INFORMAL LAND FRAGMENTATION IN SETTLEMENT SCHEMES

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HARTI

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FOREWORD

History of land settlement projects in Sri Lanka dates back to early 19th century and more than 100 settlement schemes exist by now. Settlement schemes were developed from time to time to compensate people for dispossessing of their original land due to many reasons such as expansion of plantations, construction of irrigation reservoirs and development of roads and other infrastructure facilities. In addition settlement schemes were developed to address the issue of high population pressure in densely populated areas of the country.

Land is one of the most significant determinants of poverty in the peasant society of Sri Lanka. Over 35% of the population in the country is directly or indirectly dependent on land. Therefore, land fragmentation causes many issues related to social, economic, political, cultural and environmental problems. Some of the direct effects of land fragmentation are reduced land productivity, intensive cultivation, deforestation, cultivation of reservation lands and disputes among community members harming social integration. Ownership of land allotments under irrigation settlement schemes has been granted to the settlers with restrictions imposed by the Land Development Ordinance of 1935 and revisions made afterwards to prevent selling and dividing the low land allotment to less than 1.5 acre land parcels.

The present study has made an effort to investigate socio economic impact of restricted ownership and to changes required to the existing act. I have no doubt that this report would be useful for policy makers, researchers and other stake holders for decision making to improve welfare of the rural people and to link land for the sustainable development of Sri Lanka.

E.M. Abhayaratne

Director

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G.G.de.L.W. Samarasinha

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EXECUTIVE SUMMARY

Land settlement schemes in Sri Lanka are important in terms of socio economic development of rural population, settling people from high populated areas in low populated areas and in terms of regional development. Land had been allocated to the initial settlers with restrictions preventing sale and subdivision into parcels less than 1.5 acres in case of lowlands and 0.5 acres for highland as stated in the Land Development Act of 1935 and its subsequent amendments. However with the development of settlement schemes and population growth, original allotments have been informally sub divided among the descendants according to customary practices disregarding the legal restrictions. Therefore, there is a growing pressure from beneficiaries to amend the existing Act to legalize further fragmentation.

The main objective of this study is to assess the extent of land fragmentations that had taken place and to study related issues in irrigated settlement schemes with special focus on lowlands. The study is also aimed at eliciting opinions of the settlers about the existing Act and the proposals for amendments to the Act.

More than 85% of the farmers are aware of the restrictions imposed by the existing land Act in dividing land into parcels smaller than 1.5acres in settlement schemes. Yet, 70% of the farmers are eager to amend the law to allow them to divide their allotments according to their own wish. But about 12% of the farmers prefer to limit the subdivision up to one acre to end unlimited fragmentation. In the mean time, about 28% of the lowland plots in the study areas are informally fragmented into less than 1.5 acres in extent. In older schemes of Minneriya and Minipe stage 1, the informal land fragmentation of less than 1.5 ac has occurred among 45% and 56% of the farmers respectively. Primary reason for land fragmentation is providing a share of the settlement land to their children. Farmers mostly preferred to divide the land among all their children disregarding minimum size specified in the act. However, there is no productivity decline due to reduction in land size.

About 57% and 30% of the lowland and highland farmers respectively do not possess any legal document to prove ownership inherited from their parents or previous generations. However, statutory restriction of formal method of transferring land ownership to allotments of less than 1.5acres has neither been a critical problem nor created serious negative social and economic issues for over 60% of the settlers. Most of them prefer to transfer their land ownership legally to their children or next generation.

Formal subdivision of land into small pieces is likely to create problems in water management and irrigation system operation and maintenance (O&M) as perceived by irrigation officials, because of higher resource requirement (both physical and human) for the O&M. Increased number of legal land holdings result in higher irrigation water requirement and more drainage from each sub divided land block. Irrigation officials believe that legal transfer of small pieces of land will pave the way for

farmers to sell their allotment outside their family. This could create conflicts in managing water among different owners.

As informal land fragmentation has not been realized as a barrier by majority of farmers and has not created any serious social and economic consequences, there is no reason to amend the existing Act to allow the beneficiaries to unlimited land fragmentation.

About 20% of farmers have more than 1.5 acres of lowland without legal ownership as non transfer of lands legally by the initial settlers among their children while they were alive. Therefore after death of parents, inheritance of the land goes to the eldest son as per existing Act, though there is a possibility of dividing the land to many children without violating the Act. Therefore, some amendments for the existing act are recommended to allow the family members to fragment the land up to a minimum size of 1.5 acres in the event of death of original land owner (parents) without a nominated a successor. The amendment has to provide entitlement not only to the eldest son, but to many children of the family within the minimum size of 1.5acres. Pressure on land in the settlement schemes should be minimized by creating off-farm employment opportunities and providing priorities for new generation people of old settlement schemes in allocating land under new land alienation programmes.

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ABBREVIATIONS

FAO	-	Food and Agriculture Organization
FOs	-	Farmer Organizations
LDO	-	Land Development Ordinance
O&M	-	Operation and Maintenance

CHAPTER ONE

Introduction

1.1 Overview of Settlement Schemes

History of land settlement schemes in Sri Lanka dates back to 1880 the year in which the Kalawewa reservoir was initially restored and new settlers were brought to the area. However, most of the large scale irrigation settlement schemes were established after the introduction of Land Development Ordinance (LDO) in 1935. Silva and Vidanapathirana (1984), have mentioned that major irrigation settlement schemes in Sri Lanka are of highest importance in socio-economic terms and as important growth centers in and around where numerous avenues for the development of meaningful on-farm, non-farm and agriculture related services and industries. During the initiation of settlement schemes, prime objective was to relieve land pressure in the wet zone areas while rehabilitation of the dry zone which was the cradle of Sinhalease civilization (FAO, undated). Other main objectives of the settlement schemes were increasing the national food production, resettlement of population displaced from their original land due to large scale development or irrigation projects and generating new employment and regional development (*ibid*).

All major irrigation settlement schemes are located in the dry zone of Sri Lanka. Selection criteria of beneficiaries varied depending on the specific objectives of each scheme. Landlessness and the family size were considered as one of the primary selection criteria in almost every settler selection. Young married applicants of farmer families were selected by *land kachcheri*[1] while educational background and experience on agriculture also were given due weight. Farmers were selected from wet, dry and intermediate zones of the country. Irrespective of the origin of the selected farmers, individual farmers performed well in their new settlements depending on their entrepreneurship (Tennakoon, 1982).

By now there are more than 100 irrigated settlement schemes in the country covering over 400,000 acres of land distributed among approximately 100,000 allottees. Settlement schemes of Sri Lanka have been classified into various groups depending on the original objectives of each scheme. Table 1.1 provides information on type and extent of command area under each settlement scheme implemented between the period, 1935 to 1985. By the beginning of the year 2002, 997,158 Grants had been issued to allottees for state lands under thr Land Development Ordinance. This comprised of 324,203 Swarnaboomi grants and 672,955 Jayaboomi Grants (LCGD, 2011). Initially the size of allotments distributed was 8 ac per family which constituted 3 ac of high land and 5 ac of low land. Due to increasing population pressure and limited availability of land, size of a single allotment was reduced up to 3 ac (0.5 ac of high land and 2 .5 ac of low land) during the course of time in many settlement schemes.

By the LDO Act of 1935, government imposed rigid policy restrictions confining land fragmentation and preventing selling allotments of crown land. From the findings of several studies conducted in settlement schemes of Sri Lanka on hidden land tenure, Stansbury (1988) has reported that despite the restrictions imposed by the LDO Act, illegal practices such as leasing, mortgaging and informal fragmentation among family members were common at ground level. Illegal transactions of land and disguised fragmentation of holdings have resulted in many harmful effects on effective irrigation maintenance and water distribution. Irrigation infrastructure in most schemes is designed to provide separate canal off-takes to each farm of uniform size. When fragmentation occurs it results in more irrigation off-takes and uses more irrigation water to cultivate the same extent of land (Abeyratne, 1982). Further, it has been argued that violation of restrictions imposed by the existing land act is responsible for poor adherence to general management decisions by farmers (*ibid*).

Table 1.1: The Government Land Distribution Programme from 1935 to 1985

Type of Scheme	Extent (ha)
Major Colonization Schemes	169,007
Village Expansion Schemes	301392
Highland Settlement Schemes	15016
Youth Settlement Schemes	7878
Regularization of Encroachments	269980
Middle Class Schemes	63238
Land Grants(Special Provision)	9,980
Rainfed Farming Settlement Schemes	5,363
Total	830,833

Source: Department of the Land Commissioner (2006)

1.2 Research Problem

Land has been granted to the initial settlers with imposed restrictions preventing trading and subdivision into parcels of less than 1.5ac in case of lowlands and 0.25 ac in case of highlands. However according to family tradition of dividing inherited land among the children, original allotments have been informally sub divided among the descendants over the period disregarding the LDO Act of 1935 and its subsequent amendments. Size of holding received by a single family of original settlers had been reduced over time and it had further fragmented informally making many holdings uneconomical to operate (Fonseka, 2001). Informal fragmentation of low lands has led to poor water management practices and has affected adversely on irrigation system maintenance in many settlement schemes (Merrey, D.J.*et.al*, 1988; Stanbury, 1988). There is also a growing pressure from beneficiaries to amend the existing Act to legalize further fragmentation. There is no information on the degree of the problem, the extent of land fragmentation already taken place its the consequences on alottees' livelihoods, agrarian economy and environmental implications which are vitally important to make necessary policy recommendations.

1.3 Objectives of the Study

The main objective of the study is to assess the issues related to informal land fragmentation in irrigated settlement schèmes with special focus on lowlands.

The specific objectives are:

1. To find the extent of land fragmentation and concealed land fragmentation;
2. To investigate underlying reasons for land fragmentation;
3. To document the criteria adopted in gifting lands among children
4. To ascertain consequences of land fragmentation and the subsequent issues;
5. To explore the opinions of the settlers about the existing Act and the proposals for amendments to the Act

1.4 Literature Review

Consequences of land fragmentation had been widely debated considering many aspects such as social, economic and technical for decades. Many studies have been conducted on this topic and their findings are available from many countries around the world.

Land fragmentation is widespread in India and it is the common belief that fragmented nature of land holdings is a key factor that contributes for the low levels of agricultural productivity. It is reported that land fragmentation could lead to sub optimal usage of factor inputs and will eventually lower overall returns to land. The factors contributing to this have been attributed to losses due to extra travel time, wasted space along borders, inadequate monitoring and the inability to use certain types of machinery in small plots such as harvesters.

Studying about the impact of fragmentation in Southern India, Jha, *et.al* (2005) have concluded that fragmentation has a significant impact on technical efficiency and therefore policies must be designed to allow for consolidation to take place.

Sundqvist and Andersson (2006) have reported positive effects of number of plots on land productivity for rice in Northern Vietnam. It is explained as more plots of land is positively correlated with use of fertilizers and number of hours worked on the farm. But they have not found a significant correlation between labour productivity and land fragmentation. Further, they have not found a significant correlation between machine use and number of plots.they have explained the finding due to under developed off farm labour market where household members work on the farm, regardless of the labour returns. Therefore, they have suggested that there is no negative impact of land fragmentation on land productivity in Northern Vietnam of the time of the study period.

After exploring the link between land fragmentation and productivity in Nigeria, Austin *et.al* (2012) have reported that excessive fragmentation will adversely affect agricultural productivity.

Wickramaarachchi (2011) studying about causes and incidences of paddy land fragmentation in Sri Lanka considering Maha Kanadarawa settlement scheme in Anuradhapura district has concluded that in terms of social issues conflicts related to land are more prevalent with lands of smaller sizes. Wickramaarachchi further emphasizes the fact that smaller the size of land, higher the encroachments on reservation. The study has concluded that land fragmentation is not unfavourable in term of land productivity though there are some adverse effects on economic and social aspects. It has further identified cultural practices as the major driving force of fragmentation.

Niroula and Thapa (2004) discussing the impacts and causes of land fragmentation have reported that based on experiences gained in the South Asian region and elsewhere, fragmentation of small holdings and tiny land parcels are detrimental to land conservation and economic gain which will discourage farmers from adopting agricultural innovations. They have identified major proportion of ever growing population on agriculture, law of inheritance of paternal property, lack of progressive tax on inherited land, heterogeneous land quality and an under developed land market as contributing factor for land fragmentations.

1.5 Organization of the Report

Chapter 1: Introduction :- The chapter 1 gives an introduction to the settlement schemes, research problem, objectives of the study and literature on agricultural land fragmentation.

Chapter 2: Research Methodology :- This chapter describes the method of sample selection, sample frame and background information on selected settlement schemes.

Chapter 3: Selected Land Tenure Issues in Irrigated Settlement Schemes :- Chapter three analyzes the livelihood and different tenure systems adopted by the farmers of selected settlement schemes. Further the chapter discusses the impact of informal land fragmentation on the nature of ownership of the allotments, and land productivity and issues related to water sharing and irrigation system maintenance.

Chapter 4: Current Status of Land Fragmentation in Settlement Schemes :- This chapter deals with the degree of land fragmentation, criteria adopted in giving settlement land to children by successive generations and farmer perceptions on the existing land policy.

Chapter 5: Description of Case Studies :- The case studies are mainly focused on issues related to intensified fragmentation in selected settlement schemes to validate the key findings of the sample survey.

Chapter 6: Findings and Recommendations :- Chapter six summarizes the status, reasons and issues of informal land fragmentation and provides recommendations necessary for amendments for the existing Act.

CHAPTER TWO

Research Methodology

2.1 Settlement Schemes Selected for the Study

Four irrigation settlements schemes were selected for the in-depth quantitative study representing various land holdings sizes, and different contexts of settlements. The main features of selected schemes are described in Table 2.1.

Table 2.1: Selected Schemes for In-depth Survey

Name of the Scheme	District	Original Size of Land Allotments	Year	Context
Minneriya	Polonnaruwa	5ac low land and 3 ac high land	1933	Early settlement scheme in the dry zone
Minipe Stage 1	Kandy	5ac low land and 3 ac high land	1937	Early settlement scheme villages in the wet zone with 'purana' villages
Rajangana Left Bank, Tract -7	Anuradhapura	2ac low land and 0.5 ac high land	1972	Recent settlement scheme, under tank irrigation
Mahaweli System C – Giranduru Kotte	Badulla	2.5ac low land and 0.5 ac high land	1980	Recent settlement scheme under river diversion, water abundant

In addition to the above schemes three other schemes listed in Table 2.2 were selected to elicit qualitative information about the land fragmentation problem and the related issues by rapid appraisal.

Table 2.2: Schemes Selected for Rapid Appraisal

Name of the Scheme	District	Original land size allotments	Year	Context
Wennoruwa Tank	Kurunegala	2.5 ac low land	-	Irrigation scheme in an urban environment
Navagiri Scheme	Batticoloa	3 ac low land		Settlement scheme in the conflict affected area
Dewahuwa	Matale	5ac low land	1949	Water scarce scheme

2.2 Description of the Study Areas

1. Minneriya

The Minneriya settlement scheme is one of the oldest schemes which was commenced in 1933. At the opening stage of the settlement scheme, 5 acre of land was provided for each family among 212 peasant allottees. The first batch of settlers was selected from Anuradhapura, Kandy, Kegalle and Colombo districts.

2. Minipe-Stage 1

The Minipe settlement scheme consisted of four stages as described in Table 2.3 starting from 1939 onwards at different points of time. Main objectives of the Minipe settlement scheme was increasing food production, increasing land use intensity, greater labour absorption to agriculture through cultivating more lands and intensive cultivation and improving reliability and controllability of irrigation.

The Minipe scheme is described as a perennial system of irrigation. It represents diversion of a perennial source, the Mahawali ganga. Being a single channel system the intensity of water problem became a direct function of the distance of the canal from the main anicut. Therefore potential of the last two stages is marked below than 1st and 2nd stages (Wickramasekara, 1981).

Table 2.3: Number of Beneficiaries and Extent of Land Distributed Under Different Stages of the Minipe Project

Stage	Year	Size of Land Allotment	Number of Allotters	Extent of Land Distributed (ac)
I	1939	2 acres of highland, 5 acres of lowland	473	3,480
II	1958	1 acres of highland, 2acres of lowland	1502	3,259
III	1968	0.5 acres of highland,2 acres of lowland	785	3,703
IV	1968	0.5 acres of highland,2 acres of lowland	770	1,572
	Total		3530	12,014

Source: Irrigation Engineer's office, Hasalaka

Part of the irrigated land which falls within stage-1of the project has been claimed by the Mahiyangana temple on the basis of an ancient land grant. These temple lands have been cultivated by various individuals under temple land tenancy arrangement.

3. Rajangana (Left Bank) -Tract 7

The Rajangana colonization scheme was one of the projects undertaken as part of the ten year resettlement programme implemented in the dry zone. About 6,200 settler families were brought into the scheme in batches between 1964 and 1968. Supply of

irrigation water was delayed due to various reasons and the last 300 settlers were provided with irrigation facilities only in 1972. The harsh living conditions without irrigation facilities resulted in abandoning the scheme by around 1,500 families. A detailed soil surrey in the left bank was carried out after the project work started. This survey disclosed that large tracts under irrigable command had very poor soil which was unsuitable for cultivation. Disregarding the variations in soil fertility, 65,000 acres of lands were blocked out into uniform allotments of 2 acres for irrigable paddy cultivation and 2 acres of highland for homestead development (Fernando, 2004).

4. Mahaweli System - C -Girandurukotte

The Mahaweli system C spreads over Badulla, Polonnaruwa and Ampara districts. It was established in 1980 to settle people who lost their land by inundation of Randenigala and Rantambe reservoirs. The System- C area consists of 67, 950ha of land situated by the right bank of the river Mahaweli. The area includes previous irrigation schemes of Dambarawa, Mapakada and Sorabora wewa. Several native villages and the Mahiyangana sacred land also came under the system- C. Under this project 1,336 ha of traditional land and 29,799ha of new land were developed. Main city developed under system- C is Dehiaththakandiya while Girandurukotte serves as the sub-urban center. It was designed to settle 22,321 farmer families and 5393 of non farmer families.

Initially, there were 21,130 settler families in the system- C. About 20% of the settler families have left the system due to various reasons such as outbreak of malaria and poor infrastructure facilities. However, the population has increased up to 30, 881 families by now. About 82% of the present populations are 2nd generation of the settlers. Rest are 3rd generation members. Initially a single family was granted 1 acre of highland and 2.5acres of lowland in Giradurukotte area. Later with the increased demand for land, highland extent given for a single family was reduced to 0.5acres while giving 2.5 acres of lowland.

5. Wennoruwa Scheme

Wennoruwa is an ancient scheme located in an urban environment close to Kurunegala town. At the time of the field survey there were five farmer organizations functioning in the area. The total command area of the scheme is 475acres low lands but, only 400acres is being cultivated. As the land value is very high in this area, the rest of the area has been developed for various urban activities and residential requirements. Average number of farmer families in the area is about 500. Highest extent of lowlands owned by a single person is 4 acres while the lowest extent is about 0.25 acres. Since water is abundant, paddy is cultivated in both seasons mainly for home consumption. Tenancy arrangements are very rare in the area. Most of the plots are being cultivated by the owners themselves while engaged in various non farm employments.

6. Navagiri Settlement Scheme

Navagiri settlement scheme was initiated in the early 1950's as a part of the Gal Oya irrigation project. Navagiri is operated as a single reservoir system located in the Batticaloa District. The scheme was in the conflict affected area during the last three

decades with a majority of Tamil speaking settler community. Most of the government programmes were not implemented during the conflict period and the institutional arrangements did not function well. Therefore many irrigation structures and canals are in the state of disrepair and have become non-functional. Displacement of settler community due to eruption of war from time to time was one of the major issues in this scheme.

7. Dewahuwa Scheme

Dewahuwa is one of the major colonization schemes that cover about 2,336 acres of lowland. Initially 465 farmer families were settled and this number has increased to about 5000 farmer families by now. Most of the farmers originally received 5 acres of low land and 3 acres of highland. Some of them received lands with less favourable soil conditions for cultivation and irrigation facilities, while some were given highland only. Considering the water scarcity in the scheme, bethma cultivation was practiced until 2005, but now they receive sufficient irrigation water to cultivate full extent. Farmers usually cultivate paddy in *maha* season and other field crops in *yala* season. Big onion is one of the popular crops in the yala season. Most of the present cultivators are third generation of the original settlers. There are few fourth generation farmers too. Most of the beneficiaries are engaged in off farm employments as well but their main income comes from paddy cultivation. Tenant farming is seldom practiced and often lands are operated by owners themselves. Land sizes mostly ranges from 1.5 to 0.5acres in extent. However there are land plots up to 5 acres extent.

2.3 Data Collection Methods

The findings of this study are based on both primary and secondary data. Primary data was collected from two sources as discussed in the previous section. The first source is the intensive household survey conducted in the selected settlement schemes (Table 2.1) and the other one is rapid assessment that was conducted in another set of selected schemes (Table 2.2). Farmers were selected randomly representing head and tail end areas of each selected scheme. About ten case studies were conducted in order to investigate the history of land ownership and the pattern of land operation and fragmentation in the study area. Field survey was carried out using a structured questionnaire by a well trained field staff during the period October to November 2010.

Information acquired through formal and informal discussions with farmers, leaders of the Farmer Organizations (FOs) and various government officials who serve at grass root level from irrigation, agrarian and land commissioner's departments, was used to compliment and validate the sample survey data.

Secondary data and information on land settlements, land fragmentation and subsequent issues was collected by reviewing available published and unpublished literature to understand the nature of the problem and past experiences.

2.4 Sample Selection and Sample Size

A multi-stage random sampling technique was applied for the household survey. At the first stage, colonization schemes were purposively selected to represent variations in original land size and different contexts. At the second stage, Farmer Organizations based on irrigation tracts/yaya or canals were chosen purposively to represent command areas of head and tail ends of the scheme. At the final stage, households were selected randomly from the selected farmer organization (FO) areas. From each selected FO area, about 20% of total households were randomly chosen for survey based on the farmers lists maintained by the respective FOs. Total sample size of the survey is 226. The pattern of sample distribution has been detailed in Table 2.4.

Table 2.4 Sample Distribution of the In-depth Survey

Settlement Scheme	Farmer Organization	Sample Size
Minneriya	Ulpathwewa	48
	Higuraka	28
Minipe Stage-1	D-34	16
	D-35	17
Rajangana Left bank	Saliyapura	26
	Weerapura	36
Mahaweli-C	$404D_2$	27
	Nagaswewa	28
Total		226

2.5 Data Analysis

Data collected was analyzed qualitatively and quantitatively. Descriptive statistics such as averages, percentages and ratios were used to interpret the findings.

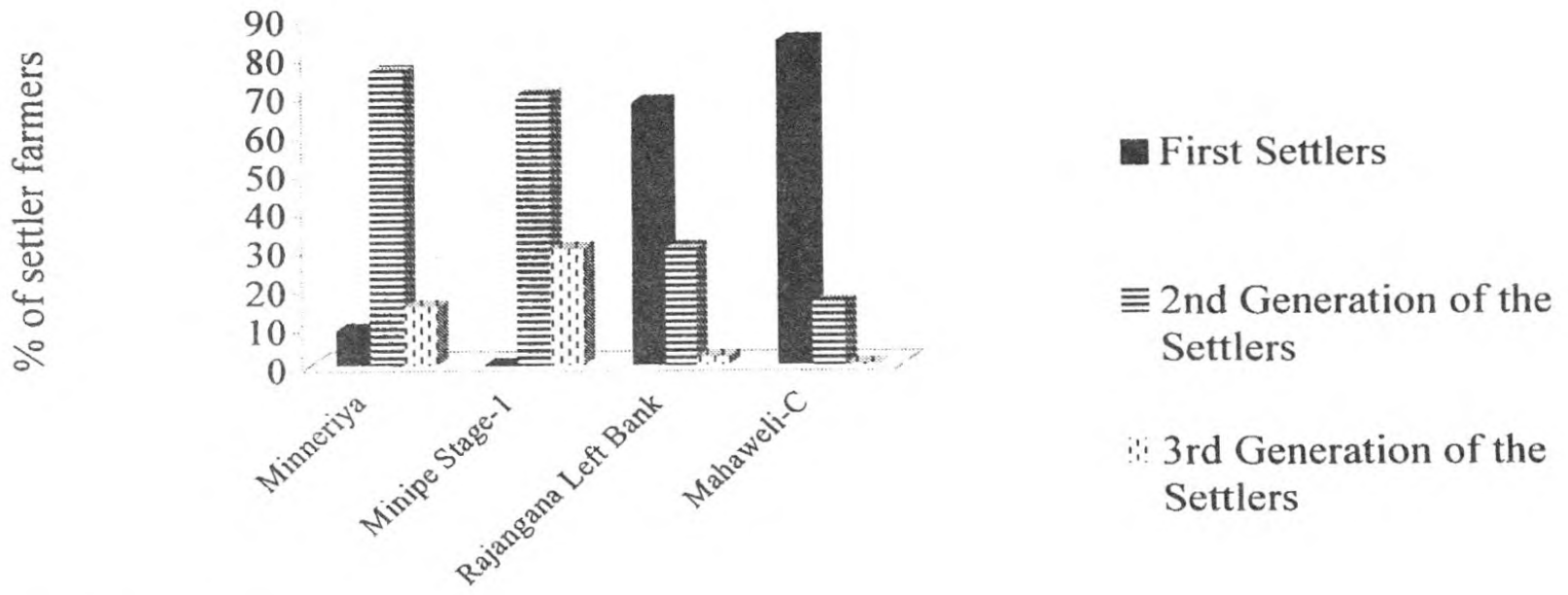
CHAPTER THREE

Selected Land Tenure Issues in Irrigation Settlement Schemes

3.1 Key Features of Sample Farmers

Out of the total selected farmers, 84% in Mahaweli-C and 48 % in Rajangana left bank tract 7 are initial settler (1st generation) farmers (Figure 3.1) while majority of the sample farmers in Minipe stage-1 and Minneriya schemes are off-springs of the settlers. In Minipe stage-1 and Minneriya, about 30% and 14% of the sample farmers respectively belong to the 3rd generation of the initial settlers.

Figure 3.1 Compositions of the Sample Farmers



Source: Author's Survey Data, 2010

Age distribution of the selected sample farmers shows that majority of them are over 55 years of age and a considerable number of farmers are over 65 years of age. Age distribution of the sample farmers is given in Table 3.1.

Table 3.1: Age Distribution of the Sample Farmers

Age Categories (Yrs.)	%			
	Minneriya	Minipe Stage-1	Rajangana Left Bank	Mahaweli-C
25-45	3.9	15.2	14.6	14.6
46-55	23.7	24.2	9.7	30.9
56-65	40.8	33.3	35.5	30.9
66-75	15.8	18.2	25.8	12.7
>75	15.8	9.1	14.4	10.9

Source: Author's Survey Data, 2010

3.2 Livelihood Options of the Sample Farmers

More than 90 percent of the sample farmers in all schemes are engaged in agriculture as their primary occupation (Table 3.2). Even under some unfavourable situations such as low profit and returns, paddy cultivation is being practiced as the main occupation of the small producers in Sri Lanka due to the absence of sufficient options for food security and surplus labour in the rural sector. Due to succession generations the land holdings have been fragmented into smaller allotments resulting in lower income from cultivation.

Table 3.2: Primary Employment of the Sample Farmers

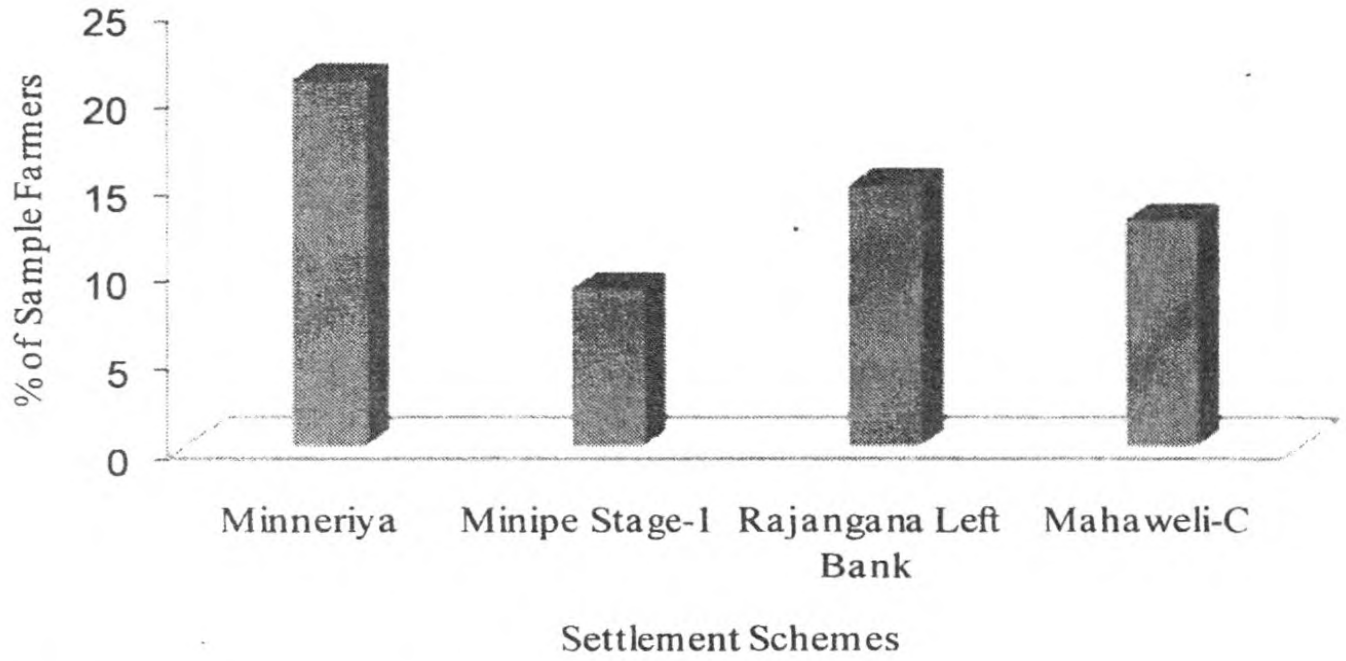
Employment Category	Minneriya		Minipe Stage-1		Rajangana left Bank		Mahaweli-C	
	No.	%	No.	%	No.	%	No.	%
Farming	69	90.8	33	100	58	93	52	94
Government Employment	1	1.3	-		1	2	1	2
Private Sector Employment	4	5.3	-		1	2	1	2
Other	2	2.6	-		2	3	1	2

Source: Authors' Survey Data, 2010

Involvement in a secondary occupation is also at a lower level (Figure 3.2) while cultivation of other land within or outside the settlement is also not common among the sample farmers. About 16% of the sample farmers own lowlands other than the lands given by the schemes. In Minipe stage -1 and Rajangana left bank, ownership of highland outside the schemes are about 24% and 32% respectively while it is about 7% in Mahaweli-C and Minneriya. However these highlands are basically used for residential purposes and do not generate much income as they had to share the highland among the siblings for settlement purposes and there was no much land left for cultivation.

As most of the initial settlers are in their old age and no depending children, income they obtain by cultivation may be sufficient to manage their livelihoods. Farmers who are younger are being engaged in various kinds of off farm employment and skilled jobs such as masonry and other skilled labour work during off seasons both within the area and neighbouring cities.

Figure 3.2: Percentage of Sample Farmers Involved in a Secondary Employment



Source: Author's Survey Data, 2010

3.3 Status of Cultivation and Different Tenure Systems

All the lowland plots owned or operated by the sample farmers are being cultivated without abandoning and about 75% of them are being cultivated by the owner farmers themselves (Table 3.3) but, sometimes by using hired labour. Tenancy rate is about 8%, nevertheless, providing the land share to another member of the family for cultivation is not common. About 11% of the highlands are not being cultivated by now mainly due to higher demand for residential requirements. Therefore many highlands in the settlement schemes consist of a number of houses. Remaining highlands if any, are mainly utilized as small scale home gardens.

Table 3.3: Different Tenure Systems in the Study Area

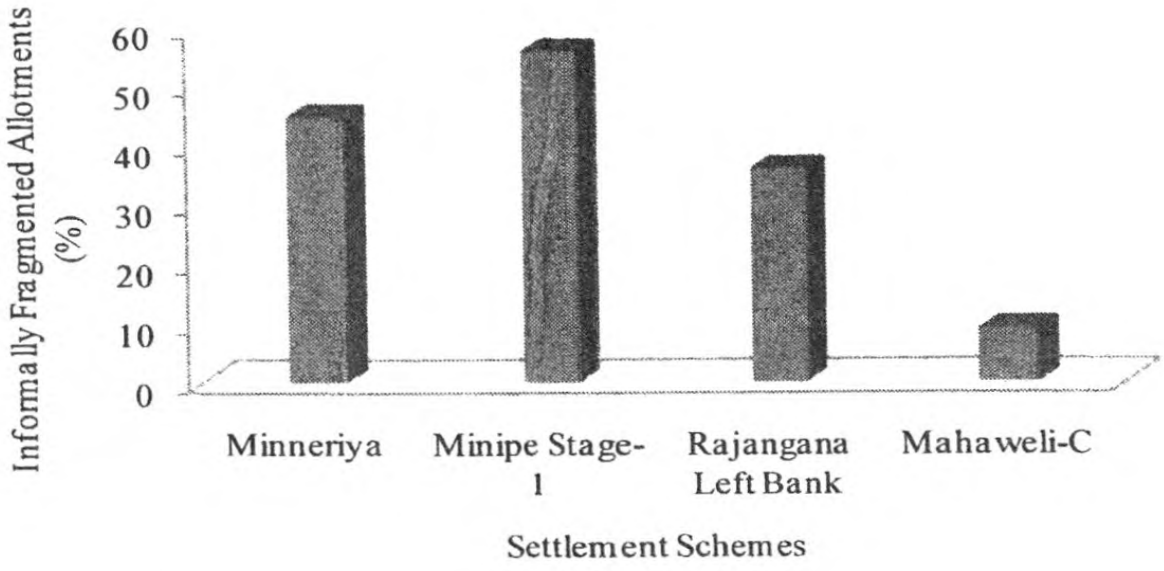
		% Allotments				
	Name of the settlement	**Owner cultivation**	**Share tenancy**	**Mortgaged**	**Sold**	**No cultivation**
Lowlands	Minneriya	70	9	6	3	-
	Minipe Stage-1	81	9	2	4	-
	Rajangana Left Bank	75	3	-	-	-
	Mahaweli-C	79	7	-	2	-
Highlands	Minneriya	66	-	4	1.5	18
	Minipe Stage-1	80	-	7	-	8
	Rajangana Left Bank	80	2	-	2	-
	Mahaweli-C	84	-	-	-	9

*percentages are based on number of operational plots
Source: Authors' Survey Data, 2010

3.4 Nature of Informal Fragmentation in Lowlands

Percentages of informally fragmented lowland allotments are 45% and 56% in Minneriya and Minipe stage-1 respectively. In Rajangana left bank, this is about 36% (Figure 3.3). In Mahaweli-system C, which was implemented rather recently has the lowest percentage of informally fragmented allotments.

Figure 3.3: Percentage of Informally Fragmented Allotments in Each Settlement Scheme



Source: Author's Survey Data, 2010

However, there are a considerable number of farmers (20%) who hold more than 1.5 acres of lowland, though they do not possess legal authority for the respective allotments (Table 3.4). Reason for the situation is that initial settlers are reluctant to divide land among their children legally when they are alive. Therefore after death of parents inheritance of the land goes to the eldest son, though there is a possibility of dividing the land to many children without violating the existing act.

Table 3.4: Percentage of Farmers with no Legal Documents for Lowlands of More than 1.5 acres

Settlement Scheme	Percentage of Farmers with no Legal Ownership
Minneriya	27
Minipe Stage-1	23
Rajangana Left Bank	13
Mahaweli-C	10
Average	20

Source: Author's Survey Data, 2010

Farmers have not identified lack of legal ownership as a barrier to day to day agricultural activities as close social relationships exist among the immediate family members. However non availability of legal documents has prevented them passing the allotment to their children in the past and possibly will prevent in future too. The non-existence of legal ownership was a more serious issue among the farmers where

the tradition of providing settlement land as part of dowry at their children's marriage specially in Tamil majority areas like Nawagiri scheme.

The study findings show that number of legal owners has been decreasing from generation to generation because of inability of dividing the originally allocated land equally among all the family members under the existing Act. In Minipe, only 62% second generation farmers have legal ownership to their lowland allotment and this has reduced to 12% in the third generation farmers. Similarly 65% of the second generation farmers in Minneriya, are legal owners, while 34% of the second generation farmers of Rajangana hold legal ownership. In Mahaweli- C, only 59% of the second generation land operators had legal ownership. When lowland was transferred to 3rd generation of the initial settlers, only 47% of Minneriya farmers had legal ownership. These results indicate that the original farmers hand over the operation of land to their family members without legal transfer.

3.5 Impact of Land Fragmentation on Water Sharing and Irrigation System Maintenance

According to the existing irrigation physical layout, individual irrigation off-take is provided to each allotment. However, due to population increases more than one child cultivate a single land allotment in most places. Because of this situation, issues were reported from all the settlement schemes in various degrees related to disputes in sharing irrigation water from the existing off takes. Reported number of farmers who have experienced issues of obtaining irrigation water was 14 percent in Rajangana left bank, 8 percent in Minneriya and 6 percent in Minipe stage -1 respectively.

According to the key informants and irrigation officials, conflicts are less and easy to resolve when sharing of water among immediate family members or relatives. When the cultivator is not within the family, participation and cooperation among them for irrigation system maintenance and sharing the limited water is a difficult task. At the same time if the informally fragmented allotments are given legal right, it gives the right to the beneficiary to demand both separate irrigation field outlet and arrangements for drainage channel for each field which will eventually necessitate a complete change of the irrigation layout costing huge amount of resources both for capital investment and recurrent expenditures. The alteration of irrigation layout by increasing number of off takes and drainage canal also would increase scheme level water duty.

3.6 Impact of Land Fragmentation on Land Productivity

Various laws enacted to address the issue of fragmentation have met with only limited success. Land fragmentation is very high in all schemes, and leasing and mortgaging as well as share cropping arrangements are prevalent (Loeve *et.al,* 2004; Fonseka, 2001). Therefore the relationship between productivity of lowland with extent of the allotment was analyzed by using the Karl Pearson correlation coefficient technique (Table 3.5).

Table 3.5: Correlation between Land Size and Productivity in Lowlands

Settlement Scheme	Pearson Correlation Coefficient	
	Yala	Maha
Minneriya	0.087	0.128
Minipe Stage-1	-0.147	-0.168
Rajangana Left Bank	-0.043	-0.088
Mahaweli-C	-0.047	-0.001
Average	**-0.0375**	**-0.0323**

Land size and productivity relationship are found to be inverse with the overall r^2 0.127. Similar findings were reported by Herath (1983) from a study conducted in two locations of Sri Lanka, namely Galaha and Anuradhapura. This kind of inverse relationship between farm productivity and farm size has been reported also from other countries by several other researchers (Carter, 1984; Byiringiro andReardon, 1996; Masterson, 2007 and Okoye *et. al*, 2008). Studying about the relationship between farm size and productivity among smallholder rice farmers in Anambra State, Nigeria, Mbam and Edeh (2011) have concluded the fact that the inverse relationship is a result of differential factor use intensity, which causes small farms to have greater average and marginal productivity of land. Thus, if farm size is small, the farmers are able to combine their resources better.

The same conclusion has been made by another study undertaken in Nepal to analyze the impact of land fragmentation on input use efficiency, crop yield and production efficiency with reference to maize and paddy. According to the yield analysis, these small parcels are more productive than large parcels due to higher applications of inputs. The small parcels have obtained higher production efficiency than large parcels considering both benefit and cost of purchased inputs indicating a positive impact of land fragmentation on farmers' income. Therefore current state of fragmentation has not affected negatively to the productivity of lands under consideration. However when production efficiency was analyzed in terms of the cost of inputs it has revealed an opposite trend that, production is more efficient in large land parcels than small land parcels leading them to conclude land fragmentation that creates smaller land parcels has a negative impact on production efficiency which constrains agricultural development (Niroula and Thapa,2007).

CHAPTER FOUR

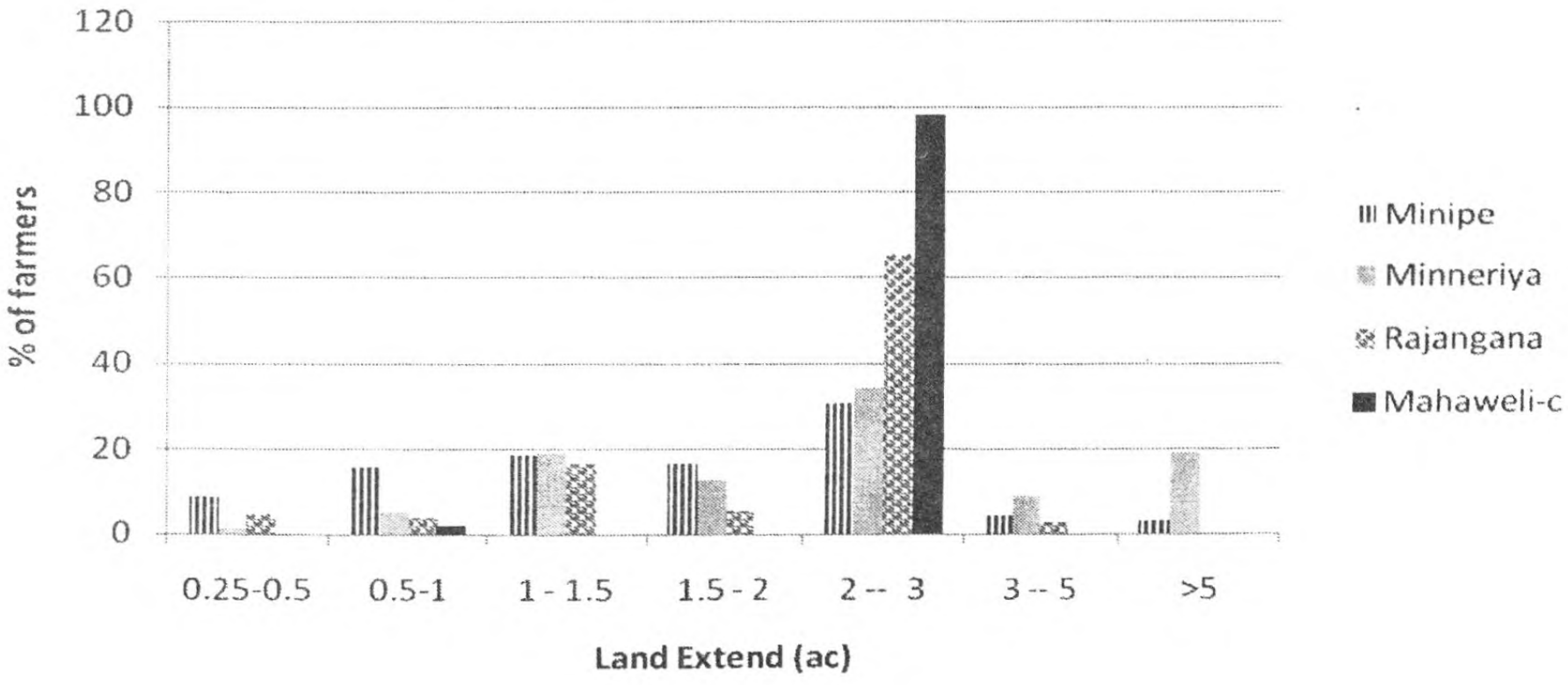
Current Status of Land Fragmentation in Settlement Schemes

4.1 Degree of Land Fragmentation

In both rural and irrigational settlement contexts, access to land is considered as birthright socio culturally, more than a matter of legal confirmation. As the settlement schemes mature, the process of land fragmentation is formally and informally expected to increase not only due to economic reasons, but also due to social and normative constraints arising from enlarged family sizes that seek accommodation through landholdings (Wanigaratne, 1995). Therefore, the lands that are alienated more or less equal in size at the inception of project becomes fragmented into a wide range of operational sizes in the course of time.

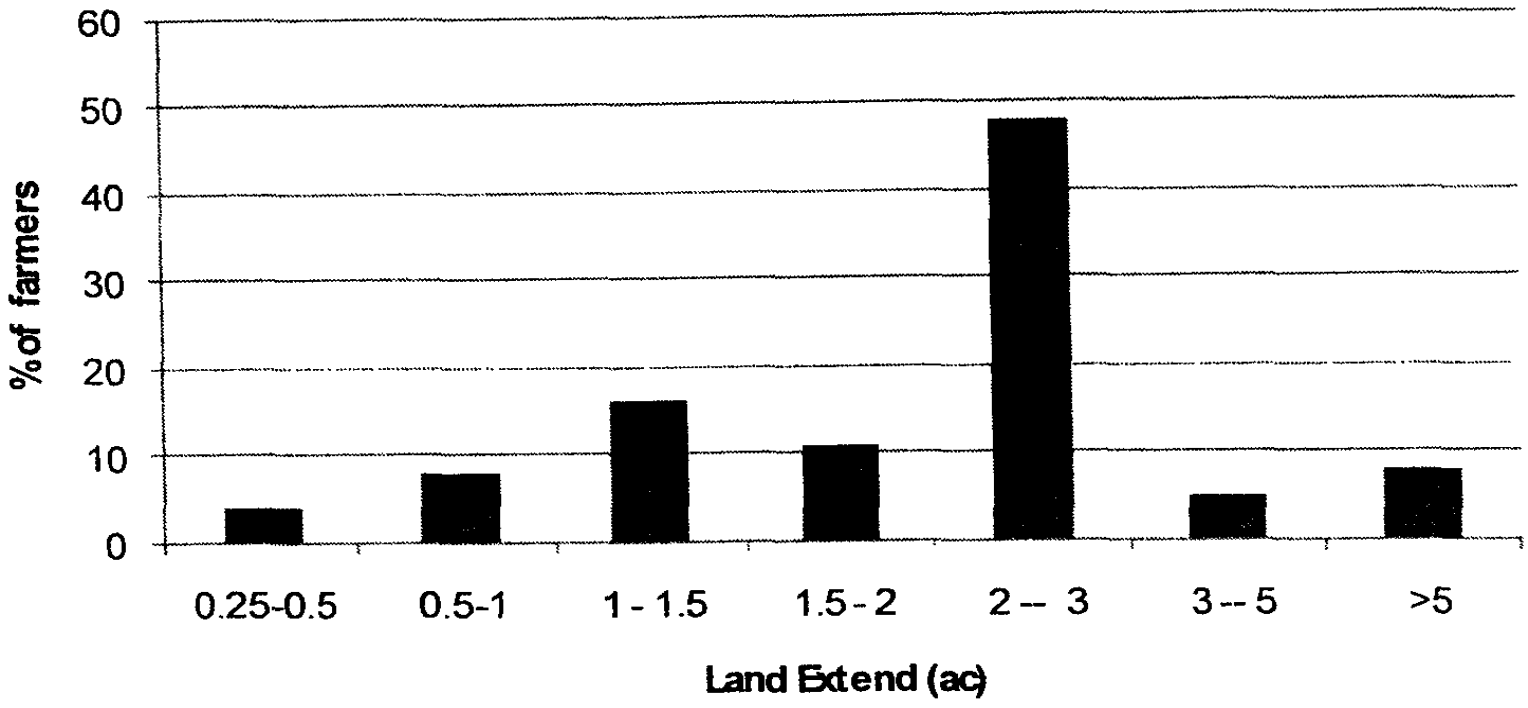
The size of current operational land classes in the selected schemes are illustrated in Figures 4.1 and 4.2. The figures show a pattern of more fragmentation with the maturity of project. In more recent schemes such as Mahaweli system-C, almost 78% of holdings are still operated in original allotment size. The most importantly, about 20% of operators in the sample locations have informally fragmented there land to less than 1.5 ac disregarding the Land Development Act of 1935 which is in force to date.

Figure 4.1: Level of Land Fragmentation in the Lowlands



Source: Author's Survey Data, 2010

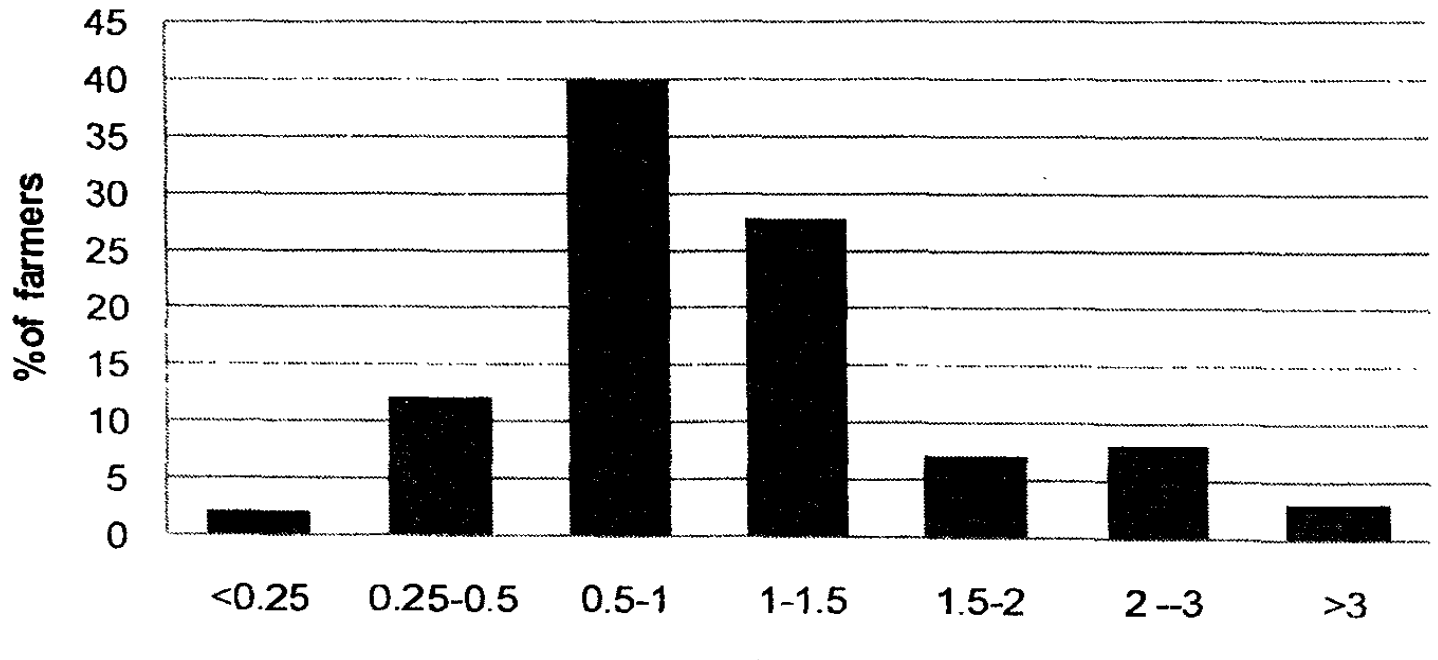
Figure 4.2: Average Land Operational Classes in Lowlands



Source: Author's Survey Data, 2010

The fragmentation is more severe in highland allotments. This is mainly due to increased demand for residential purposes with population growth. About 82% of highland holdings are less than 1.5 ac extents (Figure 4.3)

Figure 4.3: Level of Land Fragmentation in Highlands



Source: Author's Survey Data, 2010

Table 4.1 shows the number of legal owners selected from each scheme & number of existing operators in the selected farm plots. The table again validates the findings that, the problem of land fragmentation is more severe in older settlement schemes. One of the reasons for the low degree of fragmentation in Minneriya compared to Minipe is due to allocation of land for selected second and third generation people from some other areas near Minneriya by the government though holding of land "Kachcheries" from time to time.

Table 4.1: Actual Operators Vs Legal Operators in 2010

Name of the Scheme	Year of Settlement	No. of Legal Settlers Selected for the Study	No. of Actual Operators in the Selected Land Blocks	% increase
Minneriya	1937	76	148	95
Minipe	1939	33	116	251
Rajangana	1972	62	75	21
Mahaweli C	1980	53	53	0

Source: Author's Survey data, 2010

4.2 Criteria Adopted in Alienating Land Among Children

There are three kinds of beneficiaries in the selected schemes in utilizing their allocated land. Firstly, about 75% of the selected beneficiaries utilize their land themselves without any transfer of land formally or informally among their off springs. This includes the 37% of beneficiaries who have received their land from their parents without any legal transfer before his/her death. Secondly, about 9% of the beneficiaries have distributed their land formally among their offspring adopting different criteria (Table 4.2). Thirdly, about 15% of the current land users have distributed their land among children informally as described in table 5.2. Almost half of the last two categories of users have adopted the criteria of distributive land among male children only while having female children in their families.

Table 4.2: Criteria Adopted in Distributing Land among Next Generation

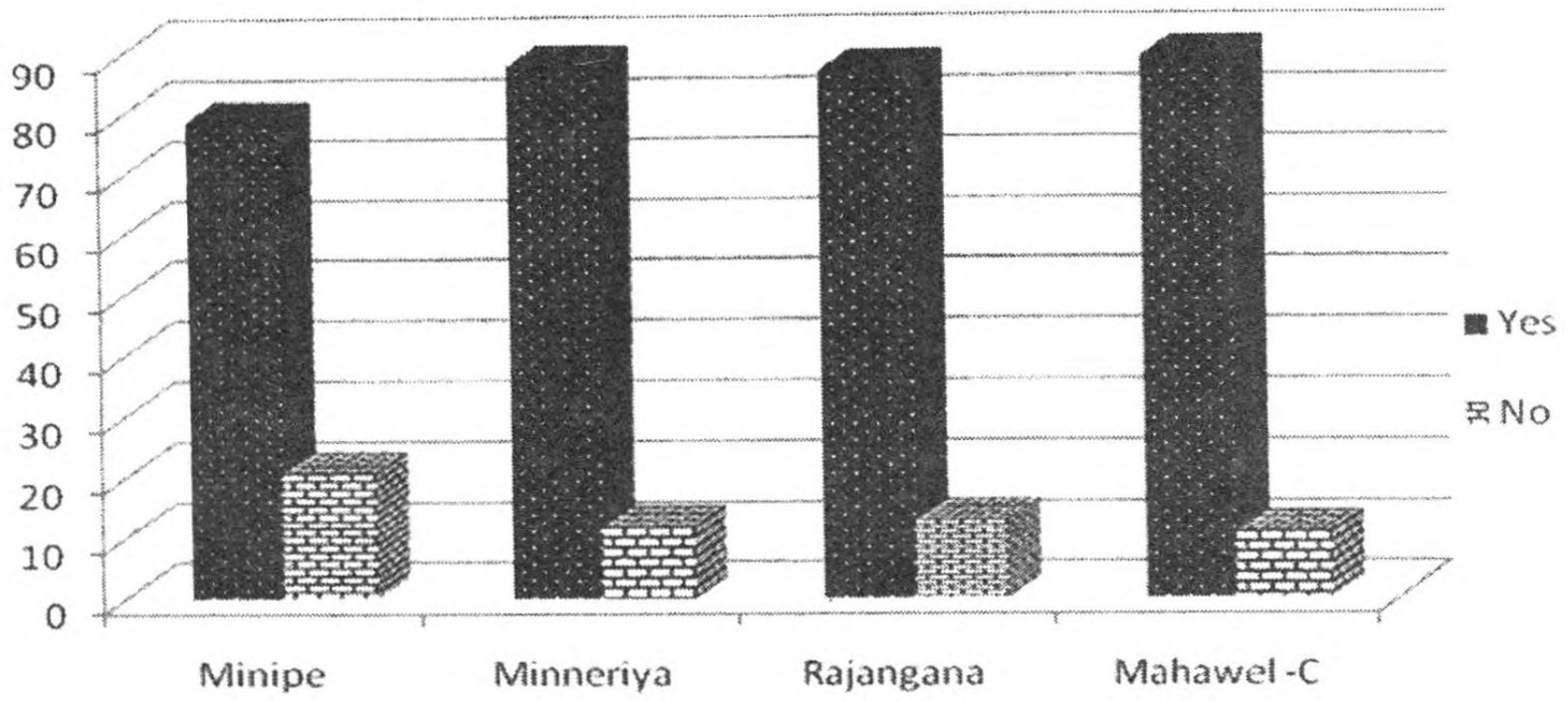
Criteria Adopted	% of Beneficiaries	
	Legal Land Transfer (N=20)	Informal Land Transfer (N=35)
Only for male children while having female child/children	45	46
Distribution among both male & female children	35	26
Only among female children, while having male child/children	05	08
Distribution among female children, but not having any male child/children	05	09
Distribution for male children, but not having any female child/children	10	11

Source: Author's Survey data, 2010

4.3 Farmer Perception towards Present Land Policy

Farmers were asked about their awareness on the existing restrictions imposed by the Land Development Act of 1935 and the subsequent amendments and their views about the Act. About 80-88% of beneficiaries in the study locations are aware of the restrictions imposed by the Act on fragmentation (Figure 4.4).

Figure 4.4 Level of Awareness on the Restrictions on Land Fragmentation



Source: Author's Survey Data, 2010

Farmers expressed different opinions about the current restrictions on land fragmentation imposed by the existing law. Majority of the farmers wanted to amend the existing law to pave the way for the beneficiary to determine the minimum size of land, while only three percent of beneficiaries think that the existing minimum size of land specified in the Act should be higher than the given limit. The details of the farmer perceptions on the existing restrictions on land fragmentation are given in table 4.3.

Table 4.3: Farmer Perceptions on the Existing Restriction on Land Fragmentation

Farmer Perception	% of Farmers
The right of determining minimum land size should be given to the owner	70
Farmers should be allowed to fragment the land up to 1acre	12
Existing minimum size limit should be further reduced	9
Present size limit specified in the Act is appropriate	9
Existing minimum size limit specified in the act should be further increased	3

Source: Authors' Survey data, 2010

Over 60% of the sample beneficiaries are willing/ anticipating to divide their alienated land equally among all the children except in the Mahweli system C. It is worthwhile to note that although original land allotment in Rajangana scheme is 2.5 ac, they still prefer to divide their land equally among the children. This is due to the current tradition and also due to social obligations of treating all the children without any discrimination. As the Mahaweli system is relatively new the fragmentation issue is not very severe.

However about 17% of the farmers prefer to transfer their land right to the youngest child as he/she is the one expect to look after the parents according to the local tradition. Farmers' preferences of their future land transfer arrangements in the settlement schemes are given in the table 4.4

Table 4.4: Farmers' Preferences of Allocating Settlement Land among their Children

Willingness of the Farmers	% of Farmers			
	Minipe	Minneriya	Rajangana	Mahaweli -C
Equal share among all the children	67	61	66	31
To the youngest child	6	13	13	33
Among all the male children	6	5	2	7
To the eldest child	3	3	5	4
Among the farming children	6	4	2	5
Not yet decided	12	13	12	15
Other	0	01	0	5

Source: Authors' Survey data, 2010

In some farmer families, inability of the farmers to divide the land bellow the 1.5ac extent has led to non transfer of land legally to the next generation until death of the legal owner. About 39% of original land allottees in the selected schemes have passed away, in which 37% of them have died without transferring their land rights to the offspring. This kind of situation has created land related conflicts among 14% of such families, whose parents had not nominated the legal owners of the alienated land after his death. However, 33% of the farm families, who had not received the land legally from their parents before his /her death, had not experienced any problem in sharing the land among members.

CHAPTER FIVE

Description of Case Studies

5.1 Dewahuwa Settlement Scheme

Case Study No. 1
Sixty nine year old Ranhami is a second generation farmer of Dewahuwa settlement Scheme. The original settler was his father. Ranhami's father was originally from Udunuwara electorate and he had received three acres of highland and five acres of lowland in 1949. Ranhami had two elder brothers and the lowland received by Ranhami's father was divided among three of them equally (1.5acres each) and the highland allotment was divided among the two elder brothers according to their collective agreement. Therefore, Ranhamy did not receive any legal homestead land.

Ranhami's homestead is developed in an encroached piece of highland. He has three children consisting one son and two daughters. At present he has informally divided his 1.5 ac lowland among the three children equally as there is a legal barrier to subdivide lowland below 1.5acres.

Among the three children only the eldest daughter is living in the settlement land with parents, while the other two are settled away from the area. Therefore eldest daughter cultivates her own share and her brothers' share while father cultivates younger daughters' share. There is no conflict in sharing the land informally among the immediate family members.

According to the existing law, Ranhami could pass inheritance of his lowland to only one of the three children. However they have not realized the need of legal ownership of the land as they cultivate the land with strong family bonds. They are happy even without legal ownership, but, they have no idea of the way of passing the land rights to their own children (fourth generation).

According to family traditions and social obligations, parents are willing to divide the total inherited land equally among all of their children regardless of gender and the legal restrictions of subdivisions. In the event of the death of the father, the entire land will legally pass to the eldest son. Then the daughter who resides in the scheme and looks after the parents will not get anything according to the existing law. The case study highlights the importance of revising the current succession procedure in the absence of a nominee.

5.2 Minipe Settlement Scheme (Stage-1)

Case Study No. 2
G. Kumarihami is a 65 years old resident in the Minipe scheme and has inherited the settlement allotment from her father. Her father, N. G. Ranbanda received ten acres of lowland and two acres of highland under the Minipe Stage-1.The family of Ranbanda

had six members including four male members. All the children were given shares from the lowland allotment while highland had been given only to male children. According to the extent of individual land share, succession had created only one illegal fragment. However, only two from the six children have legal documents for their allotments, but all are cultivating their share of land individually. The remaining informal land operators have no option to obtain their legal land document as their father is no longer living with them. With the parents' death, family ties have loosened and she is influenced by the elder brother to give her share to him. She is aware of the restrictions on minimum size of a lowland parcel but however her opinion is that existing Act should be revised to provide land to many members legally. Kumarihami has seven daughters and she is finding it difficult to give land to her children due to absence of legal basis.

This case study shows land rights on mutual agreement gets weak after the death of the parents and through the generations. This may create disputes among relatives in future.

5.3 Minneriya Settlement Scheme

Case Study No. 3
Fifty nine year old Wijayaratne is a farmer who is residing in the Minneriya settlement scheme. His father as one of the original settlers had received 5 acres of lowland and 2 ½ acres of highland in the scheme. Wijayaratne has only one sister and after the death of the father, land had been transferred to the sister as per the father's wish. However Wijayaratne had been given 1 acre of highland to reside while sister was residing in the remaining 1.5 acre of highland taking care of her mother. His father had purchased 2 acres of lowland from the settlement itself and legally transferred it to Wijeratne. Sister's lowland is cultivated by an outsider on the basis of sharing the harvest of paddy.

Father had fulfilled the social obligations by arranging some kind of land for his other child, while expecting his daughter to look after his wife by giving the daughter the entire lowland and larger portion of the highland.

Above case study highlights the importance of a parcel of land for social security. Children are obliged to look after their parents when they were given land.

Case Study No.4
Fifty eight years old Somaratne has inherited 1.25 acres of lowland owned by his father in the settlement scheme. His grandfather, the first owner of the land had received 5 acres of lowland and ½ acre of highland from the settlement in 1941. Somaratne's father had one sister but the whole lowland and highland was passed to his father legally. Somaratne has two sisters and three brothers, but low land was informally distributed equally only among male children. Highland was divided in to ¼ acre allotments and given to two of the sons. They do not hold any legal document to both lowland and highlands. As Somaratnes' farther is not living and not holding valid legal documents, the widow of the eldest brother is now demanding the entire

block of 2.5 ac lands according to Land development Act which has seriously hampered the family relationships.

The case clearly illustrates the importance of legal rights to land parcels and the problem of existing Act on the right of eldest son in the absence of father.

5.4 Navagiri Scheme

The farmers in this scheme lived in the conflict zone during the last three decades and most of them were displaced from the area from time to time during the last 30 years. They were fully displaced in the five years before 2008. About 60% of the people had been resettled by May 2008. Rest of the people are reluctant to go back due to lack of basic infrastructure facilities. Some of the original settlers had sold out their homestead while keeping low lands to themselves.

Focus group discussions revealed that majority of the original settlers had informally divided their paddy lands into 4-5 blocks holding, each 0.75 to 1 acre in extent. As giving land as dowry to their female children according to traditional culture is a requirement to give girls in marriage, priority land allocation is given to female children. Although they can't give a land parcel legally, the provision of land is ensured by the parents via unregistered notary deed. Therefore almost all the participants of the focus group discussion insisted in providing the right of dividing the land to the beneficiary at least up to a minimum of one acre extent.

CHAPTER SIX

Findings and Recommendations

Findings:

a. About 57% and 30% of the existing lowland and highland plots respectively in the study area are informally fragmented. About 28% of the lowland plots in the study areas have been fragmented into less than 1.5 acres in extent.

b. Primary reason for land fragmentation is to provide the settlement land for their children, which is considered by the farmers as their social obligation to treat all the children equally. Therefore, most of the farmers are willing to divide the land equally among all their children disregarding minimum size specified in the Act.

c. Inability of formal method of transferring ownership of land of less than1.5ac has not been a problem or created any serious social and economic issues for over 60% of the settlers at the time of survey, though most of them preferred to transfer their land ownership legally to their children or next generation. However, about 20% of farmers expressed that they are experiencing problems due to their inability to transfer the land rights legally to their children.

d. More than 85% of the farmers are aware of the legal prohibitions of sub division of lowland into less than 1.5acres in settlement schemes under the existing law. Nevertheless 70% of the farmers suggested amending the law allowing them to divide their allotments according to their own wish. But about 12% farmers preferred to limit the subdivision up to one acre as there should be an end to unlimited fragmentation.

e. About 55% of the beneficiaries intend to transfer their land rights among all the children equally, but 17% of the interviewees were willing to give their land right to the youngest in the family while 13% had not yet decided about their future action.

f. Formal subdivision of land into small pieces is expected to create problems in water management and irrigation system operation and maintenance (O&M) because of higher resource requirement (physical and human) for the O&M. Increased number of legal land holdings and higher irrigation water requirements can cause more drainage from each land block. Irrigation officials believed that, legal transfer of small pieces of land will pave the way for farmers to sell their allotment outside their family which could create conflicts in managing water between small plots breaking current harmony prevailed within family members.

Recommendations:

1. As informal land fragmentation has not been realized as a barrier by majority of the farmers and not created any serious social and economic consequences, it is not recommended to amend the existing Act to allow the beneficiary to unlimited subdivision of land allotments.

2. Some amendments for the existing Act are recommended to allow the family members to fragment the land in the event of death of original land owner (parents) without a nominated successor. The amendment must provide entitlement not only to the eldest son, but to any one of the family member nominated by the consensus of other family members irrespective of gender but within the minimum size limit of 1.5ac.

3. Pressure on land in the settlement schemes should be minimized by creating off-farm employment opportunities and providing priorities for new generation people of the old settlement schemes in allocating land under new land alienation programmes.

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