REVERSING ABANDONMENT

Success of Re-cultivation Efforts in Abandoned Paddy Lands in Low Country Wet Zone

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FOREWORD

In a context of anxiety generated by the ban on chemical fertilizer imports as well as constraints imposed by climate change it is imperative that an accurate assessment be made on potential for increased and efficient use of land, in particular for paddy cultivation. It is well known that for multiple reasons, there is been a trend of declined cultivation of paddy lands in the Low Country Wet Zone (LCWZ). It is also true that successive governments have attempted to address this issue, pushing for re-cultivation of abandoned paddy lands. An evaluation of various strategies implemented to reverse this trend is therefore timely, especially considering issues of food availability, an area of increasing concern.

The researchers have identified multiple reasons for abandonment and also assessed the response of farmers to various state initiatives. It is heartening to note that the will to re-cultivate is still alive. On the other hand, enthusiasm, and incentives notwithstanding, there are still issues that need to be addressed and resolved. These have been enumerated by the researchers who have also generated policy imperatives based on their findings. A lot of work seems to have been done and yet there is still a long way to go.

Some of the issues can certainly be addressed and resolved whereas others need better planning and greater efficiency when it comes to deploying resources. Consistent monitoring, better coordination of state actors and greater awareness-creation among cultivators as well as effective communication strategies to convince youth of the comparative advantages of re-cultivation could certainly flip the script of abandonment.

The researchers were obviously hampered by restrictions imposed on the entire country, but they have nevertheless done enough work to extract the institutional, social, and economic factors related to abandonment and re-cultivation. Indeed, they have made a case for a more comprehensive exploration of this vital subject which can and does impact issues of food security. Relevant authorities will no doubt be empowered by the findings to design and implement better strategies to resolve the issue of efficient management of agricultural lands, in particular those under paddy cultivation or have the potential to be used for the same.

Malinda Seneviratne
Director/Chief Executive Officer

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EXECUTIVE SUMMARY

The abandonment of paddy lands is a major problem in the Low Country Wet Zone (LCWZ) of Sri Lanka which obviously contributes to the overall decline in cultivated land. It also exacerbates the general degradation of all ecosystem values associated with paddy cultivation. Considering the importance of paddy lands as multifunctional systems, re-cultivation programmes have been designed and implemented by successive governments. Even though re-cultivation should lead to a decline in the abandoned paddy land extent increasing the extent of asweddumized lands, active paddy lands and thereby the sown extent, the LCWZ does not indicate such transformation over time.

This study therefore revisited the breadth of recent re-cultivation efforts in the LCWZ in order to identify key achievements and assess the prospects for re-cultivation efforts. It covers the five main districts in the LCWZ: Colombo, Gampaha, Kalutara, Galle and Matara. Data was collected by administering a semi-structured questionnaire survey of 100 farmers via telephone.

The study revealed that paddy land abandonment in the LCWZ is multifaceted and stems from several reasons where 73 percent of sample farmers had more than one reason to abandon their active paddy lands. It was revealed that degraded and ruined irrigation structures constitute the prominent reason for abandonment. Furthermore, persistent poor drainage conditions, swampy and bogged soils in paddy lands, low yields, labor shortages, difficulties in finding agricultural inputs, lack of water and wild animal damage were also critical reasons mentioned leading to abandonment. Under re-cultivation efforts the priority has been given to address the prominent issues such as reconstruction, widening, deepening, and clearing of waterways, canals and anicuts.

The majority of re-cultivation programmes were successful in addressing the pre-identified development needs and therefore the farmers have immensely benefited from those programmes. Many farmers held a positive attitude towards the timely execution and completion of re-cultivation programmes. The majority held positive views about the quality of re-cultivation efforts made with just 5 percent being unsatisfied.

The officers were largely satisfied with the participation rate of farmers in re-cultivation, although they stated that participation required continuous encouragement and motivation. Nearly 1/3rd of the sample farmers sold or consumed the harvest while the rest used it exclusively for consumption.

The majority of farmers (63%) had received financial assistance for the development of paddy lands whereas 87 percent farmers had received in-kind assistance including seed paddy and fertilizers during the period under consideration (2016 to 2020). As an additional benefit of re-cultivation efforts, the neighboring farmers were highly (47%) or moderately (43%) motivated to re-cultivate their lands by witnessing the

success of re-cultivation. The prominent drawbacks of re-cultivation programmes were poor participation of youth and delays in implementation and completion of development work leading to poor harvest. Some farmers sought more financial and in-kind assistance for the development activities.

Although replanting programs have increased the area under paddy cultivation, some farmers have found it difficult to reap the benefits due to floods, wildlife damage, poor soil conditions, low quality seeds and poor management by part-time farmers. Adverse weather conditions and wild animal damage are particularly difficult to resolve, but the underlying causes need to be addressed if the trend of abandonment is to be tackled. The most noteworthy finding of this study is that the extent of abandoned paddy land has decreased with the passage of time owing to re-cultivation programmes; however, the abandonment of active paddy lands continues.

The study recommends immediate action to monitor the changes in the use of paddy lands by developing a proper mechanism to maintain and update the digital database of all paddy lands under the supervision of the Department of Agrarian Development. Re-cultivation programmes should be systematically designed with the assistance of technical specialists before implementation. The importance of a proper schedule to maintain the renovated infrastructure is also emphasized. Strict rules and regulations are required to deal with tenants who deliberately desist from paddy cultivation. Greater awareness among the farmers regarding likely climate variability and associated weather changes under paddy cultivation is also important.

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LIST OF ABBREVIATIONS

ADA	-	Agrarian Development Act
ADO	-	Agrarian Development Officer
ARPA	-	Agrarian Research and Production Assistant
ASC	-	Agrarian Service Centre
DAD	-	Department of Agrarian Development
DCS	-	Department of Census and statistics
DOA	-	Department of Agriculture
GND	-	Grama Niladhari Division
KII	-	Key Informant Interview
LCWZ	-	Low Country Wet Zone
MOA	-	Ministry of Agriculture
MOF	-	Ministry of Finance
NAO	-	National Audit Office
RAIS	-	Rural Agricultural Irrigation System
SMA	-	State Ministry of Agriculture (State Ministry of Paddy and Cereals, Organic Food, Vegetables, Fruits, Chilies, Onion and Potato Cultivation Promotion, Seed Production and Advanced Technology Agriculture)

CHAPTER ONE

Introduction

1.1 Introduction

Abandonment of paddy lands is a major problem in the Low Country Wet Zone (LCWZ) resulting in the area under paddy cultivation declining. According to the Agrarian Development Act (ADA) No. 46 of 2000, abandoned paddy lands are defined as paddy lands that have not been consecutively cultivated for the last five years. Abandonment causes degradation of all ecosystem values associated with paddy cultivation. Various reasons such as irrigation related problems, floods, droughts, high cost of paddy production, labour scarcity, poor returns, damage caused by animals, issues relating to access roads, time unavailability due to employment, lack of cultivation of adjacent plots in the yaya by other farmers, issues in agriculture loans, credit, influence the abandonment of paddy lands (Danapala, 2005; Epasinghe *et al*. 2008).

Abandoned paddy lands are classified by the Department of Agrarian Development (DAD) into three main categories as A, B and C based on their reusability in the event of abandonment. The category A there is the capacity for re-cultivation of land, and it is considered a key solution for the abandoned paddy lands. A major development strategy pursued by the Ministry of Agriculture has been in the initiation of various programmes aimed at re-cultivation of the abandoned paddy lands. Re-cultivation appears to be an option to reclaim the natural ecosystems associated with paddy cultivation and to restore the socio-cultural values that mankind had with paddy cultivation. As an issue specific to LCWZ, this paper focuses on analyzing the achievements and prospects of programmes to re-cultivation of abandoned paddy lands in the LCWZ.

1.2 A Brief Note on Paddy Cultivation in Sri Lanka

Paddy is the most important and a highly valued crop grown in Sri Lanka. Paddy cultivation has been given utmost importance in the agriculture industry owing strong linkages to food security and socio-economic development of the rural community (Matsuno *et al*. 2006). As the staple food crop of the Sri Lankans', it is cultivated in most parts of the country especially during *Maha* seasons. During, the *Yala* season it is mainly cultivated in the wet zone and major irrigated areas. Apart from food supply, paddy cultivation is multi-functional ensuring viability of rural communities and environmental protection, such as land conservation, sustainable management of renewable natural resources, preservation of biodiversity, landscape (Sato, 2005). These multi-functional roles contribute to the country's social and economic security.

Of the total employed in Sri Lanka, 27 percent is engaged in the agriculture sector (DCS, 2020c). According to the statistical data, the total agriculture households engaged in paddy cultivation in 2016/2017 was recorded as 836,452 and of the total

22 percent and 14 percent of operators cultivated paddy during *Maha* and *Yala* seasons respectively (DCS, 2017). Paddy cultivation which provides part or seasonal employment for about half of the rural labor force in Sri Lanka is a communal collaboration involving both the land-owning farmers and the tenant farmers. Therefore, paddy cultivation not only brings economic benefits to the society but also the farming system by providing solutions to many social, cultural, and environmental problems of the country.

Paddy, as one of the most important food crops in Sri Lanka, is grown in all the administrative districts of the country. The total paddy lands in the country can be categorized as irrigated and rain-fed lands based on the supply and use of water source. Irrigated paddy cultivation is further divided as major and minor depending on the size of the water supply systems. Paddy is mainly cultivated in two main cultivation seasons in Sri Lanka as *Maha* and *Yala* which coincide with monsoon rains. By the end of the 2020/2021 *Maha* season, the gross paddy sown extent in Sri Lanka was recorded as 1,903,299 acres. The major and minor irrigation systems accounted for 871,968 acres and 486,108 acres respectively. The rain-fed paddy sown extent accounted for 545,223 acres (DCS, 2021). The gross harvested extent of paddy in 2020/2021 *Maha* season was identified as 1,883,951 acres. The gross sown and harvested extent in the 2020 *Yala* season was recorded as 1,127,308 acres and 1,113,801 acres respectively.

According to the statistical data of DCS (2020b), the total asweddumized and the sown extent of paddy shows an increasing trend over time in the country with slight fluctuations. As per Figure 1.1, the asweddumized paddy extent of the country has increased by 21 percent from 1,828,340 acres to 2,206,515 acres from 2000 to 2020. Correspondingly, the sown extent of paddy in the country has increased by 27 percent from 877,994 to 1,208,454 acres from 2000 to 2020. Hence, this clearly emphasizes that the paddy production of the country is moving towards a progressive direction. This is further confirmed by increasing the total paddy production of the country by 52 percent from 2,012,706 metric tons in 2004/2005 *Maha* season to 3,061,394 metric tons in 2020/2021 *Maha* season.

Source: DCS, 2020a.

Figure 1.1: Paddy Asweddumized and Sown Extent in Sri Lanka: 2000-2019

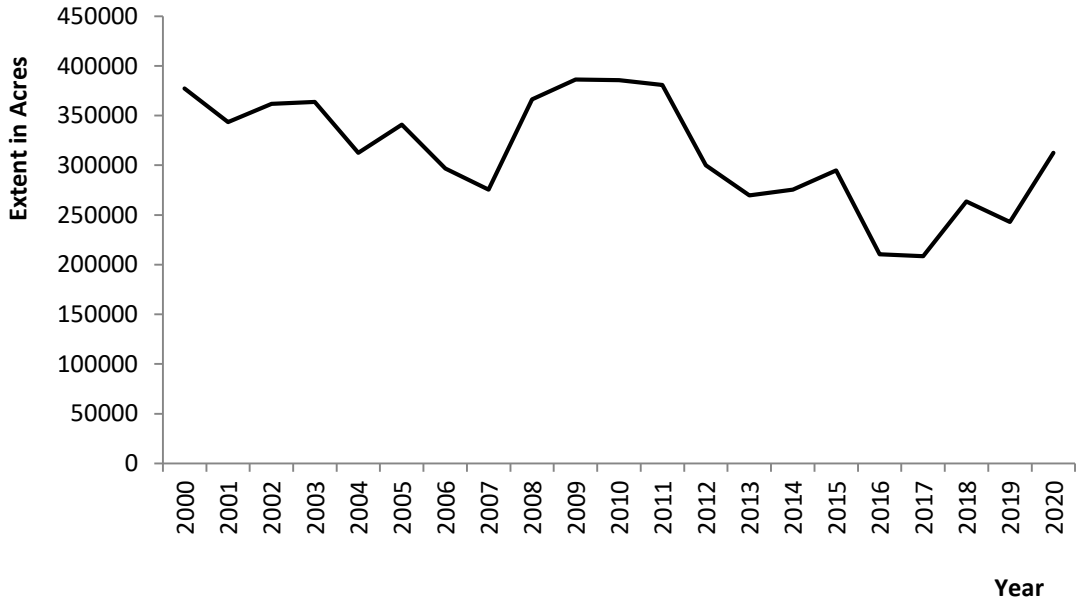
1.3 Problem Justification

Considering the importance of paddy ecosystems as multifunctional systems, it was the aspiration of every government that came to power to protect the paddy lands by re-cultivating. According to section 22 of ADA, it is the duty and responsibility of every landowner, farmer, and beneficiary to maintain good management of agricultural land. The DAD has issued a circular to all responsible officials instructing them to adhere to the government decision to cultivate all fallow paddy lands in the country. The key solution sought to restore abandoned paddy lands is the implementation of the re-cultivation programmes.

DAD has implemented several re-cultivation programmes and projects to restore the abandoned paddy lands in the country. Accordingly, the year 2015 was a turning point due to the island-wide paddy land registry revision programme. Under this programme, all the abandoned paddy lands were categorized as A, B and C at Grama Niladhari Division (GND) level based on the nature of reusability of abandoned paddy lands which facilitated the identification of abandoned paddy lands in more detail. Moreover, DAD has conducted an island-wide paddy land survey in 2016 to identify the extent of available paddy lands during that period. That survey suggested short, medium and long term solutions to restore the abandoned paddy lands. To date, DAD has made several programmes to reconstruct minor irrigation systems and develop suitable infrastructure to restore abandoned paddy lands. In each year, the government implements the national programme to re-cultivate abandoned paddy lands in a ceremonial way. In parallel to the national programme, every ASC of the country commences their re-cultivation activities (NAO, 2019).

The key intention of re-cultivation programmes is the development of fallow paddy lands in a suitable cultivation environment by providing infrastructure facilities and

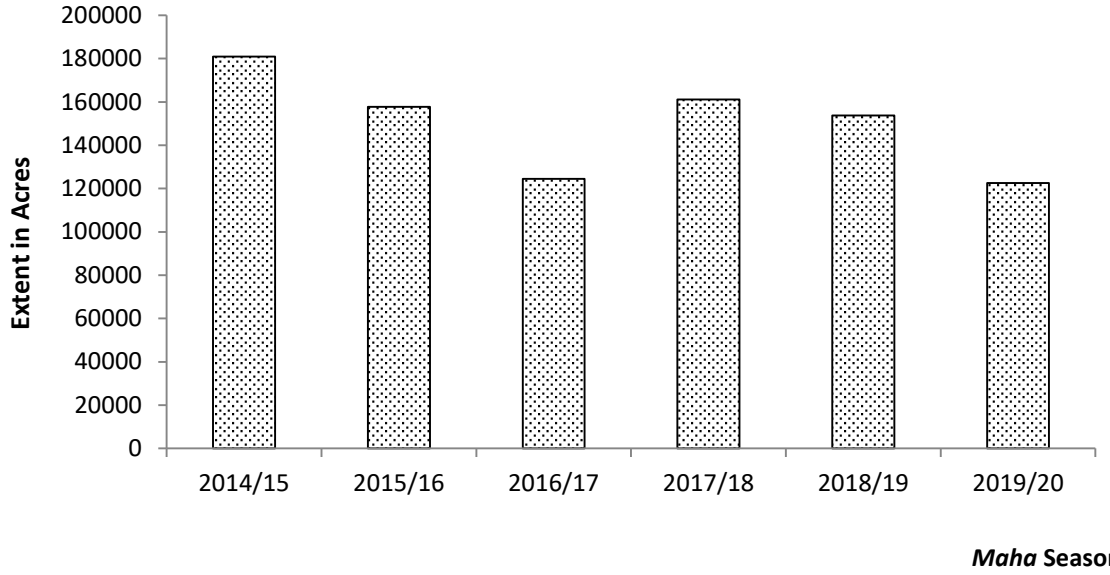
other financial and in-kind assistance. Ideally, re-cultivation of abandoned paddy lands should lead to a decline in the abandoned extent while contributing to increasing the extent of asweddumized lands, active[1] paddy lands and thereby the sown extent. Contrary to the country situation, LCWZ marks a decline in asweddumized extent (Figure 1.2) and the sown extent (Figure 1.3) over time. Does this mean that more paddy lands are being abandoned than are being re-cultivated annually, or that replanting programmes are ineffective? Hence, this study is to revisit the breadth of recent re-cultivation programmes in abandoned paddy lands and their success and failures.



Note: Low Country Wet Zone Districts: Colombo, Kalutara, Gampaha, Galle, Matara, Kegalle and Rathnapura
Source: DCS, 2020b.

Figure 1.2: Asweddumized Paddy Extent in Low Country Wet Zone in Sri Lanka: 2000-2020

[1] Based on the definitions of *asweddumized* and abandoned paddy lands active paddy lands can be defined as paddy lands cultivated with rice crop during the last five years either continually or only in certain cultivation seasons.



Note: Low Country Wet Zone Districts - Colombo, Kalutara, Gampaha, Galle, Matara, Kegalle and Rathnapura
Source: DCS, 2020b

Figure 1.3: Total Sown Extent in Low Country Wet Zone in Sri Lanka

Hence, the nature and the extent of such interventions are invisible and the response of the farming community and other stakeholders towards the same is unrevealed. The programmes launched, approaches employed, and best practices adopted, investments made, outputs and outcomes and adaptability and repeatability of such interventions are unknown. In short, the ground reality of the social interventions for the re-cultivation of abandoned paddy lands remains obscure. Perhaps, such interventions could only be media illusions. Given that the rationale for allowing such interventions must be clear and definite the state has the responsibility to evaluate them.

Given the overall issue, this study attempts to revisit the extent of recent re-cultivation programmes implemented in abandoned paddy lands and their achievement and failures or the ground reality as itemized into the following specific research questions.

- What is the nature of and causality behind the abandonment of paddy lands and to which extent the causality is addressed through re-cultivation programmes?
- What are the characteristics of re-cultivation programmes and their contribution to paddy farming?
- What are the responses from the diverse stakeholders towards the re-cultivation programme?
- Whether the re-cultivated paddy lands are continuously used for paddy cultivation?
- How is the motivation of non-beneficiary farmers to continue paddy cultivation?
- How is the youth participation for re-cultivation?

- What are the other occurrences relating to the use of paddy lands that are not explained by the official statistics?
- What factors drive success/failure of re-cultivation of abandoned paddy lands and to which extent they are successful?
- What are the best strategies to improve the efficiency of re-cultivation programmes if failed?

1.4 Objectives

1.4.1 Main Objective

The main objective of the research study is to identify the achievements and prospects of re-cultivation programmes implemented in the abandoned paddy lands in LCWZ.

1.4.2 Specific Objectives

1. To ascertain the nature of and causality behind the abandonment of paddy lands in LCWZ.
2. To diagnose the characteristics and to which extent the causality is addressed through the re-cultivation programmes implemented in LCWZ.
3. To identify the achievements and prospects of re-cultivation programmes and the best strategies to improve the efficiency of re-cultivation.

1.5 Significance of the Study

One of the significant aspects of this research study is due to its close link to contribute to achieving national and sectoral policy priorities. The national policy framework 'Vistas of Prosperity and Splendor' (MOF, 2019) determines to protect biodiversity by ensuring the sustainability of land and water resources management and not permitting large scale developments in environmentally sensitive areas. The 'Saubagya' agricultural development programme 2021 of the State Ministry of Agriculture (SMA, 2020) prioritizes several aspects relating to this study. Included are; increasing agricultural yields, increasing productivity by providing the necessary facilities to start anew and turn them towards agriculture; developing methods to make land use more efficient, motivating people to use the land as many times as possible. This assessment of the success of re-cultivation programmes would help bridge the knowledge in respect of uncertainty on the subject to facilitate policy realization and programme designing to preserve the paddy-based eco-system in LCWZ.

1.6 Structure of the Working Paper

The working paper is organized into six chapters. Chapter One includes the introductory part which presents the study background, research problems, objectives, and significance of the study. Chapter Two is allocated to discuss the overview of re-cultivation programmes implemented in LCWZ. The details of the methodology including conceptual framework, sample selection, objectives

operationalization and the data collection are explained in Chapter Three. While Chapter Four and Five are allocated to discuss the findings of the study of which Chapter Four discusses the nature of re-cultivation programmes implemented in abandoned paddy lands of LCWZ whilst Chapter Five reports achievements and prospects of re-cultivation programmes. Finally, Chapter Six concludes the working paper with key recommendations.

CHAPTER TWO

Overview of Re-cultivation Programmes in LCWZ

2.1 Status of Paddy Lands in LCWZ - 2015

Implementation of the programme to revise the registries of paddy lands of the country in 2015/2016 was a very important effort made by DAD to identify the different categories of abandoned paddy lands. Accordingly, the DAD categorizes abandoned paddy lands into three; Category A: cultivable with paddy, Category B: cultivable with other agricultural crops and Category C: land under non-agricultural uses (DAD, 2020b). The LCWZ alone possesses 455,065 paddy allotments which occupy 292,337 acres. It is 25 percent of the total paddy allotments occupying 15 percent of the total extent under paddy of the country.

Among the total paddy lands, 67,108 acres (31%) which occupy 94,300 allotments (28%) remain abandoned. Of them, 43,308 acres (65%) could be cultivable with paddy (category A) and 12,525 acres (19%) with other crops (Category B), according to DAD categorization. A and B categories altogether account for 55,833 acres. The remaining 11,275 acres (17%) is used for nonagricultural uses (Category C). The number of allotments in A, B, and C categories respectively are 66,188 (70.2%), 24,460 (17.5%) and 11,638 (12.3%). In comparison, 31 percent of paddy lands in the LCWZ remain abandoned against that of the island which is 8.3 percent. In terms of allotments, 28 percent of paddy lands are abandoned while at the national level it is 10 percent. Despite slight changes visible after the revision of agricultural lands by DAD based on the 2015/16 *Maha* season, abandonment is a key problem in the paddy-based ecosystem in LCWZ.

2.2 Status of Paddy Lands in LCWZ post - 2015

After 2015, re-cultivation of abandoned paddy lands was said to be launched with renewed enthusiasm. The situation thus shows a slight progression. In recent times, re-cultivation of abandoned paddy lands has become a high-level government-sponsored program with a considerable cost to the country's economy. The DAD has launched an island wide re-cultivation program in the 2020 *Yala* season which has successfully reached the targets. Data shows that 23,517 acres of abandoned paddy lands have been cultivated island wide in the 2020 *Yala* season and the remaining extent amounts to 80,767 acres (DAD, 2020d unpublished). According to officials, the key reason behind the success is the stimulus due to the confined environment created by the COVID-19 epidemic in the country which led the people to engage in agricultural activities. The re-cultivation program would result in a further decline in abandoned paddy lands if the 2020/21 *Maha* season target is achieved as planned. The target is 25,972 acres Island wide.

Correspondingly, the LCWZ alone has cultivated 18,484 acres in the 2020 *Yala* season, leaving 46,419 acres abandoned. The 2020/21 *Maha* season target is another 18,496

acres which if achieved will record a further decline with only 27,923 acres left abandoned. It is a positive development that re-cultivation is being launched as a targeted programme though at a cost to the economy. It is also a positive sign that the paddy-based ecosystem will be gradually restored. Nevertheless, the extent of asweddumized and sown do not mark a proportionate increase as a result of re-cultivation (Figure 1.3 & Figure 1.4). There is, therefore, uncertainty about the success of re-cultivation programmes to bring back abandoned paddy lands into cultivation.

Abandoned paddy lands are removed from the P1[2] forms through which the data on the extent under paddy is collected; however, if these lands were cultivated at any occasion, during the last five years, they are again enumerated as asweddumized lands (DCS, 1999). Accordingly, once cultivated, the status of abandonment gets canceled and continues as active for another ten consecutive cultivation seasons (five years). To be effective, re-cultivation programmes of any type should eventually contribute to a decline in the extent of abandoned paddy lands and mark an incline in the extents under active, sown and asweddumized paddy lands. However, such an incline is not evident in secondary data (Figure 1.3 & 1.4). It is also true that diverse reasons cause the non-cultivation of active paddy allotment in every season. Further, it is not known if re-cultivation programmes do guarantee that those lands are continuously used for paddy cultivation.

2.3 State Investment for Re-cultivation of Paddy Lands

The abandonment of paddy lands stems from diverse reasons that require extensive investments to bring them back to a cultivable status. DAD reports that there has been an allocation of 1,320 million rupees for minor irrigation systems and re-cultivation of abandoned paddy lands in 2016 and 2000 million rupees to implement 1494 projects for repairing of cascade systems, tanks, anicuts, canals and agricultural roads (DAD, 2016). The Ministry of Agriculture (MOA) has allocated 100 million rupees for a program titled 'National Program for Re-cultivation of Abandoned Paddy Lands in the Wet Zone' in 2017. The target area was 1250 acres. Thus, reclaiming cost accounts for 80,000 rupees per acre (DAD, 2017). Further, a decision has been taken to reimburse 25,000 to 100,000 rupees per acre to successful farmers in the same programme. Furthermore, the DAD has implemented 524 development projects in 2019 in LCWZ to re-cultivate abandoned paddy lands under the allocation of 388 million rupees by the government (DAD, 2019). In the 2020/2021 *Maha* season the DAD has set 14,468 acres of re-cultivation targets under the estimated cost of 1157 million rupees at a rate of 80,000 rupees per acre. The above analysis shows that the re-cultivation of abandoned paddy lands is far more difficult and costly than abandoning them.

[2] P1 form is prepared by the DCS using the information taken from the ASC and it includes all the detail regarding paddy land cultivation such as farmer information, name of the paddy land, lot number, paddy land extent etc. (Epasinghe, *et al*. 2008)

2.4 Development Needs in Abandoned Paddy Lands of LCWZ

The DAD has prepared detailed plans for the re-cultivation of abandoned paddy lands based on the assessment of development needs corresponding to the 2020/21 *Maha* season. The target for LCWZ alone is 18,477 acres occupied by 12,336 allotments. It is indicative of a substantial need for resources to bring the land to a cultivable status. The development needs identified vary from easy-to-meet needs such as the supply of seed paddy to extensive investments such as the construction of irrigation structures (Table 2.1). Further analysis of development needs shows that many of them are among the mandatory functions of the DAD to achieve its development goals (Government of Sri Lanka, 2000).

Table 2.1: Development Needs of Abandoned Paddy Lands – 2020/21 *Maha* Season

Development Needs/Constraints	Area		Allotments	
	ac	%	No	%
Repair and Construction of Agricultural Irrigation Systems[3]	10623	57.5	5055	41.0
Supply of Agricultural Machinery[4]	3549	19.2	1539	12.5
Inputs, Labour, Finance, Extension[5]	3285	17.8	2190	17.8
Development of agricultural roads	931	5.0	3463	28.1
Approval for other agricultural activities	32	0.2	30	0.2
Solving land ownership issues –*Tattu maru*	6	0.1	7	0.1
Control of Animal Damages	44	0.2	52	0.4
Total	**18470**	**100**	**12336**	**100**

Source: DAD, 2020d (Unpublished)

Improving the efficiency of Rural Agricultural Irrigation Systems (RAIS) is one among several goals of the DAD and it corresponds to the key development need of abandoned paddy lands too. The activities identified corresponding to this development goal are; the development of irrigation canals, anicuts, drainage systems, managing wastewater and saltwater intrusion. The area corresponding to RAIS is 10,623 acres occupied by 5,055 allotments. The introduction and supply of agricultural machinery required for agricultural activities is another goal of the DAD. Around 20 percent of the target area is in need of agricultural machinery to clear high grown shrubs, remove sand and silt and for land preparation. The development of agricultural roads is another activity that comes under the RAIS goal. The abandoned area that can be made accessible through the development of agricultural roads is substantial (931 acres). Moreover, there are 32 acres falling to the category seeking approval for the use of other agricultural activities. An extent of 6 acres has been abandoned due to conflicting tenure such as the '*Tattu maru*' system.

It can be identified that all the above development requirements are mandatory functions of DAD. According to Dhanapala (2005), paddy lands are abandoned for

[3] Irrigation canals, drainage systems, anicuts, wastewater and saltwater intrusion, water meter
[4] Clearing of shrubs, removal of sand and silt, land preparation
[5] Seeds and planting material, agro-chemicals, labour scarcity, financial and extension needs

technological or non-technological reasons. Accordingly, certain issues need to be addressed by responsible authorities such as DAD and DOA. Among those issues another new function which has so far not been the responsibility of any state agency. It means 'controlling wildlife damage to agriculture'. Data show that around 44 acres of paddy lands have been abandoned due to this reason. This makes it clear that re-cultivation programmes are essential to meet these development needs to prevent the re-abandonment of those paddy fields. However, it is unclear to what extent those needs have been met through past programmes.

The success of re-cultivation programmes depends on the extent and the nature of development needs fulfilled. Yet, the nature of the development needs of abandoned lands and the extent to which they have been resolved while bringing them back to paddy cultivation is unknown. When the problems are not solved permanently, farmers may fail to derive the best out of the effort and investment. Moreover, lessons are not learned from the experiences of re-cultivation programmes and their actual contribution to national accounts. In the absence of recent and systematic assessments on these aspects, there exist both empirical and contextual gaps of information in respect of re-cultivation programmes of abandoned paddy lands in the region. It is unclear to what extent those needs have been met through past programmes.

CHAPTER THREE

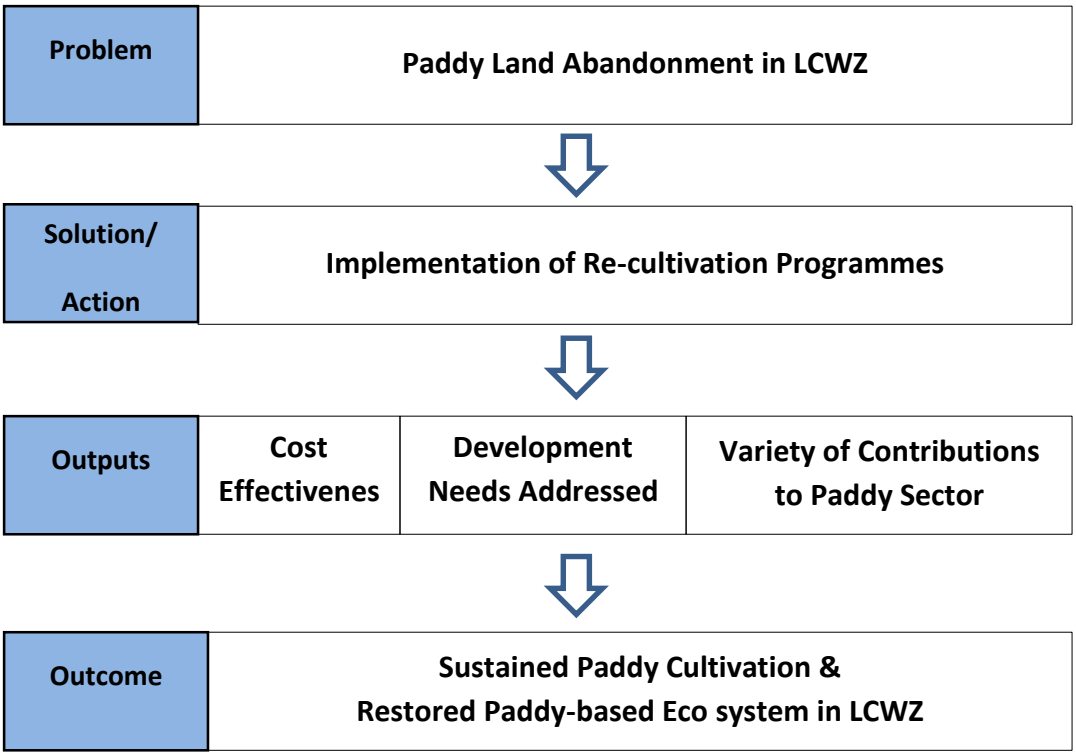
Methodology

3.1 Conceptual Framework

The literature reveals that many factors influence the abandoning of paddy lands. When they are restored, they should be able to observe the signs of restoration of paddy-based ecosystems, as well as the satisfaction of those affected by abandonment, even if they cannot be measured. Those outcomes can be affected by the nature and the extent of development work, investment made, completeness of work done, limitations affecting the process and design of sustainability.

As Figure 3.1 illustrates, the abandoned paddy lands are persistent problem in LCWZ. Re-cultivation programmes are seen as the key solution to reclaim the abandoned paddy lands. The government has made considerable interventions to reduce the extent of abandoned paddy lands in this area by initiating re-cultivation programmes with significant investment during the last five years. The development needs of those abandoned paddy lands are many and varied. Included are repair and construction of agricultural irrigation systems, supply of agricultural machinery, development of access roads, solving ownership issues, and wild animal threats. Successful re-cultivation programmes address the development needs of abandoned paddy lands lastingly and cost-effectively whilst contributing to the paddy sector in numerous ways. Such contributions include the expansion of production and extent under paddy, intensifying youth engagement in paddy farming, earning positive feedback from stakeholders, ensuring continuity of paddy cultivation in re-cultivated paddy lands, and motivating non-beneficiary farmers to continue paddy cultivation. In the long run, re-cultivation programmes sustain paddy production and restore the paddy-based ecosystem in the LCWZ.

However, the literature review reveals that the success of recent re-cultivation programmes is questionable due to their substandard outputs and information on the fulfillment of development needs and the contributions made to the agricultural sector has not been disclosed. Hence, systematic studies on these dimensions are needed to guide the policy-making process. Moreover, follow-up action in respect of what is happening at the field level is lacking. Without such feedback, further investment is futile. Therefore, this study revisits the breadth of recent re-cultivation programmes in abandoned paddy lands and their success and failures.



Source: Authors' construction based on literature review and KIIs

Figure 3.1: Conceptual Framework

3.2 Selection of Study Location

The selection of LCWZ as the study location was based on an analysis of asweddumized paddy extent in the country. There are asweddumized lands in every administrative district of Sri Lanka and it shows a gradual increase over time (Figure 1.1). The said increase is not seen in the districts which belong to the LCWZ. The only exceptions are Jaffna and Kandy districts which mark 67 percent and 29 percent decline in asweddumized extent respectively as the districts outside the LCWZ. Accordingly, the study areas belong to the LCWZ which mainly consists of seven districts *viz*. Colombo, Gampaha, Kalutara, Galle, Matara, Kegalle and Rathnapura.

The paddy-based ecosystem in these seven districts comprised 302,716 acres by the year 1979 (DCS, 2020a). Compared to the country's total asweddumized extent at that time, it is 19 percent. Since then, the asweddumized extent in this area marks a gradual decline until 2019. By 2017, there are only 241,916 acres (DCS, 2020b). Accordingly, almost 60,800 acres (20%) of the ecosystem has been lost within the past four decades. DCS (2020b) further reports that the highest extent of asweddumized lands in the LCWZ was 305,154 acres in 1983. As such, the extent loss is 63,238 acres or 21 percent by 2017. If the current trend continues, the asweddumized lands in these districts will experience an estimated loss of 85,097 acres from the extent to 150,000 acres by 2024. In total, it will mark an estimated loss of 36 percent of the

paddy-based ecosystem within the next three years. In addition, the sown extent of paddy is also on a decline.

When considering these seven districts Colombo entirely belongs to LCWZ. From the rest of the districts, the most areas fall into the LCWZ (Table 3.1). Table 3.1 further indicates the extent corresponding to the decrease in asweddumized extent in those seven districts (DCS, 2020b). Accordingly, Kegalle is the only exception with a drastic reduction in the abandoned paddy land extent. Attributing factors may be the large number of re-cultivation programmes recently undertaken in the Kegalle district.

Table 3.1: Decline in Asweddumized Extent in Low Country Wet Zone Districts

District	Province	% Area belongs to Wet Zone	Asweddumized Paddy Land Extent (acres)	% Decline in Asweddumized Extent since 1979 to 2019
Colombo	Western	100	5,580	45
Kalutara		95	16,482	26
Gampaha		95	14,797	30
Galle	Southern	93	17,970	33
Matara		60	17,885	22
Kegalle	Sabaragamuwa	60	9,082	(-52)
Ratnapura		45	16,104	52

Source: DCS, 2020b and Bentota *et al.* (2010).

Hence, it is correct to say that there is no other location with asweddumized lands that has fallen victim to such unintended purposes. They can be evident through observations too. Among them are; diversification into other crops, land filling for non-agricultural uses, use as waste disposal grounds with a view to conver them to other uses, and allocation for development activities. Nevertheless, both unintended uses and misuse of paddy lands hamper the multi-functionality of paddy-based ecosystems (Agus, 2006; Dhanapala, 2005; Yosihiro, 2013). Perennial crop cultivation is found to be one of the alternative uses of paddy lands; however, it is detrimental if an ecosystem of such importance is exploited for perennial crops without exploring other viable options. The situation in respect to the paddy-based ecosystem in LCWZ is catastrophic, thus it is chosen as the study location of this research project.

LCWZ is spread across seven districts in three provinces namely Western, Southern and Sabaragamuwa. The study sites were chosen from Colombo, Gampaha, Kalutara, Galle and Matara districts.

3.3 Population and Sample Selection

Population: The total population of the study can be defined as the re-cultivated paddy lands located in the LCWZ of Sri Lanka from 2016 to 2020. The five-year time period from 2016 to 2020 was selected mainly to reduce loss of memory of paddy farmers when collecting information on development programmes implemented and

also to assess the continuous engagement in the cultivation of paddy lands after implementing the development programmes.

Sample Selection: The stratified random sampling method was used to select the sample from the total population based on the highest re-cultivated abandoned paddy lands available in the five districts from 2016 to 2020. As the first step, the five districts were selected. Then ASCs were selected from the particular district having the highest re-cultivated extent as the second step. According to the information collected from DAD, two ASCs were selected to represent the sample area. Altogether, the study covers 10 ASCs (Table 3.2). As the last step farmers who re-cultivated their abandoned paddy lands were selected randomly from each ASC. Based on the data available at ASCs and the directives by the Agrarian Development Officers (ADOs) and Agrarian Research and Production Assistants (ARPAs) in ASCs, the required number of farmers was randomly selected. Accordingly, ten farmers were randomly selected from each ASC accounting for the total sample size of 100 farmers.

Table 3.2: Distribution of Study Sample

District	ASC	Sample Size
Colombo	Kosgama	10
	Kesbawa	10
Gampaha	Ja-Ela	10
	Dompe	10
Kalutara	Pamunugama	10
	Panadura	10
Matara	Deiyandara	10
	Madawiyangoda	10
Galle	Labuduwa	10
	Paragoda	10
Total		**100**

Source: Author's Construction, 2021

3.4 Operationalization of Variables in Objectives

3.4.1 Specific Objective One and Two

1. To ascertain the nature of and causality behind the abandoning of paddy lands in LCWZ.
2. To diagnose the characteristics and to which extent the causality is addressed through the re-cultivation programmes implemented in LCWZ.

Table 3.3 illustrates indicators, measures and types of data used to operationalize the variables relating to specific objectives one and two. The relevant data were gathered through telephone conversations with farmers and officials.

Table 3.3: Indicators, Measures and Types of Data for Specific Objectives One and Two

Indicators	Measures and Types of Data
Reasons for abandoning	Qualitative data specifying reasons for abandoning by officers and farmers
Development needs	Qualitative data on types of development needs required for re-cultivation
Time of implementation	Year of development activities implemented
Investments made	Qualitative data on how to receive the money and adequacy of investment made
In-kind assistance	Qualitative data on types of material assistance received and adequacy
Farmer participation and Youth involvement	Ratings by farmers and officers measured on farmer and youth participation in re-cultivation programmes using a Likert scale
Consistency	Qualitative data from farmers and officers on consistency of re-cultivation programmes with development needs
Quality	Farmers' and officers' satisfaction towards the quality of development undertaken using a Likert scale

Source: Author's construction based on literature review and KIIs

3.4.2 Specific Objective Three

To identify the achievements and prospects of re-cultivation programmes and the best strategies to improve the efficiency of re-cultivation.

Table 3.4 illustrates indicators, measures and types of data used to operationalize the variables relating to specific objectives one and two. The relevant data were gathered through telephone conversations with farmers and officials.

Table 3.4: Indicators, Measures and Types of Data for Specific Objective Three

Indicators	Measures and Types of Data
Paddy Production	Qualitative data from farmers on the satisfaction of yield received and way of used them
Paddy cultivation extent	Qualitative data on sown and asweddumized extents in acres and their percentage contribution to reclaiming abandoned paddy lands
Continuity in paddy cultivation	Qualitative data on continuous cultivation of re-cultivated paddy lands
Motivational effects	Motivation of non-beneficiary farmers to engage in paddy cultivation
Issues	Limitations associated with re-cultivation programmes
Suggestions	Suggestions to overcome the issues in re-cultivation of abandoned paddy lands

Source: Author's construction based on literature review and KIIs

3.5 Data Analysis

The collected data were analyzed descriptively using MS-Excel by representing results via graphs, charts and tables.

3.6 Methods of Data Collection

The study was employed in collecting both primary and secondary data. The primary data was collected from the farmers who re-cultivated their paddy lands and officials in respective ASCs such as Agrarian Development Officer (ADO), ARPAs and subject clerk (Re-cultivation).

Primary Data Collection

1. **Questionnaire Survey**: A semi-structured questionnaire was used to collect the data from farmers. The questionnaire was developed to extract the optimum level of responses, thoughts and the views of respondents via the telephone conversations.

KIIs: KIIs were conducted to collect the information from officers engaged in the re-cultivation process at ASC level. A questionnaire guide was prepared to gather information indicated in Tables 3.3 and 3.4.

2. **Case Studies:** Few case studies were conducted to identify the success factors and the reasons for failure in re-cultivating abandoned paddy lands in the study area.

The farmers' and officers' discussions were based on the nature of abandoning of paddy lands, the development needs of the area, attributes of re-cultivation programmes, benefits gains from re-cultivation, problems faced during the re-cultivation, failures of development programmes, continuity of cultivation of re-cultivated paddy lands, consistency and quality of the development activities, motivation of non-beneficiary farmers, youth participation and suggestions to overcome the problems related with re-cultivation.

Secondary Data Collection

The secondary data was collected from published reports, online sources (websites) and publications of government institutes such as DAD and DCS.

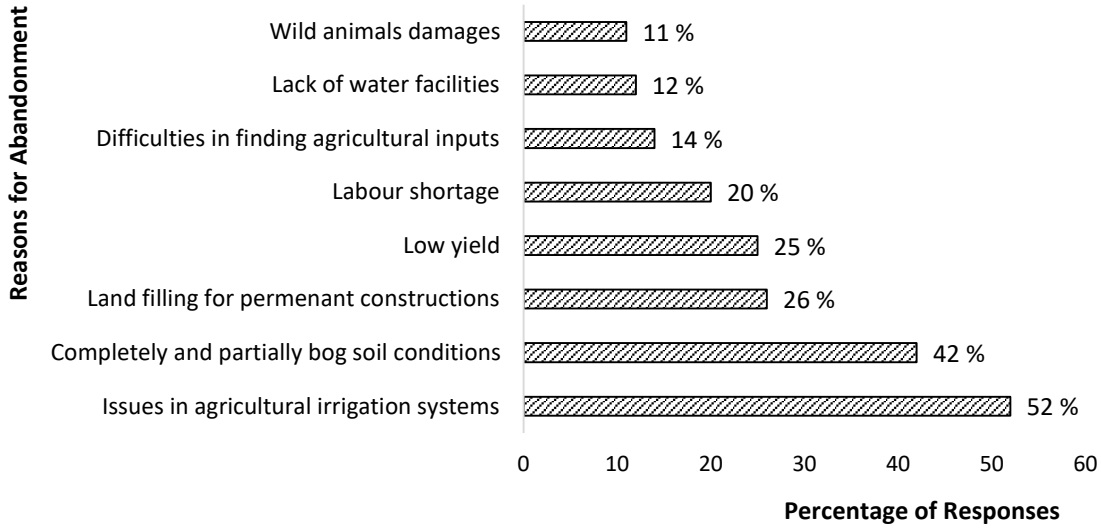
CHAPTER FOUR

Nature of Re-cultivation Programmes in Abandoned Paddy Lands

4.1 Introduction

This chapter is allocated to discussing the nature of re-cultivation programmes on abandoned paddy lands in LCWZ. It mainly focuses on identifying the reasons behind the abandoning of paddy lands and the key development needs related to them. More specifically, this chapter discusses sponsorship of development programmes, financial allocation, in-kind assistance, progress, continuation of cultivation, as well as the quality of development activities.

4.2 Reasons for the Abandoning of Paddy Lands in the Study Areas



Source: HARTI Survey Data, 2021

Figure 4.1: Percentage Variation of Reasons for the Abandonment of Paddy Lands in Study Area

Several reasons have affected the abandonment of paddy lands in the study area (Figure 4.1). Of the 100 farmers interviewed; the majority (52%) replied that largest contributions are issues in agricultural irrigation systems. Farmers have almost completely abandoned paddy lands due to the decrepit irrigation canals, filling the canals with sand and silt, destruction of anicuts and long-term restrictions on the water supply to paddy fields due to obstruction waterways by the growth of shrubs and weeds. This is especially one of the key reasons for the abandonment of paddy lands in the Colombo and Galle districts.

Some paddy lands in the study area had bog or half bog soil conditions (42%) mainly due to submerging of paddy lands with a large amount of water for a long period of

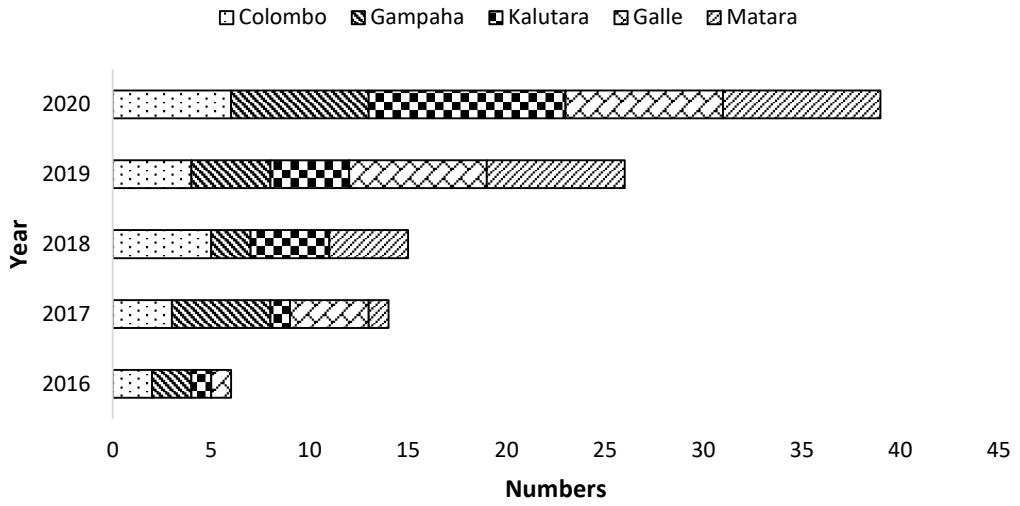
time. This case is more severe in the areas where paddy lands are located close to rivers with frequent flooding. Due to the muddy nature of paddy lands, machines used for land preparation such as tractors get bogged/stuck in the mud. The situation is worse in the Gampaha district.

Filling of paddy lands for other non-agricultural activities such as housing, buildings and other constructions is another reason to reduce the active paddy land extent in the study area. Population congestion and limited land for residential or other development activities have resulted in paddy lands being reclaimed and used for other development activities. The low yield and low income from paddy cultivation compared to other paddy cultivating areas make farmers in the study area reluctant to cultivate paddy and are tempted to use those lands for other alternative purposes. Therefore, farmers have skipped certain seasons for paddy cultivation, and it seems to be the first step towards the gradual withdrawal from paddy cultivation.

Some farmers responded that the money spent on paddy cultivation would not yield a good harvest or return on the investment and that it would be appropriate to use that money for another option. Some preferred to buy rice from the market instead of cultivating it. Paddy farmers in the study area also face labour shortages, a common issue in the entire agriculture sector of the country. The majority of the sample farmers cultivated paddy for consumption purposes and on a part-time basis. Many farmers replied that difficulty in finding workers for paddy cultivation was more precisely due to low involvement of the younger generation. In the meantime, some farmers were concerned about finding agricultural inputs such as machinery, seeds, fertilizers, and credits for cultivating paddy (14%). Due to high cost for inputs and income levels, farmers are seeking assistance from other parties.

Some farmers find it difficult to irrigate during dry spells as they cultivate paddy under rain fed conditions. Then they continuously skip the cultivation seasons. Due to irregular rainfall patterns, farmers are facing difficulties in cultivating paddy lands on time at the beginning of the season. In addition, wild animals such as wild boar, bandicoot rats, porcupines and peacocks frequently damage the paddy cultivation, and this has been the reason to leave the paddy cultivation by 11 percent of respondents. Farmers in the Matara district were the worst affected by wild animal damages (73% from total responses). From the total sample, 73 percent farmers had more than one reason to abandon their paddy lands. Therefore, it clearly emphasizes that there are several issues and development needs in the study areas to address before restoring the paddy cultivation sustainably.

4.3 Years of Re-cultivation Programmes Implemented



Source: Key Informant Interviews, 2021

Figure 4.2: Number of Re-cultivation Programme Implemented between Year 2016 and 2020

The key source information of the data indicated in Figure 4.2 was collected from the officers through KIIs. The data show some of the key points of abandoned paddy re-cultivation programmes in each district of the region from 2016 to 2020. First, an increase in the number of programmes launched during that period, and second, the highest intervention occurring in the year 2020. The average number of re-cultivation programmes implemented in the selected area in each year has increased gradually reported in the data as 1.5, 2.8, 3, 5.2 and 7.8 in 2016, 2017, 2018, 2019 and 2020 respectively. With the spread of the COVID 19 pandemic, the majority of people in Sri Lanka stayed at home due to the imposition of travel restrictions. This provided the opportunity for the people to engage in other activities in their leisure time such as farming and home gardening. Therefore, compared with the other time periods farmers have engaged more in the cultivation of abandoned paddy lands with the support given by the DAD in 2020.

4.4 Key Development Activities Implemented under Re-cultivation

Various development activities have been implemented in the study area to restore the abandoned paddy lands. Amongst, more than half (55%) of the development activities are related to the water supply issues such as reconstruction, excavating and widening of water canals. These are the key reasons for abandoning paddy lands in the study area. The banks of most of the water canals have collapsed and eroded due to prolonged bog soil conditions in the LCWZ. Further, waterways are blocked due to the growth of aquatic plants along these water canals. The decrepit water canals have been re-constructed with the clearing of plants grown in the canals to facilitate smooth flow of water to the paddy fields. In addition, excavator and backhoe machines have been used to widen and to dig out water canals by removing sand.

"*My paddy field has been fallowed for 10 years. It was in the year 2020 that the paddy cultivation was started again. There was a lot of support from the officials of the Department of Agrarian Services. Our dilapidated canal which provides water was excavated using backhoe machines and constructed for about five kilometers. It was also able to remove all the aquatic plants and clean the canal"*

(Source: Farmer Survey, Dompe, 12 October 2021)

Due to the prolonged fallow period, most of the paddy lands have become unsuitable for paddy cultivation. Especially in Gampaha and Matara districts when the bog soil persists long term it damages the structure as well as the texture of the soil. It is difficult for machinery such as tractors to enter such lands. Therefore, other development activities undertaken in the study are the construction of canal bunds and field canals to convert abandoned paddy lands into cultivable paddy fields. Under this activity, the farmers' engagement was more important

Most of the abandoned paddy lands in the study area were overgrown with shrubs (*Ketala, Wel atha)* aquatic plants, grasses (*Gini grass)* and some trees (*Accasia)* due to prolonged fallow period. Along with the land preparation, they have been removed both mechanically and manually with the support of farmer organizations. In several areas, the damaged anicuts have been re-constructed (2%) as development activities under re-cultivation.

4.5 Financial and In-kind Assistance

Only 63 percent of respondents received financial sponsorship from the government to re-cultivate their paddy lands. DAD and the Department of Irrigation are the key government agencies involved in re-cultivation programmes. DAD is the leading institute agency for managing all paddy lands in the country. Therefore, the commencement of re-cultivating abandoned paddy lands is initiated by DAD. The Regional Development Officer, ARPAs and other DAD officials have been assisting farmers since the beginning of the re-cultivation. Once the development need is identified by the DAD, they prepare separate projects for each need and estimate the total cost. Then a budget allocation is made giving priority to the most needed development activity in the area. Officials often encourage farmers to seek funding from farmers' organizations and start development activities on a reimbursement basis.

Funds have been allocated mainly for large-scale costly development activities such as re-construction of water distribution canals, widening and deepening of water canals, development of anicuts, clearing of shrubs and trees using machinery. In some areas, farmers were facilitated by reimbursing their additional expenses as the cost per acre of paddy extent. However, half of the sample farmers said that financial assistance they received was not adequate to complete the development activities. Therefore, in order to make the development programmes successful, some farmers had to bear the cost of construction of bunds around the paddy fields, preparing the land and clearing the shrubs in the field. It is also worth mentioning that the farmers expect a huge support from the government to develop their abandoned paddy lands.

"*The government did not give much money. We rented an excavator and dug the water canal. Because the canal was filled with sand and water did not flow smoothly. The rent for the excavator was paid by the Agrarian Services Centre. So that's it. All other works were done at our own expense to develop our paddy fields. I feel it's better if we could receive more money"*

(Source: Farmer Survey, Kebawa, 6 October 2021)

The rest of the farmers (37%) have re-cultivated their paddy lands at their own expenses and with the support of farmer organizations in the area without government financial assistance. However, in line with the island wide re-cultivation programme, DAD has taken initial steps to re-cultivate paddy lands at different times. ARPAs in each ARPA division take the responsibility and identify the abandoned paddy lands in the area and motivate farmers to cultivate paddy lands. It has been stated that 87 percent of the sample farmers received in-kind assistance from the government under re-cultivation. Most of them have received fertilizer subsidy as usual while others have received seed paddy for their cultivation.

4.6 Timely Execution and Completion of Re-cultivation Programmes

Generally, most re-cultivation programmes were initiated before onset of cultivation seasons (especially *Maha* season) and were completed within the stipulated time. It is mainly to facilitate the farmers to begin the cultivation at the correct time of the season. It was stated that those who started the cultivation on time were happy with their harvest.

"The main reason for the abandonment of paddy lands in my division was actually the lack of a proper water canal to provide water to paddy fields. This is because the existing canal was totally filled with sand and silt and covered with aquatic plants. We started our development program two months before the Maha season in 2018. We were able to complete it a bit earlier so the farmers had ample time to prepare their paddy lands. As we had planned, we were able to cultivate the paddy with the onset of rains in the Maha season. Today, many farmers in my division are benefiting from this development activity"

(Source: KII, Ja Ela, 15 November 2021)

However, on some occasions, the disruptions arise due to a number of issues such as delays in receiving funds, finding of laborers and machinery, adverse weather conditions (droughts & heavy rains) and lack of commitment and active participation of farmers. Due to such delays, farmers have failed to cultivate paddy at the correct time using rainwater. There are re-cultivation programmes targeting not only the *Maha* season but also the *Yala* season.

"Even though DAD planned to implement some development activities in my ARPA division during the Maha season of 2019, we were unable to do so due to adverse weather conditions. We also planned to reconstruct the main water canal which carries

water to 12 acres of paddy fields and clear the shrubs grown in paddy lands using a backhoe machine. Unfortunately, with the heavy rains and the flood situation. everything changed and therefore we postponed it to next year. We couldn't do many things in 2020 as we planned in the previous year"

(Source: KII, Diyandara, 28 October, 2021)

However, the active participation of farmers in development activities of the paddy lands and the commitment of the officials to coordinate and facilitate farmers have a decisive impact on the successful implementation and timely completion of development programmes.

4.7 Farmers' Participation in Re-cultivation

Once the ARPA identifies abandoned paddy lands in the division, the paddy land users are informed and advised of the necessity of re-cultivating them. On some occasions, the DAD has gone beyond government financial support with the support of farmer organizations and encourages farmers to cultivate their paddy fields. According to the discussions with the ARPAs, 58 percent of officials believe that farmers' participation in re-cultivation is high. Some farmers who have a good interest in re-cultivation of their lands have actively participated in re-cultivation programmes. Together they have found machines with their own initiative and begun development activities before the government intervention. Of the officials, 39 percent state that the level of farmers' participation in re-cultivation is 'average'. However, a small group of farmers (3%) were indifferent and needed frequent reminders to influence them to re-cultivate. Such farmers always asked for grants and in-kind assistance.

As a common observation seen everywhere in the country, youth participation in re-cultivation was not at a satisfactory level. According to the responses of the farmers, young people who have been cultivating with their parents are continuing to cultivate paddy. However, the majority are engaged in non-farm activities as primary or secondary occupation. Often ASCs inquire from the farmers the reasons for not engaging in re-cultivating the abandoned paddy lands. They first request the relevant farmer to submit a preliminary report mentioning the reasons for not cultivating paddy lands. If the farmer does not respond, they will be notified again. If the farmer responds by stating several reasons, a monitoring committee will be set up to investigate the veracity of the reasons. Based on the report of the monitoring committee, the ASC will impose a fine of Rs. 5000 per acre on farmers for not cultivating abandoned paddy lands if the reasons are not satisfactory. The government has the power to take over the land through the land bank if the farmer does not re-cultivate the paddy land without paying the fine (ADA, 2000). However, this legal policy is not operationalized so far as there is still no land bank established in Sri Lanka.

Officials have in some occasions informed that legal action will be taken against farmers who have abandoned paddy lands and did not engage in re-cultivation programmes even after being notified by the ASC. Fearing the loss of land, farmers are tempted to re-cultivate their paddy lands. Such action has been done so as to somehow reengage farmers in re-cultivation. If the farmer does not cultivate on

reasonable grounds and is unable to re-cultivate, the ASCs obtains the farmer's consent to handover the paddy land to another person for five years. This is generally done by agreement of the RDO of the ASC, a police officer in the area and the officers of the farmer's organization with the full consent of the farmer. ASC assumes full responsibility for the protection of the land right of the farmer.

4.8 Officers' Engagement in Re-cultivation

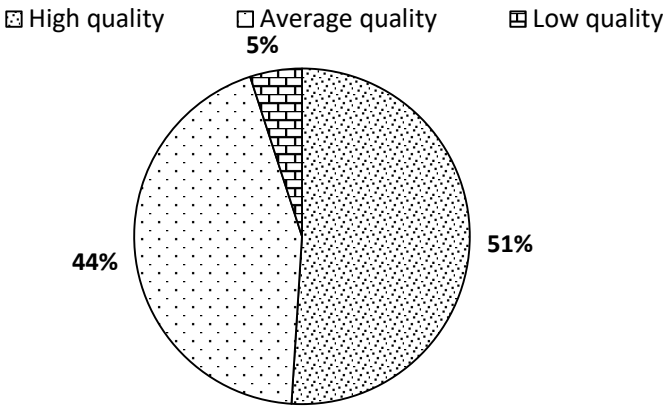
ASC officials play a major role in restoration of abandoned paddy lands in the country. ARPAs are officers who are in direct contact with farmers at the field level. The study reveals that 77 percent of farmers have a good impression of the level of official involvement in re-cultivation programmes. They are pleased with the commitment of the officials to the process of reducing the abandoned paddy lands in the area. In the opinion of these farmers, the active engagement of ARPAs and their active involvement greatly influences the success of the re-cultivation programmes. Fifteen percent of farmers responded that official's engagement in re-cultivation programmes at an 'Average' level, while eight percent have negative impression about their work behavior. Most of the time these farmers have achieved their development needs with their own commitment amidst lesser involvement of officials.

"We were able to cultivate our abandoned paddy fields because of the great effort of our ARPA madam. She recently transferred to our village. She is a young, very talented and kind-hearted woman. She often visited our home and motivated us to cultivate our abandoned paddy field. Even during this pandemic, she did the field visits and looked at our shortcomings. We continuously cultivated our paddy field since the day we started to re-cultivate our land to date. Now, we are very happy because we get a good harvest from our re-cultivated paddy field"

(Source: Farmer Survey, Deiyandra, 9 November 2021)

4.9 Quality and Relevance of the Re-cultivation Programmes

Farmers and officers had an appositive opinion regarding the relevance of re-cultivation programmes with the development needs. Out of 100 farmers, 51 farmers had a high level of satisfaction regarding the re-cultivation programmes as they are highly consistent with the required development needs of the area with another 46 percent farmers indicating an average level of satisfaction. There was no response regarding the inconsistency of re-cultivation programmes. This clearly indicates that the government programmes to restore these valuable paddy lands is in a positive direction.



Source: HARTI Survey Data, 2021

Figure 4.3: Feedback from Farmers on the Quality of Re-cultivation Programmes

Figure 4.3 shows how farmers have responded to the quality of re-cultivation programmes implemented in their abandoned paddy lands. The quality of the programme was evaluated based on the farmers' views on the benefits of development activities, overall finishing, relevance, timeliness, and sustainability. According to the personal judgment on quality, 51 percent of farmers were in a view of high quality in development programmes. These farmers had a very good understanding of the re-cultivation programmes and they were able to cultivate their abandoned paddy lands within the relevant period without any hindrance. Another 44 percent of farmers made a general judgment about the quality of re-cultivation programmes. Even though there is a good impression among the farmers about the development activities being carried out, in some cases they are not satisfied with the benefits received. They largely requested financial and in-kind assistance from the government. Only five percent of farmers reported poor quality development programmes.

"Actually, ma'am government commitment to re-cultivating abandoned paddy lands is a crucial thing today. This is because we cannot afford to grow them ourselves at our own expenses. We don't have that capacity. We need support from the government to find solutions to these development issues. Otherwise, our paddy lands are being destroyed in vain. Most of the farmers who had abandoned paddy lands in our ARPA division are very happy today. We also cultivate abandoned paddy lands successfully in the hope of a good harvest".

(Source: Farmer Survey, Labuduwa, 26 November, 2021)

"The programme is not so bad. But it would be good if we could get more financial assistance to prepare our lands. The government only gave money to reconstruct the water canal. But we had to spend more money to clear the shrubs grown in the field. We had to hire a backhoe to remove those large shrubs and grasses. Even so I was unable to get a good harvest from my land"

(Source: Farmer Survey, Kosgama, 12 November, 2021)

CHAPTER FIVE

Achievements and Prospects of Re-cultivation Programmes

5.1 Introduction

This chapter discusses the achievements of re-cultivation programmes and the prospects for successful re-cultivation in the future. Achievements were identified in terms of increase in the area under paddy cultivation, the reduction in the area of abandoned paddy lands, the yield and economic benefits obtained from the continuity of the cultivation of abandoned paddy lands and the motivational impact of re-cultivation programmes. Achievements were assessed qualitatively based on the observational judgments of the farmers. Further, this chapter discusses the issues encountered in re-cultivation programmes and possible suggestions to overcome such issues. Finally, several case studies from selected districts are incorporated to further strengthen the chapter.

5.2 Increase in the Area under Paddy Cultivation

One of the important and observable effects of the re-cultivation is the increase in the area under paddy cultivation. According to the data, 87 percent of the farmers responded that the total area under paddy cultivation in terms of both *awseddumized* and sown extents as a result of re-cultivation programmes. The majority of the farmers in the sample had continuously cultivated their abandoned paddy lands after re-cultivation programmes. Hence, the extent under paddy cultivation has increased after this development undertaking.

"I have two paddy land plots on one acre. One is located in the Alubomulla East and the other in the Alubomulla South. Until 2018, I received paddy harvest from only one plot because Alubomulla East paddy field has been abandoned due to bog soil condition and water logging. But now I am cultivating both these plots after implementing the re-cultivation programme in our ARPA division. Earlier, I worried so much about my paddy field. I'm now very happy about my decision to taken re-cultivate that land. I do not buy rice from the market for our consumption as I can actually get a sufficient amount of harvest from my paddy fields for day to day consumption.

(Source: Farmer Survey, Pamunugama, 7 October, 2021)

Thirteen percent of farmers stated that they had not been able to develop their paddy lands as expected and reap the benefits of re-cultivation programmes. Wild animal damages, flooding during rainy seasons, break-down of anicut due to heavy floods, and difficulties in finding labors, have all led to the halt of continuous cultivation in abandoned paddy lands.

"Our irrigation canal and anicut were totally destroyed and we could not cultivate our paddy lands for about eight years. With the support of ASC in our area, we were able

to renovate the canal and anicut. I personally spent a considerable amount of money to develop my abandoned paddy lands. How unfortunate we are. Due to the heavy rains in the Maha season that year, we couldn't get any harvest from our paddy fields. Our paddy fields were totally submerged by rain water. Unfortunately, our anicut also broke down again. We lost our hopes.

(Source: Farmer Survey, Madaviyangoda, 18 November, 2021)

5.3 Reduction in the Area of Abandoned Paddy Land

Eighty-nine percent of the farmers in the sample said that there is a decrease in the extent of abandoned paddy lands in the area. This is because the majority of farmers have witnessed that the existing abandoned paddy lands are now at an active stage. They have also reaped a considerable yield from their paddy lands. In contrast, eleven percent responded that abandoned paddy lands in the area have not significantly decreased. These farmers have mostly failed to develop their abandoned paddy lands and continue to cultivate them after the re-cultivation programmes.

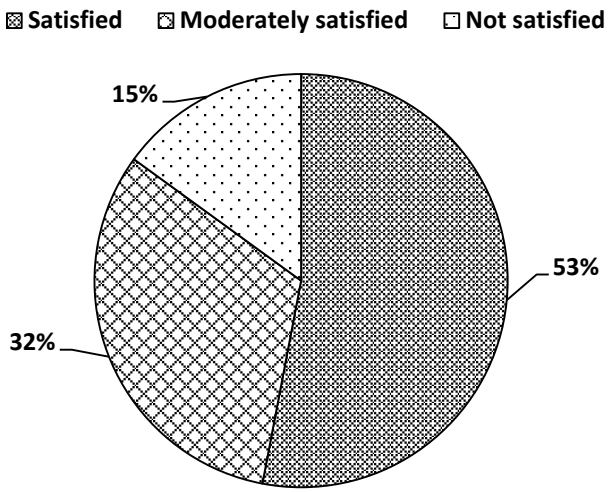
The majority of the officials' responses to the reduction of the extent of abandoned paddy land in the study area due to re-cultivation programmes is also optimistic. However, some officials expressed their constructive ideas in a different way. According to them, it is very difficult to completely grow abandoned paddy lands in an area in a given period of time. They set targets and prioritize development needs/projects based on the needs of the people and the potential for greater impact. Accordingly, they can re-cultivate only a certain extent of abandoned paddy lands within a year. However, the rest of the abandoned paddy lands in the area will be among the development needs for the coming years. In this way, after a few years, the majority of abandoned paddy lands in the area have been re-cultivated with all the obstacles they have faced. More importantly, during this time period the active paddy lands in the area are newly added to the abandoned paddy land category. Hence it is hard to observe a significant growth of the active paddy land extent in this area. According to the study of Witharana in (2016), the same finding has clearly been revealed regarding the reduction of active paddy land extent of the country. On the other hand, even though some of the abandoned paddy lands in the area have been re-used for paddy cultivation, the other two with agricultural crops (category B) and non-agricultural uses (category C) will remain further abandoned. Paddy lands used for other agricultural crops such as vegetables, leafy vegetables, and fruit crops are often not re-used for paddy cultivation. Sometimes they are converted to category B. Therefore, in the opinion of officials, the abandonment of paddy lands is an ongoing process. It is important take necessary measures to prevent further abandonment of paddy lands.

5.4 Benefits Achieved from Re-cultivation

Even though re-cultivation of abandoned paddy lands can bring a number of economic, cultural, social and environmental benefits, the crop yield is considered to be the major economic benefit. As depicted in Figure 5.1, more than half of the

sample farmers (53%) are satisfied with the harvest they obtained from the re-cultivated paddy lands. Especially, some farmers have obtained higher yields than other active paddy lands in the area. They attributed the good yield of abandoned paddy lands to the fact that the soil was more fertile than other regularly cultivated paddy lands due to prolonged fallowing.

From the rest, 32 farmers are moderately satisfied and the other 15 percent are not satisfied regarding the yield as they were unable to get a harvest from their paddy lands after re-cultivating. According to the ARPAs, paddy lands that existed as swamps before re-cultivation have given lower yields. Typically, bog soils are acidic and have poor soil quality particularly with low nutrient content. Hence, yield potential of such paddy lands is at a lower level compared with other paddy lands (Davenport & DeMoranville, 1993). Some farmers in the Gampaha and Matara districts have been damaged by flash floods due to heavy rains in the *Maha* season and their paddy lands have been totally submerged. Due to these conditions, their paddy fields yielded less. Other than that, common issues such as wild animal damages, pest and decease problems and less viability and poor quality of seeds, poor management practices of farmers' due to being busy with other important duties have contributed to the declining yields of re-cultivated paddy lands.



Source: Over the Phone Discussions with Farmers, 2021

Figure 5.1: Farmers' Satisfaction towards the Yield Obtained from Re-cultivated Paddy Lands

The results show that, 55 percent of the farmers have used their yield only for consumption purposes and 30 percent have used for both for consumption and sale. Altogether, 85 percent of the farmers have utilized their harvest obtained from re-cultivated paddy lands for consumption. This category includes both types of farmers who have good satisfaction and moderate satisfaction with the yield they obtained from re-cultivated paddy lands. The most important of these is that 30 percent of the farmers sell part of the yield after setting aside a quantity for consumption. Those farmers were in the category of having good satisfaction about the yield obtained from

re-cultivated paddy lands. Hence, it is clear from this that the farmers were able to get a harvest at least for their consumption purpose without leaving the paddy lands abandoned.

5.5 Continuity of Cultivation of Abandoned Paddy Lands

Farmers were asked about the continuity of cultivation of paddy after re-cultivating abandoned paddy lands. Accordingly, 88 percent of farmers continue to cultivate their paddy lands every year. Most of the lands are cultivated mainly in the *Maha* season as it is difficult to supply water during the *Yala* season. However, some farmers have cultivated in both the seasons of the year. Some special attributes of farmers who continuously cultivate the paddy lands were a good yield, fulfilling the consumption needs of the household, deriving economic benefits by sale of paddy, reluctance to re-abandon and willingness to cultivate paddy.

"We were able to re-cultivate 15 acres of abandoned paddy lands in our ARPA division under this programme. These paddy lands have been abandoned for about eight years. I obtained a good yield from my paddy land after re-cultivating. Normally we can get a yield around 20-25 bushels per acre from the other paddy lands in this area. But we obtained around 40 bushels per acre from these re-cultivated paddy lands. Actually, I didn't buy rice from the market since the year I re-cultivated this paddy land. So far, I have no issue. So, I continuously cultivate this paddy land"

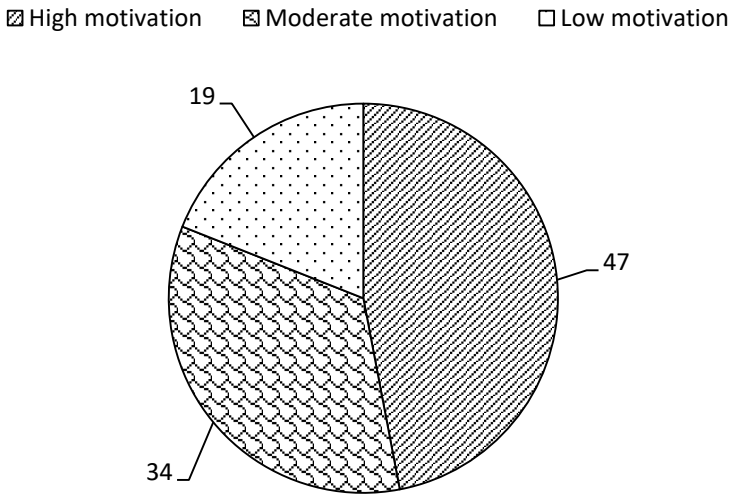
(Source: Farmer Survey, Ja-Ela, 23 November, 2021)

Twelve percent of the sample farmers failed to continuously cultivate their paddy lands and some have cultivated only one or two seasons. The high cost of cultivation, low yield, lack of time availability, wild animal damages, farmers not cultivating the *Yaya* at the same time, flash flood conditions are the main reasons stated by farmers for ceasing cultivation.

5.6 Farmers' Motivation to Re-cultivate Abandoned Paddy Lands

The farmers of the sample were asked about the motivation of the neighboring farmers to re-cultivate their abandoned paddy lands after the development activities were implemented. This information was obtained primarily to identify whether re-cultivation programmes have been an influential factor to motivate the non-beneficiary farmers to re-cultivate abandoned paddy lands in the area. Figure 5.2 depicts the percentage values on the level of farmers' motivation towards these programmes. Accordingly, 47 percent of the farmers responded that there was high motivation among the neighboring farmers to re-cultivate their paddy lands. The key reason was the visual observation of successfully re-cultivated paddy fields in the area. Further, the encouragement of officials to motivate the farmers was also influential.

Most of the farmers who had the very low influence to re-cultivate abandoned paddy lands have some issues such as lack of time available for farming, inability to afford high cost, low yield and wild animal problems.



Source: Over the Phone Discussions with Farmers, 2021

Figure 5.2: Farmers' Motivation to Re-cultivate Abandoned Paddy Lands after Implementing Re-cultivation Programmes

5.7 Issues in Re-cultivating Abandoned Paddy Lands

As an important development movement, re-cultivation seeks to convert the long-uncultivated land into productive land. Farmers have encountered several issues during the entire process of restoring the abandoned paddy lands. Inadequate financial and in-kind assistance is a major drawback. Government often provides money through DAD for large scale projects such as re-construction of minor irrigation systems, expansion of water canals, development of infrastructure, and re-construction of anicuts. In many occasions, farmers have to incur an additional cost other than the government contribution to develop their lands to a suitable level to cultivate paddy. The study found that some development activities could not commence and be completed on time. This eventually interrupts paddy cultivation from starting on time during the season. These delays directly lead to adverse impacts to the paddy cultivation such as pests and diseases problems, heavy rains during harvesting period create some management issues. Among the key reasons for the time lag, the delays in allocating funds, unavailability of labors and machinery in the area, adverse climatic changes (floods, droughts) and lack of interest and encouragement of farmers become the prominent ones.

Five percent of the farmers in the sample were unsatisfied with the quality of the development activities undertaken. Some constructions such as anicuts, sluice, canals of the irrigation systems have been damaged due to heavy flows of water during rainy seasons. Hence farmers failed to receive benefits through the development programmes.

Another issue in the re-cultivation process is that abandoned paddy lands are not continuously cultivated. Under intense pressure from officials, some farmers re-cultivate their paddy lands. It was observed that due to poor commitment by farmers

to continue the cultivation activities, they would abandon cultivation after one or two seasons. The scarcity of labor, other employment, wild animal problems, and poor harvest were other reasons for abandoning the cultivation.

Unfavorable weather conditions are an inevitable issue in re-cultivation. The key problem is heavy rains. It is difficult to carry out development activities during the rainy periods and on some occasions paddy lands are submerged all at once in case of flash floods. These conditions are more common in areas along river basins.

5.8 Suggestions to Overcome the Issues of Re-cultivating Abandoned Paddy Lands

- **Self-motivation and Cooperative Work:** Discussions with ASC officials of ASC emphasizes the importance of farmers' motivation towards re-cultivation of abandoned paddy lands to initiate and implement the development activities. Therefore, before obtaining government assistance, officials can persuade farmers to initiate the development activities as a collaborative effort with the support of farmers' organizations and neighboring farmers. To facilitate the development process, farmers can conduct the auxiliary activities related to the cultivation of abandoned paddy lands until government funds are available. They suggest that the money be borrowed from the financially rich in the village with the intention of reimbursement and that development work be started as early as possible. This will avoid the delay in completing the development activities and starting the cultivation on time.

- **Keeping Quality and Standards**: Another suggestion made was to improve the quality of development activities. It is very important to precisely identify the needs of the area and prepare accurate development plans under the supervision of technical officers of the area before meeting the development needs. Accordingly, it is vital to appoint skilled and competent technical officers to develop the projects in the area. It also generates a quality output by selecting the most suitable contractors for the development works.

- **Maintenance and follow up:** Proper maintenance of the development programme is important in the long run. Therefore, the farmers request from officials to develop a suitable maintenance schedule with regular intervals under the supervision of the field officers and give the responsibilities to farmer organizations in the area thus giving them the ability to observe and identify any issues which then can be corrected within the prescribed time limits.

- **Giving Opportunities to Capable Cultivators:** Another suggestion is to accurately identify farmers who can never re-cultivate their paddy lands and grant such paddy lands to cultivators who can increase the productivity of those lands. The Agrarian Development Act, No. 46 of 2000 clearly mentions

the ability to granting agricultural lands to others. This process should involve farmer organizations more rationally.

- **Enforcement of Rules and Regulations:** Some officials suggested that stricter rules and regulations be implemented against farmers who abandoned their paddy lands and those who deliberately refuse to develop their fields despite the possibility of avoiding the abandonment of paddy lands.

- **Control other Influences Affecting Active Paddy Cultivation:** Finally, for the successful development of paddy lands, it is suggested to take steps to control other factors such as wild animal damages and flood conditions in certain areas that directly affect paddy cultivation.

Case Study 1: A Success Paddy Farmer in Galle District

This is the story of a successful paddy farmer in the Galle district. This farmer lives in Paragoda ASC. His paddy land has been abandoned for about 12 years. The main reasons for the abandonment of paddy lands in this area are the issues of agriculture irrigation system, poor drainage facilities, difficulties in using agricultural machinery due to bog soil conditions in the lands and overgrowth of shrubs in paddy lands. Many of these issues were difficult for the farmers themselves to overcome. Therefore, farmers including Mr. Ranjith always expected the government's support to develop their abandoned paddy lands.

The abandoned paddy lands re-cultivation programme in the Paragoda ASC area was implemented in 2017. Under this programme, this farmer and his neighboring farmers had the opportunity to develop their paddy lands. Initially, with the involvement of the ARPA, they have borrowed Rs.10,000 from the farmer organization on a repayment basis and have started re-construction of the irrigation system. Later the government financial provision had greatly helped them to develop their paddy lands by re-constructing the rest of the irrigation system and the broken culvert and remove large shrubs from the paddy fields using a backhoe machine. Land preparation and bund constructions have been done by the farmers themselves. As in-kind assistance, he had received seed paddy and fertilizer subsidy.

This farmer has now re-cultivated his paddy continuously and more successfully. At the moment, he does not buy rice from the market as he meets household consumption needs from his re-cultivated paddy lands. In some seasons, he has sold the excess of paddy he has set aside for consumption. He is very satisfied with the government's support for to the development of his abandoned paddy lands in terms of high quality and consistency. However, he had a little hope of more funding and in-kind assistance. He specially mentioned the strong commitment and inspirational characteristics of an ARPA officer in the Komala ARPA division. His endless encouragement and motivation have contributed immensely to successful re-cultivation of abandoned paddy lands in the area.

Case study 2: A Success Paddy Farmer in Matara District

This farmer lives in Bandaththara GND which belongs to Deiyandara ASC of Matara district. He is a very energetic farmer with a commitment towards paddy cultivation. He has started to re-cultivate a one-acre paddy land under the re-cultivation programme implemented in 2018. This paddy land has been abandoned for about 10 years. The main reason for the abandonment of this paddy land is having bog soil conditions for a long period of time due to submerging of water under flood conditions. There is a salt barrier across the Nilwala River in this area which was established under the Nilwala Development Project. Due to this salt barrier the water does not drain properly under flood conditions. So, the entire paddy lands in this area drown to floods.

This farmer is not the owner of this paddy land. He was granted this land by ASC under an agreement for a five-year time period. During the re-cultivation programme, the irrigation water canal which filled with sand and silt was cleaned by using an excavator machine. And also, the canal was re-constructed under the financial assistance of the government. But, the rest of the development activities such as clearing shrubs, bunds preparation and land preparation have totally been done with his own expenses. Seed paddy and fertilizer subsidy were given under the in-kind assistance of the re-cultivation programme. But, he had to buy more fertilizers as the amount of fertilizer received under subsidy was not enough for one-acre paddy land. However, he was able to completely develop his paddy land during the relevant time period to commence the paddy cultivation on time. This is mainly due the commitment of his to restore this paddy land. Even though he is not the owner of this paddy land he does this with great enthusiasm.

He was lucky to have a good harvest by cultivating his abandoned paddy land. He has used it for household consumption and a small quantity has been sold. Since the 2018 Maha season up to now he has continuously cultivated the paddy land. Today he is very happy about his effort. He specially mentioned that the great support given by the ARPA officer in his division greatly motivated the re-cultivation of paddy lands. ARPA officer has frequently visited his field to advise him by inspecting the issues. The unity and the support of neighboring farmers have greatly helped to successfully re-cultivate the abandoned paddy lands in the area. He especially mentioned that without the government initiation and the support they would not be able to cultivate their abandoned paddy lands.

Case Study 3: A Story of Unsuccessful Paddy Farmer in Gampaha District

A farmer has cultivated a paddy land that has been abandoned for six years due to bog soil conditions, poor harvest earned for a long period of time and lack of time availability. He lives in Dompe ASC and works in a private company located in Gampaha district. Even though he decided to permanently quit cultivation of this paddy land, he was unable to do so due to the persistent influence of ASC. Dompe ASC has issued a special notice mentioning that all the un-cultivated paddy lands in the area will be taken over to the government if the farmers avoid cultivating them purposely. So, this frightened this farmer and motivated him to cultivate the abandoned paddy land.

This farmer has started to cultivate the paddy land in 2019 under a re-cultivation programme implemented in Dompe ASC. The government has re-constructed the irrigation system and cleaned the canal to facilitate smooth flow of water. But rest of the development activities of the paddy land had to be done by the farmer himself. The fertilizer subsidy provided was not even sufficient to the total land area, so he had purchased the rest from market. Therefore, he is not satisfied with the assistance given by the government to develop his paddy land. Another unfortunate thing was that this farmer was unable to get a harvest from his paddy land due to destruction of whole cultivation from heavy rains and flood conditions. It was a great loss to him in terms of finance and his labor. Therefore, the majority of the farmers who re-cultivated the paddy lands have skipped some seasons due to the adverse weather conditions. But this farmer has continuously cultivated the paddy land amidst the busy schedule with his occupation due to the fear of losing his paddy land. However, he was not able to get a good harvest from his paddy land. He assumes that it is due to the bog soil conditions of the paddy field in this area. However, the farmer has very poor motivation and enthusiasm towards the paddy cultivation, as he failed to receive a good harvest from the paddy field compared to the cost, he spent to develop the paddy land. It was understood from his conversation that he would quit from the cultivation of this paddy land due to the dissatisfaction developed in him regarding paddy cultivation.

CHAPTER SIX

Findings, Conclusions and Suggestions

6.1 Findings

1. Study findings revealed that issues with irrigation systems, bog soil conditions in paddy lands, permanent constructions, low yield, labor shortage, difficulties in finding agricultural inputs, lack of water and wild animal damages are the key reasons behind the abandonment of paddy lands in the study area. Amongst, irrigation system related issues such as decrepit irrigation canals, siltation, destruction of anicuts and blocking the water ways by overgrown shrubs and weeds were the prominent reasons in all districts.

2. Implementation of re-cultivation programmes has steadily increased since 2016 over time. The highest number of development programmes was implemented in 2020 (39%) while the lowest was in 2016 (6%).

3. The development activities such as reconstruction of damaged water distribution canals, excavating and widening of water distribution canals, mechanized land preparation, clearing paddy lands and re-construction of anicuts have been implemented in the study area from 2016 to 2020. Irrigation infrastructure development in the area is given the highest priority (57%).

4. Only 63 percent of farmers have received financial assistance for the development of abandoned paddy lands. Mainly large scale development works such as re-construction of water canals, widening and deepening of water canals, development of anicuts, clearing of large shrubs and trees using machinery have been undertaken using these funds. Farmers were granted money for their additional expenses spent on the development of paddy lands.

5. Most of the farmers (87%) have been given in-kind assistance mainly seed paddy and fertilizers for the re-cultivation of abandoned paddy lands

6. Many farmers have a positive attitude towards the execution and completion of re-cultivation programmes on time. However, delays in disbursement of funds, difficulty in finding laborers and machinery, adverse weather conditions (droughts & heavy rains) and lack of commitment and active participation of farmers have led to delays in re-cultivation programmes.

7. As stated by officials, farmer's participation rate in re-cultivation programmes vary; higher participation - 58 percent, moderate participation - 39 percent and poor participation - 3 percent. Youth participation in the cultivation of abandoned paddy lands was not at a satisfactory level.

8. The percentage of farmers who had a positive attitude towards the contribution of the officers in development activities was 77 percent. Another 15 percent of farmers said it was average, while the remaining eight percent said it was weak.

9. Fifty-four percent farmers responded that re-cultivation programmes are highly consistent with their development needs and the remaining 46 percent are consistent at an average level. No re-cultivation programme has been implemented in the study area which does not meet the development needs.

10. According to the farmers' personal judgment on the quality of development work, 51 percent had a vision of high quality. These farmers had a very good impression regarding the re-cultivation programmes and they have been able to cultivate their abandoned paddy lands without any obstacle during the particular time period. Another 44 percent of farmers judged that the quality of the development programmes to be average. Only five percent of farmers said that it was of low quality.

11. The majority of farmers' (87%) responded that re-cultivation programmes have increased the extent under paddy cultivation in the area. Thirteen percent of farmers failed to continuously cultivate their paddy lands and of which some have cultivated only one or two seasons.

12. The majority of farmers (89%) as well as officials are satisfied with the reduction in the extent of abandoned paddy fields in the area however others interpret it from another angle. Some officials have accused the farmers of abandoning active paddy fields in parallel with the renovation of abandoned paddy fields. Hence, priority needs to be given to prevent the abandonment of active paddy lands. Abandoned paddy lands used for permanent establishments exist thus leading to the abandoned condition further. Therefore, priority should be given to prevent the abandonment of active paddy fields. Abandoned paddy fields used for permanent buildings remained as abandoned conditions.

13. Considering the yield obtained from re-cultivated paddy lands, more than half (53%) of the farmers were satisfied with their yield, while 32 percent were only moderately satisfied. Only 15 percent of farmers were dissatisfied with their yield obtained from re-cultivated paddy lands. Swampy paddy lands, flash floods, animal damages, pest and diseases problems, low quality seeds and poor management led to low yields in re-cultivated paddy lands. Fifty-five percent of all farmers have utilized the harvest for consumption alone, and 30 percent for both consumption and sale.

14. Considering the continuity of cultivation, 88 percent of the farmers continue to cultivate their paddy lands every year. The remaining 12 percent failed to cultivate continuously due to high cost of cultivation, low yield, lack of time availability, wild animal damages, and floods conditions.

15. Looking at the success of re-cultivated paddy lands and through the stimulation of officials, some neighboring farmers have been motivated to re-cultivate their abandoned paddy lands after implementing re-cultivation programmes. Farmers' assessment of the extent to which neighboring farmers are motivated to replant paddy is different. Accordingly, 47 percent were

found to be more enthusiastic, 43 percent responding moderately and 19 percent less enthusiastic.

16. Lack of adequate financial and in-kind assistance, delays in timely execution and completion of development activities, low quality of development activities, non-continuation of paddy cultivation in re-cultivated lands and unfavorable weather conditions have hampered the success of the re-cultivation programmes implemented in the study area.

17. The key suggestions made to overcome the issues in re-cultivating abandoned paddy lands were; motivation of farmer to initiate the development activities prior to government assistance collaboratively with the farmer organizations to avoid delays, precisely identify and plan development needs with the assistance of competent technical officers to improve the quality of re-cultivation programmes, formulate a proper schedule by getting involved farmer organizations under the supervision of officers in ASC to inspect and maintain the development activities under regular time intervals, accurately identification of farmers who are incapable of re-cultivate their paddy lands at all and grant of such paddy lands to cultivators who can improve productivity of such lands, impose strict rules and regulations against farmers those who abandoned their paddy lands and hesitate to develop them purposely even though they have the capacity and take the actions to control the other factors such as wild animal damages and flood conditions in some areas that directly affect to paddy cultivation.

6.2 Conclusions

As already revealed through related studies (Danapala, 2005; Epasinghe *et al.* 2008) and further confirmed by this analysis, paddy land abandonment in the LCWZ is not a single reason phenomenon. It is multifaceted and stems from both technological and non-technological reasons. As experienced by 73 percent of sample farmers, more than one reason contributed to abandoning the active paddy lands. However, the degraded and ruined irrigation structures are the prominent reasons that led to sustain the problem of abandonment. The renovation of long-abandoned irrigation structures is a costly and time-consuming task as they are dilapidated, silted and covered with overgrown weeds and shrubs. Further, the long-held poor drainage conditions lead to lands becoming swampy and bogged soil conditions. Thus, individual farmers alone cannot afford to address those needs. Though seldom reported, land filling and permanent constructions have made irreversible damages to the paddy lands. Therefore, the government intervention is necessary for reclaiming abandoned paddy lands which on the other hand has been exemplified by the development priorities of the successive governments. Amongst the other reasons for abandonment of paddy lands are low yield, labor shortage, and difficulties in finding agricultural inputs. Lack of water and wild animal damages are also critical reasons that the government intervention is sought to halting the paddy land abandonment. According to the performance evaluation on re-cultivation programmes implemented by DAD in Western province, which was done by National

Audit Office (NAO) in 2019 also, clearly reveals that the reasons for the abandonment of paddy lands in Western province, contribution of DAD to re-cultivate abandoned paddy lands, the means of solving related problems, and some recommendations to stakeholders to reduce the abandoned paddy lands in the area (NAO, 2019).

Even though re-cultivation programmes have been increasingly launched with the funding and in-kind assistance of the government during the study period from 2016 to 2020, the extent under abandonment does not record a decline corresponding to the extent re-cultivated with the passage of time. There were two possible reasons for this; either the re-cultivation programmes have failed to bring back abandoned paddy lands into re-cultivation, or another extent of active paddy lands have been abandoned during the period. In the attempt to clear these doubts, the study found that re-cultivation programmes are considerably successful owing to a number of aspects.

The priority has been given to address the prominent issues relating to abandonment of paddy lands (57%), for instance, reconstruction, widening, deepening and clearing of waterways, canals and anicuts as relevant to the case. These issues were so complicated that they could have neither easily been resolved nor addressed by the affected farmers alone. The majority of re-cultivation programmes under concern were successful in addressing those pre-identified development needs at a greater (54%) or moderate (46%) level and therefore the farmers have immensely benefited from those programmes. The quality of development work is another important aspect which was also rated for their high (51%) or average (44%) quality, except for a few with low quality (5%). Given that, all the programmes were in accordance with the development needs and thus many farmers (77%) held a positive attitude towards the timely execution and completion of re-cultivation programmes.

Re-cultivation programmes can be viewed from the social capital viewpoint as well as it has well demonstrated the importance and the potential of the farming community in contributing to sustaining valuable agricultural systems of the country. According to officials, the participation of most farmers is high (58%) or moderate (39%) and it is only a small percentage (3%) which is low. The active participation of farmers in re-cultivation programmes both individually and collectively depicts that paddy cultivation is not only an economic venture but a community event. Utilization of the funds raised by the farmer organizations on repayment basis by the government represents the strengths of this social capital in sustaining this valuable ecosystem. The study further confirms how LCWZ farmers have given priority to paddy cultivation as a source of household food security as well as a source of income. It is evident that nearly 1/3rd of the sample farmers use the harvest both for sale and consumption whilst the rest for consumption only. Therefore, despite low economic importance assigned to LCWZ paddy cultivation, the farmers together with their collective interest greatly seek for the assistance of the government to solve the problems that led them to abandon paddy lands.

There are several other factors that led to the success of re-cultivation programmes. The vast majority of farmers (63%) had received financial assistance for the additional expenses borne by them for the development of paddy lands whereas 87 percent farmers had received in-kind assistance including seed paddy and fertilizers. Another valuable aspect that has contributed to the success of these events was the high rate of official involvement with constant encouragement. The neighboring farmers were highly (47%) or moderately (43%) motivated to re-cultivate their lands by looking at the benefits gained from re-cultivated lands, an additional benefit of re-cultivation efforts. From the point of view of the officials, their goal is to reduce the extent of abandoned paddy lands, which the majority (89%) is satisfied with, but the rest are not due to the addition of another set of active paddy lands to the abandoned category.

In addition, other drawbacks of re-cultivation programmes are poor participation of youth and delays in implementation and completion of development work leading to poor harvest. Some farmers had not completed the development activities and therefore they sought financial and in-kind assistance for the remaining activities. The delays and the poor quality of certain development work so far undertaken was limited (5%) however, it has caused dissatisfaction and adversely affected the sustainability of development work. Although replanting programmes have increased the area under paddy cultivation, some farmers have found it difficult to reap the benefits due to floods, wildlife damage, poor soil conditions, low quality seeds and poor management of part-time farmers. Though about 1/2 of the sample farmers (53%) are highly satisfied with the yield obtained, nearly 1/3rd of them (32%) are not so satisfied. The rest (15%) have lost their entire harvest due to said reasons. Similarly, around 12 percent farmers have been unable to continue paddy cultivation due to one or more reasons aforementioned. Therefore, due attention should be paid to these areas when planning and implementing replanting programmes. If not, it is a waste of investment in re-cultivation.

The most noteworthy finding of this study is that the extent of abandoned paddy land existing in the study area has decreased with the passage of time owing to re-cultivation programmes; however, the abandonment of active paddy lands continues. Also, in some reclaimed lands, the suspension of paddy cultivation is at 12 percent. If a paddy land is not cultivated for 5 years or 10 cultivation seasons, it is then added to the abandoned category. In addition, the shortcomings that are difficult or beyond human control are adverse weather conditions and wild animal damages. Nevertheless, paddy land abandonment continues unless the causality behind them is addressed lastingly.

As can be seen from the above conclusions, systematic planning, timely implementation and completion, continuous monitoring of technological and non-technological reasons for paddy land abandonment, the commitment of the officials, active engagement by the farmers, organizational support and proper maintenance of renovated structures are all important aspects for the success of re-cultivation programmes and to prevent further abandoning of active paddy lands.

6.3 Suggestions

Given the above findings and concluding remarks, the study suggests that;

1. It is not necessary to conduct further studies as sufficient studies have been conducted from time to time to identify the reasons for abandonment of active paddy fields. As directed by those studies, it is imperative that the DAD identifies the specific factors underlying the abandonment of paddy lands in each ASC area and updates the paddy land data for each cultivation season. Based on these data, immediate action should be taken to monitor the changes in use of paddy lands, prevent the abandonment and temporary fallowing of paddy lands without acceptable reasons. To achieve this, every ASC must have a mechanism to maintain and update the digital database of all paddy lands. DAD, the main government agency that can prevent the abandonment of paddy fields, has the resources and the legal provisions to do so. All that is left is to use them effectively and reap the benefits. It is doubtful whether the existing paddy land registry may fulfill the said requirement.
2. By learning lessons and best practices from the re-cultivation programmes, they should be systematically designed with a proper cost estimate under the assistance of technical specialists before implementation of development programmes to attain a sustainable and quality output.
3. Timely implementation and completion of development work is a must to ensure continuity of paddy cultivation, high yields, farmer satisfaction and motivation of neighboring farmers and finally to prevent re-abandonment of reclaimed lands. Developing a proper schedule to maintain the renovated infrastructure and create awareness among the farmer organizations about the maintenance activities by assigning responsibilities under the supervision of ARPAs and ADO would help sustain the infrastructure developed.
4. Accurate identification of the tenants who are truly incapable of cultivating the abandoned paddy lands through proper investigation and handing over of those lands to the farmers who can develop and cultivate them for a specific period. This process is already in operation in certain areas and the ASC has all the provisions under the Agrarian Services Act. Therefore, the process should be put into action and accelerated for proper land management when and where necessary. Impose strict rules and regulations against the tenant who deliberately prevented paddy cultivation.
5. Adverse weather conditions or climate variability is a minor reason for the abandonment of paddy lands. However, farmers should be made aware of the likely climate variability and associated weather changes along with providing seed paddy resistant to such weather conditions.
6. Create awareness among the farmers regarding the duty and the responsibility of efficient management of agricultural lands through mass media and social media.

6.4 Limitations of the Research

Given the COVID-19 pandemic situation the study totally depended on the data gathered through telephone conversations with farmers and relevant officials. This method encountered both pluses and minuses. Though there was a low cost to the respondents some of the respondents were reluctant to have lengthy discussions and spend more time explaining their answers to questions. The real visual expressions of respondents which underpin the answers to certain questions could not be observed through this data collection method. Further, the analysis was limited to qualitative data as quantitative data collection was purposefully omitted for accuracy and importance.

6.5 Directions for Future Research

It is suggested undertaking several case studies using qualitative data collection methods such as covert interviews and group discussions to further confirm the rate of success of re-cultivation programmes and learn lessons from them. The quantitative analysis is required to establish the severity of technical and non-technical reasons for the abandonment of paddy lands by districts of LCWZ as the districts have different natural settings, geographic variations, diversity of people and their livelihood differences.

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