will contribute to the environment as long as it links to their economic parameters."

One respondent who felt both are important said:

"Social sustainability and environmental sustainability are two sides of the coin. We can't focus on one at a time since interconnections and dependability of these are very close."

When asked “which of these (environmental or socioeconomic goals) do you think should be the starting point of development”, most of them felt it should be socioeconomic. They elaborated with comments such as:

“Once you have developed economically, you can improve environmentally,”

and

“Because socioeconomic goals are important at the moment.”

Supported responses of ‘both’, one respondent said:

“Both environmental and socioeconomic activities should start together to have overall fulfilment of sustainability goals. If we protect home economy that will boost the pleasure for protecting environment. On the other hand, if we destroy the environment through economic activities that will minimise future economic activities due to damage to the environment.”

Another said:

“Human factor, economy of the country and nature should go hand in hand to reach development.”

Looking to the future, respondents made recommendations for the future of tourism in Sri Lanka. In this regard, one respondent suggested:

“Ecofriendly camping with music and BBQ with the luxury of staying in insect proof, temperature-controlled tents.”

A second felt:

“Agritourism is a new venture in the world and 100% eco-tourism projects might be an interesting experience for some environment minded people.”

A third felt what would be important is:

“Heritage of Sri Lanka, local values, green villas, traditional meals should be developed. Because tourists always want a different experience in a different country.”

The results show that there was a high degree of enthusiasm among the local tourists for hybrid tourism. Further, they felt that socioeconomic goals take precedence in rural communities such as Puthukkudiyiruppu.

8.2.2. Tourism industry participants

This section provides the results of surveys conducted with tourism industry participants.

8.2.2.1. Nature of participation

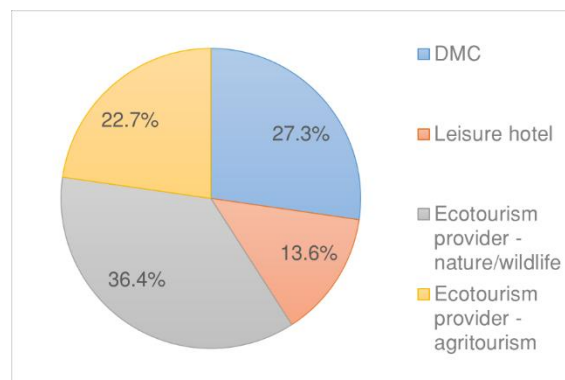


Figure 85 Pie chart of the industry the survey participants were engaged in (DMC = destination marketing company).

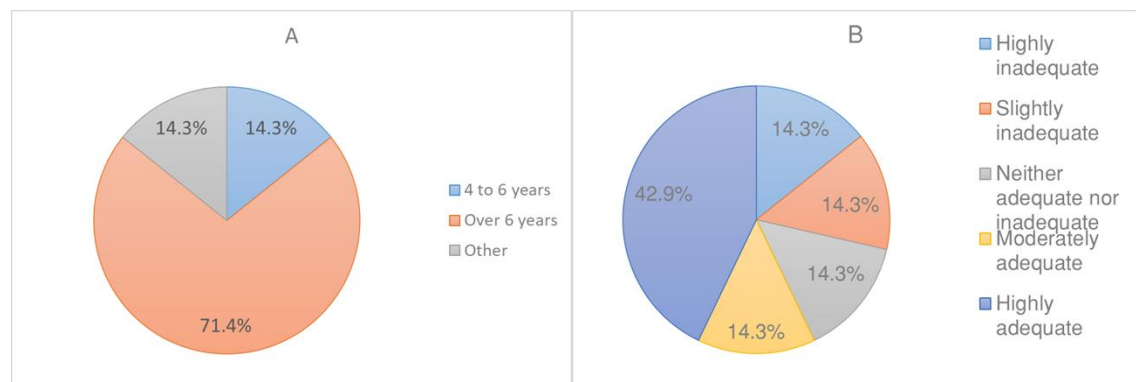


Figure 86 Pie charts of the period respondents have been practising ecotourism and whether they receive an adequate number of ecotourism tourists to sustain their business.

As per these results, the respondents represented a wide range of tourism industry participants such as destination marketing companies, leisure hotels and ecotourism operators. Most of them have been practising ecotourism for over six years and felt that they receive an adequate number of guests for ecotourism to sustain themselves.

8.2.2.2. Familiarity with the Northern Province

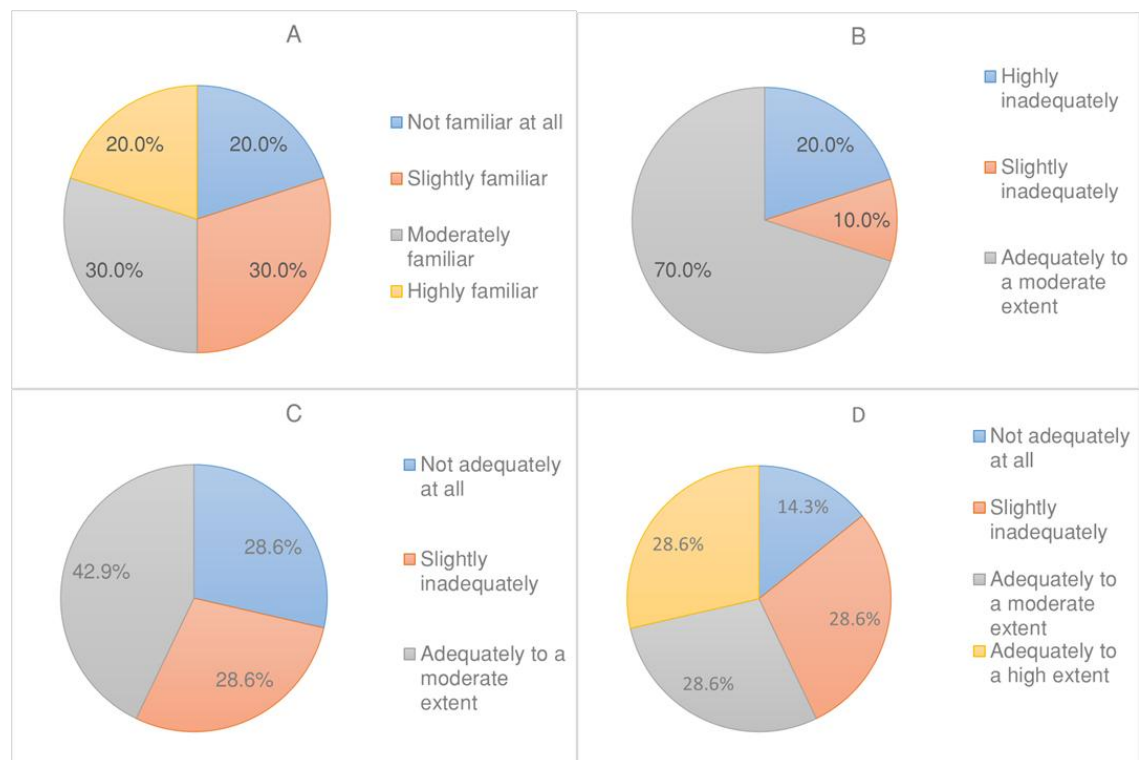


Figure 87 Pie charts of the extent of familiarity with the Northern Province in the context of tourism (A), the extent to which they have promoted tourism there (B), to what extent they felt they have adequately promoted ecotourism there (C) and to what extent they felt they have adequately promoted ecotourism in other parts of the country (D).

An equal proportion of tourism industry participants were both more familiar and less familiar with the Northern Province. Most participants felt that they adequately promoted tourism in the Northern Province. Most participants felt they have inadequately promoted ecotourism in the Northern Province. Most of them felt they promoted ecotourism adequately to other parts of the country.

8.2.2.3. Assessment of hybrid tourism

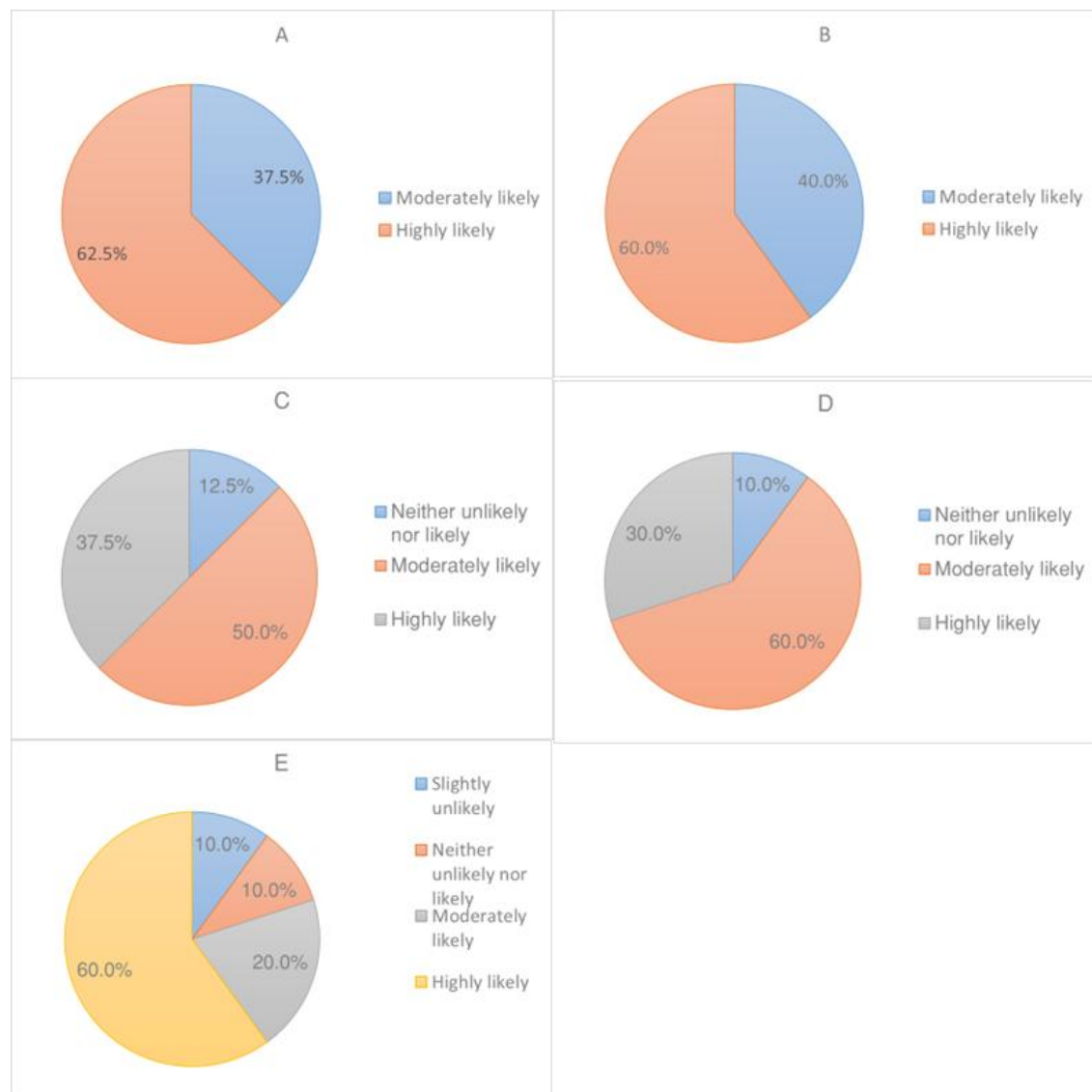


Figure 88 Pie charts of the likelihood of hybrid tourism promoting sustainable practices (A), its adaptability for Sri Lanka (B), the likelihood of it encouraging rural farmers to adapt sustainable practices such as organic farming (C), the likelihood of it helping their organisation to better coexist with the environment (D) and the likelihood of promoting it in the Northern Province if it were available (E).

Most industry participants felt that hybrid tourism can promote sustainable practices, that it can be easily adapted for Sri Lanka and that it would encourage rural farmers to adopt sustainable practices such as organic farming. They also felt it would help them better coexist with the environment and that they would promote it if available in the Northern Province.

8.2.2.4. Sustainability practices

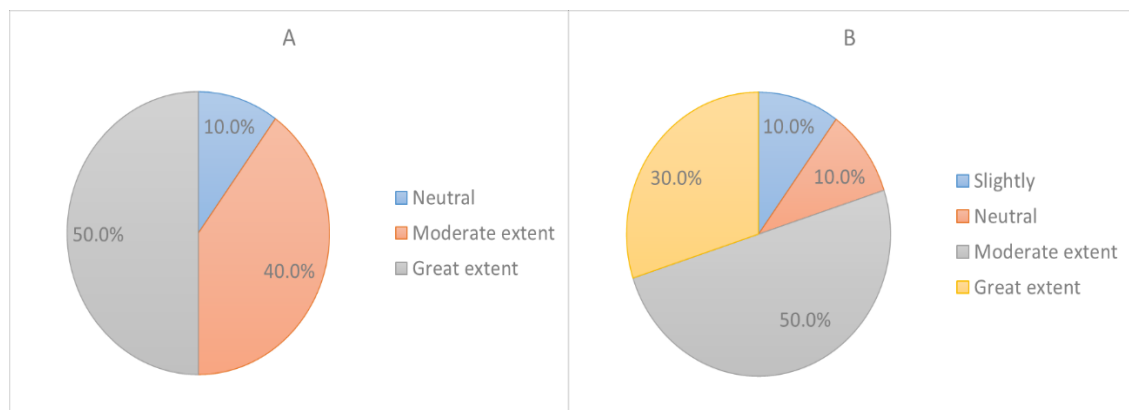


Figure 89 Pie charts of the extent to which the respondents engage rural villages for the provision of goods and services for tourists (A) and to what extent they have seen any changes in sustainable practices due to such engagement (B).

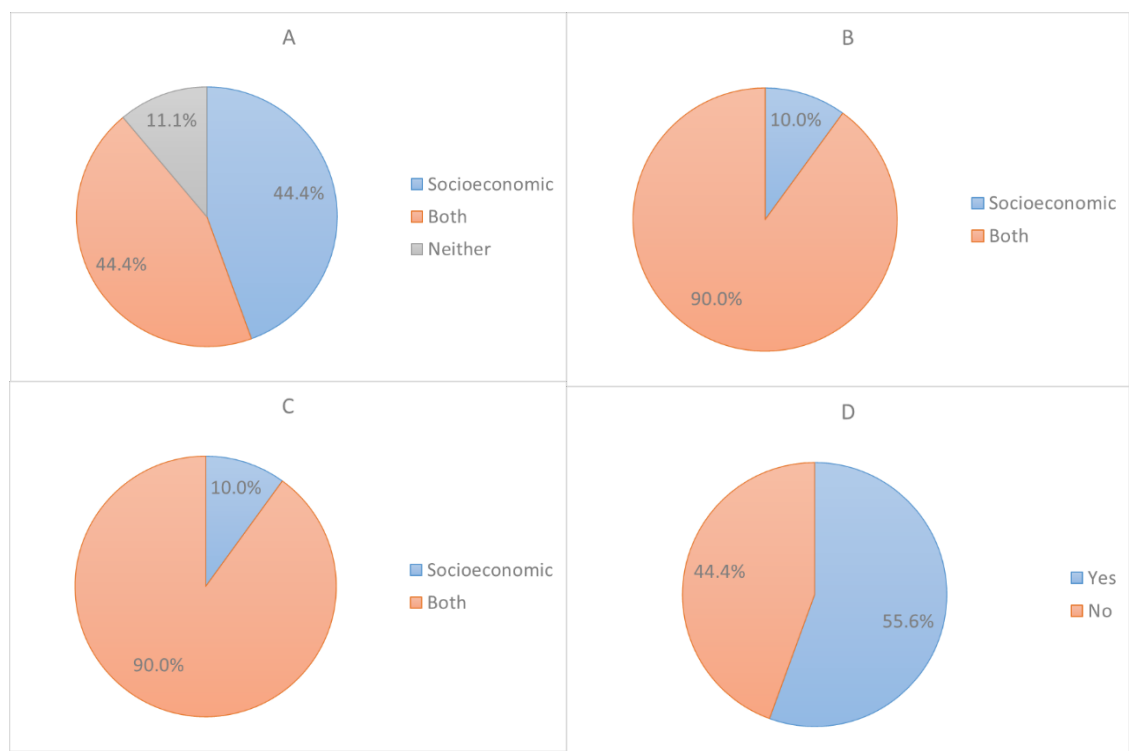


Figure 90 Pie charts of whether they felt rural people would embrace socioeconomic goals, environmental goals or both (A), from a tourist industry perspective which of these options were more important (B), from the perspective of a nation's development which of these

options were more important (C) and whether they felt people living on subsistence income would embrace environmental goals (D).

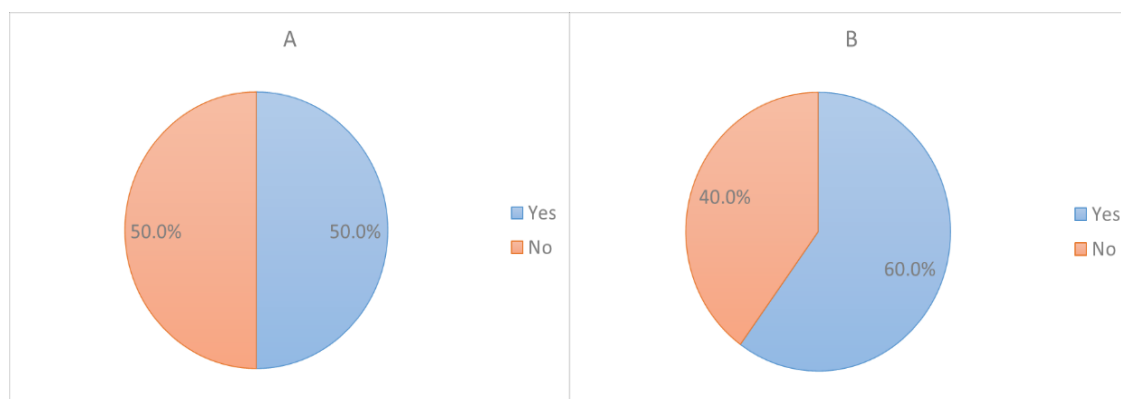


Figure 91 Whether their organisation plays a role in protecting/regulating national parks and reserves (A) and in promoting agroforestry (B).

Most participants engage local communities to provide goods and services and that primarily they have seen such communities adopt sustainable practices. They felt such communities would embrace socioeconomic and environmental goals in equal proportion and that both are needed from tourism and national development perspectives. They also felt that people living on subsistence income would embrace environmental goals. Half of them play a role in protecting and regulating national parks and 60% of them in promoting agroforestry.

One participant said:

“The organisation thinks about the reduction of carbon emissions, resource optimisation and management to reduce consumption as well as increase reusability. We also create awareness on flora and fauna, engage in community livelihood development, provide equal opportunity work, protect the environment, and are dedicated to minimise imports to support the local economy by internalising the supply chain wherever possible and encouraging supplier responsibility.”

Most participants work with rural communities for the provision of tourism goods and services and have seen a change in sustainable practices due to this engagement. Equal proportions felt that rural people would embrace environmental sustainability goals and both

environmental and socioeconomic goals. Participants felt both goals are important for the country and for the community. One participant elaborated saying:

"Most Europeans happily spend their vacations with nature and they like organic food. That's why, since 2019, we maintained our own farm, and, because of that, we get so many benefits, both financially and physically."

Another participant explained that:

"With the current condition of the environmental system the interconnected business with sustainability practices needs to be implemented. Otherwise, it is difficult to survive."

Most participants felt that people living on subsistence income would embrace environmental goals. A significant proportion felt they would not. Half of them said they play a role in protecting and regulating national parks. Most of them said they promote agroforestry. One participant elaborated:

"There are boundary lines for reservation areas, and we keep those places as conservation centres for specific flora and fauna."

Most participants felt that hybrid tourism can be easily adapted for the Northern Province, that it would encourage sustainable farming practices such as organic farming and it would help their organisation to better coexist with the environment.

One respondent elaborated that:

"In our country there are different cultural zones, climatic patterns and biological hotspots so eco-based tourism can easily be implemented."

Another said:

"The future of tourism in Sri Lanka, and hence the jobs and incomes created by tourism, depends entirely on preserving Sri Lanka's unique natural and cultural heritage."

They agreed that both socioeconomic and environmental goals are important for the tourism industry and the country. However, their opinion was equally split on whether rural communities would adapt socioeconomic goals versus both socioeconomic and environmental goals. One participant felt that:

“Overcoming poverty is their biggest issue, not protecting the environment.”

On engaging with local communities one of them commented that:

“We have done cultivation with rural villages under organic conditions with our Thrive Program, and we utilise their products.”

The participant also said that with this Thrive Program more villagers were adopting organic farming methods.

Another participant said that:

“The villagers they work with depend on ecotourism and are therefore trying to protect the environment. Their living conditions are improving as well.”

Another elaborated on how they work with local vendors for fabrics and furniture used by them and measure how much they have contributed to the local community. A third respondent said they provide training for local youth to be ecotourism guides and drivers.

Commenting on coastal tourism a participant commented that there is:

“A need to increase the coastal hotel system with a combination of sustainability practices.”

On key challenges related to implementing conservation and sustainability objectives, one participant said:

“Lack of monitoring by the Government and lack of staff with knowledge.”

Another said:

“The main barriers are that when we communicate with the local authority, they have no clue about the nature project, and they don't give any single help to start the project.”

Overall, tourism industry participants accepted that hybrid tourism has potential and that they would promote it if it was introduced as a new tourism product. However, they admitted they promote ecotourism to other parts of the country more than the Northern Province.

8.2.3. Household surveys

8.2.3.1. Adaptation of sustainable tourism

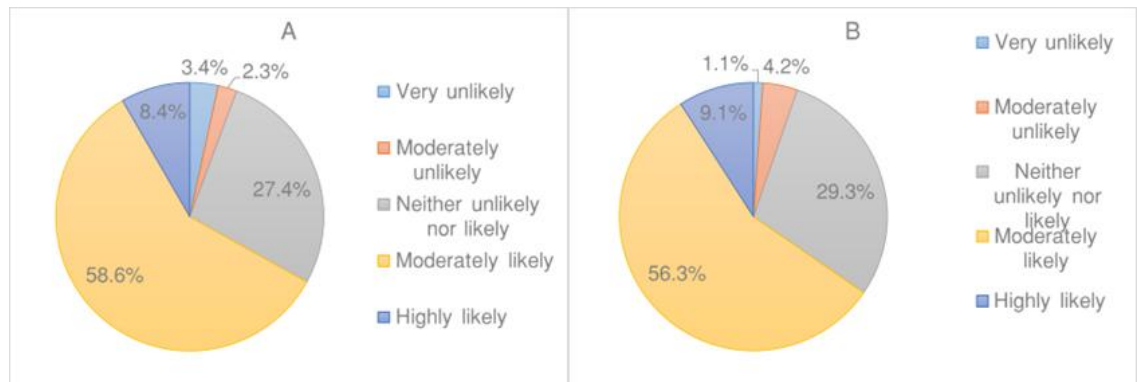


Figure 92 Pie charts of the likelihood of learning and providing nature tourism activities (A) and the likelihood of it enhancing their wellbeing (B) according to primary respondents.

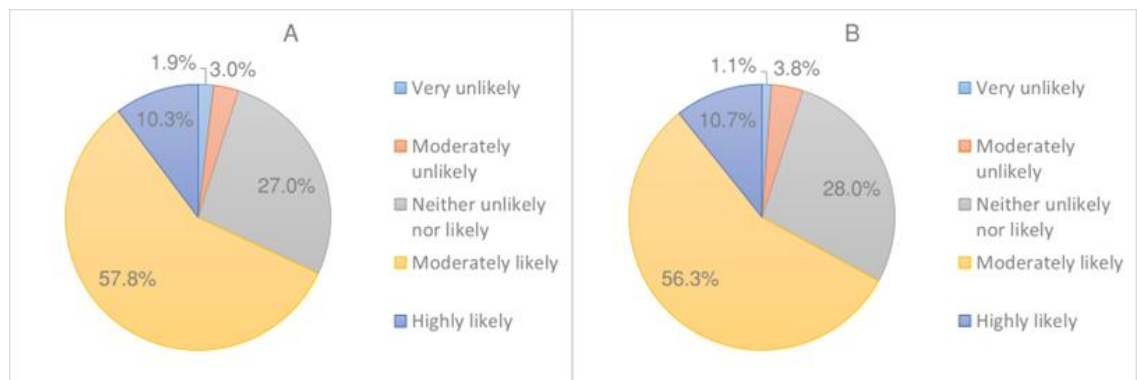


Figure 93 Pie charts of the likelihood of learning and providing agritourism activities (A) and the likelihood of it enhancing their wellbeing (B) according to primary respondents.

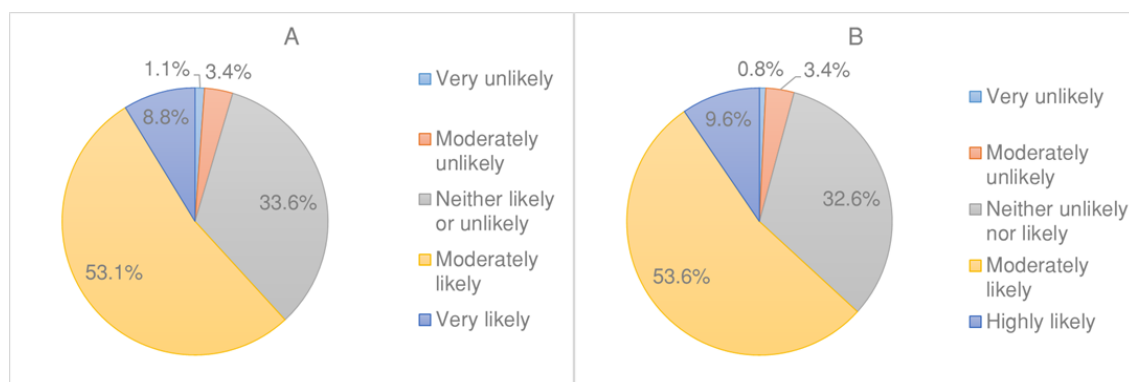


Figure 94 Pie charts of the likelihood of learning and providing hybrid tourism activities (A) and the likelihood of it enhancing their wellbeing (B) according to primary respondents.

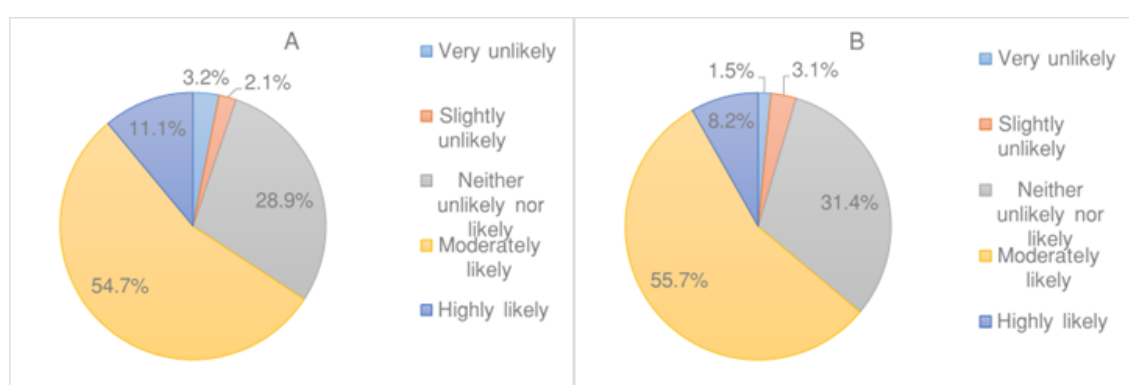


Figure 95 Pie charts of the likelihood of learning and providing nature tourism activities (A) and the likelihood of it enhancing their wellbeing (B) according to spouses.

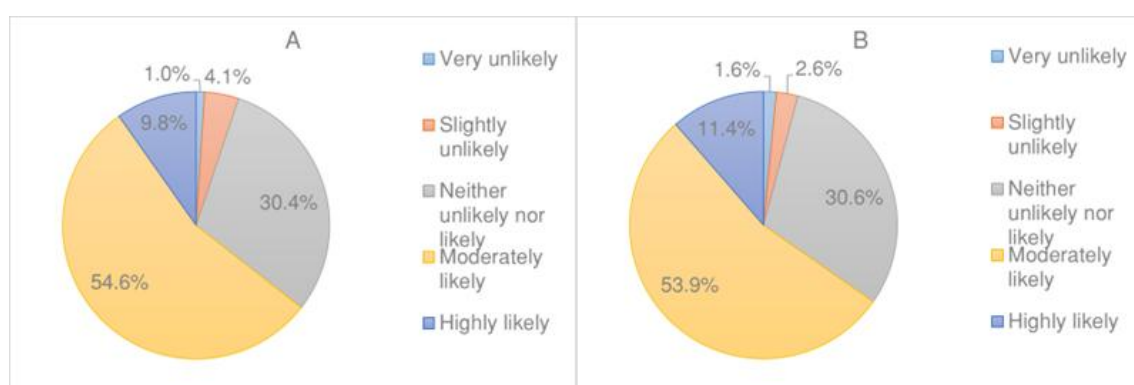


Figure 96 Pie charts of the likelihood of learning and providing agritourism activities (A) and the likelihood of it enhancing their wellbeing (B) according to spouses.

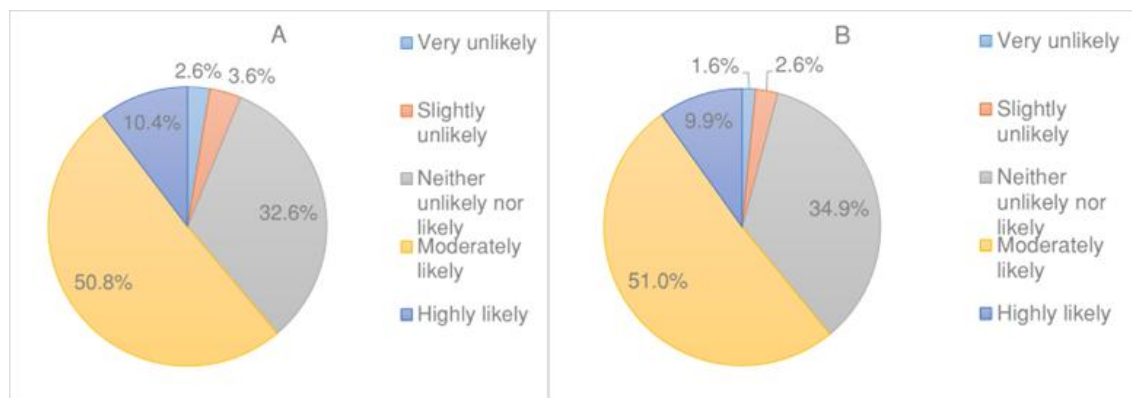


Figure 97 Pie charts of the likelihood of learning and providing hybrid tourism activities (A) and the likelihood of it enhancing their wellbeing (B) according to spouses.

As per these results, most primary respondents and spouses were likely to adapt nature tourism, agritourism and hybrid tourism and that they felt these practices would improve their wellbeing.

8.2.3.2. Provision of tourism products and services

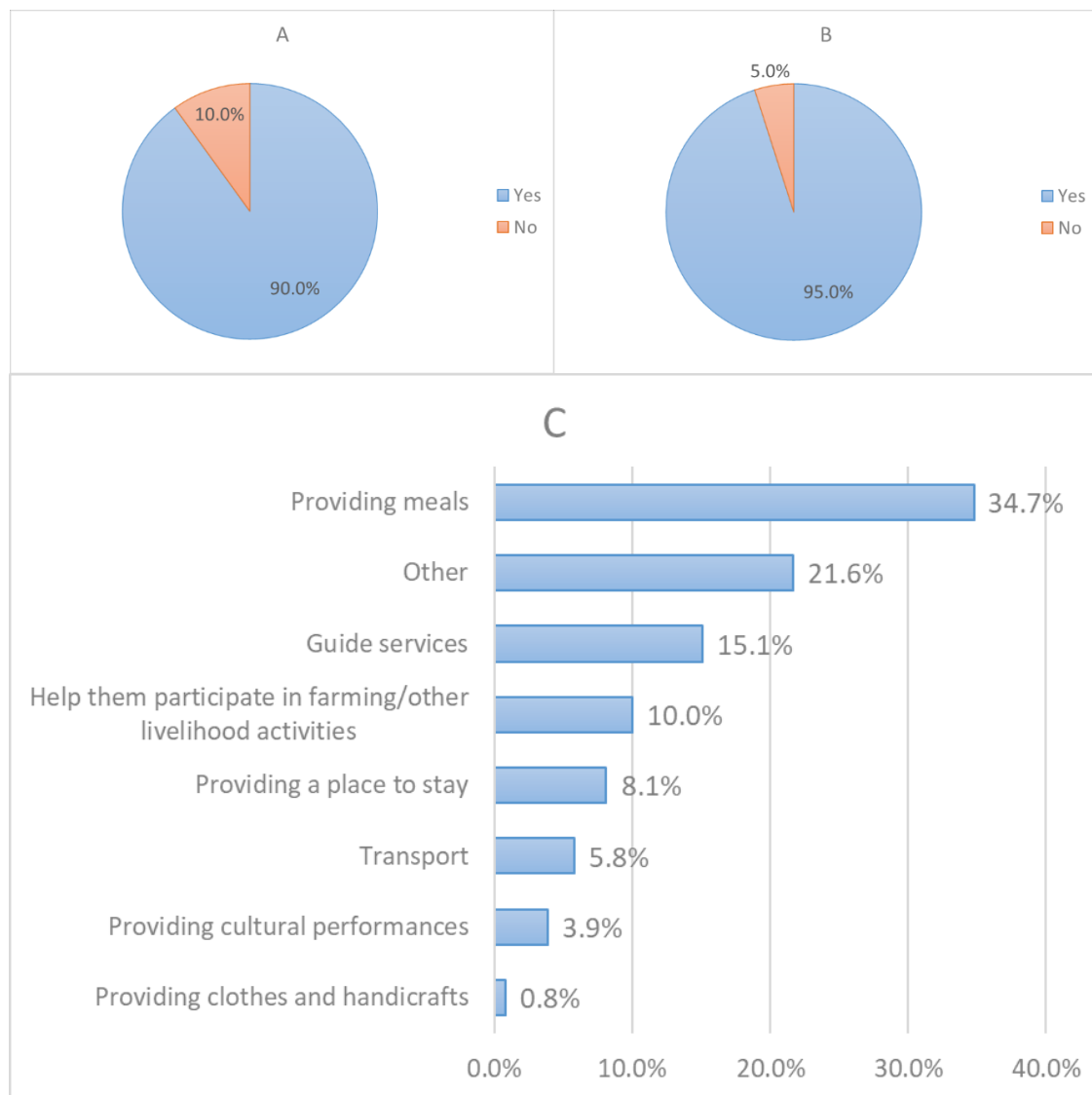


Figure 98 Pie charts of the opinion on suitability of these types of tourism for Puthukkudiyiruppu (A), interest to take part in tourism as a livelihood (B) and bar chart of what they could offer for tourism (C) according to primary respondents.

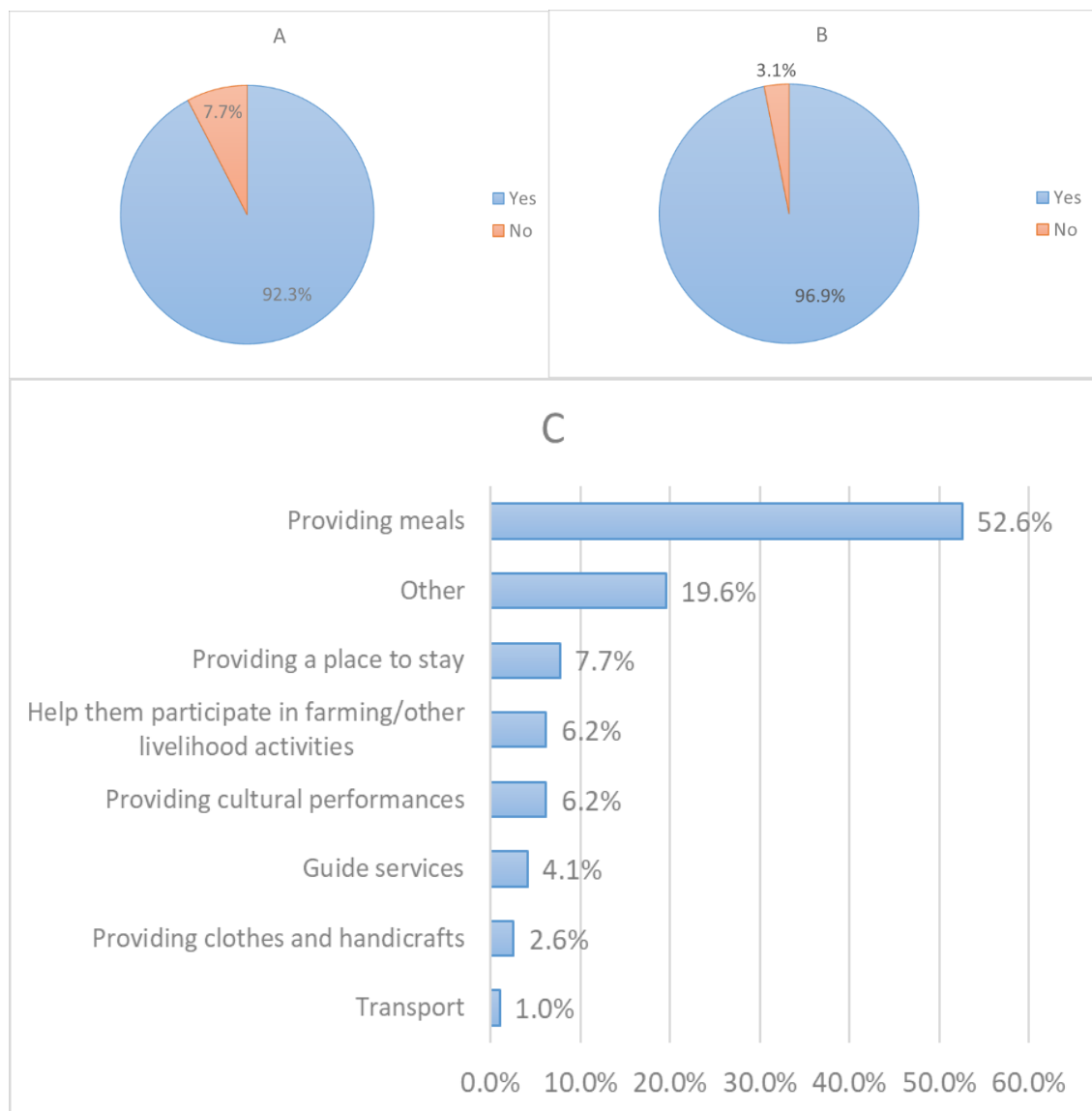


Figure 99 Pie charts of the opinion on suitability of these types of tourism for Puthukkudiyiruppu (A), interest to take part in tourism as a livelihood (B) and bar chart of what they could offer for tourism (C) according to spouses.

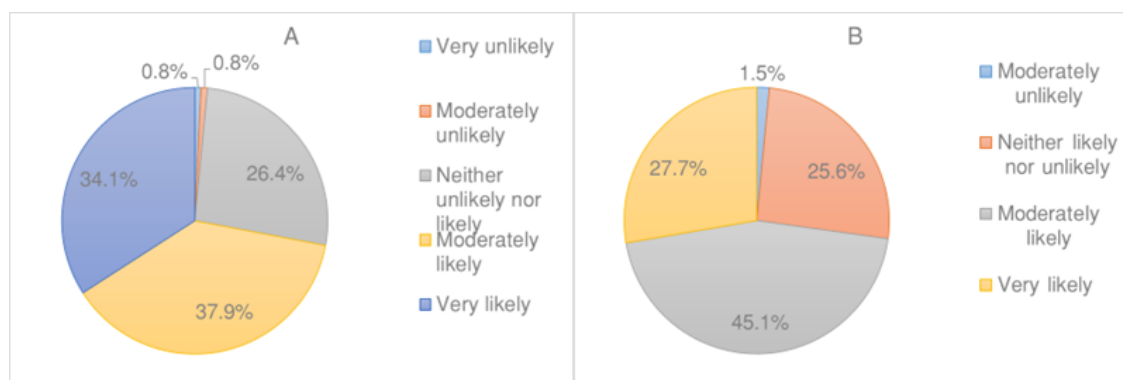


Figure 100 Pie charts of likelihood to cooperate with others in the village to provide tourism services according to primary respondents (A) and spouses (B).

These results show that most primary respondents and spouses felt that these types of tourism were suited for Puthukkudiyiruppu, and that most are willing to offer services for it. They cited many reasons for these responses such as the availability of natural resources and scenic beauty, how tourism could improve their income and how it would improve marketing opportunities. Primary respondents said they could offer meals, guide services and participation in farming and other activities. Spouses said they could offer meals, a place to stay and participation in farming and other activities. Most of them felt they could cooperate with each other to provide tourism products and services. A higher proportion of spouses felt this way.

8.2.3.3. Encouragement of sustainable farming practices

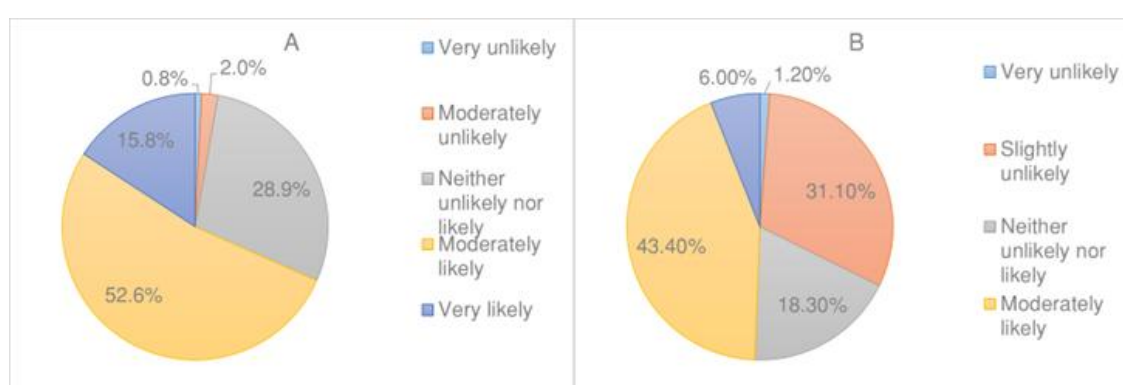


Figure 101 Pie charts of the likelihood of hybrid tourism encouraging coexistence with the environment (A) and the likelihood of the adaptation of sustainable farming such as organic,

intensification, land sparing and land sharing if hybrid tourism was available (B) according to primary respondents.

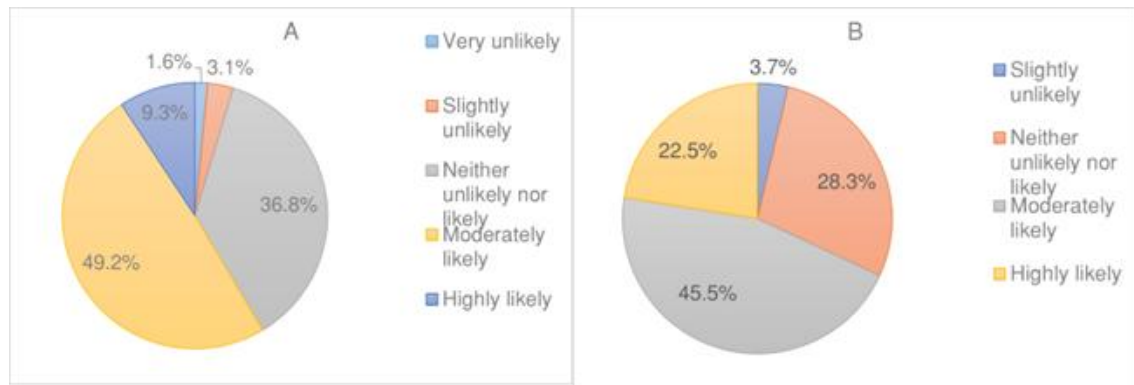


Figure 102 Pie charts of the likelihood of hybrid tourism encouraging coexistence with the environment (A) and the likelihood of the adaptation of sustainable farming such as organic, intensification, land sparing and land sharing if hybrid tourism was available (B) according to spouses.

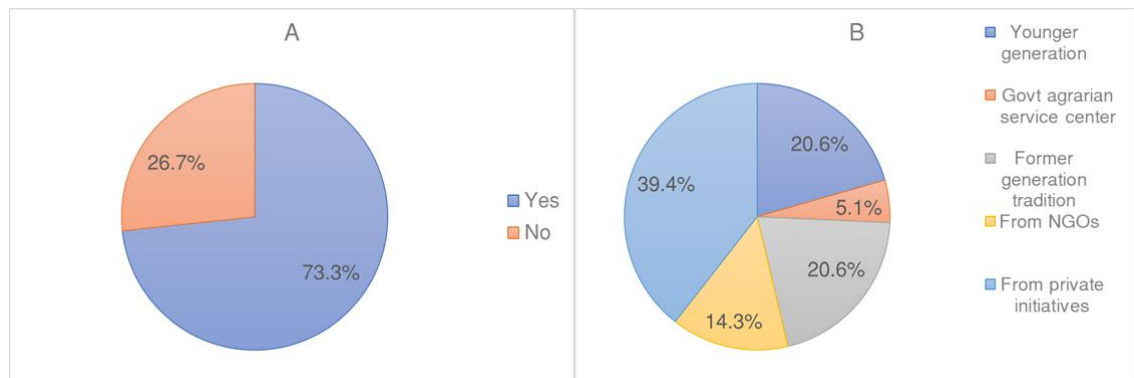


Figure 103 Pie charts of familiarity with organic farming (A) and source of familiarity (B) among primary respondents

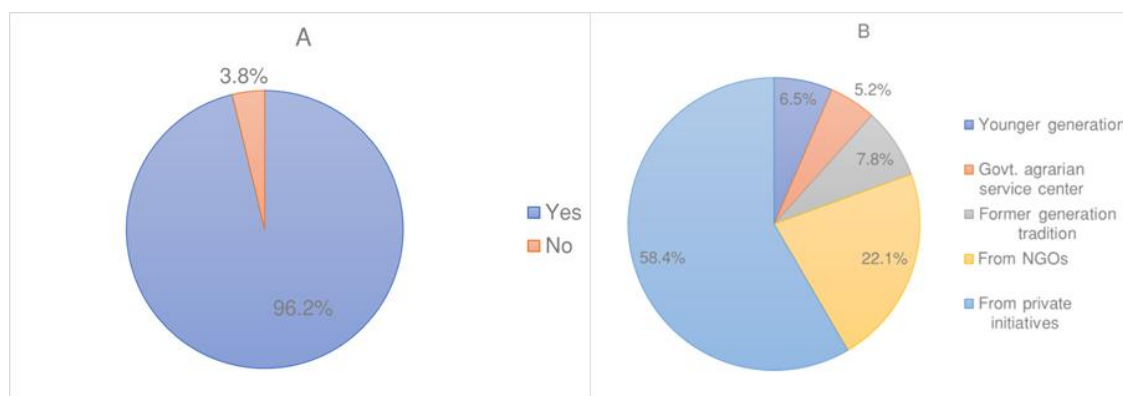


Figure 104 Pie charts of familiarity with organic farming (A) and source of familiarity (B) according to spouses.



Figure 105 Bar charts of the drivers of switching from conventional to organic farming according to primary respondents (A) and spouses (B).

Most respondents felt that hybrid tourism would encourage coexistence with the environment and that it would encourage them to adopt sustainable farming practices. Reasons included visiting natural places, taking up organic farming and developing handicrafts with natural materials. Most primary respondents and a higher proportion of spouses were familiar with organic farming practices and have gained this familiarity from private initiatives. Further, both primary respondents and spouses felt that less expensive fertiliser and market access for organic produce would encourage them to adopt organic farming.

8.2.3.4. Preferred type of tourism

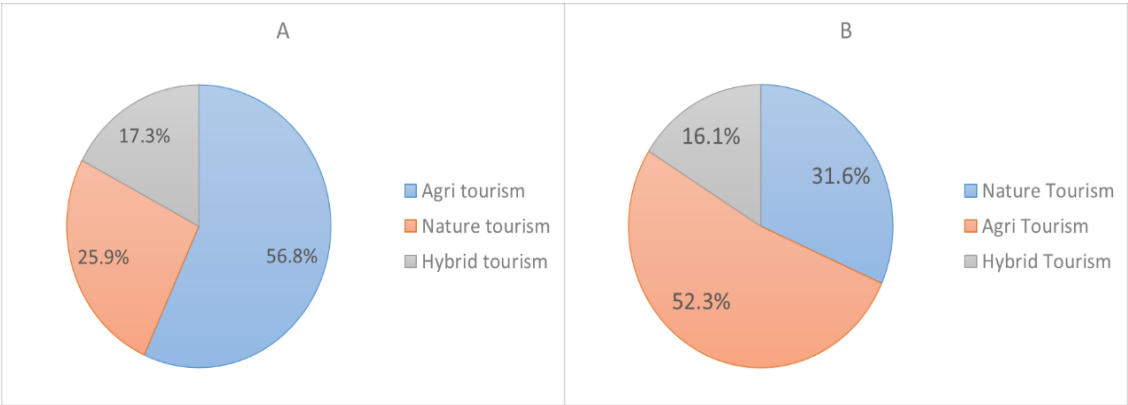


Figure 106 Pie charts of which type of tourism they felt is suitable for Puthukkudiyiruppu according to primary respondents (A) and spouses (B).

Most respondents felt agritourism would be the most suited, followed by nature tourism and hybrid tourism.

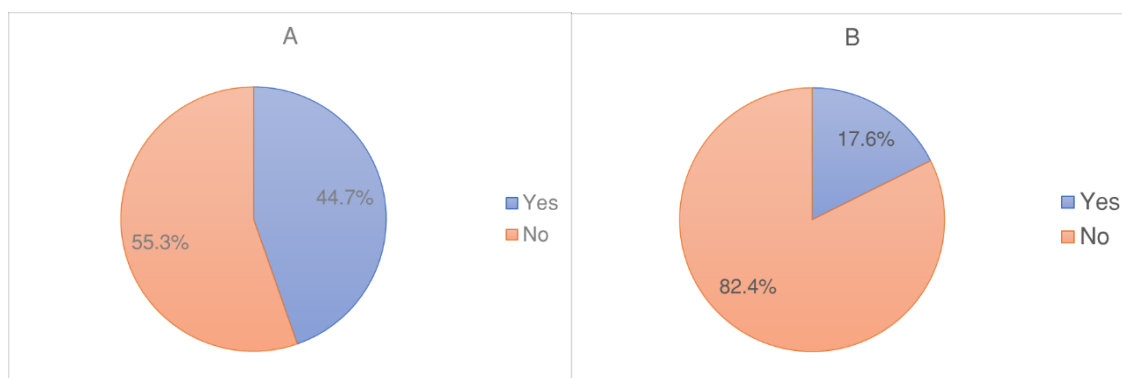


Figure 107 Pie charts of familiarity with environmental sustainability (A) and whether they have access to training programs (B) according to primary respondents.

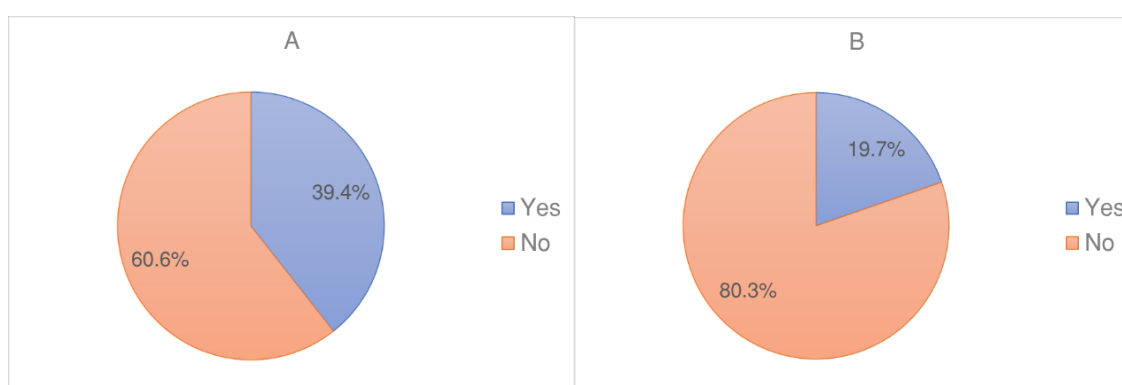


Figure 108 Pie charts of familiarity with environmental sustainability (A) and whether they have access to training programs (B) according to spouses.

Most households were unfamiliar with the concept of environmental sustainability and have had no access to training programs about the concept. Those who were familiar with environmental sustainability described it as protecting the environment, minimising use of polythene, conservation of resources, preserving ecological balance and protection from pollution.

From a gendered perspective, there were marginal differences between primary respondents and spouses on the likelihood of adopting nature tourism, agritourism and hybrid tourism as well as the likelihood of these practices enhancing their wellbeing. However, the data on primary respondents was also analysed by gender. A marginally higher proportion of women-headed households (61.8%) compared to men (61%) among primary respondents were likely to adopt hybrid tourism. Second, there were negligible differences between men and women on the likelihood to adopt nature tourism and agritourism and on their likelihood to enhance their wellbeing. Third, a significantly higher proportion of women (62.6%) versus men (51%)

felt that hybrid tourism would encourage them to adopt sustainable farming practices such as land sparing, land sharing, intensification and organic farming.

8.2.4. Focus group discussions

The results from focus group discussion showed that the participants were enthusiastic about the adaptation of tourism in their region. In this regard participants felt they could showcase their music and drama such as Bharathanatyam, Koothu and Sanganatham. Second, participants felt tourists could participate in fishing, boating and farming activities and in helping the region transition to a clean environment. Third, participants said they could offer homestay and food for tourists. Fourth, participants felt that people without jobs could be trained in tourism for which they were willing to form societies. Fifth, participants felt the region would need a marketplace to facilitate marketing their products to tourists.

8.3. Discussion

This discussion explores the potential for hybrid tourism with perceptions of local tourists who participated in a pilot, the perceptions of tourism industry participants of the Northern Province and household surveys.

8.3.1. Perceptions of hybrid tourism among local tourists

The results show that most local tourists were enthusiastic about hybrid tourism and that it would influence sustainable farming practices. However, most local tourists felt that the availability of coastal tourism would increase the likelihood of repeat visits for hybrid tourism. Therefore, the hybrid tourism model would need to incorporate sustainable coastal tourism as one of its nexuses (Chapter 1). In Sri Lanka, coastal tourism destinations in the South-West have the highest density of hospitality sites when compared to other parts of the country (Samarathunga, 2016; Buultjens et al., 2005). These tourism sites are within easy reach from the Western Province and other provinces in the southern half where most participants in the pilot tourist groups were from. Also, historically local tourists visited such coastal destinations during the conflict years when international tourists were limited. Further, local tourists continue to visit during off-season periods when there is less international tourism and have grown accustomed to such places.

Coastal tourism accounts for over 50% of global tourism (World Economic Forum, 2024). Due to this the availability of hotels in such destinations tends to be high with studies showing they have negative impacts on the environment compromising fertile land and natural capital (Khan, 2017; Wang and Liu, 2013; Yepes and Medina, 2005). Further, typically such coastal hospitality sites are non-inclusive and for short-term financial benefit (Honey and Krantz, 2007). However, tourism in such beach destinations in Sri Lanka's South has helped improve the income of SMEs (Deyshappriya and Nawarathna, 2020). Therefore, the inclusion of sustainable coastal tourism could have the potential to improve the income of people in the study area.

8.3.2. Perceptions of tourism industry participants

Industry participants such as DMCs, hotels and ecotourism providers play a crucial role in tourism (March and Wilkinson, 2009; Sheehan et al., 2007). The findings show that ecotourism in the Northern Province is promoted to a lesser degree than other such destinations in Sri Lanka, although there is a familiarity with the tourism products available. Therefore, tourism participants must be influenced to promote the Northern Province to a greater extent.

Overall, tourism industry participants accepted that hybrid tourism has potential and that they would promote it if it was introduced as a new tourism product. However, half of them admitted less familiarity with the Northern Province and that they mainly promote ecotourism to other parts of the country. This indicates that there are gaps in knowledge on what the region has to offer. Second, there are very few studies on biodiversity in the Northern Province, and their results are not highlighted in any communication tools such as the media and conferences. Third, the government has not prioritised tourism in the same manner as other destinations, with some heritage sites remaining unrehabilitated (Chapter 7) and Chundikulam National Park excluded from mainstream nature tourism.

The results also show that some of them work with local communities to supply goods and services and to provide organic produce. Further, some are engaged in conservation and agroforestry, and actively educate people on their benefits. This finding bodes well for such participants to be invited to partner with communities in the study area for hybrid tourism. However, available research shows how the approach to sustainable tourism development varies depending on the role of the concerned actors. For example, in one study, some

developers engage in tourism to improve social factors while others engage to maintain the environment for economic gain (Sørensen and Grindsted, 2021). There is also the practice of greenwashing, whereby the tourism industry stakeholder claims to be sustainable to attract customers, whereas she does not consistently embrace sustainable practices. Further, a recent systemic study shows that there are limited research articles covering greenwashing in tourism (Garcia and Vargas, 2024). Moreover, there is a significant lack of evidence to back claims of being sustainably responsible (Kundi and Ernszt, 2024). However, one study shows that there is an increasing trend in recent years among public quoted tourism and hospitality providers to make efforts towards social and environmental sustainability (Papagiannakis et al., 2024). Therefore, the right-minded tourism practitioner and eliminating greenwashing are key factors in selecting private sector participants for hybrid tourism. In this regard, a framework for hybrid tourism is presented in section 9.4.

8.3.3. The potential for hybrid tourism and its influence on sustainable practices

Most households were willing to adapt the three types of tourism namely nature tourism, agritourism and hybrid tourism and felt that these tourism practices would enhance their wellbeing. Further, they were willing to adapt sustainable farming practices such as intensification, organic farming, land sparing and sharing if hybrid tourism is introduced. Interestingly, a significantly higher proportion of women felt that hybrid tourism would encourage them to adopt such sustainable farming practices. Further, a slightly higher proportion of households headed by women were likely to adopt hybrid tourism. This resonates with the findings in preceding chapters that women demonstrated a high potential for becoming change agents to bring about sustainable practices. Overall, most households felt that agritourism would be more suited for their villages due to their familiarity with farming.

Among farming practices, organic farming is the most sustainable as shown in Chapter 2. Studies in other countries show how organic agritourism encourages tourists to visit and to purchase goods and services (Choo and Park, 2022; Little and Blau, 2019; Choo and Jamal, 2009). Further, income could potentially increase since organic produce commands higher pricing (Yadav et al., 2013; Ramesh et al., 2010). Puthukkudiyiruppu's residents prefer conventional farming due to lower yields, poor market access for organic produce and higher

cost of organic fertilisers in organic farming, although the people were familiar with organic farming, having learnt about it from private sector initiatives. However, the higher cost of organic fertiliser was during a period of economic crisis when imported fertilisers were unavailable. This shortage pushed up the cost of manure. Establishing tourism in the study area could potentially bring the market to the region in the form of tourists, help absorb the higher cost of organic fertiliser, improve market access, help mitigate climate change impacts and drive a transition to organic farming. In this regard, the study by Little and Blau (2019) is highly relevant. Their study shows that over a 15-year period there was a gradual transition to sustainable farming along with agritourism resulting in positive impacts on biodiversity and climate change mitigation. Further, job opportunities were generated for farmers, the emigration of younger people for jobs elsewhere was reduced and learning opportunities were fostered. In this and the previous chapters, we saw similar problems faced by people in the study area such as lower harvests due to climate change, loss of biodiversity, soil erosion, a need for employment opportunities for women and youth, a desire to reduce the emigration of youth and nonfulfillment of needs. Based on this study and the findings of this thesis, sustainable development with hybrid tourism has immense potential.

The local community felt that tourism was highly suited for their area and were willing to adopt suited livelihoods so that they could offer tourism products and services. In focus group discussions they said they were willing to offer commonly accessed land and buildings for tourism. Further they described many tourism products they could offer including fresh farm produce such as coconut, banana and food as well as clothes and handicrafts made by them. They said they could also provide boating and fishing experiences with the local fishermen followed by cooking the fish on the shore. As tourism services, they felt they could take people sightseeing and to observe nature sightings such as migratory birds. They also spoke about being able to offer religious and heritage tourism with temple visits to participate in spiritual events and night festivals. Further, they said they could perform with music and dance including Bharatanatyam, Koothu and Sanganatham. Integrating such traditional practices into tourism will give the added advantage of preserving local culture while generating tourism-related income. Further, tourism will help them to meet physiological and growth needs by enhancing income. Second, it will help them use their culture and heritage to cater to tourism which will contribute to fulfilment of love and belonging needs.

Most respondents know only the skills related to their livelihoods. Therefore, capacity building is a key requirement for hybrid tourism to succeed. In this regard, participants in the focus groups felt they need to develop tourism skills they lack, particularly language and hospitality skills. They expressed their willingness for village societies to be trained in tourism to develop new skills and products for catering to tourists. In this regard they felt youth could be trained in tourism and given opportunities to prevent them from idling. Further, there is lack of appropriate accommodation in the region; the main reason visitors went to Mannar and other places.

There are many opportunities for livelihood development with capacity building. The residents of Puthukkudiyiruppu have developed coping capacity to deal with evolving climate change and the social impacts felt within the recent decade with growing settlements and agriculture (Berman et al., 2012). Further, with no other opportunities their livelihoods have remained the same. Hybrid tourism will help them build adaptive capacity to mitigate climate change by bringing alternative revenue streams. Palm-based products could be developed similar to a study in Vietnam which resulted in improved biodiversity (Triet, Caines and Barzen, 2007). The residents are already familiar with agricultural production, and these skills could be easily adapted for agritourism. Also, the people could be trained in preparing products and the services related to tourism such as homestay and meals. However, the provision of homestay and food products would require specialised training that can be achieved through the partnerships with tourism industry participants. In this regard the households are willing to offer homestay.

The discussion thus far shows that the respondents were highly enthusiastic about the introduction of hybrid tourism. However, they felt that agritourism would be the most suited for Puthukkudiyiruppu since they mainly practised agriculture. Further, participants also felt cultural and heritage tourism would be appropriate. CBT is used in other parts of the world for development as detailed in Chapter 2 (Wearing and McDonald, 2002). In CBT, community members provide the products and services such as homestay, food and guiding services. Its ability to develop such communities is contentious due to lack of economies of scale, although it could have several benefits such as the creation of assets for collective use, conservation, collective enterprises and a network of products to enhance tourism in a local area (Goodwin and Santilli, 2009; Goodwin, 2008; Manyara and Jones, 2007). However, this contention can be mitigated since the hybrid tourism model proposes several nexuses whereby different

models of tourism would work together to achieve sustainability. There is also a need for a network of tourism-related products in agritourism (Choo and Park, 2022). In this regard, the local community was willing to cooperate with each other to provide tourism-related products and services. In other words, the scale could be increased with hybrid tourism.

This analysis also shows that from the perspective of local tourists and industry participants, hybrid tourism is highly viable as a development pathway for Puthukkudiyiruppu. However, having coastal beach tourism could enhance the tourism experience as suggested by local tourists. Further, as mentioned by the households, the roads must be developed to access the beaches which are four kilometres away. This shortcoming must be addressed to introduce tourism successfully in the region. Second, the local community felt that agritourism as well as cultural heritage tourism would be more suited for them. Therefore, the introduction of hybrid tourism with mass tourism in the gateway city of Jaffna, agritourism, cultural heritage tourism and coastal tourism would benefit the region. Studies show how agritourism could benefit such rural communities in other parts of the world and in Sri Lanka (Bwana et al., 2015; Tiraieyari and Hamzah 2012; Malkanthi and Routry, 2011). Other studies also show the potential for organic agritourism (Shen et al., 2020; Kuo, Chen and Huang, 2006). With cultural heritage tourism, a region's gastronomy, music, language, dance, religion, social practices, folklore, rituals, artefacts, historic buildings, handicrafts and ceremonies are used (Timothy, 2014; Ismail et al., 2014). Considering the historic buildings and sites in the region (Chapter 7), and the willingness of the respondents to provide services for tourism, cultural heritage tourism should be included in hybrid tourism.

However, coastal tourism has been shown to cause environmental problems such as deforestation and wetland degradation due to increasing demand for land, water and other resources (Petrişor et al., 2020; Garcia and Servera, 2003; Baldwin, 2000). Therefore, the inclusion of coastal tourism must be planned diligently to enhance livelihood income in Puthukkudiyiruppu with the preservation of social-ecological systems. From a sustainability perspective, the introduction of hybrid tourism has the potential to contribute towards meeting several SDGs. From a socioeconomic perspective it could contribute to goal 1 (No poverty), goal 2 (No hunger), goal 3 (Good health and wellbeing), goal 8 (Decent work and economic growth) and goal 10 (Reduced inequalities). Achieving these goals could help fulfil the needs of the local community that were shown to be lacking in Chapter 6 and enhance. From an environmental perspective, it could contribute towards SDG goals 11 (Sustainable

cities and communities, 12 (Responsible consumption and production), 13 (Climate action), 14 (Life below water) and 15 (Life on land). Achieving these goals could influence change the existing land use practices shown in Chapter 5.

Industry participants work extensively with local communities for the provision of tourism-related products and services, are experienced in ecotourism, have sustainability goals incorporated in their vision, work to protect and regulate national parks and have promoted agroforestry. Thus, partnerships among them and the people in Puthukkudiyiruppu could also contribute towards achieving goal 17 (Partnerships for the goals). However, most households were unfamiliar with the concept of environmental sustainability and have had little access to training programs about it. Further, just half the local tourists were familiar with the concept. Therefore, forging such partnerships would require adequate education to create awareness on its benefits for social-ecological systems and provision of ecosystem services and in tourism-related skills. Such education on sustainability and in tourism-related skills has advantages as shown in other parts of the world (Moctezuma Teresa et al., 2022; Artal-Tur et al., 2019). Further, local tourists must be educated on these benefits to increase interest in sustainable tourism. There are tourists that value sustainable tourism destinations and look for contact with new cultures and new landscapes and are willing to pay a higher price for genuine sustainable tourism (Nickerson, Jorgenson and Boley, 2016; Buffa, 2015). Such education will influence sustainable practices among the people in Puthukkudiyiruppu and encourage local and international tourists to visit for tourism. Such education could be provided by tourism industry participants in collaboration with the government and local communities. Other studies show the importance of such environmental education (Newman et al., 2020; Nguyen et al., 2018; Bhuiyan et al., 2016).

The findings in this chapter reflect the results of the study by Little and Blau (2019). In their study, using agritourism and nature tourism proved to be successful in creating opportunities for the local community with environmental sustainability. This chapter shows that using the natural and human capital in the study area could have similar positive sustainable outcomes.

8.4. Summary

In sum, hybrid tourism has the potential for development of this region. Second, hybrid tourism with agritourism as well as nature, coastal and cultural heritage tourism could lead to increased tourism traffic to the region. Third, this in turn could contribute to capacity building,

increasing livelihood income from tourism, influence sustainable land use practices for farming and encourage the preservation of social-ecological systems. However, tourism requires drivers such as education of local tourists and residents about sustainable practices and improving infrastructure to access proximal beaches. Further, it requires efforts by tourism industry participants to invest in and to promote the area for tourism.

9. Conclusion and recommendations

9.1. Summary of key findings

The preceding four chapters analysed and discussed LULCC in Puthukkudiyiruppu, the socioeconomic needs that drive livelihood choices, what future scenarios could hold using a Three Horizons Framework and how hybrid tourism could potentially improve socioeconomic standards and influence sustainable livelihood practices.

Findings in Chapter 5 have met my first research objective of analysing LULCC that has occurred over 42 years and a prediction of LULCC in 2030 in the study area. They established that conversion of natural land cover for agricultural and settlement use has increased after the war ended in 2009. Further, if similar land use change continues, there could be irreversible conversion of land cover with wetlands, other vegetation and palm by 2030, with some of the conversion due to seawater ingress. Findings in Chapter 7 corroborate these findings and contribute to meeting my first objective. With participatory mapping, participants acknowledged that climate change, urban expansion, migration, the cutting of palm trees and soil excavation have influenced land use change.

Findings in Chapter 6 have met my second research objective of understanding the socioeconomic activities and drivers for a region affected by conflict. They show that in the context of Maslow's hierarchy, basic, safety and security, belonging and growth needs are largely unfulfilled due to problems such as accessing financial capital and technical assistance. Further, climate change is affecting livelihoods and fulfilment of livelihood needs is contributing to climate change. Supporting this, conventional agriculture is preferred over sustainable agriculture due to ease of market access and lower cost despite reduction in crop cycles. Findings in Chapter 7 corroborate these findings by showing the social impacts the war had with the STEEP analysis. Further, they show similar livelihood challenges such as access to technical assistance, markets and financial capital.

Findings in Chapters 7 and 8 have met my third research objective of assessing hybrid tourism for the development of post-conflict resettlements and to influence sustainable farming practices. These findings show that local tourists, tourism industry participants and households felt that hybrid tourism has potential for sustainably developing the study area. However, local tourists felt that coastal tourism would increase the repetition of visits for

hybrid tourism. Households were willing to adopt sustainable farming practices if tourism was introduced. However, they felt that agritourism would be more appropriate due to their familiarity with farming. Participants felt nature tourism, coastal tourism and cultural heritage tourism could be developed and that they could contribute to and earn from them due to intrinsic knowledge, their cultural heritage and facilities for homestay and culinary experiences.

Having met my key objectives in key Chapters 5, 6 and 8, with corroboration from Chapter 7, I have met the aim of this thesis of assessing hybrid tourism for sustainable development of the study area. Hybrid tourism could develop the study area socioeconomically and improve wellbeing; this will in turn transform land use practices. However, coastal, cultural heritage tourism must be evaluated based on results from local tourist data, household data and the PSP workshop. With Chapter 7, my key objective was to understand the problems the study area faces in a participative setting, broadly covering the areas tackled in Chapters 5, 6 and 8. By taking this approach, I was able to gain firsthand insights on a wide-ranging set of problems faced by the workshop participants related to land use, livelihoods, patriarchy and gender-related issues and climate change, and on how hybrid tourism could potentially create sustainable linkages with land use and livelihoods and contribute to solving these problems.

In this conclusion, I will provide a framework for hybrid tourism and elaborate on how hybrid tourism can contribute to building adaptive capacity, diversifying sustainable livelihoods, changing land use practices and improving the wellbeing of resettled post-conflict communities in Puthukkudiyiruppu. Second, I will explain how my thesis contributes to the available literature. Third, I will make recommendations on future research for hybrid tourism, steps that can be taken in the study area and a policy framework.

9.2. Hybrid tourism conceptualised

Hybrid tourism was originally conceptualised as nexuses across four models with mass tourism, nature tourism and agritourism. Based on the findings of the four key chapters the following figure represents a revised conceptual framework for hybrid tourism. My final conceptualisation of hybrid tourism is based on this revised framework (Figure 109).

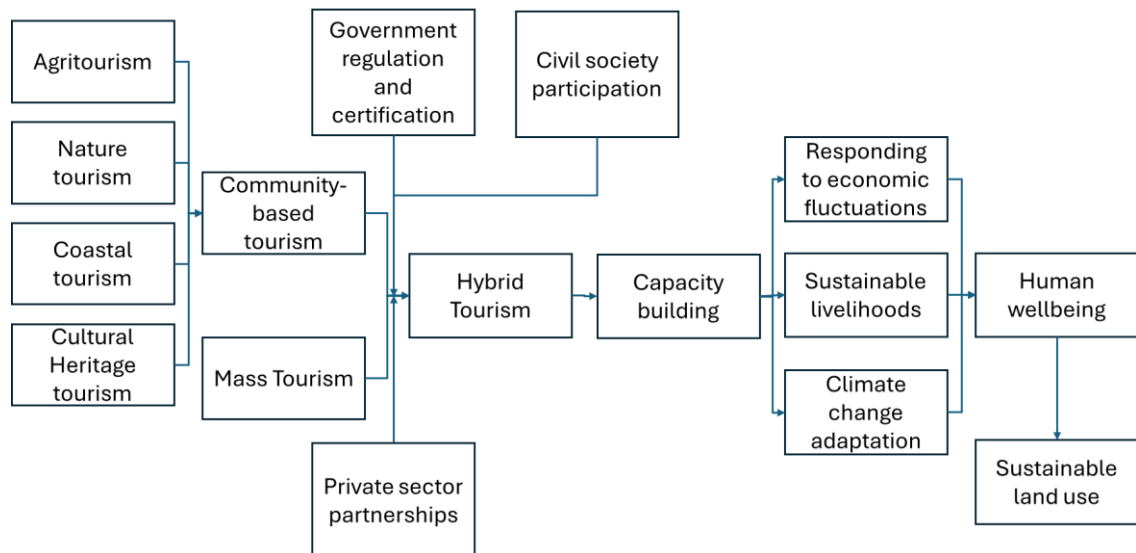


Figure 109 A framework for hybrid tourism

In this framework, hybrid tourism combines several types of tourism with CBT (nature tourism, cultural heritage tourism and agritourism) and mass tourism. Ideally mass tourism would be in the gateway city Jaffna (or other main cities), and one or more satellite rural sites would have CBT. Such satellite sites must be scaled sustainably to ensure the resource base will not be compromised. In this regard, hybrid tourism is predicated on what Weaver (2001) points out that it is the economies of scale of mass tourism that makes it financially sustainable and enables it to take up environmental and social problems. However, their inclusion as a mass tourism model in satellite sites could cause problems for the resource base (Chapter 7) in an area already facing problems with water supply; this would need to be assessed with the inclusion of social and environmental factors. Such mass tourism facilities are owned by investors who have single or multiple hospitality facilities in tourism destinations that attract an adequate number of tourists. In this regard, coastal tourism has historically been included in the traditional model of mass tourism due to high demand by Westerners for the sun and the beach. Invariably such tourism models cause overcrowding as more tourism industry participants such as destination marketing companies and hotels come on board, increase tourist arrivals and affect the available resource base (Drius et al., 2019; Satta et al., 2009). Due to excessive tourism, such destinations face water and solid waste pollution, overuse of natural resources such as water and seafood, and deforestation (Lee and Syah, 2018; Khan, 2017). Therefore, adopting unsustainable mass tourism for gateway and satellite sites must be avoided.

In an ideal world, a hybrid tourism venture in a particular region would be owned by a single tourism participant or by an alliance of such participants in a transparent private sector partnership. If not, hybrid tourism would not contribute to sustainability in a particular geographic area. This would also ensure that industry participants in hybrid tourism take on the financial challenges due to the lower economies of scale of smaller tourism sites in rural areas that cater to ecotourism, while enjoying the higher revenues and economies of scale of a larger mass tourism hospitality site.

The government should introduce an appropriate regulatory framework with policies that cover investment composition and scale (Mass and CBT), sustainability reporting and certification to regulate the private sector. I have elaborated on this approach in section 9.4. Whether such reporting encourages companies to become truly sustainable entities is questionable (Koseoglu et al., 2021). Further, Corporate Social Responsibility (CSR) initiatives tend to be sporadic. To mitigate these concerns, with hybrid tourism the initiative must be ongoing, with the engagement of the local community for provision of goods and services. Further, partnerships should be forged between tourism industry participants and members of the local community. Studies in other parts of the world show how fair revenue sharing schemes have been successful in sustaining CBT (Carius and Job, 2019). It is key that hybrid tourism with CBT generates revenues for the community, if not there will be lack of acceptance and apathy (Bello et al., 2017). In this regard the people in Puthukkudiyiruppu are willing to work together which shows CBT has potential.

Hybrid tourism will contribute towards building adaptive capacity (Chapter 8) in the study area since it provides an alternative livelihood in a region where the predominant pathway is agrarian, which is increasingly precarious due to challenges posed by intensifying climate change and economic shifts. Studies show that tourism has been successful in building adaptive capacity by showing how a community demonstrated resilience and adaptive capacity to overcome the challenges of the Covid pandemic and climate change with ecotourism (Gabriel-Campos et al., 2021; Hartman, 2016).

Over time improved wellbeing will help the community to build their financial, social and cultural capital and to make a gradual transition to sustainable land use practices. As evidenced in Chapter 6, this community is unable to fulfil its basic needs and growth needs. A gradual transformation with hybrid tourism will accrue socioeconomic benefits and fulfilment of needs for the local community since they would be participants, providing a range of goods

and services such as homestay, food, and local nature and heritage tours. This transformation will lead to several benefits for the local community as shown in the study by Little and Blau (2019). There will be a gradual transition to farming with sustainable land use practices and conservation. Climate change and economic impacts on livelihood income will be mitigated with revenue streams generated through tourism and farming. Emigration of younger people will reduce due to their retention for job opportunities in farms and tourism. There will be job opportunities for the entire community in tourism as providers of tourism products and services such as homestay, food and guiding services.

From the perspective of the SDGs, working towards SDG 17 (Partnerships for the goals) would enable meeting many other SDG goals (Chapters 6 and 8), with the local community partnering with tourism industry participants in the provision of tourism goods and services. Second, such companies would capitalise on these partnerships in their marketing. This access to transparent information about the company's engagement in sustainable hybrid tourism with certification would encourage potential tourists to visit Puthukkudiyiruppu. Ultimately, these steps would result in the sustainable development of the region and influence sustainable land use practices with organic farming.

I reviewed available literature comprehensively to understand the eco-centric perspective in nature tourism studies and the anthropogenic perspective in agritourism studies. With this knowledge, I understood the importance of comprehensively capturing both perspectives. Second, I understood the relevance of natural landscapes in the context of tourism. Third, I gathered the importance of the multiple stakeholders in the field of tourism, particularly the tourist, the tourism industry and the residents. Fourth, I realised how the needs of isolated communities such as those in my study area are not adequately fulfilled and the relevance of their livelihoods to tourism. With this understanding, I employed a rigorous methodology and data collection, covering LULCC, socioeconomic factors with needs-based analysis and multiple perspectives to assess hybrid tourism. Second, I employed a PSP workshop with a multipronged approach to assess the three key area I studied, LULCC, socioeconomic factors and hybrid tourism. This facilitated triangulation whereby local knowledge was used to corroborate findings in three key chapters. Third, I used the knowledge I gained to produce a framework for hybrid tourism (Figure 109). With these approaches and the resulting framework, I have produced an original piece of research that will contribute to the existing

knowledge on tourism. Further, it is my intention to publish findings in my key chapters as journal articles to disseminate the knowledge I gained.

In sum, the key drivers of hybrid tourism would be private sector investment and partnerships with CBT within a policy framework devised by the government. The framework must be developed pluralistically and inclusively with participation of all related stakeholders. I have provided an initial framework in section 9.4. Further, by addressing barriers such as the conservative culture and gender challenges faced by women, and with capacity building, hybrid tourism has the potential to improve wellbeing in the study area and promote sustainable land use practices.

9.3. Recommendations

9.3.1. Academic

This thesis contributes to the available academia in several areas, by introducing a new concept with hybrid tourism.

Chapter 5 brings new knowledge to the fields of studies on LULCC, rural development and tourism by using geospatial analysis and social factors related to natural capital and social factors and linking these findings for the first time in the study area. Further, with analysis of predicted LULCC it shows the importance of studying past and potential future LULCC to understand what could happen if the existing status quo continues, and how this could be a driver or a barrier to tourism. This will be of interest to academics looking for an approach to assess rural development with tourism and how this could be a barrier or driver to sustainable land use.

There are multiple avenues for future tourism research based on Chapter 5 due to historic and predicted reduction in natural capital in the context of hybrid tourism. More LULCC studies should be undertaken to extend knowledge in this area for the entire province, particularly regarding natural capital related to tourism. This would give a broader perspective to policy and decision makers for potentially driving positive change and planning sustainable land use with tourism. Second, future research on the biodiversity in the Northern Province to comprehensively cover the animal, bird and plant life in Chundikulam National Park and other PAs. This would be useful for policymakers and investors in tourism to understand the

available biodiversity in the park and to plan how this can be sustainably used for tourism. Third, most households in Puthukkudiyiruppu depend on natural resources for their livelihoods. Research should be conducted on the impacts this has on natural capital and the ecosystem services they provide. This would give policymakers better knowledge on the extent of reliance to evaluate alternative sustainable pathways such as tourism. In this regard, studies should be conducted on the health and environmental benefits of palmyra since limited studies are available and it is related to tourism for supply of food and handicrafts that are connected to the local culture (Chapters 2 and 5).

Chapter 6 brings new knowledge for studies on rural development with tourism, by applying Maslow's hierarchy to study underlying needs, and how these needs drive livelihoods and influence land use. Taking this approach helped me to assess whether any unsustainable practices can be transformed to sustainable ones in my assessment of hybrid tourism in Chapter 8. There are multiple avenues for future research based on the findings in Chapter 6. More studies on using tourism for rural development should be undertaken covering the livelihood choices made by residents, how these choices influence land use and how tourism could influence sustainable livelihoods and use of natural capital. In this regard, since coastal and cultural heritage tourism were included in my framework for hybrid tourism (Figure 109), coastal livelihoods and intrinsic cultural heritage could be studied in the context of tourism. Second, studies should be done on the effects of climate change on agricultural livelihoods over specific time periods to improve predictability so that farming could be better planned. Third, the results showed there are gaps in education and livelihood training for the respondents and education for their children. Studies should be done to uncover the full extent of what these gaps are. These studies should include assessment of livelihoods in the context of tourism. This will give policy and decision makers the knowledge to introduce more sustainable farming methods with resilient crops suited for catering to tourism, appropriate access to financial capital and improve education systems and livelihood training related to tourism. This approach would give them the knowledge needed on the factors to be fulfilled to meet the needs of such rural communities to successfully introduce sustainable tourism as a developmental model.

In Chapter 7, PSP and participatory mapping were used for the first time in the study area to coproduce a Three Horizons Framework bringing new insights to the literature on future scenarios through the perceptions of the local community. It showed that a transformative

scenario could drive sustainable development and will be of interest to academics and development professionals looking for appropriate models to assess community perceptions of the future. There are three avenues for future research based on the findings in Chapter 7, due to the strong attachment to Hindu culture (e.g., hotels near religious places, gender inequality) which could be a barrier to tourism and to participation by women. There should be more participatory research with a wider audience to set pathways for sustainable hybrid tourism development in the region. Second, research should be conducted on cultural practices to understand potential drivers and barriers for tourism and how the barriers could be mitigated. Third, the extent to which women are affected by cultural norms and practices due to patriarchy, and how this can be mitigated to influence their participation in tourism must be studied. This knowledge will be useful for industry participants to plan their investments in the region.

Chapter 8 established that hybrid tourism can drive sustainable development. This will be of interest for academics studying the interactions of tourism models with tourists, society, the tourism industry participants and the environment. There are three avenues for future research based on its findings. The local tourists were more likely to visit for hybrid tourism if there is coastal tourism. Research should be conducted using LULCC, PSP and other approaches to identify sites that could be adapted for coastal tourism without impacts to the natural capital. Studies should be inclusive with all relevant stakeholders from the tourism industry, the local community, the local government and other relevant participants. Second, research should be conducted among households to determine gaps in their knowledge and facilities to cater to hybrid tourism. Third, research should be conducted among tourism industry participants on what they would need in the context of infrastructure and skillsets to bring tourism investment and tourists to Puthukkudiyiruppu. This would give policy and decision makers the knowledge to align local knowledge and facilities with what is required for hybrid tourism and to introduce hybrid tourism with sustainable practices. Further, it would help them identify appropriate sites for coastal tourism.

9.3.2. Applied

The key concern in the study area are the unsustainable farming practices stemming from inappropriate land use planning and livelihood problems. First, the national and local governments should provide advice on how land use could be planned more effectively to

improve production with due consideration given to the ecology. In an ideal world organic farming is the appropriate option for hybrid tourism. However, farmers could be trained in conservation agriculture whereby minimal chemical-based fertilisers and herbicides could be used as an intermediary step towards sustainable farming (Chapter 2). The government should also provide solutions to solve the problems of access to financial capital for households to complete their homes and fencing, and market access problems faced in the study area. Second, the concept of hybrid tourism should be conveyed to policymakers in the government with a view to adopting it to develop tourism in rural areas. Third, training and development in tourism-related livelihoods should be introduced in the region. Private homes that are suited for CBT must be upgraded. For example, the hygiene facilities in homes would need to be modernised to facilitate homestays.

This will give the local community opportunities to be employed in the industry and gain insights on its requirements. Further, based on the success of influencing the government to adopt hybrid tourism as a policy, it will create job opportunities in the study area (and other rural areas) in the long-term. This will eventually help such communities to be employed in their own region and will reduce emigration. Fourth, this thesis uncovered how some heritage sites are in a dilapidated condition (Chapter 7). The government should rehabilitate such sites. Further, the government must improve infrastructure such as road access to beaches, install streetlights, and provide basic tourism-related facilities in such sites, (e.g., resting areas, hygiene facilities). Further, it should promote such sites in its marketing activities to attract investors and tourism. This could potentially influence tourists who visit Jaffna to also visit the region. Fifth, the local conservative culture, particularly Hinduism, is a key barrier to tourism. Further, women were identified as change agents in the key chapters but face the challenge of gender inequality due to the paternalistic culture. These barriers need attention, and I have touched on this in section 9.3.1. The recommendations I have detailed in this section will contribute to capacity building and resilience with multiple sources of livelihood stemming from farming and tourism. This will lessen the impact of shocks faced due to climate change and economic downturns.

9.4. Endnote

In concluding this thesis, I have detailed foundational elements of a policy framework that must be developed for hybrid tourism. The approach to formulating such a framework must

be inclusive and pluralistic, with the relevant stakeholders across the local community, the local and national governments and the private sector engaged in tourism fairly represented (Abbott et al., 2017). This framework should include three areas. First, it should cover guidelines for potential investors. This guideline should include selection of mass tourism sites in gateway cities such as Jaffna and satellite sites in rural areas and the coast that are sustainable. Further, the scale of investment, use of sustainable materials and practises, selection of CBT partners and their benefits should be included. Second, it should cover sustainability reporting. One such sustainability reporting approach is the Global Reporting Initiative (GRI) (Hamrouni et al., 2023). GRI covers many social and environmental indicators that must be disclosed in the company's reports of their CSR initiatives (Marimon et al., 2012). This approach is effective in imbuing growth in CSR reporting and the use of external bodies for certification to improve transparency (Hamrouni et al., 2023). Further, the GRI has been shown to motivate companies to be more transparent with clearer CSR strategies and sustainable practices (Marimon et al., 2012; Perez-Batres, Miller and Pisani, 2010). Third, it should cover sustainability certification. With such certification, an independent entity certifies as to whether a tourism industry participant's business is sustainable. It is an approach that is becoming an increasingly important element of tourism to attract tourists who are willing to pay a premium (Nelson et al., 2021). There are a growing number of international certifications such as Green Globe and the Green Key Scheme that have been shown to encourage tourism industry participants to reduce their carbon footprint over time (Mzembe et al., 2020; Chen, 2019; Font, 2002). Taking these steps will ensure the problem of greenwashing (Section 8.3.2.) does not arise. Having an appropriate framework in place would ensure that natural and social capital are sustainably used for hybrid tourism.

Appendices

Appendix 1: Survey instruments

The survey instruments namely household survey-primary respondent, household survey-spouse, pilot tourists and tourism industry participants used for this thesis are provided in this section.

Household survey - Primary respondent

1. Which village are you living in?

Suthanthirapuram

Thevipuram

Theravil

Vallipunam

Manikkapuram

Other _____

2. What is your gender?

Male

Female

Other _____

3. What is your age?

21 to 30

31 to 40

41 to 50

51 to 60

61 to 70

4. What is your marital status?

Married

Single

Separated

Widow

Widower

5. How old is your spouse?

Under 30

31 to 40

41 to 50

51 to 60

61 and over

6. How many children do you have?

0

1

2

3

4

5

7. Do you have children that are still going to school?

Yes

No

8. Do you have to pay for your children's school fees?

Yes

No

9. Do you have to pay for consumables such as books and stationery?

Yes

No

10. Do you pay for extra tuition classes?

Yes

No

11. How would you rate the additional costs you incur for your children's education?

Extremely unreasonable

Somewhat unreasonable

Neither reasonable nor unreasonable

Somewhat reasonable

Extremely reasonable

12. How satisfied are you with the education standard?

Highly dissatisfied

Moderately dissatisfied

Neutral

Moderately satisfied

Highly satisfied

13. As a parent how would you rank the options below if they were available to your children?

_____ Advise on career choices and the related education required

_____ The availability of vocational training in areas such as carpentry, plumbing etc

_____ Access to learning new computer technologies

_____ Access to new technologies in your chosen livelihood

_____ Other

14. What form of land ownership is it?

Own land

Crown/Permit

Lease

Relative's

Took occupation

15. How large is the land in acres?

0.5 acre or less

0.6 to 1 acre

1.1 to 1.5 acres

1.6 to 2 acres

2.1 to 2.5 acres

2.6 to 3 acres

Other _____

16. Did you borrow money to build your home?

Yes

No

17. Whom did you borrow money from?

Bank

Pawn broker

Relative

Friend

Self-help group

Other _____

18. How much did you borrow?

Under 100,000

101,000 to 200,000

201,000 to 300,000

301,000 to 400,000

401,000 and above

19. Have you repaid the full loan?

Yes

No

19A. Are you able to make your monthly loan payments?

Yes

No

20. What goes unfulfilled due to loan payments?

Meals

Children's needs

Livelihood development

Leisure

Security

Other _____

21. How many bedrooms does your home have?

One

Two

Three

Four

22. What type of roof does it have?

Thatch

Clay tile

Fiber cement

Galvanised

Other _____

23. What type of floor does it have?

Cement

Tiles

Other _____

24. Is the house completed?

Yes

No

25. How many months have you been building the house?

12

24

36

48

60

72 and over

26. What has caused the delay in completing your home?

Lack of funds

Children's needs

Land ownership

Issues with security

Delays in resettlement aid

Delays to get government permission

Other _____

27. Do you depend on your income to add to the house?

Yes

No

28. Does your home have its own toilet?

Yes

No

29. Is the toilet inhouse or outhouse?

Inhouse

Outhouse

30. Do you have a shower or tap?

Shower

Tap

Both

Neither

Other _____

31. How do you get water for bathing, cooking and washing up?

Well

Pipe-borne

Common well

Other _____

32. What is the average electricity bill value per month?

Less than 500

501 to 1000

1001 to 2000

2001 to 3000

3001 and over

33. Do you have a television?

Yes

No

34. What energy source do you use for cooking?

Firewood

Gas

Electricity

35. Where do you get the firewood from?

Own land

Forest

36. What type of employment do you have?

Self-employed

Employed

Unemployed

Other _____

37. What is your main livelihood?

Farming

Agroforestry

Fishing

Entrepreneur

Mining/Extraction

Tourism

Labourer

Other _____

38. What is Your Monthly household expenditure ?

39. What is your monthly income?

40. Who is the main income earner in your family?

Myself

My spouse

Other

41. Do you and your family normally eat three meals a day?

Yes

No

42. What type of farming are you doing/working in?

Cultivation

Livestock

Other _____

43. What type of cultivation is it?

Vegetables

Fruit

Rice paddy

Other _____

44. What type of livestock farming does the farm have?

Goats

Dairy cows

Poultry

Other _____

45. Is the farm for commercial or subsistence purposes?

Subsistence

Commercial

Both

Other _____

46. Have you heard of organic farming?

Yes

No

47. Where did you first learn about organic farming?

Younger generation

Govt agrarian service center

Former generation tradition

From NGOs

From private initiatives

Other

48. What form of cultivation does the farm have?

Conventional

Organic

Hybrid

Other _____

49. Does the farm use organic fertilisers?

Yes

No

50. Does the farm refrain from using chemical pesticides?

Yes

No

51. Why do you do conventional farming?

Financially viable

Pest control is easier in conventional farming

Organic needs too much attention

Insufficient output in organic

Conventional farming is easier than organic

Long experience mainly in conventional

For marketing

Other

52. Would you be willing to switch to organic farming?

Yes

No

53. What would encourage you to switch from conventional/hybrid to organic farming or make a gradual transition?

Training in organic farming methods

Better profit in organic since output is less than conventional farming

Receiving seeds, organic fertilisers and pest control

Market access for organic produce

Equipment

Partnership

The health benefits of organic farming

Less expensive organic fertiliser

Other

54. What is stopping you from switching to organic farming from conventional or hybrid?

Organic farming needs more attention and work

Lack of resources such as fertiliser and pesticides for organic

Lack of labour and other resources

Organic produce is subject to more diseases

Less profits in organic farming

Lack of market access for organic

Conventional paddy fields next-door

Inability to do organic farming on a large scale

Conventional farms need less time to manage

Lack of knowledge in organic farming

Other _____

55. To what extent do you feel you are able to use the land for agriculture efficiently?

Not at all

Hardly at all

Slightly

Moderately

Completely

56. What are the challenges you face in not achieving this?

Lack of time

Lack of investment

Unsuitable land

Other

57. How satisfied are you with the government or any other national body coming with alternative solutions for such problems?

Extremely dissatisfied

Somewhat dissatisfied

Neither satisfied nor dissatisfied

Somewhat satisfied

Extremely satisfied

58. Have you perceived erosion of the soil indicated by lower harvests?

Yes

No

59. How many crop cycles do you plant per year?

1

2

3

4

60. Has this reduced or increased over time?

Reduced

Increased

No change

61. If so how many cycles were there before?

1

2

3

4

5

62. What do you feel are the reasons for the increase in crop cycles?

Better irrigation systems

Increased availability of water

Adequate labour

Better marketing

Better income

Other _____

63. What do you feel are the reasons for the reduction in crop cycles?

Climate change

Irregular rainfall

Lack of market access

No profit

Inadequate technical support

Inadequate insurance

Other

64. How many years have these cycles been inconsistent?

Last 10 years

Last 5 to 9 years

Last 4 years

Other _____

Climate change is global warming, changes in weather patterns and rising sea levels

caused by greenhouse gas emissions. As a result, there are changes in crop planting cycles as well.

65. To what extent has climate change induced changes in crop cycles changed agricultural yield in the last ten years?

Caused a huge reduction

Caused a moderate reduction

No change

Moderately increased output

Greatly increased output

66. To what extent has climate change induced changes affected your livelihood income?

Caused a huge reduction

Caused a moderate reduction

No change

Moderately increased income

Greatly increased income

67. How severe has the negative impact been?

Extremely severe

Moderately severe

No change

Moderately not severe

Not severe at all

Land sparing is a concept in which the land is not planted once in five years to improve soil quality. In land sharing, a smaller portion of land is used for farming with the remaining land given for natural features such as endemic trees and hedgerows. These natural features could include plants and trees that provide perennial crops

68. How likely are you to include natural features such as hedgerows and other wilderness elements in your land (LAND SHARING)?

Very unlikely

Slightly unlikely

Neither unlikely nor likely

Moderately likely

Highly likely

69. How likely are you to leave your farm unplanted one in five years to improve your soil by rejuvenating organic content and to retain moisture (LAND SPARING)?

Very unlikely

Slightly unlikely

Neither unlikely nor likely

Moderately likely

Highly likely

70. How likely are you to adopt intensive farming on a smaller extent of your land whereby there is less or no crop rotation (INTENSIFICATION)?

Very unlikely

Slightly unlikely

Neither unlikely nor likely

Moderately likely

Highly likely

71. How likely are you to adopt organic farming with no chemical fertilisers and pesticides?

Very unlikely

Slightly unlikely

Neither unlikely nor likely

Moderately likely

Highly likely

72. Based on the four farming practices above, would you be more likely to adopt any of them if you earn adequate income from your other cultivation or livestock?

Very unlikely

Slightly unlikely

Neither unlikely nor likely

Moderately likely

Highly likely

73. To what extent do you feel organic farming, land sparing, land sharing and intensification will help reverse this situation?

Highly unlikely

Slightly unlikely

Neither unlikely or likely

Moderately likely

Highly likely

74. How likely are you to adopt conventional farming with chemical fertilisers and pesticides?

Very unlikely

Slightly unlikely

Neither unlikely nor likely

Moderately likely

Highly likely

75. What is the item you extract?

76. What are the products that are obtained from agroforestry?

77. What is the nature of your self-employed entrepreneurship?

78. What is the nature of your self-employment in tourism?

79. To what extent do you feel you have access to markets to sell your products?

No access at all

Very little access

Little access

Moderate access

High access

80. What are the difficulties you face with access to markets?

Lack of market opportunities

Lack of awareness about you as a supply source

Reliance on middlemen

Unfair pricing

Price fluctuation

Transport to markets

Gender-related challenges

Other

81. Could you elaborate further on the other difficulties you face?

Lack of income during rains and other bad weather

Lack of labour

Weather pattern changes

Unstable economic conditions

Inadequate profits

Lack of technological know-how

Lack of capital

Unpredictable yields

Other _____

82. To what extent do you feel you have access to loans to support your chosen livelihood?

No access at all

Very little access

Little access

Moderate access

High access

83. What is the nature of your employment as a labourer

Carpenter

Mason

Farm worker

Plumber

Labourer

Other

84. How many years have you been practicing your livelihood?

1 to 5 years

6 to 10 years

7 to 15 years

16 to 20 years

Over 20 years

85. Are there items such as buildings, tools, equipment you need?

Yes

No

86. What are the items you need?

87. Are technological inputs needed for your work?

Yes

No

88. Please explain the nature of these technologies

89. Have you easy access to such technologies, buildings, tools etc?

Yes

No

90. Have you borrowed or need to borrow for your needs?

Yes

No

91. Who or what institution has lent/will lend to you?

Bank

Microfinance

Pawn broker

Family

Friend

Self-help groups

Other

92. Do you think the terms of the loan have been fair?

Yes

No

93. Why do you feel the loan terms are unfair?

94. Could you disclose the loan amount and if so the amount?

95. Are you able to comfortably make the loan payments and live a normal life?

Yes

No

96. What did you give up due to loan repayments?

Three meals a day

Basic needs

Additional needs

Other

97. What are the additional needs that you give up?

98. Where are you employed?

99. Are you on the employer's payroll with EPF/ETF?

Yes

No

100. What is the frequency of your wage payments?

Daily

Weekly

Monthly

Other _____

101. Is it adequate for your and your family's basic needs?

Yes

No

102. Do you feel you have the required skills for the job?

Yes

No

103. What are the skills you feel you lack?

104. Do you have access to insurance to mitigate loss of income?

Yes

No

105. Do you have savings to access during disasters/shocks?

Yes

No

106. To what extent do you feel you have adequate income to meet your basic needs such as food, clothing and shelter?

Very inadequate

Slightly inadequate

Neither adequate nor inadequate

Moderately adequate

Highly adequate

107. To what extent do you feel you have adequate income to enjoy additional needs you have from time to time such as buying something special for yourself, pursuing a hobby or going on a holiday?

Very inadequate

Slightly inadequate

Neither adequate nor inadequate

Moderately adequate

Highly adequate

108. What do you end up missing due to inadequate income?

Three meals a day

Basic needs

Additional needs

Psychosocial needs

Security

Education for children

Other

109. Have you received technical assistance in your chosen livelihood?

Yes

No

110. What is the source of technical assistance?

Government agrarian services

Private sector

NGO

NAQDA

Other _____

111. What type of technical assistance have you received?

Training and development

Veterinary services

Access to new technology

Other _____

112. To what extent do you think your children will continue your livelihood?

Very unlikely

Moderately unlikely

Neither unlikely nor likely

Moderately likely

Very likely

113. Until what level of education have you completed?

Less than O/Level

O/Level

A/Level

Diploma

Degree

Other

114. Have you received training related to your chosen livelihood?

Yes

No

115. Please elaborate on nature of training you received

116. Please explain why you made the livelihood choices and the associated risk in making them

117. To what extent do you think there were risks in making your livelihood choices

Very risky

Moderately risky

Neither risky nor non-risky

Moderately non-risky

Highly non-risky

In nature tourism people visit for the day or overnight to enjoy nature and to participate in agritourism. Nature tourism activities would include looking at wildlife in Chundikulam National Park, hiking and enjoying sceneries for which you could provide tour guiding, transport, accommodation, meals, cultural performances, clothing and handicrafts

118. How likely are you to learn and become a provider of such activities?

Very unlikely

Moderately unlikely

Neither unlikely nor likely

Moderately likely

Highly likely

119. To what extent do you feel this form of nature tourism will enhance your wellbeing?

Very unlikely

Moderately unlikely

Neither unlikely nor likely

Moderately likely

Highly likely

120. In agritourism tourists participate in farming activities such as planting and harvesting, learning to cook etc. for which you could provide tour guiding, transport, accommodation, teaching to cook, meals, cultural performances, clothing and handicrafts

121. How likely are you to learn and become a provider of such agritourism activities?

Very unlikely

Moderately unlikely

Neither unlikely nor likely

Moderately likely

Highly likely

122. To what extent do you feel this form of agritourism will enhance your wellbeing?

Very unlikely

Moderately unlikely

Neither unlikely nor likely

Moderately likely

Highly likely

In hybrid tourism people visit for the day or overnight to enjoy nature in the Chundikulam nature park and to participate in agritourism. You could provide tour guiding, transport, accommodation, teach cooking, provide meals, cultural performances, clothes and handicrafts

123. How likely are you to learn and become a provider of such hybrid tourism activities?

Very unlikely

Moderately unlikely

Neither likely or unlikely

Moderately likely

Very likely

124. To what extent do you feel this form of hybrid tourism will enhance your wellbeing?

Very unlikely

Moderately unlikely

Neither unlikely nor likely

Moderately likely

Highly likely

125. Do you think these forms of tourism will be suitable in your area?

Yes

No

126. Please elaborate on your answer

127. Would you be interested to take part in tourism as a livelihood choice?

Yes

No

128. What would you offer for tourism?

Guide services

Transport

Providing a place to stay

Providing meals

Providing cultural performances

Help them participate in farming/other livelihood activities

Providing clothes and handicrafts

Other _____

129. To what extent do you think you will be able to cooperate with others in your village to offer tourism experiences and products to visitors?

Very unlikely

Moderately unlikely

Neither unlikely nor likely

Moderately likely

Very likely

130. To what extent do you think hybrid tourism will help you better coexist with the environment?

Very unlikely

Moderately unlikely

Neither unlikely nor likely

Moderately likely

Very likely

131. Please elaborate on your answer

132. To what extent do you think hybrid tourism will encourage you to take on organic farming or practice land sparing, land sharing, intensification?

Very unlikely

Slightly unlikely

Neither unlikely nor likely

Moderately likely

Highly likely

133. To what extent do you think hybrid tourism will encourage you to take on organic farming or practice land sparing, land sharing, intensification?

Very unlikely

Slightly unlikely

Neither unlikely nor likely

Moderately likely

Highly likely

134. Based on the descriptions of nature tourism, agritourism and hybrid tourism and based on your geographic area, and based on your livelihoods and culture, which type of tourism do you feel is most suited in order of preference?

_____ Nature tourism

_____ Agritourism

_____ Hybrid tourism

135. Please elaborate on your answer

136. What are your thoughts on what climate change is?

Increasing temperatures

Irregular seasonal weather patterns

Unpredictable rain

Higher intensity rainfall

Deforestation a cause

Other _____

137. Please elaborate on your previous response

138. Have you seen loss of species?

Yes

No

139. Have you seen deforestation?

Yes

No

140. Do you feel climate change has caused these changes?

Yes

No

141. How severe has the negative impact been?

Extremely negative

Somewhat negative

Neither positive nor negative

Somewhat positive

Extremely positive

142. What do you think of the water quality in your area?

Very bad

Bad

Normal

Good

Very good

143. What is your perception of the air quality in your village?

Very bad

Bad

Normal

Good

Very good

144. Are you familiar with the concept of environmental sustainability?

Yes

No

145. Please elaborate on what your understanding of this is

146. Have you received any awareness programs or education on the ecology and conservation?

Yes

No

147. What was the source of such programs and education?

148. To what extent do you feel your meals are nutritious?

Not nutritious at all

Not nutritious to a small extent

Neither non-nutritious nor nutritious

Moderately nutritious

Highly nutritious

149. What were the economic and other interventions if any and by whom after the war?

150. What are the cultural practices that are common in your society?

151. To what extent do you have the freedom to enjoy your own cultural practices?

No freedom at all

Very little freedom

Little freedom

Moderate freedom

Complete freedom

152. What are the social networks that you are a part of?

153. What are the groups if any you are members of?

154. To what extent do you think you lead a healthy life?

Very unhealthy

Slightly healthy

Neither healthy nor unhealthy

Moderately healthy

Very healthy

155. As a family, how do you experience leisure during a typical year?

Visiting relatives

Visiting temples and other places of worship

Gardening

Sports

Cooking with friends and family

Travelling

Reading

Enjoying art and music

Visiting nature sites

Other

156. On average how many times a month do you have such leisure?

Very rarely

Once

2 to 3 times

4 to 6 times

7 to 9 times

10 times or more

157. Do you have easy access to a hospital for treatment?

Yes

No

158. Do you have to pay to get medical assistance?

Yes

No

159. Do you have to pay for medicines?

Yes

No

160. Do you have to pay for surgery or other treatments?

Yes

No

161. Do you feel such payments are affordable?

Strongly disagree

Somewhat disagree

Neither agree nor disagree

Somewhat agree

Strongly agree

162. What institutions have helped you in general?

163. How conveniently are you able to access other government services such as education, welfare, livelihood assistance and protection?

Highly inconvenient to access

Moderately inconvenient to access

Neither convenient nor inconvenient

Moderately convenient to access

Highly convenient to access

164. What are the policies by the government if any and how do they affect you?

165. What are the government laws, if any, that affect you?

166. Do you experience conflict within your community from time to time?

Yes

No

167. How often would you say such conflicts are?

Very often

Not so often

Rarely

Very rarely

Not at all

Household survey - spouse

1. What is your gender?

Male

Female

Other

2. What type of employment do you have?

Self-employed

Employed

Unemployed

Other _____

3. What is your main livelihood?

Farming

Agroforestry

Fishing

Entrepreneur

Mining/Extraction

Tourism

Labourer

Other _____

4. How many years have you been practicing your livelihood?

1 to 5 years (1)

6 to 10 years (2)

7 to 15 years (3)

16 to 20 years (4)

Over 20 years (5)

5. What is your monthly household expenditure?

6. What is your monthly income?

7. What type of farming are you doing/working in?

Cultivation

Livestock

Other _____

8. What type of cultivation is it?

Vegetables

Fruit

Rice paddy

9. What type of livestock farming does the farm have?

Goats

Dairy cows

Poultry

Other _____

10. Is the farm for commercial or subsistence purposes?

Subsistence

Commercial

Both

Other _____

11. Have you heard of organic farming?

Yes

No

12. Where did you first learn about organic farming?

Younger generation

Govt. agrarian service centre

Former generation tradition

From NGOs

From private initiatives

Other _____

13. What form of cultivation does the farm have?

Conventional

Organic

Hybrid

Other _____

14. Does the farm use organic fertilisers?

Yes

No

15. Does the farm refrain from using chemical pesticides?

Yes

No

16. Why do you do conventional farming?

Financially viable

Pest control is easier in conventional farming

Organic needs too much attention

Insufficient output in organic

Conventional farming is easier than organic

Long experience mainly in conventional

For marketing

Other _____

17. Are you aware this is between organic and conventional farming?

Yes

No

18. Would you be willing to switch to organic farming?

Yes

No

19. What would encourage you to switch from conventional/hybrid to organic farming or make a gradual transition?

Training in organic farming methods

Better profit in organic since output is less than conventional farming

Receiving seeds, organic fertilisers and pest control

Market access for organic produce

Equipment

Partnership

The health benefits of organic farming

Less expensive organic fertiliser

Other _____

20. What is stopping you from switching to organic farming from conventional or hybrid?

Organic farming needs more attention and work

Lack of resources such as fertiliser and pesticides for organic

Lack of labour and other resources

Organic produce is subject to more diseases

Less profits in organic farming

Lack of market access for organic

Conventional paddy fields next-door

Inability to do organic farming on a large scale

Conventional farms need less time to manage

Lack of knowledge in organic farming

Other

21. To what extent do you feel you are able to use the land for agriculture efficiently?

Not at all

Hardly at all

Slightly

Moderately

Completely

22. What are the challenges you face in not achieving this?

Lack of time

Lack of investment

Unsuitable land

Other _____

23. Has the government or any other national body come with alternative solutions for such problems?

Yes

No

24. Have you perceived erosion of the soil indicated by lower harvests?

Yes

No

25. How many crop cycles do you plant per year?

1

2

3

4

26. Has this reduced or increased over time?

Reduced

Increased

No change

27. If so how many cycles were there before?

1

2

3

4

5

28. What do you feel are the reasons for the increase in crop cycles?

Better irrigation systems

Increased availability of water

Adequate labour

Better marketing

Better income

Other _____

29. What do you feel are the reasons for the reduction in crop cycles?

Climate change

Irregular rainfall

Lack of market access

No profit

Inadequate technical support

Inadequate insurance

Other _____

30. How many years have these cycles been inconsistent?

Last ten years

Last 5 to nine years

Last four years

Other _____

Climate change is global warming, changes in weather patterns and rising sea levels caused by greenhouse gas emissions. As a result, there are changes in crop planting cycles as well.

31. To what extent has climate change induced changes in crop cycles and yield in the last ten years?

Caused a huge reduction

Caused a moderate reduction

No change

Moderately increased output

Greatly increased output

32. To what extent has climate change induced changes affected your livelihood income?

Caused a huge reduction

Caused a moderate reduction

No change

Moderately increased income

Greatly increased income

33. How severe has the negative impact been?

Extremely severe

Moderately severe

No change

Moderately not severe

Not severe at all

Land sparing is a concept in which the land is not planted once in five years to improve soil quality. In land sharing, a smaller portion of land is used for farming with the remaining land

given for natural features such as endemic trees and hedgerows. These natural features could include plants and trees that provide perennial crops.

34. How likely are you to include natural features such as hedgerows and other wilderness elements in your land (LAND SHARING)?

Very unlikely

Slightly unlikely

Neither unlikely nor likely

Moderately likely

Highly likely

35. How likely are you to leave your farm unplanted one in five years to improve your soil by rejuvenating organic content and to retain moisture (LAND SPARING)?

Very unlikely

Slightly unlikely

Neither unlikely nor likely

Moderately likely

Highly likely

36. How likely are you to adopt intensive farming on a smaller extent of your land whereby there is less or no crop rotation (INTENSIFICATION)?

Very unlikely

Slightly unlikely

Neither unlikely nor likely

Moderately likely

Highly likely

37. How likely are you to adopt organic farming with no chemical fertilisers and pesticides?

Very unlikely

Slightly unlikely

Neither unlikely nor likely

Moderately likely

Highly likely

38. Based on the four farming practices above, would you be more likely to adopt any of them if you earn adequate income from your other cultivation or livestock?

Very unlikely

Slightly unlikely

Neither unlikely nor likely

Moderately likely

Highly likely

39. To what extent do you feel organic farming, land sparing, land sharing and intensification will help reverse this situation?

Very unlikely

Slightly unlikely

Neither unlikely nor likely

Moderately likely

Highly likely

40. How likely are you to adopt conventional farming with chemical fertilisers and pesticides?

Very unlikely

Slightly unlikely

Neither unlikely nor likely

Moderately likely

Highly likely

41. What are the products that are obtained from agroforestry?

42. What is the nature of your self-employed entrepreneurship?

43. What is the nature of your self-employment in tourism?

44. What is the nature of your self-employment as a labourer?

Carpenter

Mason

Farm worker

Plumber

Other

45. Please elaborate on your previous response

46. Do you have access to insurance to mitigate loss of income?

Yes

No

47. Do you have savings to access during shocks?

Yes

No

48. Do you feel you earn adequate income for you and your family's basic needs (food, clothing, shelter)?

Yes

No

49. To what extent do you feel you have access to adequate income to meet your basic needs such as food, clothing and shelter?

No access at all

Very little access

Little access

Moderate access

High access

50. To what extent do you feel you have access to adequate income to enjoy additional needs you have from time to time such as buying something special for yourself, pursuing a hobby or going on a holiday?

No access at all

Very little access

Little access

Moderate access

High access

51. What do you end up missing due to inadequate income?

Three meals a day

Basic needs

Additional needs

Psychosocial needs

Security

Education for children

Other

52. What are the difficulties you face with access to markets?

Lack of market opportunities

Lack of awareness about you as a supply source

Reliance on middlemen

Unfair pricing

Price fluctuation

Transport to markets

Gender-related challenges

Other

53. Could you elaborate further on the other difficulties you face?

Lack of income during rains and other bad weather

Lack of labour

Weather pattern changes

Unstable economic conditions

Inadequate profits

Lack of technological know-how

Lack of capital

Unpredictable yields

Other _____

54. To what extent do you feel you have access to markets to sell your products?

No access at all

Very little access

Little access

Moderate access

High access

55. To what extent do you feel you have access to loans to support your chosen livelihood?

No access at all

Very little access

Little access

Moderate access

High access

56. To what extent do you think your children will continue your livelihood?

Very unlikely

Moderately unlikely

Neither unlikely nor likely

Moderately likely

Very likely

57. Have you received technical assistance in your chosen livelihood?

Yes

No

58. What is the source of technical assistance?

Government agrarian services

Private sector

NGO

NAQDA

Other _____

59. What type of technical assistance have you received?

Training and development

Veterinary services

Access to new technology

Other _____

60. Have you seen loss of species?

Yes

No

61. Have you seen deforestation?

Yes

No

62. What do you think of the water quality in your area on a scale of

1 to 5 (5 being very good quality)?

Very bad

Bad

Normal

Good

Very good

63. What is your perception of the air quality in your village on a scale of 1 to 5 (5 being very good)?

Very bad

Bad

Normal

Good

Very good

64. What are your thoughts on what climate change is?

Increasing temperatures

Irregular seasonal weather patterns

Unpredictable rain

Higher intensity rainfall

Deforestation a cause

Other _____

65. Do you feel climate change has caused these changes?

Yes

No

66. Are you familiar with the concept of environmental sustainability?

Yes

No

67. Please elaborate on what your understanding of this is

68. Have you received any awareness programs or education on the ecology and conservation?

Yes

No

69. What was the source of such programs and education?

70. To what extent do you feel your meals are nutritious?

Not nutritious at all

Not nutritious to a small extent

Neither non-nutritious nor nutritious

Moderately nutritious

Highly nutritious

71. Are there items such as buildings, tools, equipment you need?

Yes

No

72. What are the items you need?

73. Are technological inputs needed for your work?

Yes

No

74. Please explain the nature of these technologies

75. Have you easy access to such technologies, buildings, tools etc?

Yes

No

76. Have you borrowed or need to borrow for your needs?

Yes

No

77. Who or what institution has lent/will lend to you?

Bank

Microfinance

Pawn broker

Family

Friend

Self-help groups

Other

78. Do you think the terms of the loan have been fair?

Yes

No

79. Why do you feel the loan terms are unfair?

80. Could you disclose the loan amount and if so the amount?

81. Are you able to comfortably make the loan payments and live a normal life?

Yes

No

82. What did you give up due to loan repayments?

Three meals a day

Basic needs

Additional needs

Other _____

83. What are the additional needs that you give up?

84. Where are you employed?

85. Are you on the employer's payroll with EPF/ETF etc?

Yes

No

86. What is the frequency of your wage payments?

Daily

Weekly

Monthly

Other _____

87. Is it adequate for your and your family's basic needs?

Yes

No

88. Do you feel you have the required skills for the job?

Yes

No

89. What are the skills you feel you lack?

In nature tourism people visit for the day or overnight to enjoy nature and to participate in agritourism. Nature tourism activities would include looking at wildlife in Chundikulam National Park, hiking and enjoying sceneries for which you could provide tour guiding, transport, accommodation, meals, cultural performances, clothing and handicrafts

90. How likely are you to learn and become a provider of such activities?

Very unlikely

Slightly unlikely

Neither unlikely nor likely

Moderately likely

Highly likely

91. To what extent do you feel this form of nature tourism will enhance your wellbeing?

Very unlikely

Slightly unlikely

Neither unlikely nor likely

Moderately likely

Highly likely

In agritourism tourists participate in farming activities such as planting and harvesting, learning to cook etc. for which you could provide tour guiding, transport, accommodation, teaching to cook, meals, cultural performances, clothing and handicrafts

92. How likely are you to learn and become a provider of such agritourism activities?

Very unlikely

Slightly unlikely

Neither unlikely nor likely

Moderately likely

Highly likely

93. To what extent do you feel this form of agritourism will enhance your wellbeing?

Very unlikely

Slightly unlikely

Neither unlikely nor likely

Moderately likely

Highly likely

In hybrid tourism people visit for the day or overnight to enjoy nature in the Chundikulam nature park and to participate in agritourism. You could provide tour guiding, transport, accommodation, teach cooking, provide meals, cultural performances, clothes and handicrafts

94. How likely are you to learn and become a provider of such hybrid tourism

activities?

Very unlikely

Slightly unlikely

Neither unlikely nor likely

Moderately likely

Highly likely

95. To what extent do you feel this form of hybrid tourism will enhance your

wellbeing?

Very unlikely

Slightly unlikely

Neither unlikely nor likely

Moderately likely

Highly likely

96. To what extent do you think hybrid tourism will help you better coexist with the

environment?

Very unlikely

Slightly unlikely

Neither unlikely nor likely

Moderately likely

Highly likely

97. To what extent do you think hybrid tourism will encourage you to take on organic

farming or practice land sparing, land sharing, intensification?

Very unlikely

Slightly unlikely

Neither unlikely nor likely

Moderately likely

Highly likely

98. Based on the descriptions of nature tourism, agritourism and hybrid tourism and based on your geographic area, and based on your livelihoods and culture, which type of tourism do you feel is most suited in order of preference?

_____ Nature tourism

_____ Agritourism

_____ Hybrid tourism

99. Do you think these forms of tourism will be suitable in your area?

Yes

No

100. Please elaborate on your answer

101. Would you be interested to take part in tourism as a livelihood choice?

Yes

No

102. What would you offer for tourism?

Guide services

Transport

Providing a place to stay

Providing meals

Providing cultural performances

Help them participate in farming/other livelihood activities

Providing clothes and handicrafts

Other _____

103. To what extent do you think you will be able to cooperate with others in your village to offer tourism experiences and products to visitors?

Very unlikely

Moderately unlikely

Neither likely nor unlikely

Moderately likely

Very likely

104. Until what level of education have you completed?

Less than O/Level

O/Level

A/Level

Diploma

Degree

Other _____

105. Have you received training related to your chosen livelihood?

Yes

No

106. Please elaborate on the nature of training you received?

107. Please explain why you made the livelihood choices and the associated risk in making them

108. To what extent do you think there were risks in making your livelihood choices?

Very risky

Moderately risky

Neither risky nor non-risky

Moderately non-risky

Highly non-risky

109. What were the economic and other interventions if any and by whom after the war?

110. What are the cultural practices that are common in your society?

111. To what extent do you have the freedom to enjoy your own cultural practices?

No freedom

Very little freedom

Little freedom

Moderate freedom

Complete freedom

112. What are the social networks that you are a part of?

113. What are the groups if any you are members of?

114. To what extent do you think you lead a healthy life?

Very unhealthy

Slightly unhealthy

Neither healthy nor unhealthy

Moderately healthy

Very healthy

115. As a family, how do you experience leisure during a typical year?

Visiting relatives

Visiting temples and other places of worship

Gardening

Sports

Cooking with friends and family

Travelling

Reading

Enjoying art and music

Visiting nature sites

Other _____

116. On average how many times a month do you have such leisure?

Very rarely

Once

2 to 3 times

4 to 6 times

7 to 9 times

10 times or more

117. Do you have easy access to a hospital for treatment?

Yes

No

118. How many km away is the nearest hospital?

119. Do you have to pay to get medical assistance?

Yes

No

120. Do you have to pay for medicines?

Yes

No

121. Do you have to pay for surgery or other treatments?

Yes

No

122. Do you feel such payments are affordable?

Strongly disagree

Somewhat disagree

Neither agree nor disagree

Somewhat agree

Strongly agree

123. What institutions have helped you in general?

124. How conveniently are you able to access other government services such as education, welfare, livelihood assistance and protection?

Highly inconvenient to access

Moderately inconvenient to access

Neither convenient nor inconvenient

Moderately convenient to access

Highly convenient to access

125. What are the policies by the government if any and how do they affect you?

126. What are the government laws, if any, that affect you?

127. Do you experience conflict within your community from time to time?

Yes

No

128. How often would you say such conflicts are?

Very often

Not so often

Rarely

Very rarely

Not at all

Pilot tourist group survey

1. Which province did you travel from?

Southern

Eastern

Western

Northern

Central

Uva

Sabaragamuwa

North Western

North Central

2. What was your mode of transport?

Self-driven

Hire vehicle with driver

Bus

Train

Flight

3. How long did the journey take in hours?

1

2

3

4

5

6

7

8

4. How would you rate the convenience of getting to the place?

Very inconvenient

Moderately inconvenient

Convenient

Moderately convenient

Highly convenient

5. Did you feel the tourism experience you had was environmentally sustainable?

Yes

No

6. Please elaborate further as to why you think so

7. Do you feel the tourism experience you had benefited the local community and was socioeconomically sustainable?

Yes

No

8. Please elaborate as to why you think so

9. How satisfied were you with the overall experience?

Highly dissatisfied

Slightly dissatisfied

Satisfied

Moderately satisfied

Highly satisfied

10. What were the shortcomings if any that were there during this experience?

In nature tourism tourists visit national parks to see wildlife, to do birding, to hike and see nice landscapes. In agritourism tourists visit villages to do planting, harvesting, see rural landscapes, enjoy locally prepared food and to enjoy time with local inhabitants. In hybrid tourism tourists enjoy both forms of tourism.

11. Do you think such tourism will encourage farmers to adopt organic farming methods?

Not likely at all

Slightly likely

Neither likely nor unlikely

Moderately likely

Highly likely

12. If hybrid tourism was available in the same tourism destination, how likely are you to go?

Not likely at all

Moderately likely

Very likely

13. To what extent do you feel this form of hybrid tourism will promote sustainable practices?

Not likely at all

Slightly likely

Neither likely nor unlikely

Moderately likely

Highly likely

14. If hybrid tourism was available in the same tourism destination, how likely are you to go?

Not likely at all

Slightly likely

Neither likely nor unlikely

Moderately likely

Highly likely

15. If there was in addition a beautiful beach nearby to enjoy as well how much more likely are you to go?

Not more likely at all

Moderately more likely

Very much more likely

16. Are you familiar with the sustainable development goals published by the UN?

Yes

No

17. Do you believe that they are important for development?

Yes

No

18. Do you believe people will embrace the environmental goals, or are they more likely to embrace socioeconomic goals?

Environmental

Socioeconomic

Both

Neither

19. Please elaborate on your answer

20. Which of these do you think should be the starting point of development?

Environment

Socioeconomic

Both

21. Please elaborate on your answer

22. Do you practice habits that are sustainable in your workplace and personal life?

Yes

No

23. Please elaborate on your answer

24. Would you like to share a great idea for tourism in Sri Lanka?

Tourism industry participants

1. What is your service provision type?

DMC

Gateway city Hotel

Leisure hotel

Ecotourism provider - nature/wildlife

Ecotourism provider - agritourism

Other _____

2. How long have you been doing ecotourism?

1 to 3 years

4 to 6 years

Over 6 years

Other _____

3. Is the number of ecotourism visitors you get adequate to sustain your business?

Highly inadequate

Slightly inadequate

Neither adequate nor inadequate

Moderately adequate

Highly adequate

4. To what extent are you familiar with the northern province/Jaffna and what it can provide for tourism?

Not familiar at all (1)

Slightly familiar (2)

Neither familiar nor unfamiliar (3)

Moderately familiar (4)

Highly familiar (5)

5. To what extent do you feel you have promoted tourism to the northern province/Jaffna adequately?

Highly inadequately (1)

Slightly inadequately (2)

Neither inadequately nor adequately (3)

Adequately to a moderate extent (4)

Adequately to a high extent (5)

6. Please elaborate on your previous answer

7. To what extent do you feel you have adequately promoted ecotourism in the northern province?

Not adequately at all (1)

Slightly inadequately (2)

Neither inadequately nor adequately (3)

Adequately to a moderate extent (4)

Adequately to a high extent (5)

8. Please elaborate on your answer

9. To what extent do you feel you have adequately promoted ecotourism in other parts of the country?

Not adequately at all (1)

Slightly inadequately (2)

Neither inadequately nor adequately (3)

Adequately to a moderate extent (4)

Adequately to a high extent (5)

10. Please elaborate on your answer

11. To which other parts of the country have you promoted ecotourism?

In nature tourism tourists visit national parks to see wildlife, to do birding, to hike and see nice

landscapes. In agritourism tourists visit villages to do planting, harvesting, see rural landscapes,

enjoy locally prepared food and to enjoy time with local inhabitants. In hybrid tourism tourists enjoy both forms of tourism.

12. To what extent do you feel this form of tourism will promote sustainable practices?

Highly unlikely (1)

Slightly unlikely (2)

Neither unlikely nor likely (3)

Moderately likely (4)

Highly likely (5)

13. To what extent do you feel this form of tourism can be adopted for Sri Lanka?

Highly unlikely (1)

Slightly unlikely (2)

Neither unlikely nor likely (3)

Moderately likely (4)

Highly likely (5)

14. To what extent do you feel this form of tourism will encourage rural farmers to adopt sustainable forms of farming such as organic agriculture?

Highly unlikely (1)

Slightly unlikely (2)

Neither unlikely nor likely (3)

Moderately likely (4)

Highly likely (5)

15. To what extent do you think hybrid tourism will help your organisation better coexist with the environment?

Highly unlikely (1)

Slightly unlikely (2)

Neither unlikely nor likely (3)

Moderately likely (4)

Highly likely (5)

16. To what extent do you think you will be likely to promote this form of hybrid tourism if it were available in the northern province?

Highly unlikely (1)

Slightly unlikely (2)

Neither unlikely nor likely (3)

Moderately likely (4)

Highly likely (5)

17. Does your institution/company have sustainability goals in its vision?

Yes (1)

No (2)

18. If you answered yes to the above, please elaborate on the goals being adopted, and which have not been and why

19. Do you believe these goals are important in the long-term needs of the nation?

Yes (1)

No (2)

20. Please elaborate on your answer

21. To what extent do you work with rural villages for tourism to provide products and services including local food, supplies, culture etc.?

Not at all (4)

Slightly (5)

Neutral (6)

Moderate extent (7)

Great extent (8)

22. Please elaborate on your answer

23. To what extent have you noticed any changes in sustainable practices in such villages due to your engagement with them?

Not at all (4)

Slightly (5)

Neutral (6)

Moderate extent (7)

Great extent (8)

24. Please elaborate on your answer

25. Do you believe rural people will embrace environmental goals, or are they more likely to embrace socioeconomic goals?

Environmental (1)

Socioeconomic (2)

Both (3)

Neither (4)

26. Please elaborate on your answer

27. Do you believe the tourism industry should be developed based on environmental goals or socioeconomic goals?

Environmental (1)

Socioeconomic (2)

Both (3)

Neither (4)

28. Please elaborate on your answer

29. From Sri Lanka's point of view which entry point do you believe will work for the country's development?

Environmental (1)

Socioeconomic (2)

Both (3)

30. Please elaborate on your answer

31. Do you think people living on subsistence income will embrace environmental goals?

Yes (1)

No (2)

32. Please elaborate on your answer

33. Please explain what your institution does to build capacity by training local communities if any

34. Please explain what your institution does to provide livelihood opportunities to local communities

35. Please explain what your institution does to provide and educate communities using new technologies related to ecotourism and agriculture, and sustainability

36. What checks and balances are in place to regulate the hospitality industry in terms of monitoring and enforcing sustainability goals?

37. Does your organisation play any role in protecting/regulating national parks and reserves?

Yes (1)

No (2)

38. Please elaborate on your answer

39. Does your organisation play any role in promoting agroforestry?

Yes (1)

No (2)

40. Please elaborate on your answer

41. What are the key challenges related to implementing conservation and sustainability objectives in your organisation?

42. In relation to the above themes, please explain the main external barriers to implementation.

43. What would you like to change in the short-term future (e.g., 2030)?

44. What would you like to change in long term-future (e.g., 2063)?

45. Do you have any questions or final comments?

Focus group discussions

The aim of this visit today is to gather information on post-conflict villages for my PhD. The subject is nature/agritourism and results will be published in a thesis. All information gathered will be anonymised and treated as confidential. Please confirm your consent for this. Your participation is voluntary, and you have the right to withdraw at any time.

1. What are the main crops, livestock you cultivate or breed and what are your off-farm livelihoods?

2. Have you noticed any major changes in climate patterns in the recent ten years and what were their impacts on your livelihoods?

3. Have you seen noticed any loss of species, change of air/water quality and deforestation, human activities that affect the environment? Can you describe any recent events and how you responded?

4. Hybrid tourism is a mix of nature tourism and agritourism. In nature tourism tourists would visit sites such as the Chundikulam National Park to enjoy looking at wildlife and scenery. In agritourism they would enjoy farming activities such as planting and harvesting as well as eating local food.

5. At the moment, what does your village for you in these forms of tourism and how does this support you?

6. What would you offer for tourism? (skills, resources, human resources, assets, cultural sites, national parks) ?

7. In the future, what opportunities do you see to learn and become a provider of such hybrid tourism activities?

8. What form of training do you think will help you engage better in hybrid tourism?

9. What do you see as the potential barriers to tourism in your area?

10. To what extent do you feel you have access to adequate income to meet your basic needs such as food, clothing and shelter, additional needs and what is missing?

11. What forms of insurance and savings do you have access to to mitigate loss of income and what do you use these for?

12. What are the difficulties you face with access to markets?

13. What do you think needs to be done differently to improve market access?

14. What are the items you need for your livelihoods? (buildings, tools, inputs, technologies, irrigation, seeds, information on weather, infrastructure)

15. What are the policies and laws by the government if any and how do they affect your livelihoods?

In this segment we would like to gather information on the interventions done by the government, NGOs and the private sector in the ten years following the war. We are looking at provision of infrastructure, training and development, technological inputs, livelihood interventions etc. Also we would like to get your thoughts on tourism. What and how did government interventions help you to improve your livelihoods?

16. What and how did NGO projects help you to improve livelihoods?

17. What and how did private sector projects help you to improve livelihoods?

18. How do individuals (e.g., in the diaspora) support your livelihoods?

19. What do you think can be done better to support your livelihoods?

20. What proportion of the land do you use for agriculture compared to other purposes (and for what)?

21. What proportion of your crops do you use for commercial verse subsistence purposes?

22. What is the average land size owned by people in this village? (acres)

23. Are you familiar with the concept of environmental sustainability? What do you think it is?

24. To what extent do you feel livelihood choices have an impact on the environment?

25. What are the changes in land management you think you can make in your chosen livelihood that would maintain income while helping the environment?

26. What are the environmental groups if any and internal efforts if any that are being taken to protect natural resources in the village and its vicinity?

27. In land sharing, a smaller portion of land is used for farming with the remaining land given for natural features such as endemic trees and hedgerows. These natural features could include plants and trees that provide perennial crops.

What practices do you do in multi-story cropping?

28. How often (in months) do you leave your farm unplanted and why(LAND SPARING)?

29. What practices do you use and crops do you grow for agroforestry, if any?

30. What plants do you grow to enhance the soil or keep pests away?

31. What would encourage farms to make the switch to organic farming?

32. What are the barriers to sustainable land management here?

33. What do you envision for your village by 2030?

34. Do you think the next generation will be interested in your chosen livelihood or would they want something different? What do you think those choices would be? Would they want to work in your village or elsewhere?

35. Do you have any questions for us?

Appendix 2: Livelihood challenges

Transportation Challenges	Marketing	Traveling expenses for employees	Hardship in getting the capital	Exceeding transportation costs	Fuel limitation	Inappropriate road construction	Increased Tax	
Special Needs in Psychosocial Wellbeing	Impacts on mental health wellbeing due to loss in Agriculture	Impacts due to war Eg: Loss of arms, legs and limbs	Malnutrition	Suicide Eg: Loan	Conflicts between families	Drug usage		
Climate Change	Destruction of crops	Transportation challenges	Destruction by insects	Loss of domestic animals	Communicable disease among animals			
Gender related challenges	Male dominance/ male headed	No independence for women	Male, female dominance	Violence against working women	Low wages for women who work a lot	Offers for Women in work places	Issues regarding Loans	
Challenges related to Land	Not enough land for agriculture	Soil excavation	Illegal land capture	Oasis tax	Contaminated soil due to war	Water issues		
Tools and Technology	Increase of prices for machines and spare parts	Not enough fuel and price increase	Stopped importing of machines	No service stations to repair machines	Government's regulation regarding imports (No international stock)			
Infrastructure facilities	Not enough marketing buildings	Lack of rice storage	Lack of drying floors	Raw material for constructing new buildings are increased in price	Financial limitation for constructing new buildings			
Local and international market	Not enough preserving facilities	Insufficient macro sales	Not setting standard price	unstable political situation	Challenges during taking products to the markets	Not knowing the marketing opportunities on time		
Capital and financial facilities	Conditions that financial institutions and banks set for loans	Lacking in capital investments	inflation	lack of government aids/ grants	Government doesn't encourage investment opportunities	Political interference on international investors	Lack of interest of investors due to current unstable situation of the country	
Vocational training	Lack of vocational training centres	People's lacking of trust on vocational training centres	No efficient trainings	No efficient trainers	Spending too much of time on vocational training	Although trainings are received, the opportunities are less.	Not enough awareness about vocational trainings	
Children's education	Lacking in good educational institutions	Misusing the communication devices	Increased usage of drugs among students	Teachers' lack of observing skills	Lacking in Sri Lankan educational situation	Economic issues	Malnutrition	No employment opportunities after education.

List of acronyms

AMS	American Missionary School
CCH	Centre for Children's Happiness
CBC	Community-based conservation
CBE	Community-based enterprises
CBT	Community-based tourism
CA	Conservation Agriculture
CSR	Corporate Social Responsibility
DMC	Destination marketing company
DMO	Destination marketing organisation
ESI	Environmental Sustainability Index
EPF	Employee Provident Fund
ETF	Employee Trust Fund
GRASS	Geographic Resources Support Analysis System
GIS	Geospatial Information Systems
GRI	Global Reporting Initiative
GDP	Gross Domestic Product
ICDP	Integrated Conservation and Development Projects
IDP	Internally displaced person
IUCN	International Union for Conservation of Nature
KNN	K-nearest neighbour

LULCC	Land use and land cover change
LTTE	Liberation Tigers of Tamil Eelam
ML	Maximum Likelihood
MDGs	Millenium Development Goals
MOLUSCE	Module for Land Use Change Simulations
MSS	Multispectral scanner
NGO	Non-Governmental Organisation
OLI	Operational land imager
PGIS	Participatory Geospatial Information Systems
PSP	Participatory scenario planning
PA	Protected area
RF	Random Forest
RS	Remote Sensing
SME	Small and medium enterprises
SOC	Soil organic carbon
SDGs	Sustainable Development Goals
TM	Thematic mapper
UN	United Nations

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