Conflicting and Complementary views of Farmers and Extension Workers

An Analysis of the Impact of Development Policies and Extension Approaches on Smallholder Farming Systems in Sri Lanka.

HERATH MUDIYANSELAGE UDAYA NANDANI HERATH

DOCTOR OF PHILOSOPHY

2018

Herath Mudiyanselage Udaya Nandani Herath

A thesis submitted in fulfillment of the degree of

Doctor of Philosophy

School of Politics History and International Relations

University of Nottingham Malaysia

2018

ABSTARCT

Transformation of economic policies from a closed to a liberalised open economy in Sri Lanka has had a significant impact on agriculture and extension since the late 1970's. Most extension projects adopted during different political regimes in the past had not been successful in developing the rural agricultural sector in Sri Lanka. Hence, the national extension service today seems to face with the challenge of catering to the real farmer needs through efficient extension delivery. A major role of agricultural extension in developing countries including Sri Lanka, is to disseminate knowledge generated through the public-sector research organizations. Thus, the central research question addressed by this thesis investigates the factors affecting the delivery of agricultural information encompassing state policies, extension agents and smallholder farmers as the main elements in the process. The study was conducted employing a combination of research tools including survey methods, extended interviews and field observation. This study pursued the theoretical background of 'Sustainable Livelihood Approach' which is considered central to analysing rural development strategies.

Despite many government-initiated extension efforts, present extension strategies too have overlooked smallholder farmers, aside from paddy farmers who receive institutional support. Group extension strategies have failed to create a marked impact on individual farmers who are constrained by social capital, further limiting their access to physical and financial capital bases. Farmers whose capabilities are shaped by social capital and benefited by institutional support, are prone to adopt new crop combinations leading to better livelihood outcomes. Study reveals that the possession of human and social capital bases, has a bearing on information sharing. Performance of the extension workers hindered by lack of motivation, poor working environments and low capacities, affect the farmer extension link thus creating a knowledge gap. Further, Government policies and extension strategies affect information sharing, as reflected by the extension interventions in the field.

Two clear paradigms are identified with a knowledge interface. Extension officers stand at one side, equipped with scientific knowledge and farmers remain on the other side, constrained by traditional knowledge and limited institutional support, awaiting long-term solutions for sustainable livelihoods.

In conclusion, the thesis reiterates the need for a National Agricultural Extension Policy encompassing strategies for capacity building of extension workers for an effective extension delivery, while empowering smallholders for better utilization of advisory services to improve their livelihoods.

ACKNOWLEDGEMENTS

First and foremost, I wish to acknowledge the contribution of my supervisors whose constant guidance and direction, enabled the completion of this dissertation. I am profoundly thankful to Professor Dr. Trevor Parfitt for his timely advice and academic guidance. More than anything, I appreciate his understanding and patience during the difficult periods I went through, in this journey. I am grateful Dr. Patrick O'reilly for his guidance and direction at the initial stages of this study. I wish to thank him for sharing his knowledge and expertise which immensely contributed to shaping this study. I owe a special word of thanks to Prof. Asha Karunarathne for inspiring me to embark on this journey to the PhD. Thank you for accompanying me to the University of Nottingham, Malaysia and for academic guidance and support given to me.

It is with a deep sense of gratitude that I extend my sincere thanks to Prof. Sayed Azam Ali, the CEO of the Crops for the Future project for sponsoring my Doctoral studies. The staff of the CFF project deserves a special appreciation for providing a friendly atmosphere during my visits there.

I wish to express my deepest gratitude to the persons without whom this thesis would not have been possible. Special thanks to MS. Preethi Gunathilake for the support given in organizing the field research and for providing me with necessary facilities to conduct the survey. Agricultural Instructors and farmers who were the key participants of the survey are deeply appreciated for their contribution. Also, I am thankful to the Provincial Director and the Deputy Director (Extension) in Anuradhapura, during the period of carrying out the survey.

I owe a very special note of thanks to my husband Ashwin and two daughters Yelani & Seneli for their patience and understanding. I am deeply indebted to my parents and my sister for their unconditional support extended over the period of study.

My brothers, in-laws and friends are remembered here with gratitude for being supportive in numerous ways. I am especially thankful to Madhuraka Balasooriya for the support given to complete this thesis on time.

Finally, I would like to express my gratitude towards my work place, The Open University of Sri Lanka for funding the field research.

TABLE OF CONTENTS

ABSTARCT iii

ACKNOWLEDGEMENTS v

TABLE OF CONTENTS vi

ABBREVIATIONS x

LIST OF TABLES xii

LIST OF FIGURES xiii

LIST OF APPENDICES xv

CHAPTER 1 1

INTRODUCTION TO THE STUDY: WHY STUDY SMALLHOLDER FARMERS AND EXTENSION WORKERS 1

1.1 Background of the Research 1
1.2 Problem Statement 8
1.3 The Research Question 9
1.3.1 Support Questions 10
1.4 Objectives of the Study 12
1.5 Theoretical Framework 13
1.5.1 Understanding Smallholder Farming from a Livelihoods Perspective 14
1.5.1.1 Contextual Analysis 17
1.5.1.2 Analysis of Livelihood Resources 17
1.5.1.3 Analysis of Institutional Processes and Organizational Structures 19
1.5.1.4 Analysis of Livelihood Strategies 19
1.5.1.5 Analysis of Sustainable Livelihood Outcomes. 20
1.6 Research Methodology 20
1.7 Definitions of Terms Related to the Central Research Question 23
1.7.1 Agricultural Extension 24
1.7.2 Advisory Service(s) 24
1.7.3 Extension Coverage 24
1.7.4 Decentralized Extension 24
1.7.5 Demand-Driven Extension 25
1.7.6 Extension Education 25
1.7.7 Farmer Field School 25
1.7.8 Farmer-to-Officer Ratio 25
1.7.9 Participatory Extension 26
1.8 Original Contribution of the Study 27
1.9 Overview of Literature Review 28
1.10 Outline of the thesis. 31

CHAPTER 2 **32**
DRYZONE FARMING SYSTEMS IN SRI LANKA: OVERVIEW OF THE RESEARCH AREA – *ANURADHAPURA* **32**

2.1 Introduction 32
2.2 Colonial History of Sri Lanka 33
2.3 Anuradhapura: The capital of the North Central Province 36
2.4 Historical Significance of Anuradhapura 38
2.5 Climatic Conditions Favouring Dry Zone Farming Systems 40
2.6 Cropping Patterns in The Dry Zone Farming Systems in Anuradhapura 47
2.7 Land Settlement in the North Central Province 50
2.8 Agriculture Administration, Population and Land Use In Anuradhapura 53
Summary 59

CHAPTER 3 **60**
METHODOLOGICAL APPROACH TO STUDY SMALLHOLDERS **60**

3.1 Introduction 60
3.2 Theoretical Background to Qualitative Data Gathering Techniques 61
3.3 Research Methods 63
3.3.1 Sources of Primary Data 63
3.3.2 Sources of Secondary Data 68
3.4 Sample Selection 69
3.5 Gaining Access to The Field 71
3.6 Primary Data Collection from Farmers 79
3.7 Primary Data Collection from The Extension Officers 80
3.8 Analysis of Primary Data 82
3.9 Qualitative Validity of the Study 82
3.9.1 Credibility 83
3.9.2 Transferability 83
3.9.3 Dependability 83
3.9.4 Confirmability 84
Summary 84

CHAPTER 4 **86**
CHANGING POLICIES AND EXTENSION APPROACHES **86**

4.1 Introduction 86
4.2 History and Development of Agricultural Policies in Sri Lanka 87
4.2.1 Agricultural Policies During the Early Formative Period (1833-1931) - Plantation Economy 88
4.2.2 Agricultural Policies During Late Colonial State (1931- 1948) - Colonization Policy 91
4.2.3 Agricultural Policies During Post-Colonial State (1948-1970) –Self-Sufficiency In Food 92
4.2.4 Agricultural Policy After Economic Liberalization (Since 1977) Open Market Policies 95
4.3 Agricultural Policies and Extension Approaches in Sri Lanka 97
4.3.1 Agricultural Policy in the Colonial Era, the Commodity Development Approach 98
4.3.2 Post-Independence Agricultural Policy and the Conventional Extension Approach (1948-1965) 100
4.3.3 Protectionist Economic Policies and the Systems Approach 105

4.3.4 Open Economic Policies and the Training and Visit (T&V) System (1979-1987) 110
4.3.5 The Second Phase of Liberalization and Second Agricultural Extension Project (SAEP) 113
4.3.6 Third Phase of Liberalization and Agricultural Extension in the Interprovincial Areas 115
4.3.7 Participatory Commodity Development Extension Approach and the Present Policy Framework 119

CHAPTER 5 123
INSTITUIONAL ARRANGEMNTS FOR EXTENSION DELIVERY: CURRENT EXTENSION FRAMEWORK 123

5.1 Introduction 123
5.2 Agricultural Extension Providers in Sri Lanka 126
5.2.1 Extension by Department of Agriculture 128
5.2.1.1 Extension and Training Division of the Department of Agriculture 129
5.2.1.2 Rice Research and Development Institute (RRDI) 135
5.2.1.3 Horticultural Crop Research and Development Institute (HORDI) 136
5.2.1.4 Field Crops Research and Development Institute (FCRDI) 137
5.2.1.5 Fruit Crop Research and Development Institute (FRDI) - *Horana* 137
5.2.2 Extension Services of The Plantation Crop Sector 138
5.2.2.1 Extension Services of The Tea Plantation Sector 138
5.2.2.2 Extension Service of The Rubber Plantation Sector 139
5.2.2.3 Extension Services of The Coconut Sector 140
5.2.3 Department of Export Agriculture 140
5.2.4 Agricultural Research Institutes 141
5.2.5 Extension Services in The Livestock Agriculture Sector. 142
5.2.6 Private Sector Extension 142
5.2.7 Extension Services of Non-Governmental Organizations (NGOs) 144
5.2.8 Extension services of Farmer-based Associations, Cooperatives and Societies 145
Summary 149

CHAPTER 6 150
EXTENSION INTERVENTIONS IN ANURADHAPURA: THE ENABLING FRAMEWORK 150

6.1 Introduction 150
6.2 Food Production Programmes 151
6.2.1 Promotion of Paddy Cultivation 151
6.2.1.1 Establishing Local Rice Varieties (50% Farmer Contribution) 151
6.2.1.2 Promoting Parachute Paddy Nurseries (50% Farmer Contribution) 152
6.2.1.3 Promoting Integrated Pest Management Programmes (IPM) In Paddy Fields 153
6.2.1.4 Promoting Integrated Plant Nutrition System (IPNS) – Demonstrations 153
6.2.1.5 The Paddy Production *Yaya* (Tract) Programme 154
6.2.2 Promotion of Big Onion Crop Cultivation 155
6.2.3 Promotion of Other Field Crop (OFC) Cultivation 157
6.2.4 Promotion of Fruit Crops and Vegetable Cultivation 158
Summary 160

CHAPTER 7 **161**
LIVELIHOOD RESOURCES: CAPITAL BASES SHAPING LIVELIHOOD STRATEGIES **161**

7.1 Introduction 161
7.2 Livelihood Resources in *Anuradhapura* 162
7.2.1 Natural and Physical Capital Bases 162
7.2.1.1 Land Availability and Land Use Patterns in The Area 169
7.2.2 Financial Capital Bases 170
7.2.3 Human Capital Bases 172
7.2.4 Social Capital Bases 174
7.2.4.1 Rural Organization as Social Capital Bases 175
Summary 183

CHAPTER 8 **185**
VOICE OF SMALLHOLDER FARMERS: EXTENSION IN THE FARMERS' PERSPECTIVE **185**

8.1 Introduction 185
8.2 How Do Farmers Respond? 188
8.2.1 Farmer Extension Link 189
Summary 211

CHAPTER 9 **214**
LIAISING ROLE OF EXTENSION AGENTS: EXTENSION IN THE BROKERS'PERSPECTIVE **214**

9.1 Introduction 214
9.2 Education, Training and Experience For of the Agricultural Instructors 216
9.3 Span Of Outreach: Coverage and Interactions With Farmer Families 220
9.4 Resource Requirements for Effective Extension Delivery 227
Summary 237

CHAPTER 10 **240**
CONCLUSIONS **240**

10.1 Overview of Findings 240
10.2 Revisiting research questions 241
10.2.1 Performance of Existing Extension Services 242
10.2.2 The role of extension agents and their perceptions 244
10.2.3 How do farmers respond? Farmers' Perspectives 245
10.2.4 What are the coping strategies for better service? 246
10.3 Revisiting the objectives 247
10.3.1 Research Objective 1 248
10.3.2 Research Objective 2 248
10.3.3 Research Objective 3 249
10.4 Conclusions 251

ABBREVIATIONS

AEO	Agricultural Extension Officer
ADA	Assistant Director of Agriculture
AI	Agriculture Instructor
AEAR	Agriculture Extension and Adaptive Research
ASC	Agrarian Service Centers
CRQ	Central Research Question
DAEO	Divisional Agricultural Extension Officer
DOA	Department of Agriculture
DZPDP	Dry Zone Participatory Development Project
FAO	Food and Agriculture Organization
GPS	Guaranteed Price Scheme
GSN	Village Administrative officer (***G****rama* ***S****eva* ***N****iladari*)
IFAD	International Fund for Agricultural Development
KVS	Field Extension Officer (***K****rushi* ***V****iyapthi* ***S****evaka*)
MARKFED	Department of Corporative and Marketing Federation
NGO	Non-Governmental Organizations
OFC	Other Field Crops
OIC	Officer in Charge
SAEP	Second Agricultural Extension Project
SMO	Subject Matter Specialist
T & V	Training & Visit System
TQ	Theoretical Question
WTO	World Trade Organization
PD	Provincial Director
PDOA	Provincial Department of Agriculture

DAPH	Animal Production and Health
TRI	Tea Research Institute
RRI	Rubber Research Institute
CRI	Coconut Research Institute
FMTC	Mechanization Training Center
RRDI	Rice Research and Development Institute
HORDI	Horticultural Crop Research and Development Institute
FCRDI	Field Crops Research and Development Institute
TSHDA	Tea Smallholdings Development Authority
EAC	Export Agricultural Crop
CARP	Council for Agricultural Research Policy
HARTI	Hector Kobbekaduwa Agrarian Research and Training Institute
IPHT	Institute of Post-Harvest Technology
DAPH	Department of Animal Production and Health
NLDB	National Livestock Development Board
NAFSO	National Federation of Fish Workers
IFAP	Sri Lanka Cooperative Marketing Federation Ltd.
IPNS	Integrated Plant Nutrition System
NIV	'New Improved Varieties'
IPM	Integrated Crop Management
NCP	North Central Province

LIST OF TABLES

Table 2-1: Distribution of Agro Ecological Regions. 42

Table 2-2 Major rainfall seasons in Sri Lanka 44

Table 2-3: Major cropping patterns in the low country dry zone. 49

Table 2-4: Distribution of administrative units within Anuradhapura district. 55

Table 2-5: Land use pattern in Anuradhapura District (2015) 57

Table 4-1: Development Policies and Extension Approaches in post-independence Sri Lanka 122

Table 5-1: Division of responsibilities in agricultural extension under the provincial administration. 127

Table 5-2: Educational and Training Institutes of the Department of Agriculture. 132

Table 7-1: Distribution of irrigation tanks within AI ranges in the research area. 165

Table 7-2: Crop combinations adopted by farmers in the research area. 167

Table 7-3: DOA Crop recommendations for *Kahatagasdigiliya* 168

Table 8-1: Extension interventions of Provincial Department of Agriculture Anuradhapura. 187

Table 8-2:Frequency of interactions between farmers and extension officers in the four segments. 191

Table 8-3: farmers' responses regarding extension support. 198

Table 8-4: Farmers' responses on the services delivered by the PDOA. 200

Table 8-5: Responses of farmers regarding Information sources 203

Table 9-1: Types of trainings received by extension officers (AI) in Anuradhapura district. 218

Table 9-2: Years of experience of AIs in *Anuradhapura* 219

Table 9-3: Fortnightly farm visit schedule in the T & V system 222

Table 10-1 Summary of the original contribution of the thesis 254

LIST OF FIGURES

Figure 1-1: DFID Sustainable livelihoods framework 16

Figure 2-1: Provinces in Sri Lanka 36

Figure 2-2: District boundaries of the North Central Province of Sri Lanka 37

Figure 2-3: Administrative map of Anuradhapura District 38

Figure 2-4: Distribution of Climatic Zones in Sri Lanka 40

Figure 2-5: Agro Climatic Regions in Sri Lanka 41

Figure 2-6: Agro-ecological Regions of Low Country Dry Zone 43

Figure 2-7: Layout of the DS divisions in the Anuradhapura District 54

Figure 3-1 Theoretical framework 66

Figure 3-2 Sampling frame for the field research 71

Figure 3-3 Organizational Structure of the Provincial Departments of Agriculture in Sri Lanka. 72

Figure 4-1 Line of command in the Extension Division of DOA. 104

Figure 4-2 Distribution of Interprovincial areas in Sri Lanka 116

Figure 4-3: Organizational structure of DOA extension 117

Figure 5-1: Organizational Structure of the extension and training division of the DOA. 134

Figure 7-1 A Cascade Irrigation Tank System 164

Figure 7-2 Farmer Participation in Rural Organizations in the research area. 177

Figure 7-3: Farmer Participation in Rural Organizations in Kahatagasdigiliya segment. 180

Figure 7-4: Farmer Participation in Rural Organizations in Anuradhapura segment 181

Figure 7-5: Farmer Participation in Rural Organizations in Ipalogama segment 182

Figure 7-6: Farmer Participation in Rural Organizations in Thirappane segment 183

Figure 8-1: Different forms of farmer extension interactions in Anuradhapura. 190

Figure 8-2: Variations among segments on receiving instructions. 194

Figure 8-3: Farmer participation in extension programmes in the four segments 196

Figure 8-4: Farmer perception on information sources 202

Figure 8-5: response of farmers on assistance to solve farming problems. 211

Figure 9-1: Distribution of the number of families covered by extension officers. 221

Figure 9-2: Extension Officers' perception on farm visits 224

Figure 9-3: Extension methods used by the AIs 226

Figure 9-4: Extension officers' perceptions on resource requirements for extension activities. 229

Figure 9-5: Role perceptions of the extension officers. 231

Figure 9-6: Suggestions of the AIs to improve the extension service. 234

Figure 10-1: Interactions among the elements in the research question. 241

Figure 10-2: Proposition for human capital development. 250

LIST OF APPENDICES

Appendix A: Letter of Permission 255

Appendix B: Farmer Coding 256

Appendix C: Interview Guide for Primary Data Collection 257

Appendix D: Questionnaire for Primary Data Collection 267

CHAPTER 1

INTRODUCTION TO THE STUDY: WHY STUDY SMALLHOLDER FARMERS AND EXTENSION WORKERS

1.1 Background of the Research

This thesis discusses the findings of a qualitative study investigating the status of the present extension and advisory services in Sri Lanka and attempts to reveal the 'Conflicting and complementary views of farmers and extension officers'. In this thesis, I will be looking at the present agricultural extension system in Sri Lanka in a broader perspective, while examining the knowledge gap between farmers and extension officers, explicitly. I will further examine the views of farmers as well as extension officers concerning a number of aspects related to sharing of agricultural information through the extension and advisory services.

The focus of extension has been transfer of technology to improve productivity, especially for staple food crops. While transfer of technology still has relevance, agricultural extension is now seen as playing a wider role by developing human and social capital, enhancing skills and knowledge for production and processing, facilitating access to markets and trade, organizing farmers and producer groups, and working with farmers toward sustainable natural resource management practices (Swanson 2008, Glendenning 2010). While agriculture contributes to a substantial share of the national income in many of the countries in the Asian region, Extension & Advisory Services face the challenge of pushing farmers beyond subsistence level agricultural livelihoods.

A major role of agricultural extension in developing countries however, has been to disseminate technologies generated through the public-sector research organizations. In doing so, a linear model of technology dissemination was adopted where the relationship between research, extension and farmers (Syed 1994) is well demonstrated. The Training and Visit system of agricultural extension (T & V) implemented in many developing countries in 1970s is one example for the adoption of this model of technology transfer (See for instance, Yuan Zhou, 2012) This World Bank funded programme took measures to revamp extension by adopting a more focused and disciplined approach(Syed et al, 1994). Different countries may

however adopt either free public extension or privatised extension while private – public partnerships lie in between as an alternative.

Extension services provided by the government ministries funded by the state are known as Free Public Extension while at a later stage many governments had adopted alternative measures. As discussed by scholars (see for example (Connolly n.d.) privatization has been a feature of national or regional reform processes over the last 10- 15 years. Privatization involves the development of new partnerships and associated capacities between government agencies and non-governmental and private sector actors. In the process of services reforms governments retain overall strategic responsibility for the services' policy and coordination. All key stakeholders articulate their demands openly to government and service providers. Private and NGO actors agree or contract to provide services for specific farming or client groups either through public sector funding or through cost sharing arrangements. The first country to adopt privatization of extension services was Chile in 1978.

While going through literature (see for example Sulaiman, 2005) many similarities can be observed in extension arrangements in many Asian countries. In comparison, Ministry of Agriculture, in these countries acts as the responsible government body for planning and implementing the extension programmes which are funded by the state. Farmers receive the extension and advisory services free of charge. Even though there had been attempts to privatize extension services in developing countries the experiences shared in literature shows that the main extension provider is the government extension service.

In Bangladesh, agricultural extension is widely accepted as the responsibility of the government, and it stresses the need for increased attention in developing more effective linkages between international research institutes and national research organizations and concurrently, between these organizations and extension (Kashem, 2009).

Similarly, in India public sector extension is a state responsibility. In the late 1990s a new extension model was introduced in India through the Agricultural Technology Management Agency (ATMA) (Reddy 2009).

Sri Lanka is not an exception and the agricultural extension service was developed as a part of the Department of Agriculture in early 1920s (Mahaliyanaarachchi 2002). While the DOA acts as the main government sector extension provider, a number of state institutions are involved in providing free extension services in Sri Lanka[1]. Present national extension service therefore constitutes many government agencies supported by private organizations and NGOs in delivering agricultural information to rural farmers.

Sri Lanka has been practicing several extension models since the country gained independence in 1948. As it was discussed by Mahaliyanaarachchi, in his article on 'Agricultural Extension Service in Sri Lanka' the national extension service in Sri Lanka has been facing many challenges particularly concerning the national policy framework. Policy makers, according to available evidences, have failed to identify the priority areas of the country's extension needs (see for example Mahaliyanaarachchi 2002)

Questions therefore arise concerning present extension practices and their impact on small holder farmers, vis-à-vis how the government policies shape extension services and how these policies are put into practice by the relevant agencies. These extension agents have not only to bring knowledge and practical solutions to the farmers, but they must also ensure that farmers' problems are brought to the researchers who can work towards feasible and economical solutions. In doing so distinctive features of the small holder farming systems in Sri Lanka, as highlighted in the section below, demand the attention of the policy makers and other stakeholders in formulating strategies to get the maximum returns for the public investments.

Elaborating the above, a key feature of the small holder systems in Sri Lanka is crop diversity. Prevalence of a range of tropical climatic conditions spread over 26 agro climatic regions within the country enables the production of a wide variety of crops within these farming systems. Historically, this polyculture system has integrated a significant range of crops,

[1] In Sri Lanka agricultural extension services are mainly provided by the government sector organizations including the DOA, Department of Animal Production and Health, Department of Export Agriculture, Coconut Cultivation Board, Tea Smallholdings Development Authority, Rubber Development Department, Tea research Institute, Rubber Research Institute, Coconut Research Institute and Mahaweli Development Authority of Sri Lanka (Damayanthi 2008).

including grains (Maize, Sorghum, Finger Millet, Cowpea, Green gram, Black gram) Oil seeds (Gingerly, Ground Nut, Soybean) Condiments (Chillies, Onions, Ginger, Turmeric) roots and tubers (Potato, Sweet Potato, Manioc). In traditional Sri Lanka, production under multi cropping systems assured food security in the rural communities. Multi cropping is still the norm for Sri Lanka's smallholders in the non-plantation agricultural sector[2] which comprises Other Field Crops (OFC) and vegetables. Other Field Crops (OFC) are also called subsidiary food crops comprising a variety of food crops cultivated over an extent of 100 000 ha within the island (see for example Hathurusinghe 2012). A range of annual field crops excluding rice for instance cereals, pulses, oilseeds, condiments[3] and yams (Roots and Tubers) belong to this subsector known as the subsidiary crop sector. While paddy is the mainstay in small holder systems in Sri Lanka, these crops are cultivated in home gardens and *Chena*, as substitutes to rice and as an additional source of income (Hathurusinghe 2012).

Home gardens is one of the main land use patterns employed in the small holder farming system in Sri Lanka which are characterized with clearly demarcated fields with fences, permanent border trees and the presence of semi-permanent or permanent dwellings of houses. A mixture of annual and perennial crops grown in home gardens. Tall trees such as teak and mahogany are often planted along the property fence while food crops and vegetables are usually grown in the garden within the boundaries (see for example Weerakoon 2012).

Homesteads are generally small, and the average size of a holding is 0.05 ha. The aggregate extent of home gardens according to all island census of agriculture, (2002) was76, 485 ha in addition to 81,822 ha of 'non-residential' holdings. This shows a crucial bearing on the agricultural potential of this type of land use pattern (Pieris, 2006).) The most intensive home garden systems in Sri Lanka are found in Kandy and Matale Districts known as 'Kandyan forest garden' and are well known the world over. They are dominated by six species; jackfruit, coconut, mango, arecanut, bread fruit and spices (Weerakoon 2012). The significance of Homesteads in the farming systems as discussed in literature (Pieris 2006) is that it serves as

[2] It is the major economic activity which provides livelihood for over 60 % of the population
[3] Chillies, Onions, Ginger, Turmeric.

sites for a large variety of food crops, fodder, fuel, timber, flowers ornamental plants, medicinal herbs and animal husbandry. A wide variety of food crops for instance, vegetables, fruits, spices, cereals and pulses, yams and tubers and other palms are also grown in home gardens.

Chena cultivation is widely regarded as being equivalent to shifting cultivation and is also known as 'slash and burn' in other tropical areas. The distinguished feature of this method of cultivation is the periodic changes in the cultivation venue and eventually returning to the former abandoned venues. Thus, it is seen as a form of 'land rotation', cyclically occurring periods of fallow periods of use of a given land (Pieris, 2006).

This trend of cultivating food crops has been further influenced by the "Green Revolution" during 1960-1970s and the application of science and technology has resulted in increasing the production of food grains in Sri Lanka (Ariyarathne, 1998). Along with these changes, agricultural production during the period from 1970 to 1977 was supported by the government which adopted import substitution, a closed economic policy. This means a tightly-regulated economy in which Imports were strictly controlled through licensing procedures, state monopolies and rationing. Essential commodities in this economic system were rationed and offered at subsidized prices to guarantee a floor level of consumption.

The consequences of the closed economy were many among which scarcities, corruption, and shortages were the most experienced (Herring 1987).

However, policy makers in Sri Lanka representing various political regimes since independence, have looked at the subsidiary crops in different perspectives, despite their significance as supplementary food crops. Hence, the place given to subsidiary food crops or Other Field Crops (OFC) within the smallholder systems has dramatically changed, over the period.

One of the significant policy changes that affected the smallholder sector is the market liberalization in 1977. The policy reforms introduced between 1977- 1988 which included price liberalisations, lifting of price controls, removing restrictions for transporting essential food items and reducing tariff rates for imported food items, demonstrated open economic

characteristics (Sanderatne 2004) . After the introduction of open economic policies, subsistence farming was gradually transformed into commercial farming promoting more cash crops including Chillies and Big Onion. As a result, many of the crops in the smallholder subsidiary crop sector have been neglected over the last 30 years (Hathurusinghe 2012).

Since the subsidiary crop sector has received little attention from researchers, policy makers or commercial interests, the extent to which they can contribute to measures aimed at improving the capacity of small holder farming systems is not understood, thus receives little support. It is increasingly recognised that small holders (who continue to make up the bulk of the world's farmers) possess a range of development potentials and that small holder systems have given rise to a range of ideas around small holder economies and mixed farming systems.

In the case of Sri Lanka for example the majority of current government policies favour the intensification of global staples. Most notably this currently involves significant support for paddy cultivation, but also includes measures to support increases in Maize cultivation in suitable areas[4]. This strategy has been successful in terms of boosting yields of rice, the national staple crop, as well as other major crops in Sri Lanka.

However, the international development literature has increasingly raised concerns as to the capacity of this system to provide an adequate living to members of producer communities (see for example Dowe 2010 and HLPE 2013). Investigating contributions of smallholder agriculture to food security, HLPE report presents that smallholder agriculture, has the capacity to contribute effectively to food security, food sovereignty, and substantially to economic growth when adequately supported by policy and public investments. Development of the smallholder sector according to this report (see for example HLPE, 2013) contributes to the emancipation of neglected and marginalized groups while reducing the spatial and socio-economic inequalities.

[4] Rice being the staple food of Sri Lanka, successive governments have provided significant subsidies for paddy
(2- 2.5 % of total government expenditure since 2005) with the primary aim of increasing paddy production (Rodrigo, C., 2014).

It is repeatedly argued that conventional approaches do not build on the strengths of traditional small holders' systems, indeed by tying small holders to the production of major crops, such approaches pose the risk of increasing their vulnerability to a range of agricultural challenges. This includes challenges related to the long-term profitability of paddy production along with the increasing vulnerability of major crops to climate change as well as the exposure of this system to other socio-economic and environmental risks and uncertainties.

As a consequence, there is an increased interest in the need to identify viable mechanisms to diversify agriculture. In this context the need for alternative strategies for income generation and food security is now more important than ever.

Dorward (2001) has argued that in reality rural dwellers can benefit from measures that support a wide range of pathways out of poverty and food insecurity. This idea is consistent with a new literature that has emerged around the "rediscovery of the small holder" and an increased recognition of the importance of small scale agriculture as a tool of rural development (see for example Dowe 2010).

This has been born out empirically in a range of research which has emphasized the durability of smallholder agriculture as well as its capacity to respond to economic opportunities arising from changes in settlement patterns and consumer taste (see for example Weinberger, K. M., & Lumpkin, T. A. (2005). As it was experienced in the past, one reason for the failure of rural development programmes was the high dependence in these approaches on external elements and resources be these genetic, technical, physical or social. As opposed to this approach the concept of self-provisioning (i.e. reducing dependency on external resources while enlarging the stock of internal resources) is advocated as a measure of building up the strengths of small scale farming systems (Dowe,2010). Traditional crop varieties which have been used over a period of time in subsistence farming systems in the past but are not as widely used or promoted at present, seemingly have the potential of increasing this stock of internal resources.

This study therefore attempts to find out whether appropriate agricultural development strategies can be devised to improve the livelihood of small scale farmers, based on the existing strengths of the traditional smallholder farming systems.

1.2 Problem Statement

While there is a growing recognition of the important role of small holder farming in addressing poverty and food security internationally, small holder farming systems in Sri Lanka have not received adequate attention despite their contribution to domestic agricultural production. Many factors account for the limited attention paid to the domestic small holder agriculture sector.

In the case of Sri Lanka, past government policies have evidently been favouring the intensification of the staple crop paddy. It is reported that successive governments since independence (in 1948) had given priority for paddy cultivation and provided incentives to achieve the self- sufficiency goal (see for instance Hathurusinghe 2012). Further, the heavy state involvement in promotion of paddy cultivation via irrigation development, land distribution and provision of free agricultural extension services have left the other farmers at a disadvantage (see for instance, Silva 1999).

As it was delineated at the beginning of this introduction, the production of "subsidiary" food crops by small holders in Sri Lanka has historically contributed significantly to domestic food needs under the closed economic policy regime. Moreover, it is evident that this system was facilitated by a range of government support services which contributed to the development of the sector. The recent history of agriculture in Sri Lanka is of declining support for these crops leading to their decline in significance. However, concerns over the sustainability of current approaches to agriculture in a number of countries, suggest that crop diversification may have the capacity to make a significant contribution to agricultural sustainability and rural development. This together with the continued presence of such crops in small holding systems albeit at a reduced rate, raises questions about the current role of these crops in Sri Lankan small holding.

This thesis therefore attempts to investigate the status of current policy interventions and support schemes concerning the expansion of the smallholder food crop sector.

In doing so special attention is paid towards extension interventions through which agricultural information is disseminated to the farmers.

While conventional approaches to commercialization, based on existing extension approaches may be useful for some farmers, these approaches are based on a productionist driven model. In this scenario it is generally recognised that, as the productivity of agricultural holdings increase there is a commensurate fall in the unit price of agricultural commodities leading to a decrease in the numbers employed in the land. Typically, in this scenario it is anticipated that these reductions in employment in the land will be offset by increases in employment elsewhere. Many studies have highlighted the inverse relationship between farm size and production per unit of land (Conway 2011).

Increasingly in recent years, research has questioned whether such approaches are likely to improve the position of small holders who are by definition at a disadvantage in mainstream agricultural production. This is because such approaches do not speak to the needs or build on the strengths of traditional systems.

1.3 The Research Question

As mentioned previously, changes in political systems and policy changes in the past have had an influence in extension approaches thus introducing new extension strategies in parallel to changing policies, had been the practice. Deviating from some of the effective extension approaches, for example elimination of the practice of regular fortnightly farm visits in the T& V extension approach, non -adoption of the principles of the participatory extension approach and continuation of the top down approach seems to have created a gap between the farmers and the state extension services.

Different approaches to agricultural extension in Sri Lanka also reflect these changes in policies adopted in the country by different political regimes. For example, extension approaches adopted during import substitution policy regime with the aim of gaining self-sufficiency in rice production were successful and the non-rice food crop sector was equally emphasised as a measure of ensuring national food security under the import substitution policy (Samarasinghe 1977).

Many farmers in developing countries who practice subsistence level agriculture for their livelihoods seem to depend on public extension services and therefore paying more attention towards the public extension services in developing counties is considered important.

Investigating the role and functions of present extension services, alongside the interactions among the various elements involved in extension delivery becomes imperative within this contextual framework. Therefore, the central research question investigated through this thesis is formulated encompassing a wider context to examine **'What factors are affecting the sharing of agricultural information with farmers?'**

Several subsidiary research questions have been formulated as support questions to facilitate the investigation of the central research question. While these questions have a direct relationship to the central research question, they are able to support finding the answer to the research question by probing into details in several directions.

1.3.1 Support Questions

There are four subsidiary questions supporting to answer the main research question, for the purpose of this thesis, which are detailed in the section below.

(i) What are the current extension strategies being implemented in Sri Lanka.

Basically, this part of the research question considers the existing scenario of the extension delivery within the country and attempts to find out the roles and functions of different extension agencies including private and public extension providers.

The broader analysis on extension strategies attempts to review the past and present extension approaches in the form of an evolutionary process.

This question also provides the framework for investigating the priority areas and target populations of each of these extension services, while considering the process of planning, implementation and monitoring of the programmes. In doing so, attention will be directed towards the participation of the field extension officers in the planning process and their involvement in decision making, ultimately analyzing how they connect these decision-making procedures to the plans of their respective extension agencies.

(ii) How do interactions influence choices made? –Extension Officers' Perspectives

This support question sets the guidelines to investigate the farmer extension interactions in a wider perspective encompassing aspects such as the frequency of their interactions, how they contact each other's groups and the methods they use to communicate etc. Further queries are made into finding out about the level of outreach of the extension services, especially the state extension service, in serving the farming community. The criteria used by the extension agents to select farmers for their extension programmes would be a special concern in this investigation. This sub question attempts to look at the main research question from the extension officers' perspective.

(iii) How do farmers respond? / Farmers' Perspectives.

This question which supports the main research question on 'What factors are affecting the sharing of agricultural information with farmers?' It analyses the feedback of the farmers regarding the extension services enjoyed by them. A primary concern in this regard would be whether the farmers participate in the extension programmes, if not, then the question arises concerning the underlying reasons for it. It is expected that the answer to this question would showcase their overall perception on the extension services.

Moving further to explore views regarding specific factors, the study attempts to find out whether they get the assistance of the advisory services to select the crop combinations and to manage pest and diseases which are crucial attributes that determine the success in farming and thereby affecting their livelihoods. Finally, their feedback on the repeated use or the continuation of the instructions provided by the extension services, and the perceived usefulness of the information would be evaluated as a measure of the effectiveness.

(iv) What are the coping strategies for better service?

The challenges encountered by the extension officers and the coping strategies used by them to overcome these challenges are investigated as the final part of the research question. Within this system, extension agents stand in the middle with farmers and the government on either side so that the coping strategies are expected to address both fragments. As far as the government is concerned, it is mainly the policy formulations and extension strategies that would affect the work load and the coverage of the field extension officers. Similarly, the attitudes, behaviors and the cooperation of the farmers in this collective endeavor counts

considerably for the performance of the extension officers. Moreover, this question concerning the coping strategies seeks to understand the level of discretion that the extension officers can exercise to modify the plans and make decisions to adopt the most appropriate strategies for the respective field situations.

Having considered the main research question and the supporting arguments, the interplay of three main constituents, namely the extension services representing state and its policies, then the farmers as the target group of the extension services and finally the extension officers as brokers between the government and farmers, are reviewed in this research. In doing so, the link between farmers and extension officers and the knowledge gap between these two elements, receive special attention.

According to the focus of the central research question and the supporting questions, the objectives of the study, as elaborated below, distinctly align with examining the process of information sharing and the knowledge interface between farmers and extension workers.

1.4 Objectives of the Study

The broad general objective of this dissertation is to analyse the factors affecting the sharing of agricultural information with farmers.

In order to examine this issue in focus, the study addresses three specific objectives;

(i) It examines the resource availability governing the livelihood pattern of the smallholder farming community, including particular focus on the institutional support extended by the government extension agencies by way of production incentives for technology adoption and knowledge sharing through extension and advisory services.

(ii) The study also seeks to analyse the relationship between smallholder farmers and extension workers shaping the delivery of extension and advisory services within the existing political, environmental, economic and policy framework in Sri Lanka.

(iii) Finally, the study seeks to identify the barriers for effective extension delivery through the analysis of constraints faced by farmers as well as the extension officers.

Having set these objectives, the study finally examines three main elements in this broader context encompassing Policy, Extension and Farmers. These elements and relationship among

these are studied comprehensively through this research, in order to understand the flow of information along the line from where it is originated i.e the research stations until it reaches the farmers who are the end users of the knowledge.

In parallel to finding these factors, government policies and their influence on the other elements in this structure, are considered as important to investigate through this study. In doing so it is vital to adopt well established theories and concepts based on empirical experiences of researchers.

While the assumption has long been that rural development activities benefit smallholders, inadequate attention has been paid both to the complexity of the interrelationship between these activities and rural livelihoods. While it is widely assumed that agricultural development disproportionately benefits the rural poor, less is understood about the means through which these benefits are thought to be achieved. Having understood the importance of studying the smallholder system, this study lays emphasis on using a holistic approach to study the sustainability of smallholder systems and therefore employs the sustainable livelihood approach as its theoretical base.

The Sustainable Livelihood Approach was proposed and defined by Robert Chambers and Gordon Conway in 1992 and subsequently modified and presented by the leading proponent of the approach, Ian Scoones (see for example ,Krantz 2001).

1.5 Theoretical Framework

This thesis presenting the findings based on the 'Conflicting and Complementary views of farmers and extension officers' examines the level of support extended by the extension and advisory services for the livelihood development of smallholder farmers. According to broader definitions, the term livelihood denotes the range and combination of activities and choices that people make or undertake in order to achieve their livelihood goals including productive activities, investment strategies, reproductive choices etc. (DFID 1999). Besides economic practices, the idea of livelihood encompasses specific ways of living and reproducing livelihood on a continuous basis. Livelihood analysis thus offers a dynamic framework for examining the activities of farming communities (for the purpose of this thesis), including economic, social and cultural practices. It is a holistic framework which provides understanding of the complexities of rural life and allows a focus on the development needs and objectives of smallholders.

Having recognized the practicality of the concept, this thesis seeks to adopt the livelihood analysis to explore the research question. The following section of the chapter provides the theoretical background of the livelihood analysis and further describes how these theories are employed to investigate the research questions.

1.5.1 Understanding Smallholder Farming from a Livelihoods Perspective

The concept of livelihood is about individuals, households or groups making a living, attempting to meet their various consumption and economic necessities coping with uncertainties and responding to new opportunities (De Hann and Zoomers 2005, Scoones 2009). The trend in livelihood studies since the 1990s has been to study survival strategies.

Livelihood analysis according to Toner, is broadly based on a multidimensional understanding of people's lives and recognizes their entitlements in relation to the wider context of institutions, regulations and cultural norms. Thus, a range of organizations including the World Bank, UNDP, DFID, Oxfam and Care has been using the livelihood framework in their studies (Toner, A, 2003). Livelihood analysis has been employed as a tool of rural development research, for a considerable period of time, as it allows exploring how specific interventions can have an impact on the wellbeing of rural communities (see for example DFID 1999, Scoones et al 2005).

As defined by Ian Scoones, a livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks, maintain or enhance its capabilities and assets, while not undermining the natural resource base (see for example Kratz 2001).

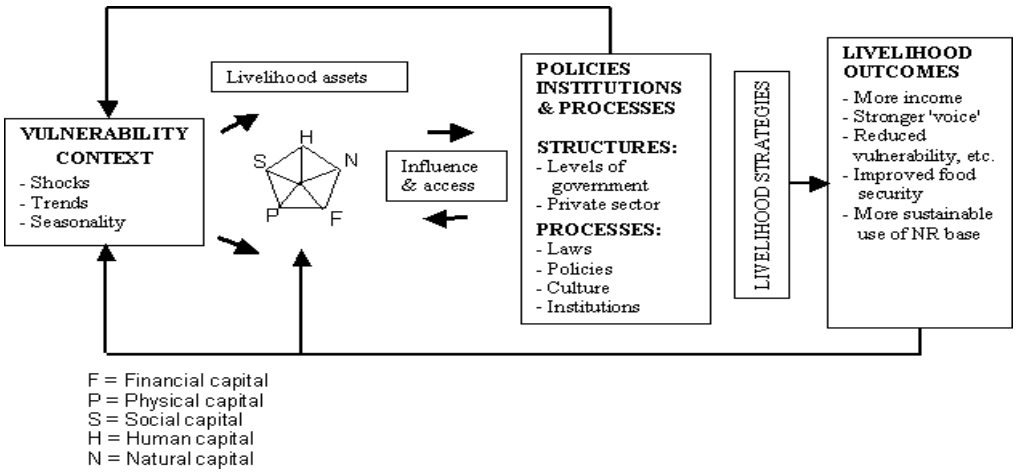
Many different factors have been described in literature as determinants of livelihood, including social, economic and ecological environments. Some livelihoods are predetermined by social factors, for example in some societies the role and hence livelihood of an individual may be ascribed to individuals who are born in to a caste. Similarly, gender is a social determinant of livelihood activities in many rural areas (Chambers 1991) and usually women occupy a lower position in the hierarchy of the social pyramid and the wellbeing and access enjoyed by women in many livelihoods are inferior to that of men.

By contrast a person may have a choice for a livelihood, as a result of, for example education and migration. Social class may also play a part. It is generally recognized that a wider choice of livelihood is enjoyed by the better off and also that wider choices are generated for individuals during periods of increased economic growth. Therefore, it is vital to develop adaptable capabilities in rural livelihoods to exploit new opportunities in the context of accelerating change (Chambers 1991).

As explained in the sustainable livelihoods guidance sheet (DFID 1999) the focus in livelihood analysis is mainly on marginalized and excluded groups and the researchers get the opportunity to develop an overall view of the status and activities of marginalised households and communities through the livelihood approach. According to the experiences shared by DIFD, many aspects of the livelihoods of marginalized groups can be identified and analysed using the livelihood approach. It is also possible to understand the basis of income of the community being studied; whether it is through specific farming, fishing or paid employment, or a combination of such activities and the degree to which these activities contribute towards family income.

A common feature in livelihood research is that, it relates the ability to pursue different livelihood strategies to the availability of basic material as well as tangible and intangible assets. Such assets in the livelihood framework, are described as the capital (or asset) base from which livelihoods are constructed (Scoones 1998). Analysing livelihoods, according to Scoones makes it possible to address three broad themes; livelihoods, institutions and governance.

The sustainable livelihood framework, as shown in the figure 1.1 below outlines the five main elements included in this analysis.



Adapted from Carney et al 1999.

Figure 1-1: DFID Sustainable livelihoods framework

Analysing livelihoods as the initial step, explains how poor people gain access to control over land, water and other resources and what institutional mechanisms are involved in this. Next the analysis on institutions explains how institutional arrangements affect poor people's access to resources. In other words, what institutional overlaps and conflicts enable or limit their access to resources. Finally, governance looks into the emergence of new governance and arrangements required to encourage a livelihood approach to rural development. Also, it analyses how different ways of looking at policy for example market oriented approaches, rights based approaches and decentralization approaches affect rural livelihoods in practice.

Further, Scoones has outlined the framework for analyzinig sustainable livelihoods in relation to five key indicators (Scoones 1998).

The indicators in this framework include the following elements;

1. Context - socio-economic conditions, policy settings, politics, Archeology and history.
2. Resources – different types of capital e.g. natural capital, social, human, financial capital
3. Institutional processes –formal and informal institutions and organizations.
4. Livelihood strategies - agricultural intensification, extensification, livelihood diversification and migration and
5. Sustainable livelihood outcomes - livelihood adaptation, reduced vulnerability and resilience enhanced.

Investigation of these interplay of the five elements using the holistic approach describes the context in which rural farmers interact with the external elements such as the policy makers and extension agents.

The next section in this chapter describes how this approach is employed to address the key research questions in the thesis.

1.5.1.1 Contextual Analysis

This analysis addresses the external environment in which rural people live and includes factors that are beyond their control although their livelihoods and access to assets, are greatly influenced by these external factors.

Three components analysed in this section include i.e. trends, shocks and seasonality affecting different people in different ways in terms of their livelihoods. This encompasses population, resource, economic (both national and international), technological and political trends. This thesis particularly examines the political trends, pertaining to the formulation of development strategies and extension approaches. Recent developments in the field of agricultural development were examined in comparison with the previous efforts in order to identify these trends and thereby assess their impact on rural livelihoods and farming practices.

1.5.1.2 Analysis of Livelihood Resources

In the practical context, livelihood assessment is intended to generate an understanding of the role and the impact of a project on enhancing and securing local people's livelihoods. Thus,

the analysis relies on a range of data collection methods combining qualitative and quantitative indicators.

The sustainable livelihood model of the UK Department For International Development (DFID)[5] promotes the notion of five capitals; natural, physical, financial, social and human capitals to frame the inquiry (Osman 2005). Such livelihood resources are referred to as 'capital bases' in the livelihood framework (see for instance Scoones 2009). The possession of these tangible and intangible assets theoretically determines the ability of smallholders to pursue different livelihood strategies.

Out of the five resource bases in the livelihood framework **physical** and **natural capital** bases are considered as fundamental requirements in deciding upon the crops to be cultivated and the crop combinations to be adopted. Availability of land for cultivation is a primary concern with the options being cultivating land owned by farmers themselves, share cropping or cultivating encroached state land. Access to physical resources for cultivation for example irrigation water, infrastructure facilities and marketing and storage facilities may act as determinants of the extent of operation.

Essential facilities for any livelihood such as credit, cash, infrastructure, production equipment and technologies and the possession of other economic assets are also analysed in order to further investigate the **financial capital base** which determines the investment capacity and thereby the scale of operation of individual farms. Similarly, the availability of financial capital is considered as a fundamental requirement for deciding upon crops and enterprise combinations and diversifications.

Human capital recognized as skills, knowledge and ability to labour, as well as to command labour and other aspects including physical capability and good health are considered important in this survey in order to assess the decision making and risk-taking abilities of

[5] DIFID is a United Kingdom government department responsible for administering overseas aid and the goal of the department is to 'promote sustainable development and eliminate world poverty. DIFID's main programme areas include education, health, social services, water supply and sanitation (Wikipedia)

farmers. Population changes over time and consequent changes in labour supply are also examined based on a longitudinal, time-based framework.

A qualitative approach was employed to gather information concerning the life stories and regular practices of farmers employing in depth interviews, narrations, personal and group discussions and observations etc.

Social relations, affiliations, associations, social claims and networks existing in the farming community in the area are examined as important elements of **social capital** for coordinated actions in livelihood strategies. A holistic approach is used to analyse human and social capital bases while engaged in institutional processes. Holistic approach helps to explain how personal motivations and individual perceptions interact with socio economic and agro ecological dynamics (Singh 2016)

1.5.1.3 Analysis of Institutional Processes and Organizational Structures

It is highlighted in the literature that policies and institutions play an influential role in gaining access to livelihood resources (Ashely and Hussein, 2000). The analysis of these institutional processes is significant as it includes social processes, underlying sustainability of livelihoods. Hence, this thesis analyses formal and informal social relationships and power dynamics in relation to resource mobilisation.

In rural Sri Lanka, farmer organizations, women's groups and societies, social welfare societies etc. play an important role in the structure of agrarian society and their contribution to the livelihood of the farming community are investigated through this research to get a broader view of the rural institutional framework in relation to livelihoods. Activities such as share cropping, sharing of labour, sharing or hiring of machinery, irrigation and water management, technology transfer and advisory services etc. are collective activities and the contribution of small organizational structures in developing these social networks, is worth investigating.

1.5.1.4 Analysis of Livelihood Strategies

This includes analysing livelihood portfolios and pathways. According to Scoones three broad clusters of livelihood strategies can be identified in the livelihoods framework namely,

Agricultural intensification or extensification, livelihood diversification and migration (Scoones 1998).

This research attempts to identify which, if any, of these strategies are evident in Sri Lanka as elements, or combinations of livelihood strategies adopted by the farming community as part of "livelihood portfolios".

1.5.1.5 Analysis of Sustainable Livelihood Outcomes.

Established ways of assessing livelihood outcomes encompass five key elements (see for example Scoones, 1998). Poverty reduction with creation of work or employment, adequacy, security, wellbeing and capability. Livelihood outcomes are measured in terms of a number of attributes namely, reduced poverty levels, increased wellbeing and capabilities, livelihood adaptations, reductions in vulnerability and finally, increased resilience.This involves the application of an interdisciplinary approach to assess the contribution or the influence of various factors on livelihood outcomes and the next section in this chapter presents the methodology followed in analysing these factors.

1.6 Research Methodology

In order to find out the above relationships, the study employed a qualitative approach, encompassing both longitudinal and cross-sectional components. The longitudinal component includes survey of literature to find out the policy changes in Sri Lanka and their impact on the development of the extension strategies over a period since gaining independence.

The cross-sectional study intends to examine the existing situation of extension delivery in the country. The study therefore uses two kinds of data, for instance the secondary data gathered from the survey of literature and the primary data gathered directly from the farmers and extension officers.

The field study was carried out in the form of a survey to collect primary data from farmers and the extension officers. While I gathered data from farmers using interview survey as the main data gathering tool, other techniques such as focus group discussions and key informant analysis were useful in obtaining detailed information. A detailed questionnaire survey was

administered to gather data from the extension officers as they could not spare time for the interviews. Besides all these data gathering tools, field observation was a valuable method for gathering data for this thesis. Indeed, it was used as a method of data triangulation more than as a method of data collection.

Having reviewed the theoretical background which laid the foundation for this research, I will summarise the stepwise process of carrying out this study followed by the order in which the chapters of this thesis are organised.

According to the sustainable livelihood framework, the first step is analysing the context in which the study is conducted. This encompasses basically the environment in which people live in, precisely, description of the area selected for gathering data for the study. For this purpose, the thesis provides a detailed geographical and demographic description of *Anuradhapura* district and the North Central Province of Sri Lanka of which *Anuradhapura* is the main city. The chapter on 'The Research area – *Anuradhapura*' highlights the significance of Anuradhapura and the justification for choosing it as the research area.

Institutional processes and organizational structures are considered important aspects in the livelihood framework. Researchers (see for example Ashely and Hussain, 2000) have highlighted that policies and institutions play an influential role in gaining access to the livelihood resources. This thesis therefore discusses formal relationships that farmers have developed among themselves and with the village level organizations. Informal social relationships among fellow farmers and the impact of power dynamics are important aspects investigated in this section of the thesis and presented in the chapter on changing policies and extension approaches.

Further, the livelihood analysis advocates the investigation of external factors that influence the livelihoods of rural farmers and their access to assets. Thus, the study seeks to investigate the present institutional framework, explicitly the system of current extension advisory services as the external element influencing farming practices by way of disseminating scientific knowledge through research stations. The chapter on 'Current Extension Framework' elaborates these findings.

In analyzing the extension services, more emphasis was placed on information on the current extension practices.

Further, comprehensive review of literature on the history and evolution of the extension services which is presented in a separate chapter in this thesis for instance 'Changing Policies and Extension Approaches', supplements the investigation on the development of extension services in Sri Lanka.

The performance of the current extension services was studied by analysing the national and provincial level extension programmes implemented by the central Department of Agriculture (DOA) and the Provincial Department of Agriculture (PDOA) in the North Central Province.

Further to the understanding of the development of extension approaches, different extension programmes being implemented in the field, contribution of these programmes to income generation of farmers and finally the participation of farmers in these extension programmes are described in the chapter on 'Extension Interventions in *Anuradhapura*'

Next step in the livelihood framework is the analysis of livelihood resources. Literature suggests that the ability of smallholders to pursue different livelihood strategies, depends on the tangible and intangible assets in their possession, referred to as 'capital bases' (Scoones, 2009). According to this theoretical base this thesis analyses the resource bases in the research area *Anuradhapura* to find out how rural farmers adopt particular livelihood strategies based on the availability of physical factors of production for instance land, labour, and inputs such as supply of seeds and fertilizer. Findings related to the resource bases are presented in the chapter on 'Livelihood Resources'.

The key step in livelihood analysis as reiterated by Scoones (2009) is identification of the combination of capitals required for choosing different livelihood pathways. For example, looking for information on whether farmers have adopted strategies such as diversification of agriculture through resource combinations, intensification of practices using technology to get more output per unit area.

This analysis of livelihood strategies and pathways is followed by the analysis of livelihood outcomes as the final step in the process. Indicators that measure livelihood outcomes include

dimensions of sustainability, for example developing capabilities to adopt coping strategies in the event of unfavourable situations such as stresses and shocks. Moreover, the analysis of sustainable livelihood outcomes includes, assuring wellbeing while reducing poverty and vulnerability (Chambers 1997, 1998, Scoones 1998), while establishing livelihood rescellience among the rural farmers as the ultimate aim of the whole analysis. Including both these steps in the analysis, the chapter on the farmers' perspectives analyses the overall smallholder farming system, crop combinations, relationship with extension services and the views of farmers etc. in this thesis.

The vital part of the study as well as the research question was analysing the 'farmer – extension link' which is measured in terms of the frequency of face to face interactions between the two parties, level of support extended to farmers by the extension services and farmers 'attribution of success to extension service etc.

In parallel to that, motivation strategies adopted by extension officers, techniques of information dissemination and perception of their role as a broker between the state and the grass root level, are important factors investigated under the section on the role of the extension agents and their perceptions, as elaborated in the research question. Findings related to the farmer extension link, including the responses of farmers as well as extension officers, are organised in to two chapters namely 'Farmers' Perspectives and 'Extension Workers' Perspectives in this thesis.

Prior to discussing the factors affecting the delivery of extension services, looking at the definitions and meanings of some of the key terms widely used in these discussions is considered worthwhile.

1.7 Definitions of Terms Related to the Central Research Question

This section of the chapter presents the definitions of some key terms discussed in the thesis. The definitions are adopted from the 'Extension and advisory services – terminology and glossary' published by the MEAS (Modernizing Extension & Advisory Services(MEAS) 2015), University of Illinois.

1.7.1 Agricultural Extension

The main focus of this thesis is Agricultural Extension services. According to the glossary Agricultural Extension was once known as the '**application of scientific research, knowledge, and technologies to improve agricultural practices through farmer education'**. However, the field of extension at present is not confined to these functions but extended to include other aspects for the benefit of the farmers and rural people. This definition which is widely used today is the one cited by the Global Forum for Rural Advisory Services, GFRAS, as given in the MEAS Glossary .

1.7.2 Advisory Service(s)

It is a term commonly used as an alternate for "extension services". These systems involve a broad spectrum of market and non-market entities, and agents who are expected to provide useful technical information about new technologies. Apart from their conventional function of providing knowledge and technology to improve agricultural productivity, agricultural advisory services are also expected to fulfil a variety of new functions, such as linking smallholder farmers to high-value and export markets, promoting environmentally sustainable production techniques and adapting to climate change etc.

1.7.3 Extension Coverage

Extension coverage refers to the degree of availability of extension services including the presence and availability of the service across geographic areas and among demographic groups. "Coverage does imply that all farmers receive services but rather that extension services are active and could potentially be accessed"

1.7.4 Decentralized Extension

This concept is based on three major elements: (1) transferring specific decision-making functions to local levels, starting with simple managerial functions, then setting priorities and allocating funds (2) encouraging public participation, reflecting the degree of authority that is formally transferred to rural people, starting in an advisory capacity for program planning and implementation, and eventually (3) expanding local involvement in organizing and delivering extension services, through local government actors, private firms or non-governmental organizations.

1.7.5 Demand-Driven Extension

This is a concept in which the farm household is the central focus of a 'farmer led' or 'participatory' extension system. Demand-driven extension is viewed differently by economists and other social scientists.

However, most people view technology systems as being "supply-driven" by research institutions; therefore, extension scholars relate "demand-driven" to the technology system itself and are aware that research and development (R&D) is seldom farmer led.

1.7.6 Extension Education

During the past century, extension education developed into a discipline or field of study with its own philosophy, objectives, methods, and techniques. It is a discipline that should be understood and followed by extension workers if they are to be effective in serving the needs of all farmers, especially small-scale and women farmers. Extension education primarily focuses on the teaching-learning methods. The basic principles, methods, and techniques of extension education are applicable to all fields within agriculture and rural development including crop, livestock, fisheries, and other rural enterprises, as well as rural youth programs and home economics, including family health, hygiene, and nutrition.

1.7.7 Farmer Field School

This is a group-based experiential learning approach which seeks to empower farmers to learn, understand and make decisions. Farmer field schools were first conceived by FAO in the late 1980s as a way of training farmers on Integrated Pest Management (IPM). In a farmer field school, groups of farmers meet regularly in the field with a facilitator to observe, talk, ask questions and learn together.

The approach is now used for a wide range of technical and social topics such as water and sanitation, household livelihood security, marketing, child labor, to name a few.

1.7.8 Farmer-to-Officer Ratio

This is a commonly used measure designed to illustrate the number of clientele each officer/extensionist is expected to serve. The ratio is calculated by determining the total

potential clients within a geographic area (district, region) and dividing this figure by the total number of extensionists responsible for this area, scaled to a denominator of one.

While high ratios suggest understaffing and perhaps a high degree of unserved potential extension clients, recommendations for an ideal ratio are mixed and depend largely on the context and services provided (Swanson, Bentz, and Sofranko, 1997).

1.7.9 Participatory Extension

Participatory Extension is essentially a combination of technology transfer, advisory services, and human resources development and involves two key elements. The first element addresses how extension systems are organized and emphasizes the fact that all types of farmers, especially small-scale and women farmers, must play an important role in setting extension priorities and shaping extension programs. By so doing, farmers will take more "ownership" over these ongoing extension programs and operations. The second key element of the participatory extension approach generally encompasses more participatory extension methods, such as experiential learning and farmer-to-farmer exchanges. It emphasizes that knowledge is gained through interactive processes that include extension field staff, private-sector firms, non-governmental organizations, and/or innovative and progressive farmers within local or nearby communities. Participants are expected to make their own decisions, especially about how they will intensify and/or diversify their farming systems.

Having described the terms used in this thesis, the next section at the end of this introduction highlights the originality of the study its contribution to the wider community.

1.8 Original Contribution of the Study

This research investigating the conflicting and complementary views of the farmers and extension workers is an in-depth study on smallholder farming systems in Sri Lanka. The whole analysis covered by the central research question can be considered a single case study.

The original contribution of this thesis is elaborated in the following section.

1. This in depth analysis encompassing a variety of individual cases especially cases of small holder farmers representing *chena* cropping systems, offers a compendium of information related to *chena* cropping systems in the non- plantation agriculture sector in Sri Lanka.

2. In addition to the cases of individual farmers, this thesis investigates the extension workers' perspectives and treats it as an overall case study. This is an extensive analysis employing questionnaire survey, personal interviews and field observations including participant and non-participant observation. The chapter on 'Liaising Role of Extension Agents' itself is an original contribution to the literature. Also this thesis through its analysis of extension in the brokers' perspective voiced the opinions of extension agents.

3. The methodology employed in the thesis for data gathering, for instance relying on primary data originating from the in depth interviews and analysis of questionnaires contributes to the originality of the research. Applying several data gathering methods and information sources facilitates triangulation which adds to the originality through validation of primary data. Carrying out two parallel field surveys with farmers and extension officers ensures authenticity of the findings through further triangulation of data.

4. The thesis, while shedding light on the merits of extensive field survey, emphasizes the significance of field exposure in the process of planning and implementing social science research projects. Through its comprehensive analysis of field extension programmes, perceptions of farmers as well as extension agents this thesis shares the first hand experiences of making access to field for gathering primary data.

5. Review of literature on past development policies and extension approaches examines the development trends and builds up scenarios that are useful in drawing up conclusions leading to recommendations for policy formulation. Incorporation of these scenarios with field data originating from two field surveys originated an analytical framework which can be used to investigate similar scenarios.

7. Overall, the findings presented in this thesis will contribute as a source of literature in the field social science research as well as agricultural extension in Sri Lanka. In addition, this holistic investigation revealing facts on policy, extension, farming systems and methods of conducting a wider social research will complement the existing knowledge base.

Having discussed the concepts, objectives, background and the definitions, this introductory chapter next gives an overview of the main sources of literature accessed for the purpose of this thesis.

1.9 Overview of Literature Review

Even though this thesis does not include a chapter on Literature Review per se, each chapter contains information elicited from various sources imbedded in the discussion, which is thought of as a more efficient way of supporting the arguments being discussed. However, the chapter on 'Changing Policies and Extension Approaches' is completely based on a thorough review of literature on past development policies (see for example chapter 4).Also the chapter contains information on extension approaches ,elicited from few sources of local literature available on the topic.

The key concepts covered in the investigation of the research question includes but not limited to Agricultural Extension, smallholder farming systems and sustainable livelihoods. Further, the study relies on development literature as a part of the literature review. The following is a summary of literature reviewed for the purpose this thesis.

The central research question of the thesis focuses on the delivery of extension services to the smallholder farmers. It is widely discussed as an issue in the South Asian region, by several authors, although this thesis discusses it in relation to a specialized locality for example Sri Lanka. Leading among them is Rasheed Suleiman who writes about 'Extension in Asia'. He highlights in his paper on 'Agricultural Extension in India: Current status and ways forward' (see for example (Rasheed 2012), the challenges faced by the agricultural sector in India and lay emphasis on the potential of agricultural extension services in addressing these challenges. However, to do this effectively, the paper alerts that extension needs to address some of the challenges it faces currently and should reinvent its role and mission. Writing further about the 'Extension Policy at the National Level in India' he discusses extension policy and policy process experienced by the countries in the South Asian region for example India, china and Indonesia. In this paper with Andy Hall, Sulaiman discusses Agriculture Extension Arrangements in the Asian Region (see for example Sulaiman 2005).

The paper highlights the need for undertaking institutional analysis of historical as well as current extension approaches and developing the capacity within the country by experimenting and evaluating the different approaches.

The discussion paper of the International Food Policy Research Institute (Glendenning 2010) provides a clear definition to extension along with a citation of an extended definition provided by Swanson (Swanson 2008 as cited by Glendenning 2010). This definition was adopted for the purpose of defining Extension the introduction of this thesis while the contents relevant to the inquiry into "Are farmers' information needs are being met?" are cited in the relevant chapters. Overall, literature authored by Swanson is central to the field of extension and the seminal article on 'The Changing Role of Agricultural Extension in a Global Economy' discusses extension in a wider perspective (swanson2006).

The FAO report on 'Agricultural Extension, Rural Development and the Food Security Challenge' authored by Rivera (Rivera 2003) contributes literature related the discussion on extension and rural development.

A review on the Technology Adoption in the Sub Saharan Africa (Muzari W., Gasti ,W.,Muvhunzi,2012) deliberates the importance of preserving the traditional technologies adopted by smallholder farmers, which also have some advantages over the modern techniques. This is much relevant to the indigenous methods used by the smallholder farmers in the conventional *chena* cropping system in Sri Lanka which is widely discussed in this thesis. A team of authors including Yuan Zhou and two others (Hans P. Binswanger 2012) have contributed valuable literature on farmer participation in value chains in Asia. Extension in Sub-Saharan Africa: Overview and Assessment of Past and Current Models, and Future Prospects (Davis 2008) describes the role of extension in Sub-Saharan Africa. While assessing the current status of extension in various Sub-Saharan African countries, the author describes new extension models and presents a framework for designing and analyzing extension systems. The T& V system which is a common topic in extension literature is discussed by several authors. For example experiences of implementing the T & V system in Pakistan is shared by Syed Hussain and while the Sri Lanka experience is shared by Gunawardnana.

Shifting from international literature on extension to the local publications, the journal publication by Mahaliyanaarachchi and Bandara, diverts the focus towards commercialization and supports the concept of commercializing agriculture. The authors pay attention towards pushing the smallholders beyond subsistence level to income generation and discuss the role

of extension within the commercialised agricultural context, further suggesting different approaches of commercialization of Agricultural Extension (Mahaliyanaarachchi 2006). However, the authors express their concerns over the resource poor smallholders and reiterates the need for public extension services for ensuring food security and reduction of poverty. One of the authors who has mainly contributed to literature on extension is Emitiyagoda (Emitiyagoda, 2009) who writes about the present extension structure within which the information sharing with smallholders occur, while Wanigasundara focusses on the importance of capacity needs assessment and current status of the extension and advisory services in Sri Lanka.

'Research Reports' of the Hector Kobbekaduawa Agrarian Research and Training Institute share literature on small holder farming systems in Sri Lanka among which the report authored by Damayanthi and Nanayakkara (Damayanthi,2008) specifically focus on the detrimental effects of the devolution of powers to provincial councils , on the delivery of public extension services in Sri Lanka. Overall, the literature review on agricultural extension encompass the above sources while the thesis make use of secondary data on several other topics related to the central research problem.

Scholarly articles on 'sustainable livelihood framework' by Ian Scoones is the major source of literature reviewed for the purpose of designing methodology in this thesis. Other sources related to livelihood analysis includes contributions by Krantz (see for example Krantz 2001), Bebbington (Bebbington, 1999) Ashley (Ashley 2000) and the joint work of Osman, Ahamad and Zakieldin (Osman 2005).

Literature on smallholder systems is significantly covered by the scholarly contributions of Dowe (Dowe 2010), Weinberger & Lumpkin (Weinberger 2005) and Dorward (Dorward 2001).

As described above, the literature is embedded in the relevant chapters in this thesis and the organization of the chapters within the thesis is outlined below.

1.10 Outline of the thesis.

Chapter 1 Introduction to the study: Why Study Smallholder Farmers and Extension Workers.

Chapter 2 Dry Zone Farming Systems in Sri Lanka: Overview of the Research Area Anuradhapura.

Chapter 3 Methodological Approach to Study Smallholders.

Chapter 4 Changing Policies and Extension Approaches

Chapter 5 Institutional Arrangements for Extension Delivery: Current Extension Framework

Chapter 6 Extension Interventions in Anuradhapura: The Enabling Framework.

Chapter 7 Livelihood Resources: Resource Bases Shaping Livelihood Strategies

Chapter 8 Voice of Smallholder Farmers: Extension in the Farmers' Perspective

Chapter 9 Liaising Role of Extension Agents: Extension in Brokers' Perspectives:

Chapter 10 Conclusions

CHAPTER 2

DRYZONE FARMING SYSTEMS IN SRI LANKA: OVERVIEW OF THE RESEARCH AREA –*ANURADHAPURA*

2.1 Introduction

The research which investigates the factors affecting the sharing of agricultural information, focuses on the smallholder farming systems in Sri Lanka. The area selected to gather data for this study, Anuradhapura district in the North Central Province, is a predominant locality in the dry zone farming system where small holder farmers cultivate paddy, home garden crops and traditional *chenas.* The aim of this chapter is to provide a comprehensive description about Anuradhapura including its historical and geographical significance in addition to its prominence being a major contributor to the national food production. Most importantly, the administrative structure of the North Central Province, governing the two districts (*Anuradhapura* and *Polonanruwa*) and the smaller administrative units, is elaborated in this chapter with the intention of providing a clear picture of the method of selecting the samples for the study. Chapter also shed light on the factors enabling the adoption of a variety of cropping patterns encompassing climate, topography and resource availability, especially the land and water resources.

While the dry zone farming systems in Sri Lanka thrive across several provinces this study seeks to investigate the dry zone farming systems in the *Anuradhapura* district in the North Central Province. Small holder agriculture in Sri Lanka is characterized by polyculture which has historically included a significant range of crops such as grains (Maize, Sorghum, Finger millet, Cowpea, Green gram, Black gram) cash crops (Chillies, Onions) roots and tubers (Potato, Sweet Potato, Manioc) and Oil seeds (Gingerly, Ground nut, Soybean). Production under multi cropping systems has assured food security in traditional rural communities. Thus, it is still the norm for Sri Lanka's smallholders to practice multi cropping with high value cash crops such as Chilli and Onions and low value cereal crops such as maize and finger millet. These crops are

grown in a number of smallholder systems, particularly in traditional *chenas* in the dry zone (Murray, 2000).

The wide range of crops grown in smallholder systems in Sri Lanka are intimately linked to the diverse agro-ecological conditions found within the country as well as to socio-economic and cultural factors. This makes generalisation about small holder systems such as those found in the research are difficult. In each case the actual shape of smallholder farming is to some extent shaped by the specific conditions found in specific areas. An understanding of these biophysical social and economic characteristics of any area is thus fundamental to an understanding of agricultural practices found there.

The discussion in this chapter therefore, intends to provide an overview of the physical, geographical and climatic factors influencing rural livelihoods in the Anuradhapura district. As a prelude to the discussion, the chapter begins with a delineation of the history, politics and administrative structure of Sri Lanka, tapering to the North Central Province followed by a detailed description of Anuradhapura district.

2.2 Colonial History of Sri Lanka

Sri Lanka, known as Ceylon before 1972 is an island in South Asia, located about 31 kilometers off the southern coast of India and as an Island the country has a pleasant tropical climate and average temperature of the low lands are ranging between 25-30 degrees Celsius.

Sri Lanka has been a strategic naval link between West Asia and South East Asia and a centre of Buddhist religion and culture from ancient times. Today, Sri Lanka is a multi-religious and multi-ethnic nation with Sinhalese, Tamils, Muslims, Moors and Malays as well as Burghers living in the country. While the Sinhalese community forms the majority of the population (around 78%), Tamils form the largest ethnic minority (see for instance History of Sri Lanka. nd)

In the history of Sri Lanka which runs back to over two thousand years, there are three recorded instances where parts of the country were invaded by three European nations the Dutch, Portuguese and the British (see for example History of Sri Lanka in Mahavamsa[6]). The Portuguese who invaded the Maritime Provinces in Sri Lanka in 1505 A.D. ruled these areas until 1658. This was followed by Dutch rule in the 17th century. The British first established their rule in Sri Lanka in 1796 and the island was subsequently declared a crown colony in 1802. After the fall of the *Kandyan* kingdom in 1815 Sri Lanka was unified under the British Rule.

The three nations that invaded the country, were attracted by the natural resources and the prime location of the island in a strategic naval link between West Asia and South East Asia. They sought to exploit its climatic and agricultural resources the creation of tea, cinnamon, rubber, sugar and coffee plantations on the island. They different economic priorities of different colonizing powers such as the Portuguese concentration on the spice trade and the Dutch expansion of the cultivation of Cinnamon, deprived many local people of their land and livelihoods. Furthermore, the British who established large scale tea plantations brought a large number of labourers from India to work in the tea estates, creating long-lasting ethnic and social issues in the plantation sector. Which continue to have resonances in Sri Lankan politics and society life in the present.

During the British rule in Sri Lanka, domestic agriculture sector was neglected in favour of plantation agriculture and this had a dramatic impact on patterns of landholding and livelihood leading to many Sri Lankan farmers became landless[7]. The British had however established modern schools, colleges, roads and churches that brought

[6] 'Great Chronicle' which is believed to have been written in the 4th century A.D containing the most elaborated and the best known dynastic history of Sri Lanka. The main written accounts of the country's history are the Buddhist chronicles of Mahavansa and Dipavamsa.

[7] An analysis which elaborates the impact of the colonial policies on small scale domestic agriculture will be presented in Chapter 6 in this thesis

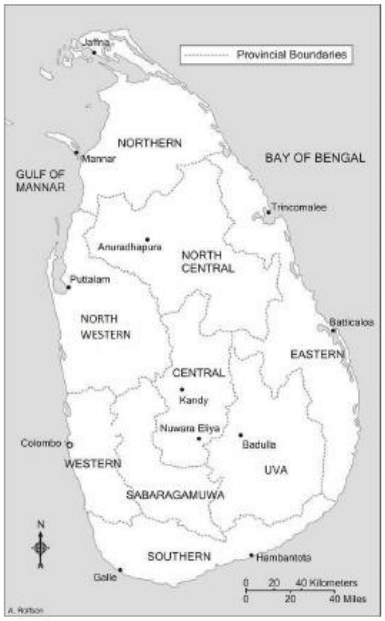
Western-style education and culture to the native people and the city of Colombo was established as their administrative center.

Sri Lanka which had been a British Colony for 150 years gained its independence on 04th February 1948. Having gone through several marked changes in terms of changing regimes, political leadership and policy. Sri Lanka became a republic within the Commonwealth in 1972, after which the country was named as the' Independent Republic of Sri Lanka'. Along with the constitutional changes in 1978 which marked significant political and economic transformations, the country became The Democratic Socialist Republic of Sri Lanka.

Since independence the local governments had adopted various measures including policy formulations to uplift domestic agriculture with the aim of ensuring self-sufficiency in food production. Among these attempts are land alienation and colonization, import substitution policies and land reform policies which will be reviewed in a forthcoming chapter in this thesis (see for example chapter 6) As reviewed by many authors subsequent modifications in the political structure with the establishment of the executive presidency and open economic policies in 1978, followed by the provincial council system introduced in 1987 etc. have had marked impact on smallholder agricultural systems (Damayanthi 2008).

With the devolution of powers to the provincial councils (as per the 13th amendment to the constitution of the Democratic Socialist Republic of Sri Lanka), the country was administratively divided into nine provinces namely, Western, Eastern, Northern, North Western, North Central, Central, Southern, *Uva* and *Sabaragamuwa* Provinces. Authors reviewing the impact of provincial councils have highlighted that, devolution of power has been proposed as a measure of regional and local development, through the participation of local population in the nine provinces (see for example, Damayanthi 2008).The research area selected to carry out the field survey to gather data for the purpose of this thesis belongs to the North Central Province thus the discussion henceforward focusses on the North Central Province.

Map 1.1: Provinces of Sri Lanka



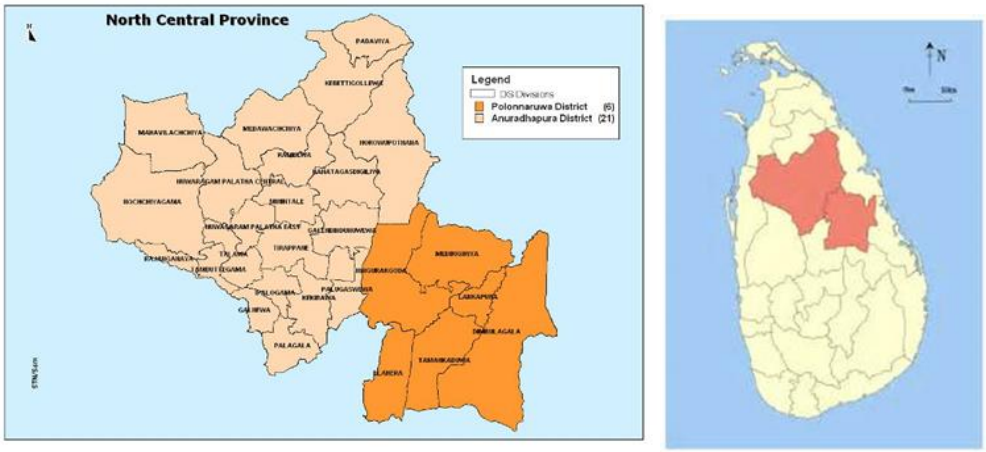
Source: Asoka Bandarage, *Colonialism in Sri Lanka: The Political Economy of the Kandyan Highlands, 1833-1886* (Berlin: Mouton, 1983) p. xiv

Figure 2-1: Provinces in Sri Lanka

2.3 Anuradhapura: The capital of the North Central Province

According to the geographical lay out of the nine provinces illustrated in figure 1, four adjoining provinces border the North central Province (NCP); the Northern Province, North Western Province, Eastern Province and the Central Province (North Central Provincial Department o Agriculture 2015). NCP being the largest province in the country ranges over a total land area of 10700 Km^2 covering 16.3% of country's total land area. The Population of the province is 1.1 million which accounts for 5.91% of the country's total population.

North Central Province (NCP) is made up of two administrative districts with historical significance as ancient kingdoms, namely *Pollonnaruwa* and *Anuradhapura* (Figure 2.2).



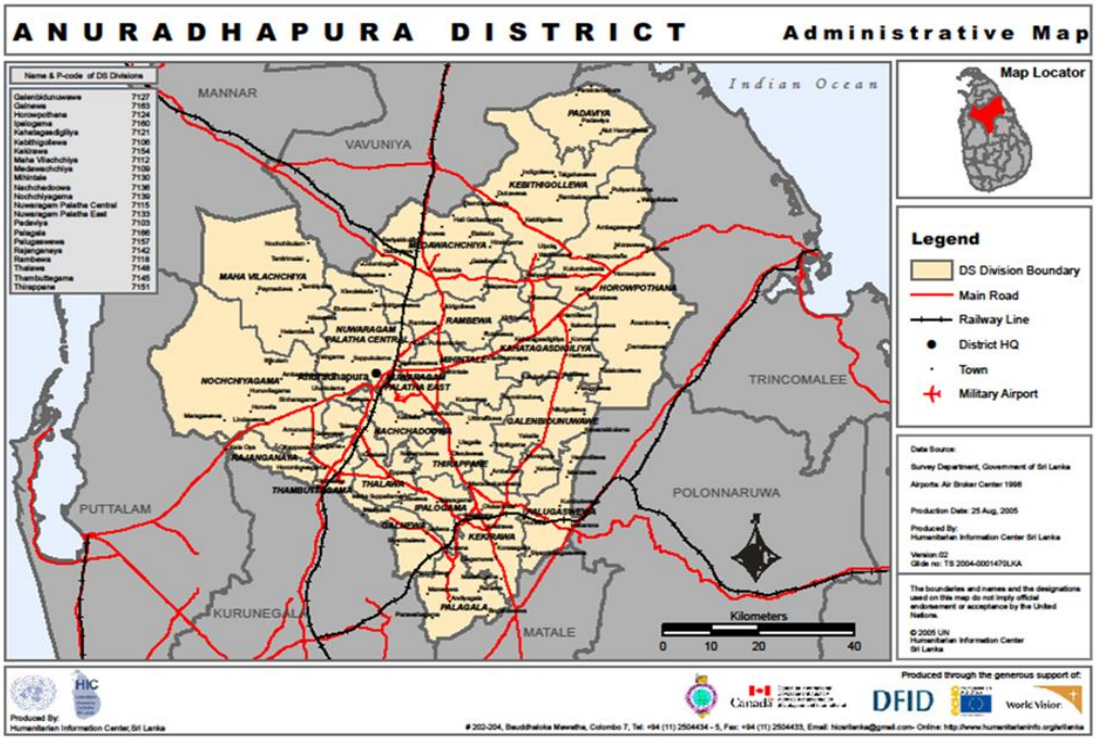
Source: (Department of Census and Statistics 2016)

Figure 2-2: District boundaries of the North Central Province of Sri Lanka

Both *Anuradhapura* and *Polonnaruwa* districts are areas in which agricultural activities have and contiunue to serve as the principle basis for local livelihoods. The area is endowed with many ancient reservoirs to store water for cultivations during dry periods. These water bodies (tanks) have existed for centuries having been constructed by the kings who promoted domestic food production in the region, especially paddy monoculture. It is recorded that the largest number of reservoirs in the island are located in the NCP covering an area of 731 Km^2 .Major reservoirs in the province include *'Kalawewa', 'Balalu wewa', 'Rajanganaya' 'Padaviya' 'Huruluwewa* located within the *Anuradhapura* district and *'Parakrama Samudraya', 'Minneriya' and 'Kawuduluwewa'* in the *Polonnaruwa* district (North Central Provincial Department of Agriculture 2015) In many instances authors have documented NCP as the 'bread basket' of Sri Lanka because it contributes with the largest portion of the grain production in the country – mainly rice, (see for instance Yapa, 2014).

Out of the two districts in the NCP Anuradhapura was purposively selected as the basis of this study. This selection was based on the existence of diverse cropping systems including paddy, home gardens and *chena* cultivations within the district as well as the researcher's familiarity with administrative arrangements within the area.

Anuradhapura is located in the North Central Province in Sri Lanka most precisely within geographical coordinates in decimal degrees (WGS84) 8.350 latitude and 80.383 longitudes. It is 205 km away from the main city towards the Northern part of the country. The city can be accessed through highways and railways and connected to the adjoining cities in the northern, eastern, north western and central provinces through a well-developed network of roads.



Source: Humanitarian Information Center, Sri Lanka

Figure 2-3: Administrative map of Anuradhapura District

2.4 Historical Significance of Anuradhapura

Anuradhapura was the first kingdom in ancient Sri Lanka founded in 377 BC and the king of Anuradhapura was treated as the supreme ruler of the country during this period. Buddhism which is the main religion of the country even today, was introduced during the reign of King *Devanam Piyatissa* who was ruler of the Anuradhapura Kingdom. Having established and propagated as the main religion of the country, Buddhism has influenced the culture and society of Sri Lanka in many ways. It has also influenced the laws and the methods of governance in Sri Lanka since the Anuradhapura era.

Highlighting its religious eminence, Anuradhapura is named as a' Sacred city 'today, and is recognised by UNESCO as a world heritage. Many pilgrims local and otherwise, visit the sacred city to venerate the sacred Bo tree *(Sri Maha Bodhi*) which is considered the worlds' oldest tree and the great stupa 'Ruwanweliseya' *and* the oldest temple in Sri Lanka, Thuparama. The city of Anuradhapura therefore epitomizes the rich history of Sri Lanka and the significance of Buddhism within its heritage (see for example truly srilanka n.d.)

The culture in ancient Sri Lanka was such that the village was entwined with the temple, and the lake *('wewa'* or the reservoir) so that building of temples and reservoirs had been a major concern of the rulers in the kingdom. According to Sri Lankan history, the first tank was built by King *Pandukabhaya* who reigned from 437 to 367 BC in Anuradhapura and King *Dathusena* (459 477) constructed the massive *Kala Wewa* reservoir[8] (Department of Irrigation n.d.)These have become landmarks of the legendary hydraulic civilization demonstrating the advanced technical and engineering skills of the local experts who designed those irrigation structures.

Having recognised historical significance of the research area Anuradhapura as a national heritage site, the next section in this chapter intends to highlight its eminence as a major agricultural area contributing to national food production and the geographical and climatic features that contribute to the cultivation patterns in the dry zone farming systems found there.

[8] 54 mile long irrigation channel called 'Jaya Ganga' or 'Yoda Ela' was a part of this irrigation system which had supplied water from this reservoir to Tissa Wewa (307 BC) which was done by King Devanampiyatissa (http://irrigation.gov.lk)

2.5 Climatic Conditions Favouring Dry Zone Farming Systems

Sri Lanka has traditionally been characterized as possessing three climatic zones, based on rainfall distribution. A Wet Zone in the south-western region including the central hill country, the Dry Zone covering predominantly, northern and eastern parts of the country, being separated by an Intermediate zone, skirting the central hills except in the south and the west (Damayanthi & Gamage, 2011). The Dry zone receives a mean annual rainfall of less than 1,750 mm with a distinct dry season from May to September. The Intermediate zone receives a mean annual rainfall between 1,750 to 2,500 mm with a short and less prominent dry season while the wet zone of Sri Lanka receives an annual rainfall above 2500 mm (Identification of climate n.d.)



Source: https://www.google.com/maps

Figure 2-4: Distribution of Climatic Zones in Sri Lanka

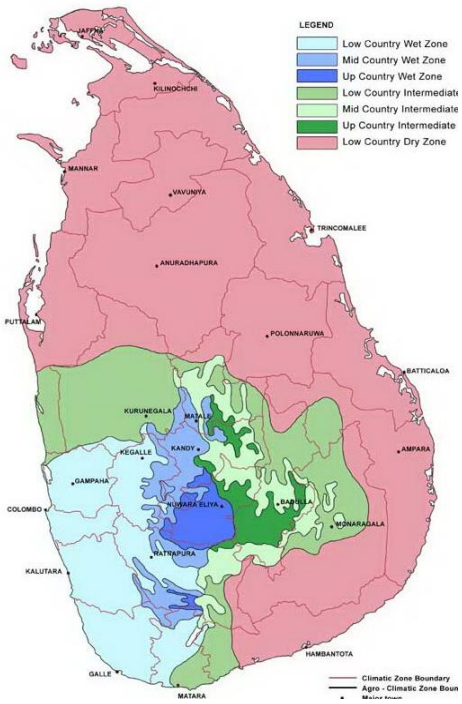
Elevation and its effects on temperature and rainfall is the single most important determinant of agro-ecology in Sri Lanka. The basic demarcation of the agro climates based on elevation, divides the country into three zones for instance,

Low country – with an elevation below 300m

Mid country – with an elevation between 300- 900m and

Up country – with an elevation above 900m

Thus, the dry, wet and intermediate zones have been further divided into seven agro climatic zones based on elevation and rainfall categorizations. According to this division, both Wet and Intermediate zones spread across all three categories of elevation while the Dry zone is confined to the Low-country. Seven Agro Climatic Zones are created as a result of this combination of elevations and rainfall as illustrated in the map shown below.



Source: Source: https://www.google.com/maps

Figure 2-5: Agro Climatic Regions in Sri Lanka

The spatial distribution of the seven Agro Climatic Zones over the wet, intermediate and dry zones and further subdivision of each climatic zone in to several regions have eventually, resulted in the identification of 46 Agro Ecological Regions (AER) covering the entire island

According to the new national Agro Ecological Region classification15 sub regions in the wet zone, 20 sub regions in the intermediate zone and 11 sub regions in the dry zone are identified [9] (Identification of climate n.d.)

Table 2-1: Distribution of Agro Ecological Regions.

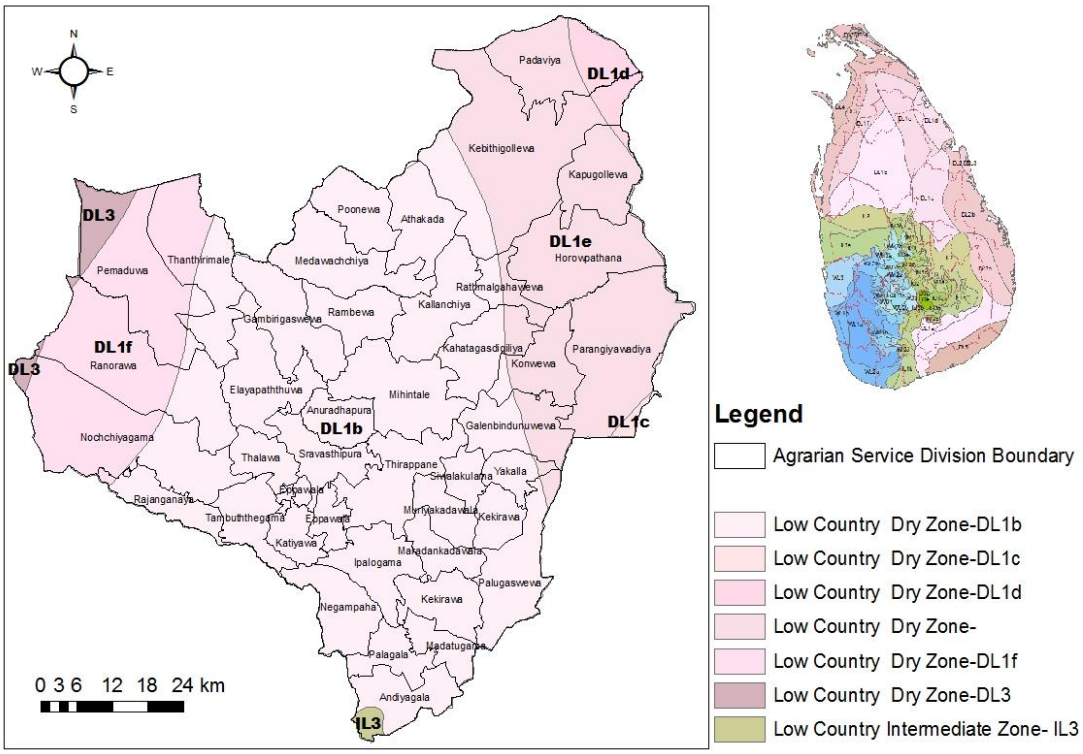
Agro ecological zone	**Agro climatic zone**	**no sub divisions (Agro ecological regions)**
Wet Zone	Low country wet zone	5
	Mid country wet zone	6
	Up country wet zone	4
Intermediate Zone	Low country intermediate	5
	Mid country intermediate	8
	Up country intermediate	7
Dry zone	Low country Dry Zone	11

Source: Murray, 2000.

According to the classification of agro-ecological regions of Sri Lanka, research area Anuradhapura district, falls within Low Country Dry Zone with DL_{1b}, DL_{1c}, DL_{1e}, DL_{1f} and DL_{2b} micro climatic zones.

[9] Agro ecological regions are given symbols according to that W, I and D symbols are used to classify regions according monthly rainfall (wet, intermediate, dry) L,M,U symbols are used to classify regions according to elevation (Low, mid up country) a-f and numbers from 1-5 to express range of soil moisture. For example, DL1a region is located in low country dry zone, contains Reddish Brown Earth and Low Humic - Glay soils with relatively good moisture range.

Apart from the research area the North Central Province, parts of other provinces for instance, Northern, Eastern and Southern, North western and *Uva* provinces belong to the low country dry zone, which covers nearly 70% of the total land area lying below 300m. The spatial distribution of the micro climates of the low country dry zone across the entire island and their distribution within Anuradhapura district are illustrated in the map given below.



Source: Murray, 2000, Panabokke 1998.

Figure 2-6: Agro-ecological Regions of Low Country Dry Zone

Apart from micro climates, rainfall is a vital factor in crop selection especially in the dry zone areas which includes the research area Anuradhapura. According to the annual rainfall pattern in the country, two main rainfall seasons for instance the South West monsoon and the North West Monsoon seasons and two inter monsoon rain seasons have been recorded;

Table 2-2 Major rainfall seasons in Sri Lanka

Period	Rainfall season	Cultivation season
March - April	First Inter Monsoon rains (FIM)	Yala season
May – September	South West Monsoon rains (SWM)	
October - November	Second Inter Monsoon rains (SIM)	Maha season
November -February	North East Monsoon rains (NEM)	

Source: Murray 2000.

Out of the four rainfall seasons, two consecutive rainy seasons make up the two growing seasons of Sri Lanka or instance, combination of FIM and SWM rains mark the *Yala* season while the combination of SIM and NEM rains make up the *Maha* season. These two growing seasons based on the bi modal rainfall pattern are the two main cultivation seasons in Anuradhapura.

When the wet zone of Sri Lanka receives the South West Monsoon (SWM) rains during May to September, the dry zone areas in Sri Lanka including Anuradhapura, do not receive substantial rainfall from the SWM rains. Anuradhapura receives a highest rainfall during mid-September – February with the arrival of the second Inter monsoon rains followed by the North-East monsoon rains (November –February). The major growing season of the whole country, *Maha* begins with the arrival of SIM rains in Mid-September and continues up to late February with the NEM rains (See for instance, IRRI 2009).

The minor growing season *Yala* in the whole country generally starts in mid-March and continues till early May. During this season the dry zone areas including Anuradhapura receive rainfall from the First Inter-Monsoonal Rains (FIM) rains. *Yala* is generally considered a dry season and *Maha* is comparatively a wet season. Rainfall

is unevenly distributed over the two growing seasons, with 60-70% falling during the *Maha* season and 20-40% falling during the minor *Yala* cultivation season (Murray 2000).

In summary, rainfall is the most important climatic factor affecting agriculture and human settlements in the dry zone, (Gunaratne 1980) Rainfall is mainly received from North West Monsoon rains and less rainfall is received from the South West Monsoon rains (Identification of climate n.d.) A special characteristic feature of the dry zone is the, marked dry periods experienced after each of these rainy seasons. The dry zone rainfall pattern is also characterised by high annual variability thus certain years of high rainfall may be followed by years of low rainfall.

The rain fed crop cultivations in the dry zone are established in the two growing seasons based on the bimodal rainfall pattern[10] as elaborated above in this chapter. However, supplementary irrigation is provided for the cultivations, when rainfall is not sufficient. Water storage structures such as large reservoirs and anicuts[11] which were built during ancient times serve as major components of these irrigation networks. Two main types of irrigation have been defined according to the command area (area that can be cultivated using irrigated water). While the irrigation systems with a command area less than 80 ha are defined as minor irrigation, both tanks (reservoir) and anicut systems are included in the minor irrigation systems and they are managed by the Department of Agrarian Services. Since the command area is comparatively small and distributary channel lengths are shorter, better regulation can be expected in minor irrigation systems. Availability of water depends on the catchment area, rainfall, tank capacity and the size of command area (Department of Agriculture n.d)).

[10] The presence of two well defined rainy seasons is known as the bimodal rainfall pattern which is well observed in the dry zone.

[11] Anicut is a barrier constructed across a waterway to control the water flow or to raise the level of water in order to regulate the flow of the system.

Systems with a command area above 80 ha are defined as major irrigation systems. Major irrigation systems are within the authority of either the Irrigation Department or the Mahaweli Authority of Sri Lanka. These systems also include both tanks (reservoir) and anicut systems. The distributary channel system in these systems are better equipped with control structures than in the minor irrigation schemes. Hence water management practices with a control mechanism have been introduced into these systems thus water is issued mostly on a pre- scheduled rotation (www.agridept.gov.lk).These definitions of major and minor are further used in introducing the provincial and interprovincial administrative systems that will be discussed towards the end of the chapter. Thus, the following description on major and minor irrigation systems are provided as a prelude.

In addition to the agro climatic conditions, soil types of the area and the topography are considered as important factors determining the cropping patterns. The prominent soil group in the dry zone is Reddish Brown Earth which is ideal for lowland paddy cultivation. These soils are confined to the dry zone and occur in a catenary sequence, the colour of the surface is reddish brown when dry, turns to dark reddish brown when moist. Reddish Brown Soils are extremely hard when dry and firm when moist. They have a low water holding capacity with a rapid release of soil moisture at low tensions. The organic carbon content of the soils is low, 1-2%. (Department of Agriculture n.d.). Other main soil type is the Low Humic Gley Soils. They are characterized by wetness or gleying throughout the profile. Soils are extremely hard when dry and sticky when wet, drainage is poor and soil reaction is moderately alkaline. They are more suitable for rice, but other crops can be grown with proper drainage.

Having dealt with the agro ecological features in the region that determine the crop selection, next section in this this chapter intends to discuss the cultivation patterns in the dry zone agricultural systems.

2.6 Cropping Patterns in The Dry Zone Farming Systems in Anuradhapura

Since ancient civilizations, agricultural systems in the dry zone of Sri Lanka were made up of a combination of lowland rice culture as the main crop and traditional slash and burn upland cultivation systems.

The most fundamental feature of the dry zone civilization was the Tank (Reservoir) Village System where the centre of the dry zone village is a tank; houses are grouped on one or both sides of the tank at a comparatively high elevation, and rice is cultivated in the valley floor under irrigation from the tank. The dry crops grown on the upper slopes includes, *Kurakkan* (Eleusina corocana), *Thanahal* (Setaria italica), *Cumbu* (Pennistetum tpyhodeum), *Menari* (Panicum miliaceum), *Maize* (Zea mays), *Cowpea* (Vigna unguiculata) *Greengram* (Vigna radiata) *Sesami* (Sesamum orientale), *Undu* (Vigna mungo), *Mustard* (Brassica juncea), and *chilli* (Capsicun annum). These crops were referred to as 'dry crops' during the era of dry zone civilization and are now identified as Other Field Crops (OFCs) which constitute an important component in the Food Crop Sector in Sri Lanka. The system of refined *chena* [12]cultivation or the growing of crops on un- irrigable lands is known as Dry Farming in the modern agriculture (Wijerathne 2011).

Chena cultivation is described as a form of agriculture practiced by people living in sparsely populated areas with easy access to scrubland or forest land that could be used for rain fed farming. As elaborated by Pieris in his writing on 'land utilization in agriculture, see for example (Peiris 2006) '*Chena '*represents a fairly broad and diversified segment of a continuum of agricultural land use. This farming system sometimes could be the only source of livelihood for some farmers while others may consider it as a supplementary livelihood activity. *Chena* cultivation differs from other

[12] Chena cultivation is widely regarded as being equivalent to '*shifting cultivation'* (also referred to as lading, *swidden* or 'slash and burn' in other tropical and subtropical areas.

farming systems due to the periodic changes in the cultivation venue (so that it is also known as shifting cultivation) and the presence of cyclically occurring fallow periods. The length of the uncultivated period depends on several factors including limited availability of labour and prolonged drought periods.

Farmers belonging to several divisions in the research area, Anuradhapura engage in *Chena* cultivation for their livelihoods, although it is not the traditional form of slash and burn, shifting cultivation. The chapter on 'livelihood resources in Anuradhapura' in this thesis further describes the features of the *chena* cultivations in the dry zone of Sri Lanka.

Backing the idea that crop selections depend on the prevalence of suitable agro climatic features, specific cropping patterns are established across the dry zone, with variations depending on local agro ecological conditions and with other social and economic factors playing a small role. This contributes to a diverse patchwork of local cropping systems within the dry zone (Table 2.3) However, lowland paddy cultivation is commonly practiced irrespective of the micro climatic variations.

Table 2-3: Major cropping patterns in the low country dry zone.

Agro Ecological Region	**Expected annual rainfall mm**	**Major land use**	
		Crops	**Other**
DL1a	> 1,100	Paddy, mixed home gardens, sugarcane	Forest plantations, scrub, natural forests
DL1b	> 900	Paddy, rain fed upland crops, mixed home gardens	Forest plantations, scrub
DL1c	> 900	Paddy, Rain fed upland crops, Sugarcane	Forest plantations, scrub, natural forests
DL1d	> 900	Paddy, Rain fed upland crops	
DL1e	> 900	Paddy, Rain fed upland crops	Scrub
DL1f	> 800	Paddy, Rain fed upland crops	Scrub, Natural forests
DL2a	> 1,300	Paddy, Rain fed upland crops, sugarcane	Scrub, Natural forests
DL2b	> 1,100	Paddy, Rain fed upland crops	Scrub, Natural forests
DL3	> 800	Paddy, Rain fed upland crops Cashew, Coconut, Condiments	Scrub, Natural forests
DL4	> 750	Paddy, Rain fed upland crops	Scrub
DL5	> 650	Paddy, Rain fed upland crops	Scrub, Natural forests

Source: Department of Agriculture, Sri Lanka 2006

These cropping patterns have been continued by the smallholder farmers over a long period of time and influence the farming systems that exist in the area.

2.7 Land Settlement in the North Central Province

In the North Central Province, where the cropping patterns described above have emerged, have had a strong influence on smallholder farming system over a long period of time. The different policies of both colonial and national policy regimes have also had an influence on local farming practices. According to previous studies these communities primarily employed a threefold land use system Paddy, homestead and *chena*, (see for example 'Rain fed farming in the dry zone of Sri Lanka by Goonaratne 1980) These settlements or '*purana villages'* [13] were the traditional settlements associated with the small tank irrigation system.

The Province has also been an area of focus for the land settlement and colonization programmmes started during the colonial period and since independence by the Sri Lankan Government. The land commission established in 1927 with the objective of preserving the peasantry has also attempted in reinforcing peasant land ownership. Distribution of state lands among middle class and peasants, ensuring land availability for agriculture and housing and elimination of multi ownership for the alienated land were among the other objectives of the land commission (see for example Ariyaratne 1998). A series of developments which culminated in a policy of aided peasant colonization in the dry zone of Sri Lanka, was followed after the Donoughmore constitution in 1931 under which the country gained internal self-government (Farmer 1982).

The Crown Lands Ordinance of 1947 provided a comprehensive and flexible basis for making state land available to individuals and institutions for development projects and for public purposes. It enabled the making of absolute or provisional grants by way of sale, lease, agreement, permit etc.

[13] Traditional Sri Lankan village settlements meaning ancient /traditional villages

The Land Development Ordinance and the Crown Lands Ordinance still maintain their pre- eminence as the core legislation for the alienation, utilization and development of state land in Sri Lanka (Wijedasa 2000).

Establishing land settlements in the dry zone, was the outcome of the formulation of land policies subsequent to Land Development Ordinance of 1935[14] (Sandaratne 2004).

The author further describes that the implementation of the Land Development Ordinance enabled the dispersal of population from the densely populated wet zone to the sparsely populated dry zone resulting in the restoration of several irrigation schemes and settling of a large number of landless peasant families in the dry zone. Nevertheless, certain restrictions enforced on the use of alienated state land for example prohibition of sale, transfer, mortgaging, leasing and subdividing resulted in neglecting the lands without attempting to make any permanent improvements by the peasants.

This post independent land development effort is reported as the key agricultural development policy in the first decade after independence. By the end of 1953 thirty colonies have been established with an estimated area of 118, 438 acres (47 950 ha) was alienated for cultivation and the allotments consisted of 5 acres (approximately 2ha) of wet irrigated land for rice cultivation and 3 acres of highland (approximately 1.2 ha) for the cultivation of other crops (see for example Chandrapala 1986).

[14] See chapter 6 in this thesis for more details on this policy formulation.

Settlement of peasant farmers from other areas of the country in these colonies had a marked impact on the population pattern in the dry zone. It is reported that the population of the North Central Province increased from 97,365 in 1931 to 170,164 in 1951(See for instance Chandrapala1986). This increase in population is attributed in literature to the effective control of Malaria Epidemic [15]and migration due to expansion of the colonization programme, placed over the natural increase.

A significant development in the settlement programme in more recent history, was the Mahaweli Development Scheme[16], which is considered the centerpiece of the agricultural development policy of the 1977 regime (Sandaratne 2004). The aim of the programme was to develop 365,000 ha of land This would involve the creation of 13 systems (WHAT type of systems), establishment of new settlements, developing irrigation facilities for agriculture and construction of a series of reservoirs and hydroelectricity plants (Mahaweli. gov.lk) The development process was initially proposed to spread over a period of 30 years and subsequent to the change of political regime in 1977 it was decided to complete the project within 5-6 years.

The Accelerated Mahaweli Development Programme was completed within the period between 1977-1983 and the impact of the development scheme on dry zone settlement is demonstrated by the statistics for example total number of families settled in Mahweli systems amounting to 47, 278 and total land area cultivated (with paddy and other field crops) amounting to 154,346 acres (62, 488 ha).

[15] Malaria epidemic which claimed the lives of many peasants in the dry zone was eradicated by spraying DDT (Dichloro Diphenyl Trichloroethane). This effort has drastically reduced deaths from 12 500 to 4500 between1946 – 1947.

[16] Mahaweli scheme is the largest multi-purpose river basin development project ever undertaken in Sri Lanka (for further details on this topic please refer H.A.Chandrapala,1986 pp 269)

2.8 Agriculture Administration, Population and Land Use In Anuradhapura

This thesis investigating the complementary and conflicting views of farmers and extension workers, on the delivery of present agricultural extension services has selected Anuradhapura district, for gathering data within the areas served by the Provincial Agricultural Extension service offered by the PDOA in the North Central. Thus, the farmers in the Mahaweli scheme were not included in this investigation as they are served by the Mahaweli extension service[17].However, this chapter discusses the demographic and socio-economic background of the entire Anuradhapura district.

Anuradhapura district which is spreading over 71 7900 ha of land accounting for 10.9% of the total land area of the country is administratively divided into 22 Divisional Secretariat Divisions (DS divisions) (District statistical branch Anuradhapura, 2015). Total population in the district distributed over these smaller administrative units, amounts to 893000 of which 49 % is males and 51 % is females. Population statistics further reveal that the dependency ratio in the district stands at 56% with 42 % child dependency and 14% elderly dependency (District Statistical Branch, Anuradhapura 2015).

[17] Extension services provided by different agencies are reviewed in chapter 4 in this thesis.



Source: http://www.anuradhapura.dist.gov.lk

Figure 2-7: Layout of the DS divisions in the Anuradhapura District

The District Secretariat is the apex body of administration in the district level led by the District Secretary. The DS divisions are administered by the Divisional Secretariats in the respective divisions and the Divisional Secretary acts as the head of the Divisional Secretariat. Each DS division is further divided into several *Grama Niladari*[18](GN) Divisions which are smaller administrative units comprising several villages. For instance, there are 694 GN divisions and 2584 villages. Most importantly there are 42 Agrarian Services Centers[19] serving the farming community scattered in the 22 DS divisions in the Anuradhapura district.

[18] Grass root level government administrative officer. Area of administration is the GN division.

[19] Agrarian Service Center is the grass root level organization managed by the Department of Agrarian Development. Services provided by the Agrarian services centers are further review in chapter --- in this thesis.

Table 2-4: Distribution of administrative units within Anuradhapura district.

DS division	No of GN Divisions	No of villages	No of agrarian services centers
1. Padaviya	15	52	1
2. Kebithigollewa	26	91	1
3. Mahavilachchiya	17	142	2
4. Medavachchiya	37	169	3
5. N.P.C	40	195	3
6. Rambewa	38	108	2
7. Kahatagasdigiliya	40	131	3
8. Horowpaathana	38	276	3
9. Galenbidunuwewa	41	163	3
10. Mihintale	25	145	1
11. N.P.E.	29	120	1
12. Nachchaduwa	19	51	1
13. Nochchiyagama	36	165	2
14. Rajanganaya	21	37	1
15. Thambuththegama	26	64	1
16. Thalawa	39	131	3
17. Thirappane	41	107	2
18. Kekirawa	53	149	3
19. Palugaswewa	16	43	1
20. Ipalogama	32	116	1
21. Galnewa	30	86	1
22. Palagala	35	103	2
Total	694	2584	41

Source: http://www.anuradhapura.dist.gov.lk

Among the facilities available for smallholder farmers within each of these DS divisions is the availability of well organised village fairs to sell their farm produce. Generally, these are organised as weekly fairs and a particular day or sometimes two or three days are assigned for each DS division to hold the weekly fair. For example, in *Nochchiyagama* DS division the weekly fair is held on Thursdays whereas in *Rambewa* DS division, Tuesday and Thursday are allocated for village fairs in two locations. Through this system, smallholder farmers get the opportunity sell their produce directly to the consumers without having to pay a commission to the market intermediaries. Usually a village fair is a market place where a wide variety of fresh fruits, vegetables, yams and grains are available for sale. They can minimise the cost of transport as there is a village fair organised in each DS division sometimes in several locations.

Another option for farmers who have a sizeable amount of produce to be marketed, is to take those to the *Dambulla* Economic Center which is about 65 km away from Anuradhapura city. It is the main vegetable collection and marketing hub in Sri Lanka. Vegetables from many parts of the country are daily transported to *Dambulla* Economic Center where there are many whole sellers and market intermediaries are involved in trading. Vegetables are distributed to retail markets in many parts of the country from this center.

Anuradhapura being one of the main farming areas in the country has utilised 33 % of the available land area for cultivations while another 31 % remains as forest lands. The total land availability in the district stands at 92 % while 8% of the land is covered by water bodies providing irrigation water for cultivations. It is recorded that 16 % of the paddy cultivations receive irrigation water from these reservoirs while the rain fed paddy cultivations are confined to 2.4 % of the total extent of paddy. Further illustration of the land use pattern of the district is presented in the table.

Table 2-5: Land use pattern in Anuradhapura District (2015)

Land use pattern		**Percentage**
Paddy	Irrigated	15.9 %
	Rain fed	2.4 %
Grasslands & *chena*		26.7 %
Home gardens		13.4%
Forests		30.8 %
Reservoirs		7.7 %
Other uses		2.1 %

Source: http://www.anuradhapura.dist.gov.lk

The major cultivations in the area comprises paddy, *chena* and home gardens, supported by several government departments for instance the Department of Agriculture, Department of Agrarian Services, and Department of Irrigation covering several aspects including advisory services, provision of agricultural inputs and irrigation management respectively. The administration of these functions especially the extension and advisory services are carried out under two main systems within the district namely provincial and interprovincial systems. Agricultural lands cultivated under major irrigation systems are defined as the 'interprovincial areas' which are administered by the central government and the management of the other areas in the province are devolved to the provincial councils. Whilst the chapter on 'extension Interventions in Anuradhapura (chapter 6) provide a review of these systems, this chapter introduces provincial and interprovincial systems in brief.

Anuradhapura is one of the areas where Interprovincial Agricultural Extension programme is implemented, other areas being *Ampara*, *Hamabantota Polonnaruwa, Moneragala* and *Kandy.*

Primary areas belonging to the interprovincial extension service in Anuradhapura include the following areas.

1. *Dewahoowa.*
2. *Galenbindunuwewa*
3. *Kebithigollewa*
4. *Neelabemma*
5. *Nuwarawewa*
6. *Padaviya*
7. *Rajanganaya*
8. *Rambewa*
9. *Srawasthipura.*
10. *UsgalaSiyambalangamuwa and 11. Willachchiya*

Extension activities in these interprovincial areas are administered by the Deputy Director of Agriculture under three main segments headed by Assistant Directors in Agriculture (segment ADAs) and supported by Subject Matter Officers (SMO) .

The Provincial Department of Agriculture in Anuradhapura implement extension activities under the direction of the Provincial Director (PD) and assisted by the Deputy Director (Extension). The farming areas in Anuradhapura which are managed by the PDOA are organised in four main segments namely, *Anuradhapura, Kahatagasdigiliya, Ipalogama* and *Thirappane*.

However, this thesis focusses on the extension services provided by the Provincial Department of Agriculture (PDOA) and the emphasis will be placed on the programmes implemented by the PDOA.

Summary

This chapter on the research area described historical, geographical and agroclimatic factors related to the farming activities in the Anuradhapura district. Moreover, the demographic and land use patterns described in this chapter provides an overview of the availability and the distribution of resources in the area. Presentation of information on the dry zone farming systems and cropping patterns substantiate the comprehensive discussions on smallholder farming systems investigated through the study and presented in forthcoming chapters in this thesis. The methodology adopted in this thesis to investigate the smallholder farming systems, is elaborated in the next chapter.

CHAPTER 3

METHODOLOGICAL APPROACH TO STUDY SMALLHOLDERS

3.1 Introduction

This study on the analysis of small holder farming systems in Sri Lanka falls within the category of social research and therefore a qualitative research methodology was adopted. The study deals with a research question that investigates the factors influencing the delivery of advisory services within which the views of farmers and extension officers becomes a major part of analysis. Also, it involves the review of policies and organisational behaviors. These are social phenomena which cannot be evaluated using quantitative measures thus qualitative approach is considered a suitable method of analysis which provides a holistic and complete understanding of the phenomena (see for example Bhattacherjee 2012).

Setting out with an overview of the problem addressed by the study, this chapter provides the theoretical background to the research in order to substantiate the methods and techniques employed in the study. Following from this, the data collection techniques are presented describing the various tools used for collecting information for the study. The study employs a twofold data collection technique. A survey of past literature is carried out to gather information on the history and development of extension approaches alongside changing agricultural policies in post-colonial Sri Lanka. In addition, a field survey is designed to gather primary data from farmers and extension officers (AIs). An essential element in field research involved negotiating 'access to the research field. This chapter intends to share the experience of following the procedures involved in conducting the field work. It describes the protocols followed when conducting surveys and interviews to obtain primary data from government institutions government employees and other actors. Before proceeding with the details, it is worthwhile to have a brief overview of the method employed in this research.

The central research question addressed by the study 'What factors are affecting information sharing with farmers' contains three main constituents as was elaborated in the introduction to the thesis;

I. The performance of existing extension services in providing information to the farmer
II. The role of extension agents and their perceptions of the farming community and
III. Perceptions of the farmers of extension officers and the programmes implemented in the area.

The next section of this chapter elaborates on the theoretical approach underlying the research methodology.

3.2 Theoretical Background to Qualitative Data Gathering Techniques

The study employs a qualitative approach in its research methodology. Qualitative research as explained by Denzin and Lincoln, allows the researcher to describe existing phenomena and current situation while providing a holistic view of the facts under investigation (See for example Denzin 2000). Most importantly, through qualitative research, it is possible to obtain a more realistic view of the lived world of those the research wishes to study than can be achieved via quantitative approaches which involves the collection of numerical data and statistical analysis.

Setting the theoretical background of social science research, literature reveals two that two fundamental philosophical assumptions shape the study of social phenomena i.e. Ontology and Epistemology. While ontology refers to the assumptions on how we see the world, epistomoloogy refers to the assumptions on the best way to study the world (see for instance Bhattacherjee 2012). In parallel to these assumptions, two popular paradigms in social research are 'positivism ' and 'post positivism'. Positivism which leads to emperism holds that science or knowledge creation is restricted to phenomena that can be observed and measured , and totally relies on theories that can be directly tested. As it was emphasised by Bhattacherjee,

this empirical nature of positivist phylosophy restricts social research from considering human thoughts and emotions which cannot be measured. Post – positivism which emerged in the mid - late 20th century , in contrast argues that reasonable inferences about a phenomenon can be drawn by combining emperical observations with logical reasoning.

Further elaborating and extending the application of these fundamentals in social science research, epistemology and ontology, four categories of social research (radical structuralism, radical humanism, functionalism and interpretivism) have been identified (Burell and Morgan 1979, Bhattacherjee 2012). Understanding of 'How 'and 'Why' things happen, using subjective approaches such as ethnographic study and in –depth interviews belong to the category of interpretivism (Raddon 2010) Bhattacherjee further elaborates that researchers have inclined towards using subjectivist techniques such as interviews and ethnographic studies after the emergence of the post positivism. Social research which belongs to the interpretivist paradigm however, adopts an inductive approach whereas natural science research adopting a positivist model, takes a deductive approach. In brief, while natural science research focus on testing theories, social research in the interpretive tradition focuses on the building up theories based on observations and reflection on those observations.

While many post-positivist researchers rely solely on qualitative data collection methods, it is worthwhile to consider the application of a multi paradigmatic approach which combines elements of both qualitative and quantitative methods of data collection. Literature suggests (see for example Bhattacherjee 2012) that it allows a more holistic understanding of complex social phenomena.

Thus, the research design of this study employs a combination of approaches. This study employs survey methods, extended interviews and field observations as tools to investigate the interactions between the farmers and the extension services, as elaborated in the research question.

3.3 Research Methods

This study investigating the impact of past development policies on the smallholder agricultural systems in a broader perspective, while specifically looking at the performance of the agricultural extension services, does not limit the sources of evidence to primary data. Instead, an array of secondary data is reviewed for the analysis of past development policies and historical perspectives associated with the research question.

While primary sources, for example field surveys, group discussions and observations etc. are used for the inquiry of existing field situations, information sources such as policy documents, central bank reports, facts and figures from the reports of the department of census and statistics etc. are among the secondary data sources, which are elaborated below.

3.3.1 Sources of Primary Data

Sources of primary data used for the investigation of the research question include field surveys, in-depth interviews, participant observation and direct observations and formal and informal discussions with the key informants. Two types of surveys i.e. questionnaire survey to gather primary data from the agricultural Instructors and interview survey to gather primary data from the farmers are employed in the study.

The use of surveys was pioneered as a formal research method, by the sociologist Paul Lazarsfeld who had used survey method to examine the effects of the radio on political opinion formation of the United States during the period 1930- 1940 (Bhattacherjee 2012). Having compared with other research methods, researchers emphasise that survey method can be used for measuring a wide variety of unobservable data, such as people's preferences, traits, attitudes, beliefs, behaviours or factual information such as income.

Bhattacherjee, in his book on 'Social Science Research : Principals, Methods and Practices' has endorsed survey as an appropriate method for remotely collecting data about a population that is too large to observe directly. It may also allow comparative analysis of population subgroups for example analysis within group and between groups (see for example Bhattacherjee 2012). These strengths of survey method, particularly its ability to measure a wide variety of data related to socio economic aspects, prompted the adoption of survey method to investigate the interactions between farmers and extension services.

Literature reiterates that (Bhattacherjee 2012) field surveys being non-experimental designs, do not control for or manipulate independent variables or treatments. Justifying the wide use of field survey in social research Bhattacherjee highlights that the strength of field surveys lies in the external validity, its ability to capture and control for a large number of variables, and the ability to study a problem from multiple perspectives or using multiple theories. In this study survey research was used in order to examine the resource bases, cropping patterns, and marketing aspects and to examine the access to extension and advisory services in a broader sense.

In social research, data gathering through in-depth interviews includes both individual interviews and group interviews, with the aim of probing the ideas of the interviewees about the phenomenon of interest (M.K.Trochim 2006). While individual interviews include face to face data gathering (for instance one – on –one) group interviews include techniques such as focus group discussions. Indirect interviews differ from direct observation based on the nature of interaction. For example, in interviews it is assumed that there is a questioner and one or more interviewees. Finally, the data gathered through the interviews can be recorded in the form of written notes, audio or video recordings.

Participant observation is considered a broad approach to qualitative data gathering and the essential idea is that the researcher goes "into the field "to observe the

phenomenon in its natural state (M.K Trochim, 2006).According to Trochim, participant observation, is one of the most demanding qualitative data gathering methods, which requires the researcher to become a participant in the context being observed.

In keeping with this methodology, participant observation was performed in this study, in order to supplement the information gathered through the questionnaire survey and in-depth interviews.

In parallel to participant observation the other component which cannot be isolated is the direct observation. The distinction between participant observation and direct observation is that direct observation is a more detached approach as the researcher does not take part in the activities but carefully watches and records the events. In doing so, the direct observer should attempt to be as unobtrusive as possible. Also, direct observation tends to be more focussed than participant observation as the researcher is trying to observe certain sampled situations. It does not take a long time either, because the researcher observes a situation under specific circumstances for instance observing from behind a one-way mirror in a laboratory setting (see for instance Trochim 2006).

Following this procedure advocated by Trochim, field research activities such as field days, method and result demonstrations and crop clinics were observed during data collection regarding the extension programmes implemented in the research area. While participant observation was the technique used to gather information from field days, direct observation was helpful to observe the method demonstrations performed by the extension officers. Field days and crop clinics are more interactive social activities where farmers inclusive of both males and females, extension officers, subject matter specialists and other officials from the provincial departments also participate. Therefore, it is more suitable to interact with them and gather information representing a wider cross section. Method demonstrations in contrast, are programmes where the technical experts or the extension officers demonstrate a new

method or a technique to farmers. Therefore, it is more or less a two-way approach rather than an interactive session where many groups participate. Hence, direct observation is considered the appropriate data gathering tool, especially for the purpose of data triangulation.

For the purpose of this thesis, the study included two distinct categories of respondents representing two elements within the overall theoretical framework presented in the figure below.

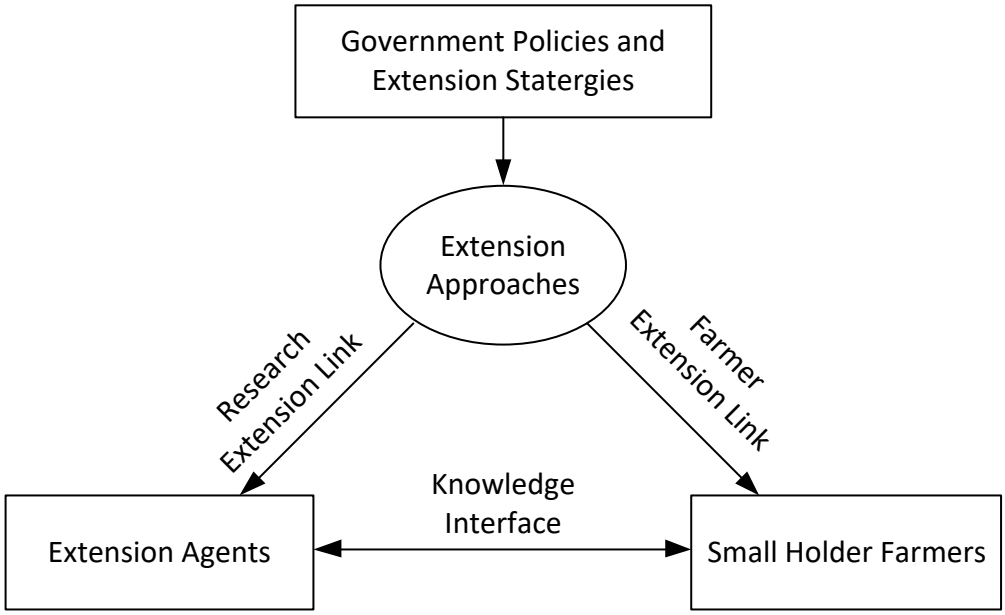


Figure 3-1 Theoretical framework

The study focusses on encounters at the interface between extension agents and smallholder farmers. For this reason, the research particularly focussed on farmers as clients and field extension officers who deliver extension services and act as the brokers between farmers and the policy makers. Both aspects i.e the extension activities implemented by the extension officers and the farming practices in the farmer fields were observed during the period of primary data gathering. This data was sought in order analyse the knowledge interface between farmers and extension agents.

For this reason, the two main types of data collection techniques used in the field involved a combination of the quantitative and qualitative methods mentioned above namely a series of survey questionnaires and in-depth interviews. These methods were employed in data collection with the appropriate tools being selected to work with different groups. In part the selection of the specific research method to use depended on practical consideration. For instance, a questionnaire based quantitative survey was carried out using a structured questionnaire to obtain information from the field extension officers whose time was limited and who were less likely to commit to the time necessary to undertake an in-depth interview. This information was augmented by participant and direct observation of extension staff during meetings and interactions with farmers during which the researcher was able to observe their practices and engage them in informal conversations. Information from the farmers was gathered through the use of in-depth interviews, using a structured interview guide. This was possible because the researcher was able to spend extended periods of time with individual farmers. Direct and participant observation methods were also undertaken.

As previously mentioned participant observation was also employed to generate additional data during the course of this study. Trochim has further emphasised that, while practicing this technique, it is important to consider how to make the entry to the context in addition to have a clear understanding about the role of the researcher. Literature further reveals that participant observation often requires months or sometimes years of intensive work because the researcher needs to become accepted as a natural part of the culture in order to assure that the observations are of the natural phenomenon. The section on ‘gaining access to the field ‘in this chapter elaborates how this process of gaining acceptance by the respondents was achieved prior to data collection in this study.

In addition to participant observation, direct observation was used to gather information for the study especially data concerning the implementation of the extension and advisory services in the village level.

3.3.2 Sources of Secondary Data

Analysis of secondary data generally involves combining information from multiple data bases to examine research questions (Trochim 2006). In this research a range of such secondary sources were accessed.

Books, conference proceedings, research publications, and publications of the Ministry of Agriculture, memos, transcripts of conversations, and annual reports served as valuable sources of secondary data in addition to the websites and other electronic resources. Useful information regarding the past development policies were elicited from books, research papers and review reports written by policy analysts, most often available at the library of the Institute of Policy Studies, which is the key organization in Sri Lanka for policy research. Information related to peasant studies and agrarian transformations, literature on development stages and information related to smallholder farming sector in Sri Lanka were available at the library of the *Hector Kobbekaduwa* Agrarian Research and Training Institute (HARTI)[20]. The source of information that provided most of the information related to the extension services and the current extension programmes is the web site of Department of Agriculture.

Other than the above sources, Central Bank annual reports, information published by Department of Census and Statistics, Documents from the Department of Agriculture and Agrarian Service centers are valuable information sources used in data collection. These sources are important to gather socio –economic data, population data and agronomic and crop cultivation data presented in the form of cropping colanders, cultivation plans, irrigation schedules etc. Research papers published by eminent

[20]HARTI is the premier national Institute in the field of socio-economic research relating to agrarian sector in Sri Lanka.

researchers served as empirical sources of information among the secondary data reviewed in this thesis.

3.4 Sample Selection

The research area selected for the study is Anuradhapura District in the North Central Province of Sri Lanka. Out of the nine provinces in the administrative map of Sri Lanka North Central Province was selected since it is one of the province representing dry zone agriculture where *chena* cultivation is widely practiced.

The aim of the study was to generate a comprehensive series of insights concerning the delivery of extension services in Sri Lanka. For this reason, it was hoped to explore how this occurs in the context of varied farming systems involving for example paddy (rice), home gardening and *chena* cropping system. Therefore, districts in the North Central Province Anuradhapura that where all three faming systems are present were excluding *Polonnaruwa* where paddy is prominent in the cropping system.

This study basically contains two survey components, one with the farmers and the other with the extension officers (AIS). All the AIs employed under the North Central Provincial Department of Agriculture in Anuradhapura were included in the survey and therefore sampling techniques were not required for this component. However, the research design demanded criteria for selecting the sample for the survey with farmers, which included 40 farmers in the sample. A multi stage purposive technique was employed. The forty farmers were selected from the four divisions managed by the Provincial Department of Agriculture. The area covered by one AI is identified as 'AI range' and there are eight such ranges in each of these divisions. One AI range from each division was selected except for *Ipalogama* segment from which two AI ranges were selected to better represent the different cropping patterns found in this division.

Next, village clusters within each AI range were selected. In total four village clusters belonging to each of the AI range were selected, *Thirappane* being the only exception.

Five village clusters were selected from *Thirappane* range which has the highest number of village clusters (29) within the AI range.

This was deliberately done to avoid biased sampling. The smallest unit of analysis which is the farm family was randomly selected from within the sample village clusters to get the total sample of forty farm families. The sampling frame included ten farm families from each division. In-depth interviews were conducted with forty farmers and their family members at their homesteads or sometimes in the farm itself.

The framework presented in the figure below depicts different stages in the sampling procedure. The sampling procedure required the researcher to rely heavily on links that were developed with AI's and farmers early in the project for this reason the question of how access was gained was crucial to the development of the work.

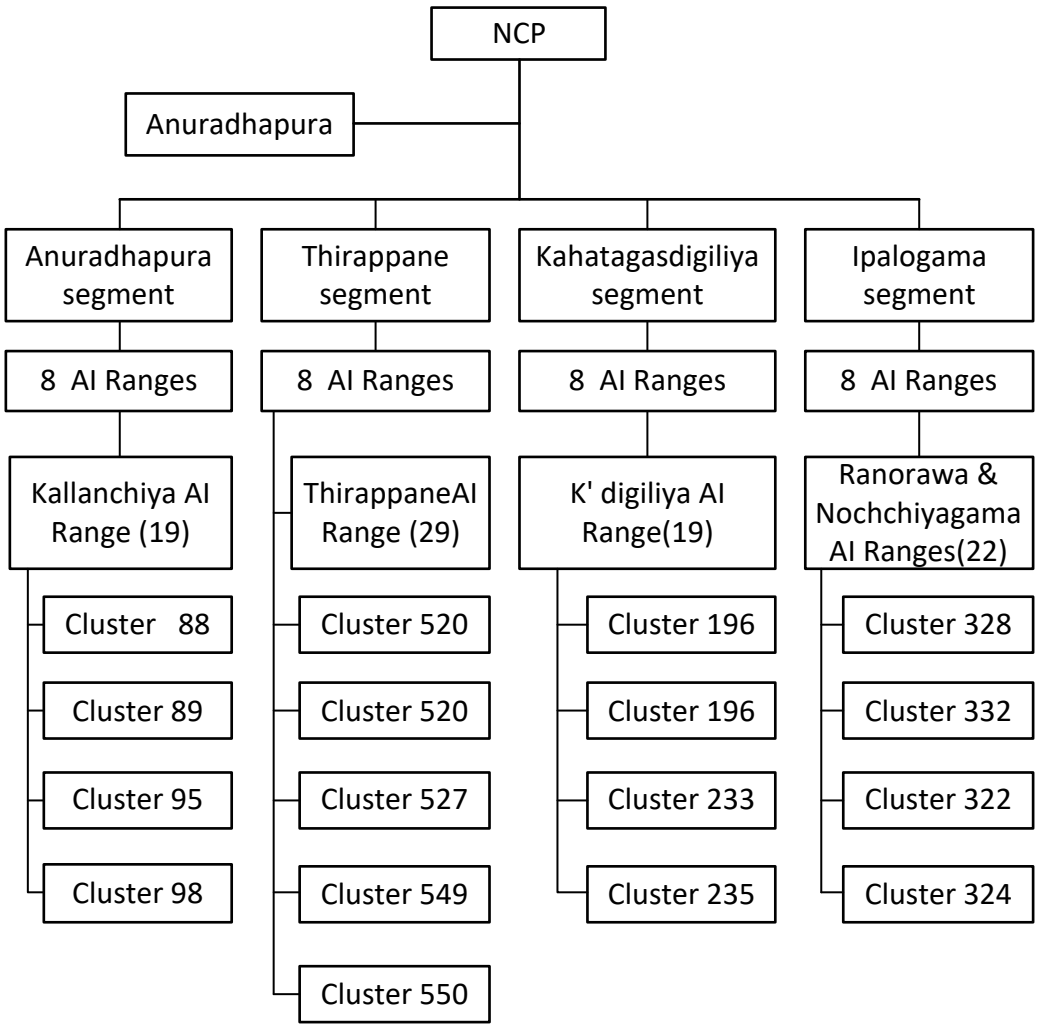


Figure 3-2 Sampling frame for the field research

3.5 Gaining Access to The Field

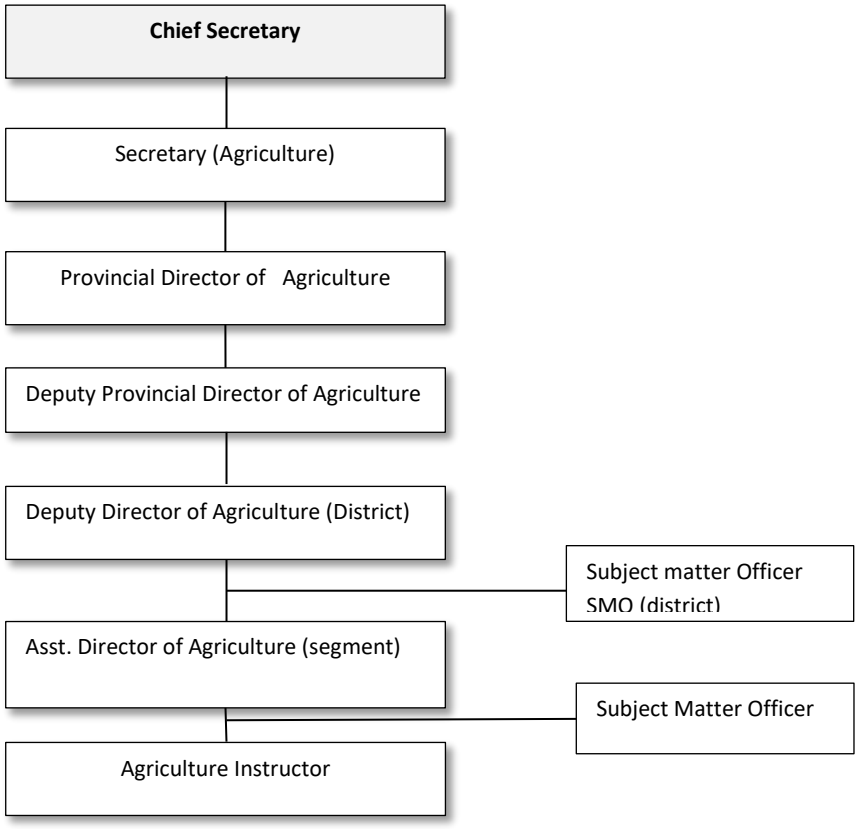
As previously mentioned an important step in the process of gathering field data in social research is, gaining access to the research area and the respondents. It has to be done in a sensible and sensitive manner as the quality of information and level of responses etc. depend on the trust built up through the process of accessing the research area. This is generally a gradual process which demands patience and good communication skills from the part of the researcher. The next section in this chapter describes the process of gaining access to the farmers in the research area.

The area selected to carry out the field research activities belongs to the North Central Province, which is the largest out of the nine provinces in Sri Lanka. As was stated previously, while a number of agencies deliver extension services in Sri Lanka this research examines agricultural extension activities implemented under the purview of the Provincial Department of Agriculture.

As it is illustrated in the organizational structure (see figure 3.3 below) the PDOA comes under the purview of the Provincial Ministry of Agriculture and headed by the Chief Secretary to the ministry. The Provincial Director (PD) of Agriculture is in charge of the administration and management of the Provincial Department of Agriculture (PDOA). All provincial councils have established a post of Deputy Director Agriculture, at the district administrative level. While the Provincial Director is responsible for the overall management of the Provincial Department of Agriculture, the Deputy Director (Extension) is responsible for carrying out the field extension programmes within the province; for the purpose of this study, The North Central Province.

A description about the positions and the responsibilities with regards to the delivery of extension and advisory services is included in ‘chapter 5 ‘of this thesis while discussing the institutional arrangement for extension delivery.

Organizational Structure of Provincial Department of Agriculture is illustrated in the figure given below;



Source: Sumathipala 2007, Nadeeka 2008

Figure 3-3 Organizational Structure of the Provincial Departments of Agriculture in Sri Lanka.

As stated previously the farming area managed by the Provincial Department of Agriculture in *Anuradhapura,* is divided into four segments namely *Anuradhapura, Kahatagasdigiliya, Thirappane* and *Ipalogama* and there are four Assistant Directors of Agriculture (ADA) who are responsible for the administration of agricultural extension activities in each of these segments. Agricultural Instructors (AI) who are the field level extension agents, perform duties under the supervision of the ADAs and there are eight AIs attached to each segment. Contacting the farmers through the AIs who are functioning as the link between the administrators and the farmers, was considered the most appropriate way of gaining access to the farming community.

Prior to the selection of the sample or deciding upon which areas to be selected for primary data gathering, preliminary field visits were helpful for setting the necessary

background for the field work. The first visit was organized with the assistance of the ADA in the *Thirappane* segment who was accessed through informal channels.

The Assistant Director (ADA) introduced the Subject Matter Specialist (SMO) and the Agricultural Instructor (AI) of the area. After a discussion about the objectives of the research and the background of the field data collection requirements, the SMO suggested to visit some farmers who are in contact with them. As a measure of developing initial contacts with the farmers. Several farmer fields were visited with the SMO and the details are presented below.

Box 1: Details of Preliminary Field Visit No1

Farmers in the area had a variety of crops in their fields. While some famers maintained large home gardens with fruit and vegetable cultivations closer to the house and plots of maize crop towards the far end of the home garden. Even though the home garden which we visited (farmer P -1) was not very systematically planned, it contained many varieties of annual and perennial crops for example Guava, Cashew, Banana, Papaya, Pineapple, Passion Fruit and few bushes of Pomegranates and Sour Sap. Other than that, small plots of Cassava, Sesame and Finger Millet were in the home garden. They had cultivated vegetables including Brinjal, Long Beans, Okra and Chillies for home consumption. The main cultivations for income generation was the guava crop which was well maintained with the recommendations of the Agricultural Instructors.

All the above cultivations were managed under irrigation (agrowells) and there was one side of the village where farmers cultivated other field crops in chenas, mainly depending on rain water. They had cultivated a plot of Mustard (Brascica junca) which is used for culinary purposes. According the farmer this crop can be used to keep the wild elephants away from the fields. The strong aroma of the brassica plant especially the leaves when they are crushed or stamped by the elephants, act as a repellent. This particular farmer had established brassica crop in the chena adjoining a patch of jungle on the opposite side of his home garden. In the plot behind his house was the Sesame cultivation. Both these crops are chena crops which require minimum land preparation and low levels of farm inputs.

One important observation during this preliminary visit was the commercial level farm cultivated by another farmer (farmer P-2) with entrepreneurial orientation, who had also participated in a national level farmer competition. He is operating with hired labour and mainly producing for sale at the Dambulla Dedicated Economic Center. He cultivates the crops using recommended seed varieties and fertilizer applications as instructed by the agricultural instructors. Labour is hired for land preparation, weeding, harvesting and sorting fruits and vegetables. Important point related to marketing was that they practiced sorting and grading of farm produce before transporting them to the market. Further, he had taken efforts to eliminate the involvement of the middlemen by transporting his produce to the market in his own vehicle. This farmer seemed to possess the knowledge of pricing strategies and comparative advantage which is worth investigating through an in-depth interview during the field survey.

We visited two *chenas* with the AI and the farmers had their *chenas* away from the homesteads. They appeared as encroached jungle patches cleared for *chena* cultivation. One of these had features of the traditional *chena* system in which they cultivated grains as a mix crop in the traditional way.

Box 2: Details of Preliminary Filed Visit No.2

Chena 1
Chena reflected the traditional farming system where there was no systemic preparation of beds or demarcation of plots with different crops. Several traditional varieties of cereal crops such as Finger Millet, Foxtail Millet, Black Gram and Horse Gram (locally known as Kollu) were grown as patches among other crops, as a system of mix cropping. Brassica, Maize, Sesame and Ground Nut were among the other crops. In this traditional system framers broadcast the seeds after land clearance with the onset of rains. Slash & burn was practiced as the method of land preparation.

Chena 2
Although it was a chena cultivated according to the traditional method, a section was maintained as a commercial maize cultivation. Total land extent is approximately 5-6 acres. Land preparation for the maize cultivation was done using machinery and fertilizer application was practiced according to the instructions provided by the department of agriculture.
Other crops in this field included Brassica, Cowpea, Black gram, Sesame, a small plot of paddy, and vegetable crops such as Long bean, Cucumber, Bittter gourd, Okra and green vegetables in small extents. Special feature found here was that mainly the farmer and his wife were involved in farming activities and they continued clearing of more land and expanding the farm every season.

Two other researchers including one of the supervisors also joined in this visit, whose professional contribution helped in the selection of the area for primary data collection. The team, after a discussion decided to select four AI ranges representing the three main cropping patterns for instance, paddy, *chena* and home gardens enabling a holistic analysis of the smallholder cropping systems in *Anuradhapura*. Therefore, the sample includes five (5) AI ranges and 13 village clusters representing all four segments namely *Anuradhapura, Thirappane*, *Kahatagasdigiliya* and *Ipalogama*[21]*.*

The procedure adopted in gaining access to the farming community in these areas, while following the ethical procedures in conducting this filed research, are described in the next section in the methodology. However, it was necessary to pass through the higher levels of management in the Provincial Department of Agriculture (PDOA) before proceeding to the field level for primary data gathering. The ADA of *Thirappane* segment who liaised with the officials at the PDOA and set the background for a discussion.

Hence, the first and foremost official discussion regarding the field survey was held with the Provincial Director (PD) and the Deputy Director Extension (DD extension) in the Provincial Department of Agriculture, Anuradhapura. The Officers expressed their contentment for selecting the areas under their purview for the study. They envisaged this selection as a task with mutual benefits, in view of the fact that they get an opportunity to receive feed- back on their field extension programmes.

After the preliminary discussions held with PD and the DD (extension) next important step was to contact the Assistant Directors (ADA) to make them aware of the field research activities to be carried out in the selected divisions. The four ADAs in charge

[21] See Chapter 3 on 'Methodology' for more details on sample selection

of the segments, were informed about the field activities through the Deputy Director (DD Extension) during the monthly progress meeting held at the office of the Provincial Director (PD). This is the forum where the AIs and ADAs representing both districts (*Anuradhapura* and *Polonnaruwa*) meet with the higher officers to discuss the progress and prepare plans for the future activities.

This interaction with the Provincial Director and the Deputy Director (extension) followed by the meeting with ADAs and the Agricultural Instructors were the initial steps in the process of gaining access to the field.

I was then given the opportunity to address the field level extension officers (AIs) to explain the purpose of the research as well as the importance of their contribution to the study. Also, it was possible to talk to them personally and request their cooperation in conducting the field survey.

The next step (3) was to attend the meetings conducted by the four ADAs in the respective segments. Four separate meetings are usually held at the segment offices every month after the progress meeting at the PD office. It is at this meeting the ADA discuss with the AIs and assign the tasks and targets for the coming month. It was a suitable forum to meet all the AIs representing eight AI ranges within each segment at the same time. The merit in attending this meeting was that the AIs were rather independent and feeling free to discuss while they were in the segment office. Apart from that some of them voluntarily explained about the cropping patterns in their ranges which was helpful in deciding on the selection of AI ranges for primary data collection.

Such meetings conducted at all four segments were attended, starting from *Kahatagasdigiliya*. All the AIs were personally met at these meetings and their contact details were collected for further communications.

At the end of these discussions the field officers suggested that the best way to access the farmers and to build up rapport with them would be to participate in on- going extension interventions.

Therefore, the fourth step (4) in this process was participating in field extension activities organized by the PDOA in Anuradhapura. It was the time when the AIs were organizing various field activities including crop clinics and IPM programmes. Among the field extension activities were Crop Clinic conducted in the *Kahatagasdigiliya* segment and the IPM programme in the *Ipalogama* segment[22]. It was a good opportunity to talk to the farmers and build up a relationship before commencing the proper questionnaire survey work. Also, during this activity it was possible to observe interactions between the AIs and the farmers.

One significant move in relation to ethical clearance was emphasizing the aim of the field survey or reiterating that it was not for the purpose of providing any funds for the farmers but for the purpose of a study. This is an essential step in the process to ensure that the respondents are devoid of the feeling of 'deception'. The most important ethical concern in social research as discussed in literature (see for instance Berg 2012), is dealing with their concerns regarding harm, consent, privacy as well as confidentiality of data. Hence it was considered as important to get the consent of the farmers before the discussions and assuring the maintenance of confidentiality. While the assumption quite often is that respondents prefer to participate in surveys with the expectation of receiving funds, farm equipment or infrastructure facilities for the village and so on, it is important to note that they are also keen in providing information for other purposes as well.

[22] These field interactions will be discussed in detail in chapter 6.

Preliminary visits to the villages and participation in programs were successful approaches to build up rapport and develop trust among the farming community as well as among the field extension officers.

Consequently (step 5), selection of the segments and the AI ranges for the study was done based on the information gathered during the preliminary field visits. Type of crops grown, different farming practices, ongoing extension programs and accessibility were important factors considered in selecting the locations for the survey. One AI range from each of the four divisions was selected for the survey as shown in the figure presented at the beginning of this section (see figure 3.2).

The next important step (step 6) in the process was identifying the farmers from each AI range as respondents in the questionnaire survey. However, official records of all farmers within the AI range was not available with the AIs. As suggested by one of the AIs, the fertilizer subsidy distribution list which was available at the Agrarian Services Centers, was used for selecting farmers for the survey. This is the list of all farmers registered under the Agrarian Services Centers in order to receive the fertilizer subsidy issued by the government. This can be recommended as a reliable source that can be used for selecting a sample for research purposes. Village level breakdown of the record was maintained by the Agrarian Development Officers (DO) and a list of farmers belonging to each cluster or '*Thulana*' as it is called locally, is available at respective Agrarian Services Centers.

Nevertheless, there was an administrative procedure to be followed before accessing information in the fertilizer recipient list. The authority of the information in the fertilizer subsidy distribution list, lies with the Agrarian Development Commissioner of the relevant province, North Central Province for this matter.

First, it was necessary to get permission from the commissioner to access the lists maintained at the Agrarian Services Centers.

After meeting the Agrarian Development Commissioner to inform the purpose of requesting this list, a formal letter was forwarded to the commissioner requesting permission to access the list. It is necessary to mention the particular Agrarian Services Centers from where we need to get the list of farmers.

Subsequently, a letter was issued by the Commissioner to Divisional Officers (DO) in charge of the ASC granting permission to release the records. Selection was made easier by referring to these lists and the detailed procedure of selecting the respondents was further elaborated in the section on 'sample selection'.

3.6 Primary Data Collection from Farmers

Having selected the farmers, the survey was carried out in the village clusters using a detailed interview guide. Making access to the farmers in each village cluster was facilitated by the DO and the AIs. While Agricultural Research & Production Assistants (ARPA) with the guidance of the DO facilitated the process of contacting the farmers in *Kahatagasdigiliya* and *Anuradhapura* segments, it was the AI who facilitated the access together with the ARPAs in *Thirappane* and *Ipalogama* divisions. Contact farmers [23] were introduced at the beginning and the survey was continued with their assistance to reach the fellow farmers.

The notable feature in this process was the prominent role played by the DOs and the ARPAs demonstrating their close relationship with farmers especially in *Kahatagasdigiliya* and *Anuradhapura* divisions. The ARPAs perform their roles as field level coordinators between farmers and the DO while the AI directly involves in disseminating agricultural information at the field level.

[23] More active farmers who play leading roles in the village are selected as contact farmers.

In the other two divisions namely *Thirappane* and *Ipalogama* the AIs and the ARPAS assisted in contacting the farmers. After the initial step, these officers were not involved, and the field survey was continued independently without their influence.

In summary the steps followed when making access to the field;

1. Meeting with the provincial Director and the Deputy Director (extension) the Provincial Directors office.
2. PD and DD informing the field staff about the field research and providing instructions for necessary action.
3. Meeting with ADAs and AIs to organize field research activities.
4. Preliminary Filed visits
5. Obtaining permission from the Provincial Commissioner of Agrarian Development, to obtain the list of farmers.
6. Meeting the DO with the permission letter to obtain the farmer lists.
7. Meeting with DO and ARPAs to select farmers.
8. Making access to the villages with ARPA/AI and meeting contact farmers.
9. Conducting Field survey.
10. Acknowledging the corporation of all those who involved in the process

3.7 Primary Data Collection from The Extension Officers

Another component in this study is the questionnaire survey carried out to gather information from the Agricultural Instructors (AI) extension officers. This was administered as described in the section below.

The survey targeted all 32 Agricultural Instructors serving in the four segments managed by the Provincial Department of Agriculture. Structured questionnaires were distributed among the AIs during the monthly progress meeting, while adhering to the ethical standards concerning social survey. As it was made clear to them about the survey, the questionnaire carried a statement to say that the privacy and confidentiality of information would be maintained.

This being a survey involving officers of the government service, it was essential to assure that this exercise does not cause any harm to their occupational relationships. Bearing this in mind, they were given the liberty to stay anonymous, so that writing their names on the questionnaire was not compulsory. Also, they were given the freedom to leave out the questions which they did not want to answer.

When it came to the actual survey, the total number was dropped from 32 to 28 as some officers were on long term leave due to various reasons such as foreign training, maternity leave and medical leave. AIs were given a period of two months to respond by filling up the questionnaire. However, only few responses were (five in number) received at the end of two months. A total number of 20 responses were ultimately received as a result of sending reminders through telephone calls and reminding them during field visits. Some of the officers who had paid very poor attention towards this survey or who were least concerned about responding to the questionnaire, had misplaced the questionnaire. As there was a doubt concerning their consent to participate, several copies of the questionnaire were made available at the Provincial Office and the divisional offices for the convenience of those who opted to respond later on. One officer who did not fill up the questionnaire, later on opted to provide information over the phone, when he had free time. This telephone interview which was conducted with intermittent breaks due to interruptions at his office, was quite informative and immensely contributed to the findings. After each break, the officer volunteered to resume the conversation, expressing his concern to provide information.

However, it is reiterated here, that the respondents were given the freedom to refrain from responding to the questionnaire, if they were not willing to participate in the survey. In spite of all these concerns nearly six months were spent to obtain responses from 20 Agricultural Instructors. The possible reasons for this behaviour and numerous hardships faced by the field extension officers are presented in chapter 9 which discusses the extension officers' perspective.

3.8 Analysis of Primary Data

Information gathered from the AIs, through the questionnaire survey were recorded in the questionnaire itself. Recording the responses of the in-depth interviews with farmers was a time-consuming process compared to the questionnaire survey. Main points of responses given by the farmers were noted down on the interview guide which was prepared for recording details of individual farmers. Detailed information was recorded in the note books while conducting the interviews. Later these details were incorporated to the direct responses and one single data sheet for each responded was processed. These primary data were analysed employing a descriptive approach. Tables and graphs for the analysis were prepared using the SPSS computer package.

Having explained the methodological approach to the study, it is imperative to focus attention towards ensuring the trustworthiness of the research outcomes judged by the qualitative validity.

3.9 Qualitative Validity of the Study

The validity of the qualitative social research has been traditionally judged by using four criteria namely internal validity, external validity, reliability and objectivity, which have been alternatively replaced by credibility, transferability, dependability and confirmability. Scholars who have proposed these alternative criteria, Guba and Lincoln, believed that these four criteria better reflected underlying assumptions involved in qualitative research (see for example M.K.Trochim 2006).

Hence, the following discussion presents, for the purpose of this thesis, how qualitative validity is ensured in its methodology.

3.9.1 Credibility

As elaborated by Trochim, credibility criteria involve establishing that the results of qualitative research are credible or believable from the perspectives of the participants in the research. In other words, it is understanding the situation from the participants' viewpoint.

The methodology for the purpose of this thesis therefore employed a combination of data collection techniques for example in-depth interviews, focus group discussions and participant observations enabling the triangulation of data.

3.9.2 Transferability

Being able to generalise or transfer the results of a qualitative research to different contexts, is termed as transferability. It involves application of the findings of the research to a wider population. As it is generally practised in qualitative research, this study focused on the extension programmes implemented in a single province out of the nine provinces in Sri Lanka. The geographical description of the area provided at the beginning of this thesis and the clear division of units of analysis for example selection of four divisions and AI ranges belonging to each division, in the methodology specify conditions, ensuring the transferability of the findings.

3.9.3 Dependability

Dependability in social research implies the need for the researcher to be mindful about the constantly changing contexts. Hence it becomes the responsibility of the researcher to provide details about the changing situations and their impact on the research. Hence, the research design in this thesis follows a chronological order in describing the policies and development of extension approaches that were analysed for the purpose of this dissertation. Also, a categorisation was followed for example analysing the current extension services in the field and investigating farmer perceptions on activities which are being implemented by the PDOA.

3.9.4 Confirmability

This refers to the degree to which the findings could be confirmed by others. One strategy to ensure confirmability is documenting data for rechecking. This study which employed in-depth interviews with structured interview guides and the questionnaire survey with extension officers have completed documents as evidence for confirming the results. Further the field notes taken during the process of participant observation and field visits provide more evidence for confirming the findings.

Individual and group discussions with respondents, observations during field visits, participant observations while attending the meetings and field extension programmes etc. were among the useful techniques for triangulation of data. It is important to record that these triangulation techniques were applied to confirm data in both surveys i.e. the survey with farmers and extension officers. The two surveys themselves served as triangulation methods. Elaborating this further, the common pieces of information required for the study, for instance evidences about the effectiveness of extension interventions, selection of farmers for the programmes, participation of farmers in extension programmes, frequency of meeting and methods of contacting farmers and extension officers vice - versa, could be confirmed by comparing the data in the two surveys.

Having fulfilled the requirements for qualitative validity, the chapter on methodology summarises the process of data collection in the section below.

Summary

Data gathering for the study was done using four methods; qualitative survey, in depth interviews and participant and direct observations. These are time consuming techniques and data collection using all methods was conducted simultaneously, in order to overcome this constraint. The in-depth interviews with farmers demanded active involvement of the researcher in the discussions and probing etc. and a substantial duration was allocated for this survey. Survey with the extension officers being a remote method in which they had to complete the details in the questionnaire by themselves, facilitated parallel data collection using however this also created

challenges in gathering responses from a somewhat reluctant sample. In addition to these two techniques, a number of formal and informal data elicitation techniques such as observations, informal discussions with individuals and groups, key informant discussions etc. were used in gathering data. The use of these alternative data collection techniques was useful in validating the findings.

This being a project which included qualitative research methods involving government institutions and government employees demanded strict adherence to the protocols in making access to the research field. Although it was perceived at the beginning of the research, that it would be a difficult procedure to obtain permission and start primary data collection, the government and provincial council officials extended their support without any hesitations. On the other hand, farmers who participated in the interviews provided valuable information about the extension services. However, the interviews with the farmers were conducted while they were working in their fields, without interrupting their regular activities. This method of collecting primary data, paved the way for observing their farming practices and cropping patterns in their fields.

As it was mentioned at the beginning of the methodology chapter, literature on the development policies that have been adopted in Sri Lanka are reviewed in this thesis. This review which is carried out while investigating their impact on the extension strategies is presented in the next chapter.

CHAPTER 4

CHANGING POLICIES AND EXTENSION APPROACHES

4.1 Introduction

Sri Lanka had passed three eras under the colonial administration of the Portuguese, Dutch and the British rulers in its history. It was the last colonial masters of these three, the British who have made a marked impact in terms of development policies in the country. Among the significant policies during the British rule are the, Donoughmore Constitution in 1931 and the Colebrook -Cameron policy reforms which will be discussed in this chapter. They introduced the plantation agriculture to Sri Lanka especially Tea plantations [24]after the coffee plantations that were devastated due to a disease outbreak. However, the traditional peasant agriculture was neglected in favour of plantation agriculture by the colonial policy makers. This resulted in a 'dual economy' with a well-organized, foreign owned, capitalist plantation economy alongside a traditional and primitive subsistence peasant economy (see for example Jayasuriya 2004). Literature related to the development of domestic agricultural sector in Sri Lanka reveals that the Agricultural sector in Sri Lanka is not an exception from that of many other colonised countries (See for instance Henegedara2011). Similar to many other countries that share a colonial history, Sri Lanka inherits dual economic features associated with modernized plantation crop sector (Tea, Rubber and Coconut) and small scale subsistence sector (with paddy and subsidiary food crops), consequently embedding plantation and non - plantation subdivisions within the domestic agricultural sector.The plantation crop sector especially tea cultivation of the dual economy was well developed during their rule which is still the main source of foreign exchange earning of the agricultural sector.

[24]James Taylor who introduced Tea crop to Sri Lanka in 1867, established the first Tea plant in the *Loolkandura* Estate in Kandy.

As per the information shared in the book titled 'Agriculture in the peasant sector of Sri Lanka' it has been peasant agriculture that provided livelihood for the vast majority of the country's population since its beginning albeit the higher contribution of the plantation sector to the national economy. Nevertheless, it was only after gaining independence that the local administrators could pay (Samarasinghe 1977) attention towards developing peasant agriculture through historical rural development programmes such as peasant colonization. Since independence the country had faced many different situations with regard to policy implementations with the changing political regimes.

The purpose of this chapter therefore is to discuss the stages of this process of evolution of state policies since the colonial rule in Sri Lanka. The contribution of the state policies to development process of the country over this time span and their impact on sectoral development, particularly on domestic agriculture in the long run, is discussed in this chapter based on review of literature. While the first section of this chapter deals with the review of the stages of policy development, the next section presents a discussion on the impact of state policies on the agricultural sector with an emphasis on the agricultural extension approaches.

4.2 History and Development of Agricultural Policies in Sri Lanka

Sri Lanka is ranked in development literature as an exceptional case of middle to low income country which has attempted to satisfy basic needs especially of the poorest, by incorporating economic growth with minimum standards of welfare (Jayasuriya, 2004). Writing an article on 'The Colonial Lineages of the Welfare State" the author explains that the decline of the social democratic and the welfare state started with the political and economic crisis that has been experienced by the country since 1970s. Nevertheless, for a country with a poor per capita Gross National Product (GNP) Sri Lanka still rates relatively high in comparison with other developing countries on a range of social indicators such as Human Development Index (HDI). The question however arises as to how Sri Lanka as a low- to – middle income country embarked on the task of creating a welfare state. According to the article, Sri Lankan

welfare state which emerged in 1960s and 1970s and existed until its dismantling in the late 1970s was inherited from the British colonial past (Jayasuriya, 2004).

This colonial policy which cannot be completely separated from the intellectual setting of the British social policy shows three main phases in the process of evolution.

1. Early formative period (1833- 1931).
2. Late colonial state (1931 -1948).
3. Post-Colonial state (1948 – 1970).

4.2.1 Agricultural Policies During the Early Formative Period (1833-1931) - Plantation Economy

Development efforts in Sri Lanka during the colonial rule are discussed in two stages. Introduction of the plantation agriculture was the development objective at the early stage of the colonial rule, as discussed in development literature. Lands cultivated by the peasants in the wet zone of Sri Lanka were converted into large scale plantation estates, by acquiring lands initially for the coffee cultivation and subsequently for tea plantations in the up country. The criticism in this regard is that the policy formulations adopted by the British for acquiring land had resulted in depriving the local peasants of the opportunity of engaging in their traditional cultivations. They were compelled to sell these land holdings to the new plantation authorities to very low prices with the enforcement of the Waste Lands Ordinance of 1840. (See for example Ariyaratne, 1998) Moreover, agricultural and irrigation activities were interrupted due to the absorption of all land under the physical eco complex of the rural village structures into the newly created plantation estates (Ariyaratne, 1998). The colonial economy based on overseas capital and built around three main commodities for instance coffee till about 1886 followed by tea, rubber and coconut was a classic example for an enclave economy [25](Jayasuriya, 2004).

[25] A widely used term to describe post-colonial dependency relations in the developing world.

The traditional peasant agriculture was neglected in favour of plantation agriculture by the colonial policy makers. This resulted in a 'dual economy' giving prominence to the export-oriented plantation crop sector especially tea plantations, while neglecting the peasant food crop sector. The policy reforms of the Colebrooke – Cameron commission in 1833 [26]further strengthened the export crop sector by introducing a free wage labour force which subsequently opened up the path to bring labourers from India to work in the Sri Lankan tea estates.

As literature highlights (Bandarage 1883; Jayawardana 2000; Jayasuriya 2003) this dualistic nature was not limited to the economy in which the capitalist plantation agriculture sector thrived, but it had an influence on the social structure of the country as well. The new colonial economy has paved the way for the creation of an entrepreneurial culture, which in turn created a local capitalist class based upon the mercantilist foundation of the export economy (see for instance Jayasuriya 2003).

Other than the development of the colonial export economy these early stages of the colonial state is marked by the modernization of the Sri Lankan society. Changing the social structure existing in the country, a new middle class was emerged due to urbanization under plantation agriculture. New aristocracy and landlordism was developed, and the large majority of peasants were compelled to resort to work as labourers in the lands owned by these aristocrats. That was a notable transformation of peasant agriculture: farmers becoming laborers without any bargaining power or status under the new system.

A compilation of historical developments "Towards a new Agriculture" published by the Ministry of Agriculture and Lands (1998) reveals that the first attempt of the

[26] Colebrooke-Cameron policy reforms brought about radical changes to the system public and judicial administration in 1833. This reform had a marked influence on all subsequent policy developments including social, political and economic policies.

British government in favour of the peasants is the restoration of few irrigation schemes, under the first **Irrigation Ordinance** of Sri Lanka enacted in 1856 by the British governor Sir Henry Ward. Having realized the need to improve the living standards of the villagers and reducing food imports, irrigation management procedures similar to the traditional practices have been reintroduced. All the local customs, practices and traditions related to the maintenance of irrigation schemes were incorporated in this ordinance. A notable feature here was ensuring farmer participation in decision making through the 'proprietor's meetings' or 'cultivation meetings'. It was the mechanism of making important decisions regarding irrigation and cultivation practices in rural Sri Lanka (Ariyaratne, 1998). Irrigation development efforts in the Dry Zone were intensified by the British administration in order to promote domestic food production to overcome food shortages experienced during the world war.

As reported by Farmer (1982), the British government has been adopting economic policy favouring the commercial plantation economy for nearly a century, until the First World War in 1915. It was only after the First World War that the focus had been directed towards colonial land policy in general and colonization in particular, as per historical records (Farrington, Abeyratne, Gill, Framer (ed). (1982). As a result, a land commission was established in 1927 with the objective of preserving the peasantry and reinforcing peasant land ownership. Distribution of state lands among middle class and peasants, ensuring land availability for agriculture and housing and elimination of multi ownership for the alienated land were among the other objectives of the land commission (see for example Ariyaratne 1998). A series of developments the key policy of which was peasant colonization in the dry zone of Sri Lanka, was followed after the Donoughmore constitution in 1931. It was under the Donoughmore constitution the country gained internal self-government (Farmer 1982).

4.2.2 Agricultural Policies During Late Colonial State (1931- 1948) - Colonization Policy

A land mark in peasant colonization is the Land Development Ordinance in 1935. As described in literature (Chandrapala, 1986) it is considered one of the greatest pieces of socialist legislation. The ordinance reflected the increasing concern for food production and improving the position of the peasant cultivator. Significant outcomes of the land development ordinance include the government intervention in land alienation and provision of the legal framework for subsequent land alienation policies facilitating colonization programmes, village expansions and middle-class lease of land (Chandrapala 1986). Approximately 402,328 acres of land were developed based on major settlements, village expansion and highland colonization by 1965. This land policy, according to literature, was accepted by all successive governments and continued without change (Ariyaratne 1998).

Writing an article on "Impact of rural landlessness and land tenure on domestic agriculture" the author Wijedasa, highlights the reasons for considering the land development ordinance of 1935 as a unique piece of legislation. In brief, it reflected a change in British colonial policy towards peasantry, it was intended to bring about a resurgence in paddy cultivation which had been neglected by the British rulers and finally, it provided the legal and institutional framework for the systematic development of state land for the first time in the history (Wijedasa 2000).

The author further describes that the implementation of the Land Development Ordinance enabled the restoration of several irrigation schemes and settling of a large number of landless peasant families in the dry zone. Nevertheless, certain restrictions enforced on the use of alienated state land for example prohibition of sale, transfer, mortgaging, leasing and subdividing, have resulted in neglecting the lands without attempting to make any permanent improvements by the peasants.

In Contrast, the Crown Lands Ordinance of 1947 provided a comprehensive and flexible basis for making state land available to individuals and institutions for development projects and for public purposes. It enabled the making of absolute or provisional grants by way of sale, lease, agreement, permit etc. The Land development Ordinance and the Crown Lands Ordinance still maintain their pre-eminence as the core legislation for the alienation, utilization and development of state land in Sri Lanka (Wijedasa, 2000).

4.2.3 Agricultural Policies During Post-Colonial State (1948-1970) –Self-Sufficiency In Food

There was no historical evidence of marked development or change in agricultural policies immediately after gaining independence in 1948 and the policies adopted after the Donoughmore Constitution in 1931 were continued. Analysing the controversial issues of agricultural development, Sandaratne emphasizes that the main thrust of policies in the post – independence period was to attain self – sufficiency in food mainly rice through extensive land settlement in the dry zone (Sanderatne, N, Kelegama, 2004).

The first prime minister in the independent Sri Lanka Hon D.S. Senanayake's government was under the perception that the future of agriculture depended on effective colonization and irrigation development in the dry zone, as reported by the author in 'Performance in Agricultural Sector'. Thus, the new government supported and successfully continued the colonization policy of the British rulers (see for example Chandrapala, 1986). Simultaneously, the developments in the plantation sector and the tea boom in early 1950s enabled the government to gather necessary funds for pursuing a policy of rapid colonization and irrigation development in dry zone areas. (Chandrapala, 1986).

On the contrary, the second government in the independent Sri Lanka came to power with some unfavorable conditions such as expenditure rising over income subsequent to the closure of the boom in the plantation sector, declining total external assets and

unfavorable levels of the balance of payments. Following this situation, the policy measures in agriculture started shifting from food crop sector to the plantation sector. Thus, rehabilitation of the plantation sector and increasing its competitiveness were given more attention during this period.

In this process of policy making, 1956 was a historically significant year as it marks a major political change that has taken place in the country. A coalition of several political parties with some prominent Marxists in the frontline of leadership, came to power in the parliamentary elections in 1956. Analysing this significant political change, development literature emphasizes its positive impact on agrarian policy (see for example Pieris, 2006). Many tenant farmers especially paddy farmers have benefited from the institutional reforms during this period. Policy reforms were implemented to regulate land rent and to grant permanent cultivation rights to the tenants in share tenancy in paddy cultivation. Cultivation committees were established, and farmer representatives were given the powers to carry out functions related to paddy cultivation. Already existing cooperative movement was strengthened, and the scope was widened from retailing of consumer goods to production and supply of agricultural inputs (Pieris, 2006). Modification of the fertilizer subsidy scheme which made it applicable to all paddy cultivators in the country, was another noticeable change (see for example Chandrapala, 1986). Author explains that the Crop Insurance Scheme on paddy which was introduced in 1958/59 on an experimental basis was an extension of these reforms. The aim was to increase paddy production by providing insurance cover against crop losses caused by natural hazards or by adoption of new cultivation practices.

The significance of the policy reforms in 1956 is such that many reviews and reports highlight these policy measures. For instance, Sandaratne has reviewed this as “The first change in agricultural policy strategy with an emphasis on institutional changes and government support for paddy farming in particular”. Emphasis was laid on institutional changes such as crop insurance scheme, cultivation committees and co-operative societies while comprehensive policies covering marketing, credit, crop

insurance and land tenure reform with village level farmer organizations were formulated. The historical importance during this period is the establishment of the Department of Agrarian Services in order to administer the proposed programmes (Sanderatne 2004).

According to historical records the prime minister of this coalition government Mr. S.W.R.D Bandaranayake had identified "paddy field as the centre- piece of development of Sri Lanka and evidently attempted to promote the paddy production by increasing the extent of cultivation (see for example, Ariyaratne 1998). The Paddy Lands Act which sought to regulate tenancies on paddy lands was the most significant policy to support peasant agriculture (Chandrapala 1986).

While passing through different policy regimes in the past, the period between 1960-1965 marks a lull period. One reason for this was the existence of different political ideology within the government resulting in a lack of commitment to one specific direction of change. However, the government of 1960 and the new successive government which came to power after 1965, adopted statutory measures to increase the effectiveness of the Paddy Lands Act , as documented by Pieris (2006).

Notably, many significant transformations in the country have taken place after 1970. Policy changes in relation to land reforms are well described in the chapter on "Hector Kobbekaduwa and the land reform programme in Sri Lanka" authored by Weerawardana. Describing the land reforms, this chapter reveals how the government had imposed restrictions to private ownership of land. This measure has been taken with the aim of reducing inequalities in land ownership. This decision was implemented through the Land Reform Law no 1 of 1972 and a ceiling of 25 acres of paddy land and 50 acres of other land for upland cultivations (approximately 10 ha and 20 ha respectively) was imposed on the individual ownership of land (Weerawardana 2000)

Land reform laws of 1972 (followed by the reforms in 1974) is reported as a turning point in agrarian reforms in Sri Lanka and lands in excess to the ceiling were vested with the 'land reform commission' that was established under the provision of land reform act (Chandrapala 1986).

Further to this policy reform, policy reviewers have emphasized the consequences of the amendment to the land reform law in 1974. According to them (see for example Sanderatne & Kelegama 2004), company owned lands which were exempted from restrictions in 1972 were subsequently nationalised by the land reform law of 1974, yet again favouring plantation agriculture with the large scale state ownership of land.

Nevertheless, the development agenda of the government in 1970 which followed a protectionist economic policy was focused on the promotion of small holder domestic agriculture. Development of subsidiary food crops was given priority as an area with development potential while introducing schemes of assistance such as low-cost credit, price support schemes and fertilizer subsidies. Import bans were imposed on subsidiary food crops i.e. chilies, onions, potatoes and pulses to encourage domestic production. During this period the country experienced a closed economy in which import substitution possibilities were explored due to increasing balance of payments problems. (Chandrapala 1986).

4.2.4 Agricultural Policy After Economic Liberalization (Since 1977) Open Market Policies

The economy of Sri Lanka faced a transformation from this closed economy to an open economy during the first phase of policy reforms introduced in 1977. A wide range of economic reforms including trade liberalization was introduced within the period between 1977- 1988. These policy reforms brought together many changes for instance, price liberalisations, lifting of price controls, lifting restrictions for transporting essential food items and reducing tariff rates for imported food items as stated in policy reviews by Sandaratene & Kelegama.

Since economic liberalization in 1977, multilateral, international agencies have had an increasing influence on the country's agricultural policies (Sanderatne & Kelegama, 2004).

Consequent to these changes, the policy reforms in the second phase of liberalization from 1989 -1993, took the form of structural adjustment programmes as recommended by the World Bank and the International Monitory Fund (IMF). Significant policy changes have taken place due to the involvement of these international agencies. Withdrawal of input subsidies (fertilizer subsidy) as well as waiving of Guaranteed Price Scheme (GPS) for paddy purchasing were among the reforms which had negative impacts on the subsidiary food crop sector (Sanderatne & Kelegama, 2004). For example, previous studies reveal that the total production of Green Gram, Cowpea and Chillies has declined by nearly 50 percent while production of Finger Millet has dropped by 37 percent due to lifting of import licensing requirements in 1993. (see for example Hathurusinghe 2012). Describing the implications further Damayanthi & Gamage have communicated that the government support for agricultural marketing, extension and credit has been reduced due to shifting of focus towards commercial farming under the export led development strategies. (Damayanthi 2012).

Throughout the period of liberalization, the small holder sector has experienced a slowing down of productivity rates and reduction of incomes while the quantities and range of crops grown, has also changed. At present the demand for many of the crops categorized as subsidiary food crops is met by imports (wheat grains, flour, cereals) and in many cases there is a perception that local Sri Lankan farmers cannot compete with imports in relation to these crops. However, the causes for the decline in the production of these crops are likely to be complex. Furthermore, and despite the favourable treatment given to specific commercial crops and agricultural objectives, Sri Lankan farmers continue to opt to cultivate a range of crops, albeit that this is changing, as time and policy influences farmer decision making.

A third phase of liberalization (1994- 2004) has adopted policies to promote commercial domestic farming and includes reforms such as eliminating restrictions regarding land ownership, institutions, credit and infrastructure. Total welfare of the public was facilitated through tariff subsidy and reforms on farm support policies were introduced to cater to the needs of the small farmers.

Agricultural Policy has been revisited after 2004 and reintroducing fertilizer subsidy, guaranteed price for paddy, re-establishing paddy market board and enforcing high tariff rates for some selected food items are among the revisions. Ten Year Horizon development Framework for 2006 – 2016, has focused special attention towards the development of the rural sector by improving rural infrastructure and increasing marketing avenues through regional economic centers (Sanderatne & Kelegama, 2004).

Consequences of these policy changes, both positive and negative have influenced the domestic agricultural systems encompassing plantation and non-plantation sectors.

The next section in this chapter analyses how the extension and advisory services have been influenced by these policy reforms. This section on 'Changing Policies and Extension Approaches ' elaborates on the development of extension approaches under changing policy regimes and its impact on the smallholder farming sector in Sri Lanka.

4.3 Agricultural Policies and Extension Approaches in Sri Lanka

Extension plays an important role in shaping rural livelihood and these services themselves are shaped by the policy context in which they are developed. Sri Lanka reflects many aspects of an agricultural and extension policy trajectory which is in many respects typical in many of the post-colonial societies. This discussion presents parallel developments in agricultural and extension policies as a chronological description beginning from the colonial era.

4.3.1 Agricultural Policy in the Colonial Era, the Commodity Development Approach

Agricultural extension plays an important role in rural development. It serves to the rural community by providing them with information and new technologies that can be adopted to improve the production, incomes and their living standards.

According to literature (see for example Emitiyagoda 2009), the earliest recorded attempts to deliver extension services in Sri Lanka have commenced around 1880 during the period of British rule which favoured plantation agriculture. At the beginning, a small number of Agricultural Instructors (AI) with two years of training worked under Government Agents. Government Agents however, had limited time to expend on the development of peasant agriculture amidst their main duties such as collection of revenues and maintenance of law and order.

In view of this situation, the Ceylon Agricultural Society was established by the wealthier planters, land owners and agriculturists in 1904, with the aim of helping "native" farmers. As reported by Arasasingham, this society had taken real efforts in collaboration with government agents, to develop peasant agriculture. Their objective was to educate the small holders with the experience and knowledge of agriculture possessed by various experienced planters and agriculturalists belonging to the society (Arasasingham1981)

According to Arasasingham, Agricultural Extension Service in Sri Lanka has evolved further with the establishment of the Department of Agriculture (DOA) in 1912, which is considered a landmark in the history of agricultural extension. The main functions of the DOA at its inception, included 'research, extension and education'. Consequent to this development, agricultural extension service was developed as a part of the DOA (in early 1920s) and the staff of the Ceylon Agricultural Society was absorbed into the DOA.

The main task of this extension service was linking farmers with research in order to deliver new information and transfer technology, besides providing farmers with seeds and planting material. During this period agriculture officers were in charge of divisions while Agriculture Instructors (AI) performed duties as field level extension workers. AIs were in charge of delivering advisory services to farmers in addition to taking the responsibility for research and experimentation.

During the colonial period, extension in Sri Lanka had been focusing on increasing commodity production in parallel to the colonial policy. The commodity development approach therefore is one of the early extension approaches and a continuation of technology transfer systems introduced by the during the colonial period in Sri Lanka with the aim of producing relatively high value commodities efficiently. For example, commodity development approach concentrated on beverage crops such as tea and coffee. Under this extension strategy, each phase of technology development and transfer was well organized and separate research institutes for example Tea, Rubber and Coconut research stations were established to carry out research. According to literature (see for example Hathurusinghe 2010), it was through this commodity development extension approach, that new extension arms were added to the Tea Small Holders Development Authority, Rubber Controller's Department, Coconut Cultivation Board and the Coconut Development Authority, in order to impart research findings to the planters or plantation companies.

Attention of the colonial policies was directed towards commodity crop production at the expense of food crop production in the peasant agricultural systems. However, a food production drive was launched in 1922 to cater to the food shortage experienced in the first world war (Arasasingham 1981). Subsequently, there was a temporary reorientation of the energies of the field staff towards the direction of food production for similar reasons in the 1940's.

The outbreak of the Second World War and the subsequent food shortage in the country, prompted the government to revise the agricultural development policies of

the country. A food production drive was initiated by 1943 through 'state *chenas'* with the strength of the field staff of the DOA. Efforts of the field staff of the DOA were directed towards increasing domestic rice production, as rice imports were disturbed due to the war.

During this period, the government attempted to expand the extent of land under paddy cultivation up to 40 000 ha and to obtain an average yield of 2t /ha. With this aim the Paddy Advisory Board was established in year 1944 to provide advisory services to the government regarding paddy production. The role of extension was to support the government in reaching its goal in achieving self-sufficiency in food production. These attempts were continued even after gaining independence, as the colonization policies and subsequent land settlement continued as key agricultural policies in the post-independence government of Sri Lanka aiming at self-sufficiency in rice production(Sandaratne,2004). The purpose of the conventional extension approach introduced under the post-independence agricultural policy did not therefore deviate from meeting the food demands of the nation.

4.3.2 Post-Independence Agricultural Policy and the Conventional Extension Approach (1948- 1965)

In common with many other post-colonial societies, Sri Lanka inherited a skewed agricultural sector on gaining independence in 1948, in the immediate period of post-independence. Again, in line with the experience of other post-colonial countries the country retained a focus on commodity production, while also adopting policies which accelerated the redistribution of some land and promoting food autarchy. Attaining self-sufficiency in food, mainly rice was the aim of the policies adopted in the immediate post-independence period (Sandaratne 2004). This was attempted through the land settlement and colonization programmes during the period 1931-1953, as it was elaborated in the previous section on agricultural policies.

As a consequence, the focus of attention in agricultural extension shifted from plantation crops to rice production. More pressure was exerted to the DOA for

improving and transferring rice technology to smallholders settled in the colonisation schemes established under the renovated irrigation programme. Agricultural policies adopted after the Donoughmore constitution of 1931 were continued even after gaining independence in 1948.More emphasis was given for paddy cultivation without adopting an integrated approach to develop both sectors (see for example Chandrapala 1986).

While paddy production increased during this period, the absence of a work plan to develop highland crop cultivation was seen as a weakness in this development effort. Furthermore, agricultural extension had not been given sufficient recognition within the land settlement programme. Qualitative changes in extension programmes to meet the challenges the settlement programme posed were not made within the DOA. Agricultural extension service executed by Divisional Agricultural Officers did not have any national planning and sporadic drives executed by the DOA intensified an unhealthy situation. (See for example Arasasingham1981). Lack of field level extension officers was another reason for the poor performance of the agricultural extension service at this time. For this reason, a new cadre called the KVS (grass root level extension workers) was created in 1952 below the position of the AI.

In the mid-1950s field demonstrators (about 70 in number) were appointed to assist the AIs in organizing field days, cinema shows etc. but not for advisory services with farmers (Emitiyagoda 2009).

Further changes in extension approaches were made in 1955 for example, improving previous demonstration techniques to include method demonstrations and result demonstrations. Method demonstrations were used to introduce new methods to farmers as a way of developing skills to perform farming practices in an effective manner. Result demonstrations were used as a method of motivating people to adopt new practices by showing its distinctly superior result. Such demonstrations were conducted on the farms of selected individuals and were considered as a very effective way of transferring technology. Other innovations included the introduction of farmer

group discussions, building up research- extension linkages and conducting experiments in farmers' fields.

The traditional Sri Lanka's small holder sector operated on a self- sufficiency basis through an integrated farming system where lowland paddy, subsidiary crop cultivations in uplands and home garden crops were integrated with a herd of cattle or buffaloes (Ariyaratne 1998). While in the immediate post-independence period extension resulted in some adjustments to this system, it did not involve significant changes in farming technologies and practices. However, the growing belief that this system needed to be improved, gave rise to a number of initiatives which drew on green revolution technologies and raised the importance attached to extension systems during the late 1950's and 1960's.

With regards to extension services during this period, there was a revision of positions in the organizational structure of the DOA. The Divisional Agricultural Officer cadre was abolished in 1957 and District Agricultural Extension Offices (DAEO) were appointed as the responsible bodies for implementation, supervision, monitoring and evaluation of the extension program under the administrative control of Deputy Director at national level. Under these reforms village level extension officers (KVSs) were recruited to conduct extension programmes at village level (Mahaliyanaarchchi 2002). Field level extension officers directly contacted smallholder farmer families and about 1000-1500 smallholder families each were served by 1090 field extension workers. This system covered 22 districts divided into 202 AI ranges in the country (Emitiyagoda 2009).

The clientele of this conventional agricultural extension approach were all farmers. However, reaching the whole farm population presented challenge in a context in which sufficient numbers of trained extension staff were difficult to achieve.

During this period the main objectives of extension was centred on increasing national agricultural production including food crops, export crops and animal production.

This basis of national extension to increase the national food production did not take a different shape either in terms of its objectives or the mechanisms delivering scientific information to the 'village agriculturist 'until the 1970's. This top-down oriented conventional approach provided advisory services to the farmers in the form of technical assistance through the grassroots level extension workers. In most situations, agricultural extension workers concentrate on individual methods of extension, particularly home and farm visits, as well as office calls by farmers. Mass methods such as radio programs in addition to extension bulletins and teaching aids are other conventional methods used in the conventional approach. However, lack of improved technology and appropriate teaching materials to use in group meetings typically results in little educational and communication works being carried out by field extension personnel.

Literature reveals that the extension services based on the conventional approach, were further expanded to provide plant protection services in case of epidemic outbreaks and hiring of water pumps etc. (see for example Arasasingham 1981).

During this period extension work concentrated mainly on rice production. It was stated in the administrative report of the Director of Agriculture, that the department resources were channelled to paddy cultivation while insufficient attention was given to other food crops (Arasasingham 1981).

The DAEOs continued to operate until separate Deputy Directors were appointed in 1963 to coordinate extension work in rice, subsidiary food crops and horticulture.

The importance of agricultural extension as a special field of agricultural development was consequently recognized and a separate division for extension activities was created in 1964. The In-Service Training Institute was established in 1967, to train extension officers in order to improve the quality of their service and competence on crop technologies (Emitiyagoda 2009).

After organising the division for extension (in 1964) under the supervision of a Deputy Director (Extension), a very clear single line of command as shown in the figure below, was developed in the extension service in the DOA (Mahaliyanaarachchi 2002).

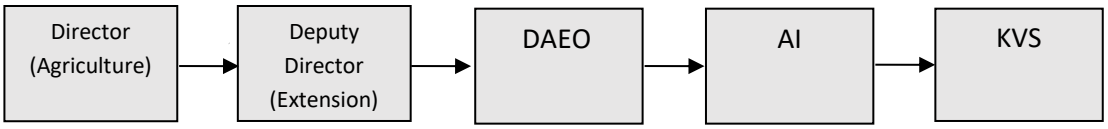


Figure 4-1 Line of command in the Extension Division of DOA.

This structure of administration was smoothly functioning until the drastic policy decision to abolish the field level extension carder was implemented. With the introduction of the 'Provincial Council system' in 1987 KVSs were absorbed in to the administrative service.

4.3.3 Protectionist Economic Policies and the Systems Approach

'**Systems Approach'** to agricultural development was adopted during 1960- 1970. The new perspective was to develop small farms in terms of appropriate farming systems that would make the best use of available resources and bring higher incomes. Higher incomes on small farms are dependent on farmers' own decision. The role of the government thus focussed on providing information and supporting farmers to take effective economic decisions. Other decisive factors externally affecting their decisions were level of expertise, access to agricultural inputs, credits, markets, satisfactory prices, and solving tenurial and other agricultural problems. Within this programme, the government had to take the initiative in organizing and coordination of these support activities to the small-scale farmers. Although the supporting services were not widely available, the government during the period 1960 – 1970 made considerable effort to facilitate the farmers with required services through the '**Systems approach**' to agricultural development.

The main systems coordinated together to develop the small-scale farming were, as described below (Abeyratne 2000).

1. Agro-technical research system- Research centers established in the major agro ecological regions to develop improved strains of crops and livestock and farming systems best suited to each region.
2. Agro technology transfer systems- Extension of technology transfer system from research centers to the village level.
3. Agricultural education system – formal education in terms of certificate, diploma, degree and postgraduate qualifications to ensure well educated extension staff to serve the farmers.
4. Agricultural In-service training system – regular in-service training courses for extension staff to keep them updated with agro technology. Special training courses conducted at the Agrarian Research and Training Institute.

5. Agricultural socio – economic research system- The Agrarian Research and Training Institute was entrusted with the responsibility of carrying out socio-economic research on agricultural development as guide to policy changes, planning and implementation of programmes. This institute was also responsible for undertaking research on prices of agricultural products, problems of credit, marketing and the supply of agricultural inputs.
6. Agricultural input supply system - ensured adequate supply of inputs through approved dealers. Fertilizer supplied through the fertilizer corporation and recommended agrochemicals provided by approved dealers and agrarian services centers. Agricultural extension centers were established to provide the farming community with latest information, and inputs such as seeds, fertilizer and agrochemicals. These centers were further strengthened by establishing the Agrarian Service Centers (ASC) in 1970 with all related agencies under one roof (Emitiyagoda 2009).
7. Rural banking and credit system – Large number of rural banks opened under the patronage of People's Bank which is one of the reputed state banks.
8. System of marketing of agricultural products and guaranteed price scheme – Paddy Marketing Board purchased paddy directly from farmers avoiding the exploitation by private traders. Paddy Marketing Board in association with the Department of Agrarian Services were responsible for purchasing paddy and other grain crops While the Department of Corporative and Marketing Federation (Markfed) purchased other crops and vegetables and the milk board purchased milk from farmers.
9. In order to ensure markets for farm products guaranteed price scheme was expanded (which was earlier set for paddy) to cover 25 farm products.
10. System for the resolution of tenurial problems - Under the paddy lands act of 1958, government created Institution of Cultivation committees at village level for the development of paddy production and resolution of tenurial problems regarding paddy lands.
11. A system for crop insurance – government introduced a crop insurance scheme under the Agrarian Services Department to help farmers overcome crop losses due to various reasons.

Subsequently, the new government in 1970 which focused on an integrated- self-sustaining development proposed a five-year plan with the aim of achieving simultaneous development of all sectors (Ariyaratne 1998). Efforts were taken to coordinate the diverse activities of the various government agencies namely, Department of Irrigation, Industrial Development Board, Territorial Engineering Service and the Department of Agrarian services at the district level. Promotion of small holder domestic agriculture was given priority in the development agenda of the government in 1970 which followed a protectionist economic policy. During this period the country experienced a closed economy in which import substitution possibilities were explored due to increasing balance of payments problems. Development of subsidiary food crops was given priority as an area with development potential while introducing schemes of assistance such as low-cost credit, price support schemes and fertilizer subsidies. Import bans were imposed on subsidiary food crops i.e. chilies, onions, potatoes and pulses to encourage domestic production under the import substitution policy regime (Chandrapala 1986).

The 1966- 1970 proposals were almost entirely focused on import substitution irrespective of farm structure and size. Agricultural development from 1970-1977 made a significant departure by introducing a new perspective of considering agricultural development on the basis of farm incomes, seeing farming as an economic business and improving farm incomes by the use of all available resources in each farm, through crop diversification and the integration of crop and animal husbandry, wherever this was feasible. The role of the government and its institutions was to provide information and support the farmers to take valid economic decisions. The post 1977 (After economic liberalization) approach to agricultural development is one alternative in a different political context, where small farmers were apparently neglected (Abeyratne 2000).

The new government proposed a five-year development plan in 1971 and its decision to implement the 'Protectionist Economic Policy'[27] as proposed in the five-year plan is considered a radical move in the political history of Sri Lanka (Ariyaratne 1998)

The noticeable proposal in the five-year plan with regard to agricultural extension is the establishment of the Agrarian Services Centers (ASC). Agricultural Productivity Committees were established in each village council area which held the authority and gave leadership to all agricultural activities in the area. Agrarian Services Centers acted as the hub of all these activities and there was one Agrarian Services Center performing under each Agricultural Productivity Committee. Five hundred ASC s were established in the island and it provided storage space for agricultural produce, meeting hall and office space for the officers (Weerawardena 2000).

The conventional extension approach which was facilitating the changing policy decisions of successive governments in the post - colonial Sri Lanka was progressively strengthened and functioned until the late 1970s. Nevertheless, this approach was constrained by a number of factors for example; Lack of technical guidance, heavy load of non - extension activities thin coverage by extension officers, lack of mobility to field extension staff and poor research extension linkage. These factors which are intertwined, have had a negative impact on the continuation of the conventional extension approach. On an average an Agricultural Instructor had to cover about 3000ha of paddy land and to serve around 3000-6000 farm families (Arasasingham 1981). These figures describe the challenge faced by the field extension staff regarding the coverage of the farmer families on a regular basis.

[27] During this period there were other policy measures taken to safeguard the economy from adverse inflationary trends caused by difficulties in foreign exchange situation. Government imposed a ban on the imports food items that could be grown locally in addition to the ban on luxury items which were considered not so essential.

Adding to this the District Agricultural Extension Officer (DAEO) as the person in charge of the implementation, monitoring and evaluation of the field extension programmes was burdened with a wide range of functions for example advising and servicing the field staff and the district coordinating committees on technical matters within the district, in addition to the responsibilities mentioned above. For this reason the contact between the DAEO and the field staff was mostly superficial. The situation in larger districts was worse and the DAEO could not give necessary technical guidance to his field staff.

The Agricultural Instructor (AI) however, was a generalist dealing with all crops and livestock problems that arose within the range. He got involved in the production, purchase certification and distribution of seed and planting materials in addition to the sale of agrochemicals and other inputs. These functions were coordinated through the Multi-Purpose Corporative Societies and cultivation committees with the participation of the farmers and the extension officers. Therefore, attending the meetings of these organisations was another responsibility of the AIs. Adding to the non-extension functions performed by the AIs he sometimes had to assist the Department of Census and Statistics to assess the yields of paddy and collect other crop statistics. Moreover, organizing school garden programmes conducting competitions and organizing activities of the Young Farmers Clubs were among the many functions performed by the AIS. Due to this heavy load of non- extension duties, the AIs could not perform the role of 'teacher and guide to the farmers' effectively.

Further, the efficiency of the extension workers was constrained by their lack of mobility. As Arasasingham has reported (see for example, Arasasingham 1981) The grass root level extension workers – KVSs had to ride their push bikes to visit their farmer families where as the AIs were expected to use their own cars or motor bikes. The alternative was to use the public transport. This situation constraining the mobility of the extension officers in the field affected their quality of work as an educator and communicator.

Link with research was superficial. There was no effective mechanism to take farmers problems to research and to take research findings to farmers. Further, research was conducted in the major research stations of the country and was not oriented to tackle the problems of the regions.

In view of the above limitations, a new approach was introduced in 1979 to replace the conventional extension approach. This coincided with a movement away from a state controlled agricultural sector towards a more market-oriented policy regime. The new approach; Training and Visit System known as the T &V system was implemented under the Agricultural Extension and Adaptive Research (AEAR) Project with the financial assistance of the World Bank, during the open economic policy regime.

4.3.4 Open Economic Policies and the Training and Visit (T&V) System (1979-1987)

Open Economic Policy facilitated the extension of the market principle beyond the domestic economy and permitted importation of agricultural products whenever domestic supply declines or prices increase.

Unlike the extension service which was implemented under the closed economic system during early 1970s, the policies implemented under the open economic policy regime which commenced in 1977 welcomed private sector involvement as well as the support of the funding agents such as the World Bank. As analysed by economic reviewers, (see for example Somaratne 2002) liberalisation has allowed for greater global access to capital and improved technologies. Foreign funding was extended for the implementation of programmes and the World Bank funded Training and Visit system of extension was introduced to Sri Lanka under the open economic policy regime.

The T &V system was a unified extension system implemented within 1979 to 1987 which covered all food crops with a single line of command from the national level to the field level (From Deputy Director of Extension to Village level extension worker).

It was an attempt to reform and improve the effectiveness of conventional approaches and was used in many third world countries with the support of the World Bank.

The main objective of the T & V system was to increase individual farm production and income. The implicit assumption was that national agricultural production would be increased as a result of increases in individual farmers' production.

Other important objectives were:

1. Introducing a single, direct line of technical support and administrative control.
2. Clearly defining the role of extension workers confining their work to education and communication activities.
3. Improving coverage by limiting coverage of farm families by a single extension worker.
4. Improving the technical knowledge of extension workers through regular in – service training.
5. Improving research – extension linkage by recruiting more subject matter specialists who act as the link between research stations and ensure flow of research information to farmers and their problems to research personnel.

A special feature of the T & V system was the regular and fortnightly training of extension staff and scheduled visits to farmers with relevant information developed during those sessions. The extension worker received training from the Subject Matter specialist (SMS) in the first week and in the second week Agricultural Extension Officer (AEO) provides informal training on problem solving.

A contact farmer system was introduced with KVS's serving750 farm families on average divided into clusters. Within these clusters more progressive farmers were selected as contact farmers and represented about 10 % of the farmers in each village.

Each contact farmer was visited fortnightly and these farmers were expected to deliver the information to their fellow farmers. The T & V system was based on the total number of farm families to be covered reflecting the population density, availability of roads, cropping intensity and diversity. The extension worker - farmer ratio varied from 1 to 1200 to an average of 1 to 800 (Gunawardana 1981)

However, literature reveals that (see for example Ariyaratne 1998), this system could not be continued due to drastic administrative changes in 1987 following the devolution of powers to provincial councils. Devolution was a political decision taken by the government. With this decision, the responsibility of serving the rural agricultural sector became highly fragmented aggravating the difficult situation created for small scale producers by the opening of agricultural markets in 1977.

Devolution led to the removal of KVSs from agriculture extension. In 1990, 2400 grass root level extension workers (KVSs) were detached from the DOA and transferred to the Ministry of Public Administration as village administrative officers (GSN). The consequence of this decision was a virtual collapse of the village level extension service (Mahaliyanaarachchi 2002). The unified extension system was dismantled with this change and extension staff was assigned to eight provincial councils creating 8 independent extension agencies. All formal linkages were disturbed and the linkage with the national extension and research system was left only to informal avenues (Emitiyagoda 2009).

The policy decision to remove the grassroots level extension agents crippled the field operations implemented through the T & V system, as it required a large number of extension persons. In parallel to this several other constraints having great impact on this extension approach caused the discontinuation of the T & V system. Although the fortnightly training of the officers and subsequent field visits benefited that was a rigid schedule which was hard to continue. The extension workers had to visit four groups of contact farmers on the first week and another four groups during the next week.

There was a tight supervisory mechanism in place and a diary was maintained by the extension workers to record the visits to contact farmers, problems encountered, and recommendations made etc. Other than for supervisory purposes these maintain the diary was useful to identify the problems encountered during field visits and find solutions to those during the training sessions with the SMO and the AEO.

However, this fortnightly schedule was difficult to operate during the slack periods. Further, extension worker supervision was not in many instances positive and supportive, due to the authoritative manner of the supervisory procedures followed by the extension organizations, instead harming extension worker morale. Beyond the issues in grassroots level, the other critical factor which contributed to the withdrawal of the T & V operation from the field was the 'top –down' orientation of this system as the decision making was done by so called experts and passed down to the lower levels. Limited participation of the farmers in the programme implementation was identified as a weakness of the T & V approach.

4.3.5 The Second Phase of Liberalization and Second Agricultural Extension Project (SAEP)

Subsequently, a Second Agricultural Extension Project (SAEP) was introduced in 1993 as an alternative strategy to fill the vacuum created by the elimination of the T &V system with the financial assistance of the World Bank. The second phase of economic liberalization which was implemented during 1989 – 1993, took the form structural adjustment programmes recommended by the World Bank and the International Monitory Fund (IMF). The SAEP project adopted a participatory and integrated extension approach for food crops, minor export crops, and livestock and coconut sectors in Sri Lanka.

An integrated approach was adopted in the SAEP to develop extension service through a process called **'**problem census and problem-solving technique**'** and the Ministry of Agriculture and Lands was responsible for the implementation of the project.

According to the world bank archives objectives of the SAEP were to increase farmers' income and agricultural production through inter alia promotion of innovative technology (See for example World Bank 1992) .The project consisted of a multifaceted programme to improve agricultural extension services, including closer integration of existing extension services, improved use of mass media, strengthened plant protection, quarantine and pest control , safer use of pesticide, training and private sector pilot extension programme.

However, the records on the history of extension services reveal that the SAEP project suffered due to lack of integration among the line agencies and lack of effective coordination between the project and provincial councils. The achievement of the objectives of increasing farm incomes and agricultural production were only partially achieved, and the project was terminated in 1998 (Emitiyagoda 2009).

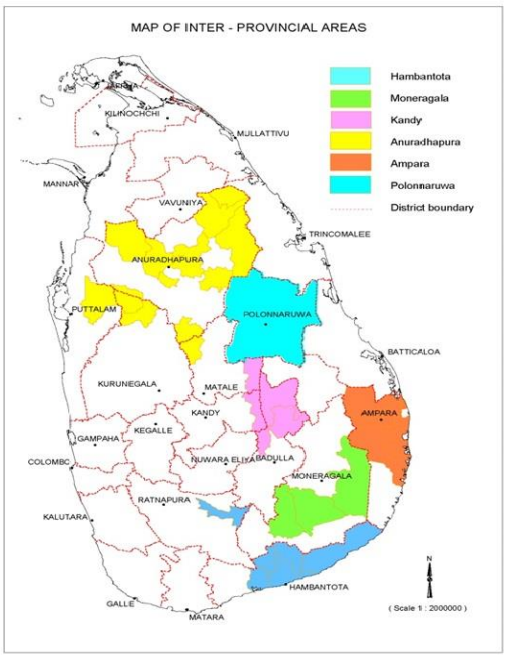
When evaluating the effects of the second phase of implementing the open economic policies in Sri Lanka, mixed results have been emphasised in literature (see for example Sandaratne, 2004). Overall economy of the country benefited from the structural changes for instance, development of industries through increased investments and the involvement of the foreign agencies in. Urban consumers welcomed the reforms such as lifting of transportation restrictions on essential food items. In In spite of these developments in the economy, small scale agriculture sector was however affected through due to the dismantling of the institutional support mechanisms. As the section on 'open market policies' discussed earlier in this chapter elaborated (see for example 4.1.4. Agricultural policy after economic liberalization) withdrawal of the input subsidies and waiving of the guaranteed price scheme for paddy purchasing have had marked impact on small farmers. Economic liberalization policies were continued and passed through another phase during which the DOA focused on interprovincial extension management.

4.3.6 Third Phase of Liberalization and Agricultural Extension in the Interprovincial Areas

The third phase of economic liberalization in Sri Lanka got underway with the beginning of a new political regime in 1994. Policies followed during this period were focused on eliminating restrictions in land ownership, institutions, credit and infrastructure. The broad aim was elimination of hidden discrimination and market distortions. Further adjustments regarding farm support policies to cater to the needs of small farmers and policies supporting the total welfare of the public were introduced during the third phase of liberalization (1994- 2004).

Deregulation process under the third wave of liberalization created a business-friendly environment including tariff subsidy and farm support policies in favour of small holder farmers. Removing regulatory mechanisms in trade and investment is one of the driving forces of globalization defined by the WTO (1998) as 'integration of the world economy through trade, investment the global movement of capital' (see for example Somaratne 2002). Liberalisation policies along with technological changes supported by extension services, have introduced competitiveness in the open market creating new economic political and social challenges. A special attention was made during this period to revitalize the agricultural extension service which was in a poor state due to arbitrary policy decisions taken by the previous regime (Ariyaratne 1998)

The Department of Agriculture as the main extension provider in the non-plantation crop sector, shifted its focus towards interprovincial extension management. Six interprovincial areas under the central government control were established in accordance with the 13th amendment to the constitution of Sri Lanka (Emitiyagoda 2009). Thus, one of the major extension function of the DOA in recent years included dissemination of technologies related to food crops in the interprovincial areas. The map given below illustrates the geographical distribution of the six interprovincial areas.

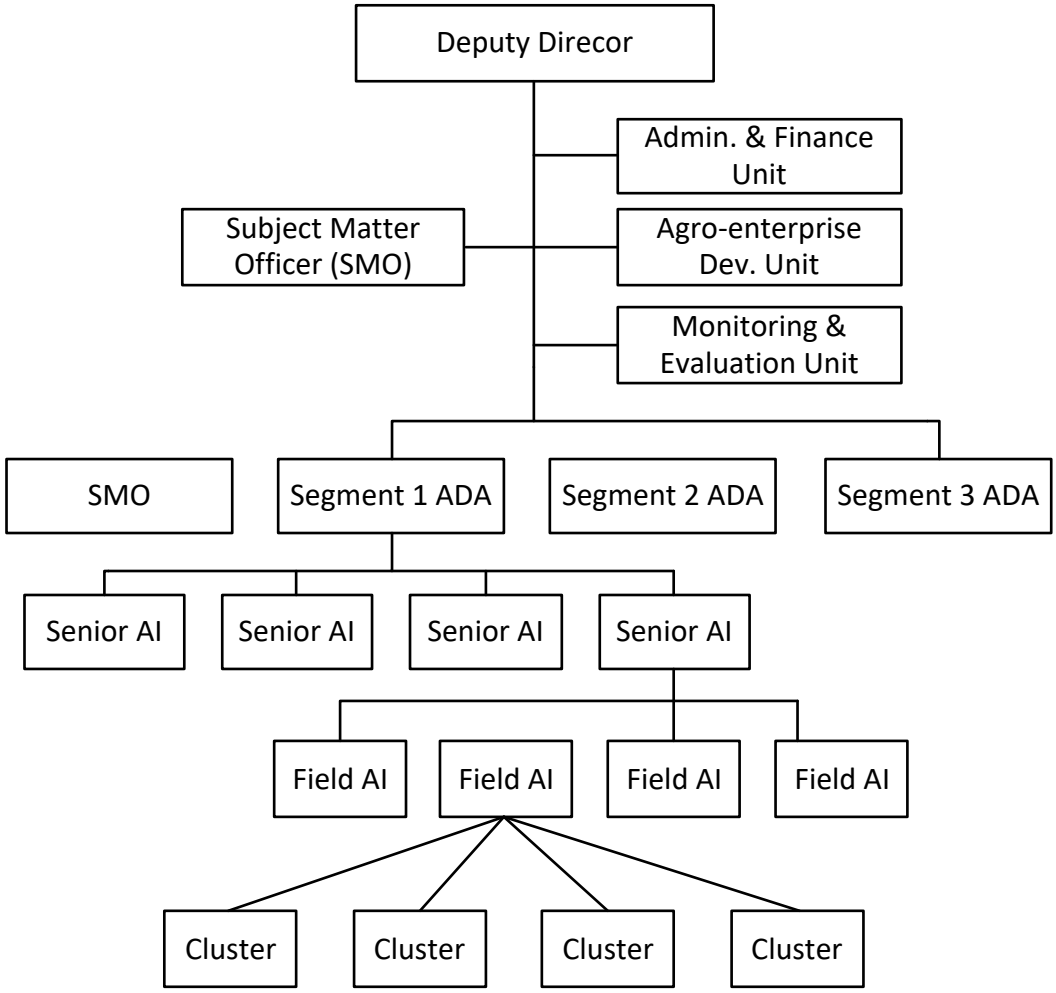


Source: http://www.gov.lk

Figure 4-2 Distribution of Interprovincial areas in Sri Lanka

Extension activities in the interprovincial areas were coordinated by the Assistant Director of Agriculture as the head of the Interprovincial unit since 1987. Subsequently, this post was elevated to Deputy Director in year 2005. At the same time another Deputy Director (extension) post was created in the extension and training center of the DOA to coordinate extension activities in the interprovincial areas.

The following figure illustrates the organizational structure of the Inter – provincial extension model.



Source: Emitiyagoda, S (2009)

Figure 4-3: Organizational structure of DOA extension

A participatory and commodity based mixed extension approach was adopted by the DOA since 1996. This approach focuses on farmer group strategy which encourages the participation of farmers in the extension implementation. Participatory Extension as spelled out in the 'Implementation manual for extension workers' compiled by the Republic of Zambia, is "*enabling communities to identify and decide on their own development priorities. It strengthens communities' abilities to identify and solve problems on their own and encourages communities to revalue their indigenous knowledge systems and to interlink it with modern knowledge systems".* The role of extension in this approach is capacity building of individuals and communities. In doing so, the manual instructs that the extension workers should concentrate on four main pillars of extension i.e. technology transfer, problem solving, education and human development (see for instance (Ministry of Agriculture and Coorporatives,Republic of Zambia 2009). Extension here acts as a means to facilitate and stimulate individuals and communities to take the initiative in problem definition and seeking solutions to individual and societal concerns

In Sri Lanka, participatory extension approach was built upon the experience of previous extension approaches, especially the 'farmer participatory group extension strategy in the *"Yaya"* (tract) production programme[28] 'implemented in 1996. Reviewing the interprovincial system Emitiyagoda reports that farmer group strategies were given much emphasis within this approach (see for example Emitiyagoda 2009). This extension approach implemented in the interprovincial areas was strengthened by a number of attributes in the present extension system. For example, high potential rice growing environments, availability of large number of highest qualified extension staff in interprovincial areas[29] and the availability of

[28] These extension programmes will be discussed in the forthcoming chapters in this thesis.

[29] Interprovincial areas which are under the purview of the Central DOA has a separate group of extension staff from the extension staff of the provincial DOA. Anuradhapura interprovincial office headed by the deputy Director of Agriculture has 5 Agricultural Officers (AO), 3 Agricultural Monitoring Officers, 40 Agricultural Instructors (AI) 5 Programme Assistants and 10 Supporting Staff.

efficient extension strategies such as rice production tract programme. Implementation of group strategies has been experienced as comparatively successful in rice growing areas as the farmers are connected through the Farmer Organizations (FO). In spite of the positive outlook of the supportive background, implementation of this group approach in the interprovincial areas, was disturbed due to inadequacies in many aspects for example,

Lack of proper system of supervision, monitoring and evaluation which in turn affected the efficiency of the programme and lack of integration among agencies including the central DOA, research institutes, government and non-governmental agencies. Further, problems faced by the extension workers such as poor remunerations and lack of mobility etc were discouraging them from engaging in project activities. Essentially, lack of community-based organizations and poor organisation of farmers constrained the successful implementation of the participatory extension programme.

While innovations in 1996 sought to address some of the weaknesses resulting from the removal of KVS's posts, the programme failed to adequately address these problems. A new participatory commodity development extension approach has been implemented since 2006 to overcome the above weaknesses.

4.3.7 Participatory Commodity Development Extension Approach and the Present Policy Framework

The participatory extension programme was an extension approach designed with scheduled visits to farmer groups in the AI ranges[30]. The range to be covered by the AI was further divided into five clusters to include homogenous units within each cluster.

[30] See for example the chapter on Methodology

The formation of homogenous clusters was facilitating the efficient implementation of the commodity-based strategies, with the participation of farmer groups with similar interest. Participatory extension planning was adopted as a new approach to empower self - help farmer groups, who shared the responsibility of the project. Furthermore, revolving fund programmes were initiated to maintain the group cohesiveness while providing them with financial assistance. Under this initiative, Individual meetings with farmers were not encouraged, in keeping with the concept of the group approach. Instead, fortnightly meetings were organized with the participation of the AIs and the agricultural production societies such as 'Rice Production *Yaya* society', Vegetable Growers Society and other Community Based Organizations. The fortnightly meeting with farmer groups and societies is a feature of this group extension approach. The Agricultural Research and Production Assistants (ARPA) supported in the formation and maintenance of the farmer groups.

This approach is being continued in interprovincial areas and monitored by the DOA through scheduled visits by officials including the directors, supervisory officers and field extension staff. A comprehensive account of these current extension programmes will be presented in the next chapter of this thesis.

Summary

This chapter included review of literature on development attempts by several political regimes in the country since the colonial period. As discussed in the chapter, policies of the British rulers were favouring plantation agriculture at the expense of peasant agriculture. Developing peasant agriculture was attempted after the Donoughmore constitution in 1931.The post-independence policy regimes that focused on domestic agriculture formulated policies on irrigation and land development. The most significant events in this sequence were the colonization programme, agrarian reforms, import substitution policies and finally, the economic policy transformation in 1977 with the opening up of the economy to a market economic system.

The parallel development of extension services in Sri Lanka reflects the changing nature of extension approaches with changes in agricultural policies. While the paddy

production programme implemented during the import substitution policy regime was successful in gaining self -sufficiency in rice production, this policy strategy also emphasised the non-rice food crop sector as a measure of ensuring national food security. Past literature points to the wider developmental aims underlying the priority given to the small holder food crop sector, under the import substitution policy in the 1970s. Sri Lanka's extension service was further changed under the Agricultural Extension and Adaptive Research Project and the Second Agricultural Extension Project. Several different models and styles of extension were experimented under these projects but met with limited success while weaknesses are attributed to devolution of powers to the provincial councils. The entire agricultural extension system was heavily fragmented and resulted in a complex extension system. The open economic policies have had a marked impact on small holders and they were often reported to have been ignored and isolated. Consequently, farmers were left with poor bargaining powers.

A summary of the development policies proposed by the political regimes since independence and corresponding agricultural extension strategies adopted under these policy environments are summarised in the table given below.

Table 4-1: Development Policies and Extension Approaches in post-independence Sri Lanka

Time period	**Policy approach**	**Extension approach**	**Impact**
1880 – 1948	Colonial policy	Commodity Development Approach.	Technology transfer for high value commodities- Tea Rubber, Coconut & Coffee.
1948 - 1956	Post-independence policy	Commodity Development Approach.	Focus of extension shifted to rice production. Dissemination of rice technology by DOA.
1956	Socio political revolution.	Integrated Approach	Agrarian/institutional reforms for rice self sufficiency
1958	Agriculture plan	Scientific approach	Promoting rice technology as a result of green revolution
1966 – 1970	Five-year development policy	Special projects approach	Accelerated food production / rice and subsidiary crops.
1970 - 1977	Protectionist economic policy	Import substitution.	promotion of domestic food production
1977	Free market economic policy (Introduction)	Conventional approach	Attempts to commercialise agriculture
1979- 1987	Continuation of Open economic policy	T & V System	Advisory services covering all food crops
1987 - 1989	Provincial council system Devolution of powers.	End of T & V	Adverse effects on extension by removing field officers
1989 – 1993	2nd phase of liberalization Structural changes (IMF)	SAEP - Integrated approach	Increasing production- food crops, minor exports livestock and coconut sectors.
1994- 2004	3rd Phase of liberalization	Interprovincial Extension Approach.	Extension management through provincial councils.
2005- 2015	Ten-year Horizon development Plan Post conflict Sri Lanka.	Participatory Commodity Development Approach.	Expanding markets through regional economic centers.

This analysis on the history and the development of agricultural policies and parallel changes in extension approaches, leads to an enquiry in to the current extension strategies implemented in the country by various extension providers. Thus, the next chapter of the thesis presents information on extension agencies with special reference to the state sector extension providers.

CHAPTER 5

INSTITUIONAL ARRANGEMNTS FOR EXTENSION DELIVERY: CURRENT EXTENSION FRAMEWORK

5.1 Introduction

Extension and advisory services in Sri Lanka are mainly provided by the state sector while several private organisations have initiated their own extension services for specific purposes. State extension service falls within the portfolio of the Ministry of Agriculture and Agrarian Development, which covers a range of functions including preparation and implementation of policies, plans and programmes, research and extension, production improvement, agriculture education and agricultural enterprise development. The overall responsibility of the smallholder agricultural development has been entrusted to the Ministry of Agrarian Development while there are nine ministries responsible for the subject as per the gazette notification[31] (Damayanthi 2008).

The ministry of Agriculture and Agrarian Development comprises two departments, namely the Department of Agriculture (DOA) and the Department of Agrarian Development. Department of Agriculture (DOA) is administered by the Director General of Agriculture and serves the function of information dissemination through the Agricultural Instructors (AI) who serve as the government extension agents. There are many other organizations operating under the purview of the DOA and the services provided by the DOA will be discussed separately in this chapter. It is

[31]Gazette Extra Ordinary No – 1482/9 of January 29, 2007.

however, important to note that some of the functions of the DOA are devolved on the provincial councils, with the establishment of provincial councils in 1988[32].

Hence, at present both the central DOA and the Provincial Departments of Agriculture are involved in providing extension services to the smallholder farmers. While implementing programmes in the fields some of the functions performed by the DOA for example extension and agricultural education overlap with the functions that have already been devolved on the provincial councils.

This contradictory status in division of responsibilities has resulted in creating a rather complicated situation and the implications are discussed under relevant topics in this chapter.

Department of Agrarian Development is administered by the Commissioner General of Agrarian Development and serves as the supplier of agricultural inputs such as fertilizer, seeds, planting material and equipment. This Department manages about 547 Agrarian Services Centers (ASC) which are the grass root level administrative units operating island wide. The agrarian Development Officer (DO) is in charge of each ASC and about 9600 Agricultural Research and Production Assistants (ARPA) are working under the DO. The government extension agents i.e. Agricultural Instructors (AI) who belong to the DOA also run their offices within the Agrarian Services Centers.

[32] Devolution refers to the full transfer of authority for decision making, finance and management to a local level public authority that is autonomous, independent and have legally recognized geographical boundaries.

Even though the thirteenth amendment to the constitution [33] devolved the subject of 'Agrarian services 'on the provincial councils, the functions related to agrarian services are implemented by the Central Government.

The powers of agrarian services are therefore vested with the cabinet minister. While going through this discussion it should be noted that, there are a multiplicity of ministries engaged in the subject of agriculture and agrarian services even after the devolution of powers. Hence, currently there are nine cabinet ministries[34] responsible for the subject.

With this setting, the chapter titled 'Present Agricultural Extension set up in Sri Lanka' in this thesis, presents the status of the extension and advisory services available for smallholder farmers in Sri Lanka.

The first section of this discussion 'Agriculture Extension Providers in Sri Lanka', presents information on the extension services offered by the government extension organizations, mainly the Department of Agriculture followed by information on other extension providers. This section contains information from secondary data sources for instance web sites of the institutions, reports and findings of previous studies. The

[33] Provincial councils in 1988 were legally established by act No 42 of 1987. The thirteenth amendment to the constitution of the Democratic Socialist Republic of Sri Lanka proposed to establish nine provincial councils. However only eight provincial councils were established because the Northern and Eastern councils were subsequently merged.

[34] Nine ministries as per the gazette –extraordinary No 1482/9 of January 29,2007 are;
Ministry of Agricultural Development and Agrarian Services
Ministry of Plantation Industries
Ministry of Supplementary Plantation Crops Development
Ministry of Public Estate Management and Development
Ministry of Fisheries and Aquatic Resources
Ministry of Nation Building and Estate Infrastructure Development
Ministry of Livestock and Livestock Development
Ministry of Land and Land Development
Ministry of Irrigation and Water Management

second part of this chapter 'Extension Interventions in Anuradhapura ' which discusses the findings of the field survey, provides evidence for the operation of the government, private and other extension providers in the field.

5.2 Agricultural Extension Providers in Sri Lanka

At present the shape of extension services in Sri Lanka is one that is highly fragmented with a number of bodies involved in supporting the production of a wide range of crops. Agricultural extension in Sri Lanka, is a subject which is mainly handled by the state sector with the involvement of multiple stakeholders representing private, non-governmental, and semi-autonomous institutions.

Delivering an area-based system of extension services besides the the Department of Agriculture (DOA) which is the main government department delivering extension and advisory services, several other government institutions provide extension services. Firstly, there are three main research institutes covering the large-scale plantation crop sectors. These are the Tea Research Institute (TRI), Rubber Research Institute (RRI) and the Coconut Research Institute (CRI). Each of these entities operate extension arms namely, the Tea Small Holdings Authority, Rubber Development Department and the Coconut Cultivation Board. Secondly the Department of Export Agriculture caters to the specific extension needs of the minor export crop sector. Thirdly the Department of Animal Production and Health serves as the government extension agent of the livestock sector. Other government organizations also provide their own extension and advisory services including the *Mahaweli* Authority if Sri Lanka, the Sugarcane Research Institute and the Department of Fisheries and Aquatic Resources. The bulk of these bodies operate on national and sectoral basis supporting the achievement of national production goals for specific crops or commodities. In addition to these state initiatives a limited number of private and Non-Government Organizations (NGO) provide extension services in certain identified fields such as the dairy industry and seed production. However these services d not reach the majority of the small scale farmers it is nonetheless worth mentioning them as they add to the complex and fragmentary nature of Sri Lankan Extension services.

Having exposed to the multiplicity of extension delivery, it is important to review the structure of extension delivery under the Provincial Council system. As it was discussed previously in this thesis (see for example in chapter 4) the policy changes in 1987 and subsequent devolution of powers to the provincial councils resulted in dividing the functions and responsibilities of the DOA between the central DOA and the Provincial Departments.

The structure of devolution is such that it is constitutes three tiers of administrative and institutional support (Damayanthi 2008). The centre, the ministry of Agriculture for this matter, is responsible for subjects and functions affecting the whole country for instance, macro planning and policy formulation. While the Provincial Councils are entrusted with the responsibility of formulation and implementation of micro policies pertaining to its area of jurisdiction strategies and plans. Divisions being the smallest unit of administration look after the operations and perform monitoring and evaluation functions.

The division of authority with regards to the planning and implementation of advisory services among the three tires is illustrated below.

Table 5-1: Division of responsibilities in agricultural extension under the provincial administration.

Tier	**Administrative Level**	**Functions**
1	Central	Macro planning, policy formulation, standard setting and evaluation
2	Provincial	Development of resources within its area of jurisdiction, formulation and implementation of micro policies, strategies and plans.
3.	Divisional	Operational planning, budgeting, monitoring and evaluation

Adopted from *Impact of the provincial council system on the smallholder Agriculture in Sri Lanka* (Damayanthi 2008)

According to the division of responsibilities between national and provincial levels, the Government of Sri Lanka as the central body of administration performs the following extension functions:

I. Agriculture in inter –provincial irrigation and land development schemes, state lands and plantation agriculture.
II. Agrarian Development (Agrarian Services)
III. Export Agriculture
IV. Agriculture Research

Similarly, Provincial Councils perform functions including agricultural extension, promotion and education for provincial purposes.

Having dealt with the division of responsibilities of agricultural extension between national and provincial administration, this thesis intends to provide a comprehensive review of the overall extension operation in the country at present. With this aim this chapter presents a review of the extension services delivered by the central DOA and other private and non-governmental extension organizations, followed by a review on Provincial Extension Services with special reference to the North Central Province where the data collection was carried out. (Department of Agriculture n.d.)

5.2.1 Extension by Department of Agriculture

The DOA is the main government department responsible for the delivery of extension and advisory services to the farming community in Sri Lanka. It comprises nine divisions, namely Extension and Training, Horticulture Research and Development, Field Crop Research and Development, Rice Research Development, Socio Economic and Planning, Seed Certification and Plant Protection Seed and Planting Material Development and finally Administration and Finance division. Each of these divisions has a director who is responsible for providing extension and advisory services to the smallholder agricultural sector. Moreover, the research stations affiliated to the DOA provide extension and advisory services related to specific fields.

5.2.1.1 Extension and Training Division of the Department of Agriculture

The Extension and Training Division of the Department of Agriculture is responsible for organizing activities in four spheres for instance Extension, Training, Communication and Agricultural Education (Department of Agriculture n.d.) Deputy Directors (DD) are assigned to implement programmes in each of these four fields which are reviewed in the sections below.

(i) Agriculture Extension

The central DOA provides extension services to the major irrigation areas categorised as interprovincial areas covering *Kandy, Hambantota, Moneragala, Anuradhapura, Polonnaruwa* and *Ampara.* This interprovincial extension service covered by the office of the Deputy Director includes extension activities mainly on Paddy, Other Field Crops (OFC), vegetables and fruits. It should also be noted that a provincial extension service is operating in parallel to the interprovincial extension service. For example, in Anuradhapura where the data collection for this study was carried out, both provincial and interprovincial extension services are in operation.

However, this ambiguity in defining the 'provincial' and 'interprovincial' areas and overlapping operations of the two systems creates a puzzled atmosphere which makes it difficult to clearly identify the type of extension service operating in a particular area. This situation was experienced at the conception of this research, while selecting the research area. As it was previously discussed in the methodology, this study focused on the provincial extension services under the purview of Provincial Departments of Agriculture (PDOA).

According to the sources of secondary data, for instance the website of the DOA, the Provincial Agricultural Departments provide advisory services regarding a range of agricultural activities. These include plant nutrition & organic agriculture, Micro irrigation and protected agriculture, women's agriculture extension, Bee keeping development, young farmers' clubs promotion activities and Agro enterprise development.

The next chapter titled 'extension interventions in Anuradhapura' in this thesis further elaborates these extension activities carried out by the Provincial Department of Agriculture – Anuradhapura

(ii) Communication

The communication division of the DOA supports the extension division to transfer improved agricultural technologies to the farming community. Such activities include designing of audio visual material (for instance, leaflets & posters) providing agricultural information through radio and television programmes, conducting exhibitions and developing and monitoring useful websites and cyber extension programs. These services are provided through the farm broadcasting service, agricultural publication unit and the Audio Visual Center of the DOA.

(iii) Agriculture Education

Educational function of the DOA is performed by the Schools of Agriculture located at *Kundasale, Pelwehera, Angunakolapellessa, Vavunia*, and *Karapincha.*

Schools of agriculture offer the two-year Diploma - National Diploma in Agriculture Production Technology equivalent to NVQ level 5[35] and the Plant Nursery

This is undoubtedly one of the most beneficial services rendered by the Extension and Training Division of the Department of Agriculture. The Diploma holders of these

[35] National Vocational Qualification (NVQ) System with 7 Levels has been introduced by the Tertiary and Vocational Education Commission (TVEC) especially for the job seekers after the A/L. At the completion of each level of the NVQ qualification, candidates become eligible to enter the professional job market.

schools are recruited as Agricultural Instructors to serve as the field level agricultural extension officers island wide.

In addition to the agricultural schools named at the beginning of this description, several others have been added to the list in the recent past. These include agricultural schools in *Anuradhapua, Wariyapola, Bibile, Labuduwa* and *Palamunai*.

(iv) Agriculture Training.

The Department of Agriculture provides training to all categories of persons engaged in agriculture including agricultural officers, farmers, school children and the general public. In order to accomplish this task the department has instituted three types of training organizations namely in-service training Centers, Farm Mechanization and Training Center and the District Agricultural Training Centers. Each training institute caters to the training needs in specific fields in agriculture as discussed below.

The in-service training institutes at *Gannoruwa, Angunakolapellessa* and *Aralaganwila* conduct trainings to enhance professional skills of the while updating knowledge on new agricultural technologies. These training programmes include training modules imparting practical knowledge necessary for addressing field problems. For example, Production of good quality fruit plants, vegetable nursery management, Other Field Crop (OFC) production technology, mushroom cultivation, food technology and post-harvest technology. Further, in-service training is provided to the officers on extension methodology, scientific methods and project proposal writing.

Gannoruwa in service training institute is the main agricultural training institute at the national level. Model farm and the demonstration fields in *Gannoruwa* facilitate information dissemination to farmers and school children. Also school leavers are trained at this training center through the 'landscape technician' training course (NVQ level 3/4).

In service training institute at *Angunakolapellessa* offers its services in the southern region for instance it covers areas including Galle, *Matara, Hambantota* districts.

In addition to the pre-seasonal training, induction training and refresher training, 'Plant Nursery Development Assistant' training course (NVQ3/4 level) is conducted with institutional and on the job training components. This training institute provides advisory services on plant protection in crop clinics for farmers.

The in-service training institute at *Aralaganwila* provides training to the government, non-government officers and the extension staff of the *Mahaweli* authority of Sri Lanka. The course on 'Field Assistant in Agriculture' at NVQ level 4 training course is conducted at this in-service training institute.

Farm Mechanization Training Center (FMTC) in *Anuradhapura* is the sole national level training institute in the country for providing farm machinery training. FMTC conducts national level training on farm machineries for a diverse group including farmers, government officers and students of government schools, universities and schools of agriculture. The programme includes training sessions on tractors, water pumps, plant protection equipment, combine harvesters and hand implements.

Moreover, there are four District Agricultural Training Centers providing extension services especially for the paddy crop. These are situated in *Weeravila*, *Vavunia, Polonnaruwa* and *Addalachchenai* areas.

The table below summarises the services extended by the education and training division of the Department of Agriculture.

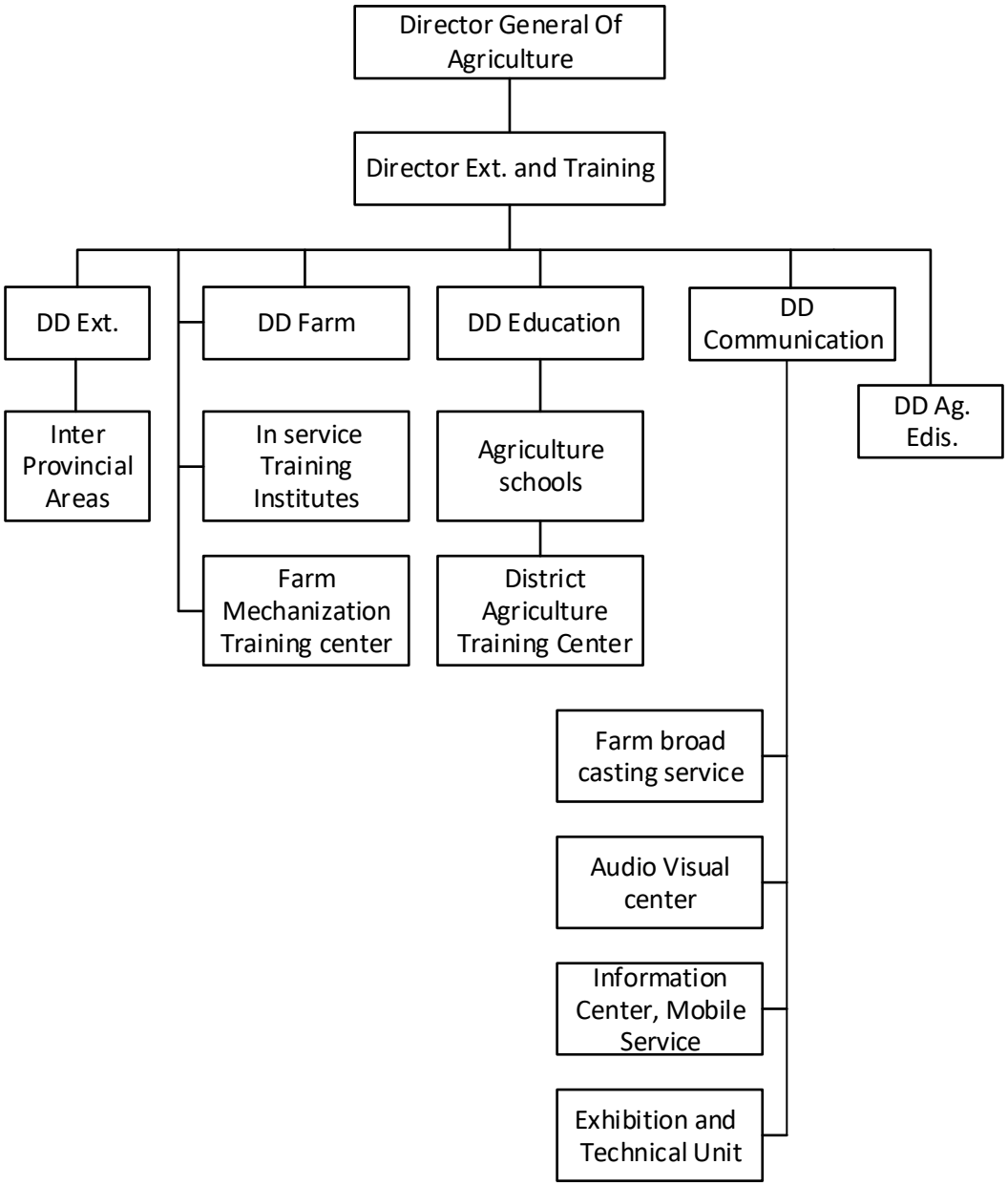
Table 5-2: Educational and Training Institutes of the Department of Agriculture.

Institute	Names /locations	Function

Schools of Agriculture	Kundasale, *Pelwehera, Angunakolapellessa, Vavunia, , Karapincha. Anuradhapua, Wariyapola, Bibile, Labuduwa , Palamunai*.	Conducting the Programme in National Diploma in Agriculture Production Technology equivalent to NVQ level 5 For school leaders who have passed GCE advanced level
In-service training Institutes	*Gannoruwa Aralaganwila, Angunakolapellesa*	1. Production of good quality fruit plants, vegetable nursery management, Other Field Crop (OFC) production technology, mushroom cultivation, food technology and post-harvest technology. 2. Extension methodology, scientific methods and project proposal writing.
Farm Mechanization Training Institute (FMTC)	*Anuradhapura*	Farm machinery training on tractors, water pumps, plant protection equipment, combine harvesters and hand implements.
District Agricultural Training Centers	*Weeravila, Vavunia , Polonnaruwa, Addalachchenai*	Provide extension and advisory services for paddy farmers.

Source: (Department of Agriculture n.d.)

The Organizational structure of the extension and training centers of the domestic agriculture sector provides a clear picture of the organization of training activities in the DOA.



Source: Dayawansa, W.G.M, 2007 adopted from *Impact of provincial council system on the smallholder agriculture in Sri Lanka* (Damayanthi 2008)

Figure 5-1: Organizational Structure of the extension and training division of the DOA.

Having discussed the education and training services offered by the DOA, this thesis seeks to further explain the role of the research institutions under the purview of the DOA. These are research organizations which have been established for the purpose of conducting research on various crops and disseminating research findings through the government extension services.

These organizations have permanent research mandates irrespective of changing policy directions of different governments and policy regimes. It is mainly the priority crops or thrust areas (for example technology transfer, farmer training or farm mechanization) that would differ with changing regimes and policy formulations. The process of transferring scientific knowledge being one aspect investigated through the research question in this study, it is of vital importance to learn about the functions of major research organizations where new knowledge is generated.

With this aim, the discussion focuses on the services provided by the following research institutes.

5.2.1.2 Rice Research and Development Institute (RRDI)

The RRDI in Bathalagoda is the main rice research station in the country. It is situated in the North-Western Province. Farmers have access to the services of RRDI through its regional Rice Research and Development Institute at *Bombuwela* and the four rice research stations at *Bathalagoda, Labuduwa, Samnthurai* and *Ambalantota.* The institute conducts research on various aspects of paddy crop cultivation, including experiments and field trials to develop new rice varieties. Among the many services provided by the RRDI, the main function is distribution of seed paddy of newly bred rice varieties with better characteristics. Moreover, RRDI promotes cultivation of high yielding rice varieties by distributing samples of seed paddy of such varieties among farmers.

RRDI has taken efforts to enhance the profitability and productivity of the rice crop through the implementation of extension and technology transfer programmes. They have been successful in disseminating proven technologies in the fields of Plant Protection, Agronomy, Soil Fertility and Water Management in rice fields thus the increase in yield per unit area is attributed to large scale adoption of improved production technologies (www.doa.gov.lk).

Farmers can obtain the services of the institute when they need to diagnose problems in rice cultivations. Field visits are made to farmer fields during pest and disease out breaks, and during the cultivation season. Soil testing and recommendation of fertilizer for specific locations are among the other services rendered by the institute. While individual farmers have access to the services, some of the extension intervention for example 'Paddy production tract programme' to promote high yielding varieties, are implemented in collaboration with the RRDI (read chapter 6). Extension agents operate as the link between the research station and the farmer organizations.

5.2.1.3 Horticultural Crop Research and Development Institute (HORDI)

HORDI situated in *Gannoruwa,* Kandy (Central Province) is the main research station providing advisory services on horticultural crops. The institute is assigned with the responsibility of technology development concerning vegetables, fruit, roots & tuber crops and floriculture. Research programmes are focused on the development of improved varieties, new propagation methods, post-harvest and food processing methods. Main research areas are varietal development, Integrated Pest management, Plant nutrition and soil fertility (www.doa.gov.lk) . HORDI has two main sections to implement its responsibilities namely, Food research unit at *Gannoruwa* and fruit crop research and development centre at *Horana.*

Farmers in all regions of the country can obtain these services through its extension and training programs. Moreover, the annual exhibition has become a major event organized by HORDI to demonstrate a wide variety of planting methods such as home

gardens, urban gardens, hydroponic planting systems, pot cultivations, hanging pots and polybag plant structures. The concept of Agro Technology Parks as a method of information delivery has been a successful method introduced by the HORDI. Such attractive parks and home garden structures undoubtedly serve an important educative function for the benefit of farmers, home garden growers as well as the general public.

5.2.1.4 Field Crops Research and Development Institute (FCRDI)

Field Crop research and Development Institute in *Mahailluppallama,* in the North Central Province, is the main research station conducting experiments and field trials related to Field crops such as Finger Millet, Green gram, Cowpea, Black Gram and Chillies etc. mainly cultivated in dry zone areas. One significant service offered by the field crop research center is providing breeder seeds of recommended field crop varieties to the farmers. Solving farmer problems related to field crop cultivation and offering a range of training programmes are among many other functions performed by the institute.

5.2.1.5 Fruit Crop Research and Development Institute (FRDI) - *Horana*

The Fruit Crop Research and Development Centre established in 2001 at Horticulture farm, *Horana* (Western Province) was later promoted as Fruit Research and Development Institute in 2013 (Department of Agriculture n.d.)This Institute aims at developing technology for enhancing the productivity and quality of fruit crops and its mandate is 'Development and dissemination of appropriate technologies to increase commercial fruit production in the country and improving the living standards of famers.' Dissemination of environmentally friendly, sustainable and economically viable technologies in collaboration with state and private sector extension organizations is the main extension function of the institute. Moreover, they facilitate research on breeding of good quality high yielding varieties of popular fruit crops. Popularization of underutilised fruit varieties and development of organic fruit production technology are other functions performed by the institute.The discussion so far has been focusing on the extension and technology transfer efforts of the non-

plantation agricultural research institutes under the purview of the Department of agriculture. However, there are three main research institutes in Sri Lanka, representing the Plantation Agricultural crop sector namely the Tea Research Institute, Rubber Research Institute and the Coconut Research Institutes conduction extension programmes of their own.

5.2.2 Extension Services of the Plantation Crop Sector

Whilst the Department of Agriculture acts as the main government agricultural extension provider for the food crop sector, there are other government extension services provided by the major research stations. These research stations deliver extension services pertaining to large scale specific crop sectors for instance Tea, Rubber and Coconut. In addition, the export agriculture department delivers extension programmes to the growers of minor export crops such as Cinnomon, Cardomom, Nutmeg and Pepper. While research stations related to the three main plantation crops for instance TRI, RRI and the CRI comes under the purview of Ministry of Plantation industries, Export Agricultural Crops belong to the ministry of Minor Export Crop Promotion. These research stations deliver extension services related to specific fields.

5.2.2.1 Extension Services of The Tea Plantation Sector

The Tea industry consists of two main sectors: the corporate tea sector and the tea smallholdings. While the Tea research Institute (TRI) is mandated to undertake advisory and extension services to the corporate sector, Tea Smallholdings Development Authority (TSHDA) delivers advisory services to the tea small holdings.

The advisory and extension division of the Tea Research Institute (TRI) is involved in dissemination of tea related technologies to the growers, and assists them in field applications. The TRI was compelled to change its extension strategies with the privatization of the tea companies in early 1990s, in order to cater to the diverse technology demands of different plantation companies (Samansiri 2016).

Hence new extension models have been proposed in the areas of private public partnership, para extension approaches[36], IT based information delivery in addition to the adaptive trials conducted in the growers' fields. Among the general extension programmes of the TRI are crop clinics, diagnostic advisory field visits, demonstrations and inspection of commercial nurseries**.** The TSHDA considers individual contacts as the most effective extension method for behavioral changes of farmers while group contacts remained the primary extension method for training and educating tea stallholders (Samansiri 2016).

5.2.2.2 Extension Service of The Rubber Plantation Sector

The advisory service of the rubber sector includes dissemination of information on Rubber agronomy and technology. The Rubber Research Institute in *Agalawatta* (Western Province) *conducts* research activities and provides research information on new findings to its extension division for dissemination.

The advisory service covers a range of issues, including product quality improvement, latex exploitation and general advice on soil conservation, nutrient management and pest and disease management. Training programmes are conducted on nursery management, plantation management, bud grafting and rubber processing to the growers.

[36] An approach to provide agricultural knowledge to the employees of corporate sector tea estates, through a group of 'Para Trainers'. These trainers are also qualified field officers or welfare officers of the estates who have been regularly trained by the TRI on most needed subject areas.

5.2.2.3 Extension Services of the Coconut Sector

The Coconut Research Institute (CRI) at Lunuwila conducts research activities and assists growers by providing technical information. CRI provides advisory services to the large scale growers and the Coconut Cultivation Board is responsible for the extension and advisory services to the small scale growers and the Coconut Development Officers disseminate information at the field level. They operate from the Agrarian Services Centers and provide technical information to the growers in addition to distribution of inputs and manging the subsidy scheme (Wanigasundara, 2015). Coconut Development Authority is responsible for the industrial development and marketing in the coconut sector.

5.2.3 Department of Export Agriculture

The main government body responsible for the delivery of advisory and extension services in this sector is the Department of Export Agriculture. Extension services are delivered by a limited number of extension officers attached to the Agrarian Service Centers, covering a variety of crops for example beverage crops coffee and cocoa), spice crops (cinnamon, cardamom, nutmeg, pepper and cloves) citronella and lemongrass, ginger and turmeric etc. Stake holders of the Export Agricultural Crop (EAC) sector includes growers, nurserymen, processors, traders, industrialists and exporters (Lindara, 2016). The main training programmes of the sector includes in service training, farmer training and cinnamon peeler training (Department of Export Agriculture 2010).

Having discussed the extension services provided by the state sector for the benefit of the smallholder farmers in the crop production sector, advisory services available for the livestock farmers cannot be ignored. The extension and advisory service of the livestock sector is a well-established system and many smallholder livestock farmers are benefited from the service.

5.2.4 Agricultural Research Institutes

Agricultural research activities include research conducted by the DOA in general and the crop specific research carried out by the research institutes such as TRI, RRI and CRI etc.

According to the 13th amendment, agricultural research, except national agricultural research institutions is a Provincial Council Subject (Damayanthi 2008). However, at provincial council level major research activities are not conducted (they conduct only field trails) due to the difficulty in allocating resources such as laboratories, competent scientists and support services in the provinces.

Therefore, the agricultural research system remains with the central government. Within to this setting, there are three research institutes performing distinctive research functions in the field of agriculture. Sri Lanka Council for Agricultural Research Policy (CARP) serves as the regulatory body for agricultural research and works towards avoiding wasteful repetition of research, while coordinating agricultural research policy.

Moreover, Hector Kobbekaduwa Agrarian Research and Training Institute (HARTI) and the Institute of Post-Harvest Technology (IPHT) conduct socio economic research and post-harvest technology research respectively.

Domestic agricultural sector of Sri Lanka comprises both crop and livestock production. While the extension dissemination in plantation and non-plantation crop sectors have already been discussed, the chapter directs attention towards the extension services in the domestic livestock sector.

Extension Services in the Livestock Agriculture Sector.

Ministry of Livestock Development has the responsibility of extension delivery in the livestock sector. Main livestock extension agencies under the purview of the ministry are the Department of Animal Production and Health (DAPH) and the National Livestock Development Board (NLDB). Apart from Ministry of Livestock Development, the Ministry of Agricultural Development and Agrarian Services, collaborates in livestock extension at the national level through its livestock extension wings, *Mahaweli* Livestock and Agro Enterprises and the *Mahaweli* Extension Resources Co Ltd. [37]

Each provincial council has a Provincial Department of Animal Production and Health. Public livestock extension service is delivered through government veterinary offices under these nine provincial departments. Each government veterinary unit is usually manned by one veterinary surgeon and two middle level extension workers. The DAPH in collaboration with the NLDB facilitates the delivery of innovations and research findings released from the Veterinary Research Institute (Wickremasooriya, 2009).

5.2.5 Private Sector Extension

Presently, in Sri Lanka, there is no established private agricultural extension services provider as such in which provides extension services to farmers on regular basis. There are rare examples of successful public-private partnership, one of them being in maize production program during mid-1990s in which the Department of Agriculture, an international NGO Agent and a private company CAI (Private) Ltd. joined hands. Some of the private companies that sell agricultural inputs, machinery and equipment, are involved in plantation agriculture and that trades or exports certain commodities like tea, do provide advisory services for selected growers as part

[37] These extension services are provided to the livestock and dairy farmers in the *Mahaweli* settlement areas. Pl refer to foot note --- for details regarding the *Mahaweli* settlement.

of their commercial activities. These advisory services are normally not fee-based but rather a marketing tool to promote companies' products or to ensure the quality of raw produce that relevant companies buy from its producers. Many companies work with farmers under contracts. Some companies have mobile services and some have sales offices in many parts of the country (Qamar 2012).

The description presented in the next section includes examples of private companies providing extension services to the small holder farmers.

(i) A Baur & Co. (Pvt) Ltd.

The company covers the plantation sector and small holders of tea, rubber, coconut and export crops through its advisory services. The company has its own extension staff and their advisory services include advise on inputs to optimize production and quality, educating farmers and planters in good management practices, training of planters and farmers in Integrated Pest Management (IPM) and Integrated Nutrient Management (INM) to achieve sustained yield increments, and advising tea factories and agriculture produce processors on monitoring quality parameters and improving quality aspects. Moreover this private organization is a well-known seller of fertilizers and chemical farm inputs.

(ii) CIC Agribusiness (Private) Limited.

This organization manages over 10,000 acres of its own farm land in Sri Lanka. Company employs its own extension staff that work directly with over 20,000 farmers that produce a variety of agricultural and livestock products for instance paddy seed, fruits, vegetables, eggs, yoghurt, etc. This is a reputed company with a strong commitment to enhancing income levels of farmers through a variety of agricultural enterprises.

(iii) Brown and Company PLC.

This company differs from other private organizations that provide extension and advisory services for the reason that it deals with farm machinery and equipment. Its Agriculture Division sells imported tractors, harvesters, and other farm machinery. Brown and Company has pioneered in agriculture mechanization in Sri Lanka and now stands in the forefront of agriculture sector, specifically in the plantation sector.

Apart from these private organizations, Sri Lanka has a large number of national and international NGOs. Some of these NGOs are active in rural community development and, as such, undertake a variety of activities including extension.

5.2.6 Extension Services of Non-Governmental Organizations (NGOs)

Most of these NGOs work either under donor funded projects or they work alongside international NGOs, mainly due to their lack of independent, sustained funding sources (http;www.g-fras.org/en/).

The following section presents a brief description s of NGOs operating in Sri Lanka.

(i) Care International

This international NGO has been working in partnership with local NGOs on a variety of projects, since 1950. At the inception, the focus was on poverty allocation and maternal and child health whereas at present focus has shifted to peace building, sustainable livelihoods and gender equality etc. They work with special groups of people in need for instance, conflict affected populations, marginalized groups and plantation workers etc. In relation to agricultural sector, Care international works towards helping the farming community through various rural development and poverty alleviation projects.

(ii) Sarvodaya

This being the largest NGO in Sri Lanka, works on a range of projects including social, political, economic and legal projects. Community Development and rural development are other priority projects of the *Sarvodaya* movement which was founded in 1958. There are many sister organizations affiliated with *Sarvodaya* movement in addition to its chapter in USA.

(iii) Agromart Foundation

This is an example for an NGO which focusses on empowering rural women by developing their entrepreneurial capabilities. Founded in 1989 Agromart has implemented projects related to agriculture, animal husbandry, agro processing and trading.

Even though the NGOs do not directly engage in delivering extension services to the farmers, these organizations contribute in delivering advisory services related to livelihood development and capacity building.

It is important to notice that most of the advisory services that have been discussed previously, adopt top down extension approaches, in contrast to the concepts of the cooperatives and societies discussed below.

5.2.7 Extension services of Farmer-based Associations, Cooperatives and Societies

There are many farmer-based associations, cooperatives and companies in Sri Lanka. They are involved in activities like input supply, credit provision, value addition and marketing. Some are involved in irrigation management while some facilitate contract farming with agribusinesses.

A few examples of farmers' organizations are given below.

i. Small Organic Farmers Association
ii. Coconut Triangle Milk Producers' Union
iii. National Federation of Fish Workers (NAFSO)
iv. Sri Lanka Cooperative Marketing Federation Ltd. (IFAP)

These farmer organizations operate in areas where their services are required and therefore operations are restricted to particular locations. For instance coconut triangle milk producers' union operates in the North Western Province where a large number of coconut estates are available and dairy farming is practiced. Integration of diary with coconut has been identified as a feasible project since pasture can be grown in the coconut estates as an undergrowth. Similarly, the National Federation of Fish Workers operate in coastal areas such as Negombo and Chilaw.

In spite of this heterogeneity in extension delivery, the national extension plan of the country aims at delivering efficient extension and advisory services to the farming community in Sri Lanka. The responsibility of implanting the national extension programme is the responsibility of the Department of Agriculture whereas in the provinces, it becomes the responsibility of the Provincial Departments of Agriculture. Coming under the purview of the same ministry the Department of agrarian Development plays a major role in the implementation of extension and advisory services through the Agrarian Services Centers (ASC) established throughout the country. These centers come under the administrative structure of the central government as agrarian services remain a non-devolved responsibility. On the contrary, the 13th amendment to the constitution has devolved the subject of 'agrarian services' on the provincial councils. This thesis intends to highlight the inconsistencies in the policy implementations by citing the following description in a report authored by Damayanthi and Nanayakkara[38] (2008).

[38] Refer Research Study by the Authors on 'Impact of the Provincial Council System on the Small Holder Agriculture in Sri Lanka' (Research study No 126, HARTI).

According to this study, even though the actions and subjects related to agrarian services are implemented by the central government, it is the responsibility of the provincial councils as per the constitution. This ambiguity has been arisen due to a controversial The listing of subjects, functions and institutions assigned to the Ministry of Agricultural Development and Agrarian services in the Gazette (**Gazette extra – ordinary No 1482/9 of 29.01.2007**) has surfaced this ambiguity . The gazette assigns the subject of 'administration and operation of the **Agrarian Services Act'** to the cabinet portfolio of Agricultural Development and Agrarian Services, thereby contradicting the provisions in the 13th amendment. Further, **The Agrarian Services Act No 58 of 1979** has been repealed and replaced by the passage of the **Agrarian Development Act No 46 of 2000** (section 99 of Agrarian Development Act). Therefore, it should be noted that the above gazette notification refers to an act which has already been repealed.

Amidst these ambiguities in the policy documents, it was declared that agrarian services remain non devolved, confirming the implementation of the Agrarian Reforms under the Agrarian Development act as a responsibility of the Central Department of Agrarian Development (Damayanthi 2008)

This policy deviation had evidently created complicated situations in several other sectors affecting small holder agricultural systems. For example the Agrarian Services Committee which is responsible for coordinating agricultural activities and implementing government policies come under the administration of the central government. The newly formed Farmer Organizations face the same setback. Rural institutions for agriculture therefore stand outside the purview of the provincial councils, making the process of their operation a lengthy and complicated affair.

Similarly, administration of local development schemes are affected by such policy deviations as is the case in the land development schemes. While interprovincial land development schemes remain under the central government others come under the provincial councils, splitting the same subject in to two administrative structures.

In the North Central Province where the bulk of the agricultural lands come under the interprovincial schemes, administrative arrangements however, have been worked out between The Ministry of Land and the Provincial Council to address day to day concerns of allottees through the divisional secretaries.

This chapter discussing the current extension system in Sri Lanka included the structure of the government research organizations which are not spared by the adverse outcomes of the ad hoc policy implementations. The report on 'Impact of Provincial Council System on Smallholder Agriculture' emphasises that the research system remains with the central government despite the reference to agricultural research in the provincial Council list. Except for the research institutions designated as national agricultural research institutions, agricultural research is a provincial responsibility.[39] Although the provincial councils have the authority to conduct agricultural research at the provincial level, it is not practiced. Most of the agricultural research activities are carried out by the national level research organizations that were described in this chapter.

On the other hand one argument against the existing setup is the absence of an integrated and comprehensive policy document for agriculture development, education, research and extension in the country (see for example (Wickremasinghe 2006). One reason highlighted by the author is positioning of agricultural and science & technology institutions under many ministries leading to formulation of many policy and planning documents by relevant ministries. As a result there are overlaps in national efforts and undue competition for resources when it comes to the stage of implementation of recommendations.

[39] According to Article 9.3 of provincial Council List of the Thirteenth Amendment to the constitution.

Summary

This chapter on Present Agricultural Extension Setup in Sri Lanka discussed about the delivery of extension and advisory services in the domestic agriculture sector in the country. As highlighted in the chapter, agricultural extension services operate island wide, with the contribution of government, private as well as nongovernmental extension agencies demonstrating the fragmented nature of the services delivered by the numerous organizations catering to the domestic food crop sector.

While this study conducted in the dry zone area, focused on the extension delivery of the DOA covering the food crop sector, there are many other institutions for instance, Tea Research Institute, Rubber Research Institute or the Department of Export Agriculture which provide location specific and crop specific extension services. With the availability of such extension services, a question arises on striking a balance between providing services to both categories for instance, commercial farmers practicing cash cropping and the small scale farmers engaged in home gardening and *chena* cropping in the small scale production units. In the meantime paddy farmers seem to be benefited from the availability of new varieties, technologies and support services as a result of continuous government attention given to the staple food crop.

While discussing the extension set up in Sri Lanka it was quite useful to identify vital policy formulations responsible for the creation of the existing situation. Hence the chapter included the discussion on the implications of the devolution of powers on the provincial councils for instance, overlapping of institutional responsibilities due to ambiguous policy interpretations.

Amidst the highly fragmented nature of the tasks and responsibilities related to agricultural development, the provincial and interprovincial departments carryout many extension activities in the respective locations. The next chapter highlights some of the many extension interventions of the Provincial Department of Agriculture, Anuradhapura.

CHAPTER 6

EXTENSION INTERVENTIONS IN ANURADHAPURA: THE ENABLING FRAMEWORK

6.1 Introduction

The institutional framework discussed in the previous chapter highlighted the different extension providers including government, nongovernment and private extension institutions operating in Sri Lanka. The aim of this chapter is to discuss role of the Provincial Department of Agriculture in the North Central Province as an extension provider and this chapter includes information collected through the filed survey conducted in Anuradhapura.

The national extension programme is formulated by the Ministry of Agriculture with special reference to promotion of food production through cultivation of crops suitable for respective agro ecological regions .The current national extension plan has been devised for a period of two years (2016-2018) The objectives as stipulated in the national food production plan (2016- 2018) are; increasing food crop production and productivity by for example, increasing the production and productivity of paddy and subsidiary food crops including Maize, Green gram, Ground nut, Soya bean, Big Onion, Chillies, Potato, Turmeric and Ginger (Ministry of Agriculture 2016). The objective of increasing the production of these crops is planned to be accomplished through the Food Production Programme whereas fruit and vegetable crop production programmes are planned to be implemented under the Home Gardening Programme. Field level implementation of the programmes is entrusted to the respective provincial and interprovincial extension departments (Ministry of Agriculture 2016).

The previous chapter presented the institutional structure through which the extension and advisory services are delivered to the farming community. The provincial extension services play an important role within this institutional framework.

As such, this chapter specifically seeks to examine the food production programmes implemented by the Provincial Department of Agriculture in the North Central Province during the period of the field survey (2014-2015).

6.2 Food Production Programmes

It was repeatedly mentioned in previous chapters that, Paddy being the staple crop of the country, has been receiving the attention of all governments in Sri Lanka since gaining independence. While there were many extension programmes related to the promotion of paddy crop, there were several other extension prorammes implemented in the area with the aim of promoting food production. Starting with the priority crop paddy, the discussion on extension programmes is organised in the following order.

I. Promotion of Paddy cultivation
II. Promotion of Big Onion cultivation
III. Promotion of Other Field Crops (OFC)
IV. Promotion of fruit crops and vegetables

6.2.1 Promotion of Paddy Cultivation

6.2.1.1 Establishing Local Rice Varieties (50% Farmer Contribution)

Sri Lanka having a history of a prosperous country harvesting golden rice crops owned a wealth of indigenous rice varieties. Introduction of hybrid varieties through the green revolution and subsequent developments in the field of rice research has encouraged the rice farmers to cultivate hybrid varieties. Within this context, the local varieties were given little attention by farmers as well as policy makers. However, importance of preserving the local varieties has been brought to the attention of the policy makers thus, establishing local rice varieties has become a component of the National Agricultural Plan today.

Under this initiative the Provincial Department of Agriculture has implemented programs to promote the cultivation of high yielding local rice varieties. Provincial Extension service has taken steps to establish 13 tracts of paddy over an extent of 6 ha. All the paddy fields with the same variety of rice is cultivated in all the paddy fields in the tract (Weerakkody 2011).

6.2.1.2 Promoting Parachute Paddy Nurseries (50% Farmer Contribution)

A similar extension approach related to paddy production, adopted by the provincial extension service is the 'Parachute Paddy Nurseries'.

Parachute method, a seedling broadcasting technology of rice was introduced to major irrigated areas in the country by the Rice Research Institute (RRI) at *Batalagoda*. This technology which is seen as a low cost and high yielding technology for rice establishment was introduced to the Anuradhapura district through the *Mahaweli* and interprovincial extension management systems.

In the Parachute method, seedlings are raised in plastic trays so that they can be uprooted easily with a soil ball around the root system. Uprooted seedlings are then tossed in a projectile manner into the puddled field and the soil adhering to the roots acts as a weight and ensures that the seedlings are dropped upright. Little water is applied to the nurseries when required and it would take only 12-1 8 days to attain the necessary height (about 20cm) for uprooting (Weerakkody 2011).

This technology was invented in China and was later modified by the Rice Research Institute to facilitate manual broadcasting. DOA is implementing this programme as it gives numerous benefits to the rice farmers for example, saving of nursery bed area ($100m^2$ for 306 trays to raise seedlings for 1 ac / 0.4 ha), saving labour, enabling early transplanting, improving nutrient and environmental conditions for the seedlings and promoting early tilling which in turn results in increased production and on the other hand reduces the high cost of production.

Even though the technique of transplanting of paddy was introduced as a remedy to reduce the seed requirement thereby reducing cost for hybrid seeds, it was not preferred by the farmers due to high demand of labour for the activity. Therefore the parachute method can be popularised as a low cost alternative.

With this aim the Provincial Department of Agriculture in *Anuradhapaura* has implemented programmes to encourage farmers to use the parachute method by providing them with hybrid seeds as well as nursery trays, on 50 % cost sharing basis. The extension approach includes awareness programmes, method demonstrations and training sessions on parachute technology.

6.2.1.3 Promoting Integrated Pest Management Programmes (IPM) In Paddy Fields

The Integrated Pest Management programmes for rice crop are implemented by the Provincial Department of Agriculture in collaboration with the Plant Protection Division of the central DOA. Experts and scientists from the DOA provide their services for conducting awareness programmes, demonstrations and training sessions. The Plant Protection Service is collaborating with several divisions of the DOA, for example the Rice Research and Development Centre and Provincial Agriculture Extension Departments in order to organize training programmes. They conduct IPM training programmes for extension officers focusing on in rice and vegetables crops. The extension officers (AIs) will train small holder farmers in their respective AI ranges. This method is popularised as an alternative to excessive use of chemicals for pest and disease management in the rice crop.

6.2.1.4 Promoting Integrated Plant Nutrition System (IPNS) – Demonstrations

Integrated Plant Nutrition System (IPNS) is a holistic approach to plant nutrition which ensures that the system delivers nutrients to plants through a combination of inorganic and organic sources to maintain and sustain soil fertility and enhance crop productivity. Fertilizer Use Efficiency (FUE) is low in all chemical fertilizers and organic manure when used singularly. The combined use of organic manures and chemical fertilizers is recommended as it increases efficiency in fertilizer use.

More than 90% of the cultivars grown in Sri Lanka are 'New Improved Varieties' (NIV) with yield potentials over 10 t/ha. The reported national average yield of rice crop in Sri Lanka is 3.78 t/ha and it has been found that this yield can be elevated to an average of 6-7 t/ha easily by adopting IPNS practices. Application of rice straw, green manure, dried cow dung/poultry manure, 'charred' rice husk in combination with chemical fertilizers can be practiced according to IPNS technique, in order to gain higher yields through improvement of chemical, physical and biological status of the rice growing soils (Department of Agriculture n.d.)

IPNS is recommended by the DOA with the objectives of increasing Fertilizer Use Efficiency, thereby increasing the return to investment on fertilizers and developing a balanced system of crop nutrition and management. For this reason farmers in the research area are encouraged to practice IPNS by providing them with suitable varieties of paddy to be cultivated using this technique, with the aim of increasing the rice production in the area as well as cutting down the use of chemical fertilizers in crop production. The extension service provided to the farmers in the area ensures the proper adoption of the technique by conducting awareness programmes, demonstrations and training sessions on IPNS.

6.2.1.5 The Paddy Production *Yaya* (Tract) Programme

The paddy production *Yaya* (Tract programme) is one of the extension approaches to promote overall rice production in the country. This programme known as the 'Block Demonstration" initiated in the mid-1980s as a pilot project was a successful approach which demonstrated a yield increase in 1-2 t/ha. Being a holistic group approach, the block demonstration programme has identified farmer participation, availability of technical knowhow and input supply with credit as the pivotal components in the approach.

The main feature in this programme is cultivating 20- 30 ha of blocks of paddy by a group of farmers who are organized under farmer organizations to follow a package of integrated crop management practices (Wirasinghe 2000).

The integrated crop management practices recommended for enhancing both technical and resource allocation efficiency are;

1. Improvement of soil fertility by recycling straw from the previous harvest and adding organic manure along with chemical fertilizer. This step is considered the most important intervention to increase productivity.
2. Proper land preparation especially deep ploughing.
3. Timely and collective cultivation.
4. Use of good quality seed paddy and maintaining proper plant densities.
5. Proper weed control and use of IPM practices.

This programme was initiated by the DOA with the aim of bridging the gap between the potential paddy yield and the farmers 'yield which is attributed to the low levels of soil fertility in farmer fields. It is expected to address this issue by adopting a strategy where the efficiency of resource allocation is improved through the group intervention and technical efficiency is enhanced through technical sessions and interaction with resource persons (see for example Wirasinghe 2000)

The main role of extension in this programme is to conduct at least three on farm training programmes to educate the farmer groups on the use of this technique in the proper way to get the maximum benefit. Selection and organization of the farmer groups are the responsibilities of the Agricultural Instructors in addition to facilitating the timely distribution of farm inputs such as fertilizer and providing good quality seed paddy to the farmer organizations.

6.2.2 Promotion of Big Onion Crop Cultivation

Big Onion is one of the main cash crops grown in the Dry Zone areas of the country. Advisory services provided by the provincial DOA focus on Big Onion seed production and as well as the bulb production. Some of the farmers are familiar with the cultivation of big onion bulbs, but seed production is a new practice introduced by the DOA in order to cut down the cost for seeds.

Farmers have to spend around Rs. 25 000 to purchase imported seeds to cultivate one hectare of Big Onion (Rs 25 000/ha). Local seed production is considered important on the other hand, as the imported seeds sometimes are not reliable. For instance, during the field survey a farmer commented "*last season we purchased Big Onion seeds from private seed outlets in Dambulla. Though we asked for local seeds they had given Indian seeds (variety Rampur) and the yield was lower than expected*"[40]

Therefore steps have been taken by the DOA to introduce seed production to local farmers. This awareness programme is now being implemented in Anuradhapura, *Matale*, *Kurunegala* and *Polonnaruwa* Districts. Seed production procedure involves vernalisation[41] of the seeds and it is usually done in cooler areas in the island for example *Seetha Eliya* and *Rahangala* where the required low temperature (8- 15 ^{0}c) is available (Department of Agriculture n.d.)

The AIs provide facilities for farmers to transport big onions (which are to be used as mother bulbs to raise seedlings) to *Seetha Eliya* for vernalization. Those farmers who already have mother bulbs, are encouraged to use them while others are provided with facilities to buy mother bulbs.

Other required inputs such as fungicides, polythene to cover the flowers to protect from rain and frost, fishing nets to retain flowers from falling, as well as packaging materials and racks to store production are provided to farmers. Especially installation of racks for safe keeping of the seeds, which can be used to start cultivation in the next (*Yala*) season.

[40] Farmer code AK (98) 8

[41] Vernalization is the requirement for a period of low temperature for transition of a plant from vegetative to reproductive phase.

In addition to providing inputs and facilities for Big Onion cultivation, training of the farmers for seed production, is an important aspect of this extension intervention. Agricultural Instructors also receive training on technical aspects of big onion seed production including different crop management practices. Having completed their training, AIs are assigned with the task of organizing training sessions for the farmers. Extension and training programmes related to Big Onion Cultivation include, awareness programmes, demonstrations and field trips to share the experiences of successful farmers in addition to introducing seed production to new group of farmers and expansion of area under big onion cultivation.

As a promotional strategy the PDOA provides seeds on 50% cost sharing basis through this intervention.

6.2.3 Promotion of Other Field Crop (OFC) Cultivation

The extension and advisory service of the DOA also covers field crops which are widely grown in the area such as Finger Millet, Black gram, Green gram, Cowpea, Ground Nut, Chillies and Soya Bean. Farmers are encouraged to grow these crops by providing them with seeds on a concessionary basis i.e. charging only 50 % of the total cost for the seeds. Seeds are distributed among selected farmers belonging to the AI range by the Agricultural Instructor (AI) along with necessary advisory services for the management of these crops for a better harvest.

The Paddy Production Tract programme as described above in this chapter, was one of the successful extension interventions of the DOA. With this experience the DOA has extended this style of intervention to promote production of Other Field Crops (OFC) including Cowpea, Green Gram, Black Gram, Finger Millet, Soy Bean and Ground Nut. Similar Activities are carried out at field level and the same facilities are extended to the farmers.

In addition to this, seed production programmes have been introduced by the DOA. Training programmes are conducted by the DOA to train farmers to produce seeds of field crops. Separate seed production units have been established in farmer's fields under the guidance and supervision of the AIs. Training programmes are conducted, in collaboration with seed production and certification services provided by the DOA. The aim of the intervention is providing high quality seeds to farmers. Those farmers who receive training and start seed production, can generate additional income by selling seeds to fellow farmers while producing their own seed requirement.

A project that gained popularity among farmers is cultivating Green Gram in between the two main cultivation seasons, which is known as 'extension of the season'. Usually this is the fallow period before the begging of the next season. According to this technique, Green Gram is established as a short term crop with minimum level of crop management practices. AIs instruct the farmers to sow the Green Gram seeds in the paddy fields after reaping the paddy harvest. Many farmers who own paddy fields in the research area have adopted this method.

The provincial DOA through its extension interventions has introduced Integrated Crop Management (IPM) practices for the Chillie crop. AIs provide chillies seeds to selected farmers on 50% cost sharing basis and conduct sessions to create awareness on the IPM techniques in the demonstration plots established in farmers' fields.

6.2.4 Promotion of Fruit Crops and Vegetable Cultivation

The home garden promotion programme organised by the PDOA includes several components for example promotion of fruit crop cultivation (Mango, Guava, Papaya and Passion Fruitis), home garden crop cultivation mushroom production and IPM projects. Similar to the previously discussed instances, the DOA provide planting material on the cost sharing basis so that farmers have to bear only 50 % of the cost. Training programmes are conducted by the AIs on pruning of fruit plants and post-harvest crop management of fruits.

The Horticultural Crop Research and Development Institute in *Gannoruwa* collaborate with the PDOA in educating the farmers through these interventions. The PDOA further assists the farmers who are engaged in fruit crop cultivation, by providing them with micro irrigation facilities (sprinklers) and water pumps at concessionary prices. Advisory services are available on planning and maintaining of home garden crops and the DOA organizes competitions to select the best home garden, as a measure of motivating the farmers. With regards to the mushroom production, necessary technical information is provided by the AIs in addition to the financial assistance given by the PDOA to build mushroom huts.

Having discussed the extension interventions of the provincial extension service in Anuradhapura, it is important to look into the procedure of decision making, planning and implementation of the extension programmes within the PDOA. It should be noted that these programmes are usually planned at the ministry level based on the national agricultural plans and passed down to the provinces. At the provincial level the PDOA is the responsible body for implementation and the Provincial Director (PD) is responsible for the execution of the national plans, as the head of the Institution. In doing so, the PD together with the Deputy Director (DD) extension decide on the programmes suitable for each segment under their purview. Extension activities for the year are generally planned at the meetings presided over by the PD with the participation of the ADAs of the four segments, Subject Matter Officers (SMO) and the Agricultural Instructors (AI).

Further planning of the extension interventions is usually carried out during the monthly meeting at the segment office, headed by the ADA. Having discussed with the AIs the ADAs distribute the projects suitable for each AI range and assign relevant tasks to the AIs. These tasks are assigned to the AIs in the form of targets for the particular season. For example, if a particular AI range is located in an area where the majority of farmers cultivate Chillie crop, the AI in charge of the area would get to promote the IPM practices in Chillie cultivation.

The issue in this whole procedure is that, the selection of the extension intervention is based on the production plans drawn at the provincial level, without the consultation of the field level officers. This plan however is an outcome of a top down decision making process based on available production and yield statistics and there is no deliberation for a needs analysis at the grassroots level which would better represent the needs of the farmers. Extension officers are finally compelled to deliver a package handed over to them by the authorities with little autonomy or decision making power extended to them.

Summary

The above chapter described the field extension programmes implemented by the PDOA, covering several fields such as productivity enhancement, plant protection, plant nutrition and IPM etc. The interventions aim at facilitating the farmers through knowledge and technology dissemination, distribution of seeds and other farm inputs in addition to providing farm equipment. The analysis of these extension interventions supports the idea that PDOA has put many support services in to action in collaboration with several government organizations and training institutes. The National Agricultural Plan has envisioned the development of the food crop sector in several facets and allocated organizational and institutional resources for the benefit of the sector. Nevertheless, the status quo presented in the chapter above, calls for an in-depth analysis of the real field situations under which these programmes are implemented. As elaborated in the research question, it is important to the analyse the responses of the farmers as well as the extension officers (AI)s to find out how they take decisions, accomplish their targets and cope up with the situations. With this intention, the forthcoming chapters in this thesis provide a more descriptive analysis of the primary data collected through the survey. Most importantly this analysis will be supported by direct and indirect observations employed as a method of triangulation. Such holistic investigation of field scenarios will undoubtedly lead to a thorough understanding of the entire process which enables making recommendations to reconcile the matters.

CHAPTER 7

LIVELIHOOD RESOURCES: CAPITAL BASES SHAPING LIVELIHOOD STRATEGIES

7.1 Introduction

The key proposition of this chapter is to explore smallholders 'possession of resource bases and to explain how it supports their crop selection decisions. Studies have found that exploitation of natural resources is essential for human existence and the society cannot function without the continuous use of such resources (see for instance Rupasinghe 2017).

Farming system is a way of decision making in utilizing resources according to the requirements of the farm household (Rupasinghe 2017, Panda 2013 ,Chatergee 1993) and rural people use environmental resources in various forms such as consumption goods, input goods, output goods and durable goods.

The discussion on the livelihood resources begins with a description of the resource bases and their geographical distribution over the four segments selected for the study. It explains the five categories of livelihood resources illustrated in the 'assets pentagon' in the livelihood framework (see for example, Scoones, 2000). The framework understands these assets not only as things that allow survival, adaptation and poverty alleviation. ''Assets are the basis of the agents' power to act and reproduce, challenge or change the rules that govern the control, use and transformation of resources" (Bebbington 1999). The writing on 'Capitals and Capabilities' further elaborates that assets or capabilities are not simply resources that people use to build livelihoods but they are assets that give them capabilities. According to Sen (1997) cited by Bebbington, rural peoples' possession of human capital gives them the capability to engage more fruitfully and meaningfully with the world and to change the world.

With this review of past studies on livelihood resources, the chapter henceforth analyses the distribution of livelihood resources and the possession of capabilities of the rural people in the research area.

7.2 Livelihood Resources in *Anuradhapura*

This chapter describes five types of resource bases namely, natural & physical , financial, human and social resource bases**.**

7.2.1 Natural and Physical Capital Bases

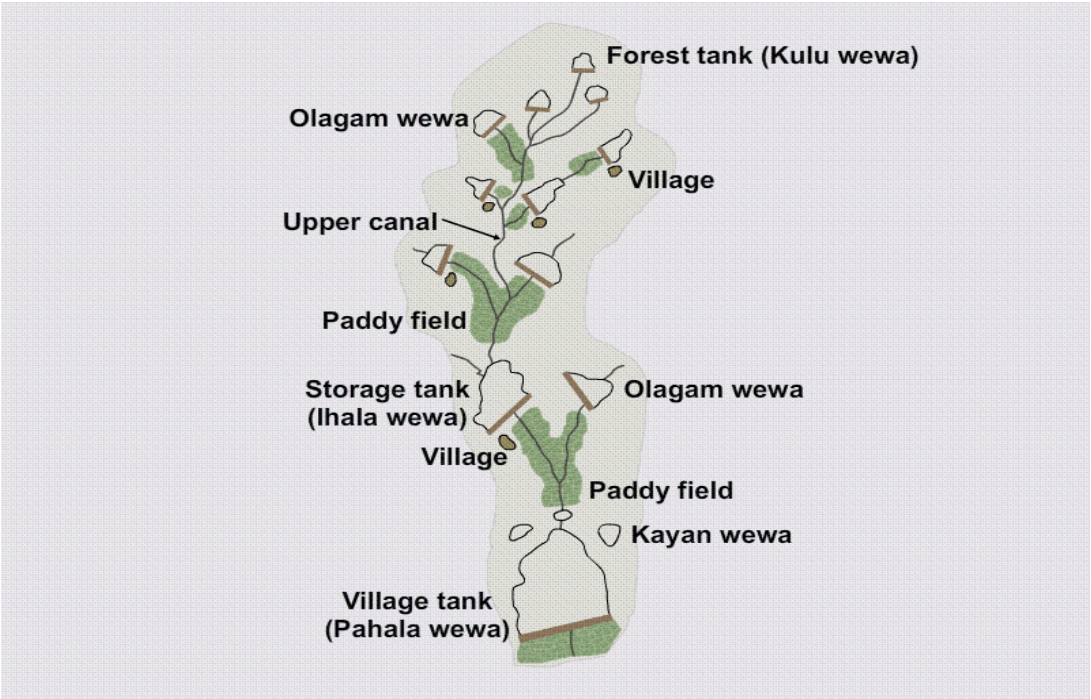
Out of the five capital bases (Natural, Physical, Human , Social and Financial capital) defined in the asset pentagon in the livelihood framework, **physical** and **natural capital** bases are fundamental in deciding upon the crops to be cultivated and the crop combinations to be adopted (Scoones, 2009). Natural capital here is defined as the natural resource stocks such as soil, water, air genetic resources and environmental service such as hydrological cycle, pollution sinks etc. Availability of land for cultivation is a primary concern in determining agricultural livelihoods and the ownership of land and the availability of land for cultivation, are the parameters considered in this study. Access to physical resources for cultivation for example irrigation water, infrastructure facilities, marketing and storage facilities act as determinants of livelihood strategies and portfolios that finally make up the source of income. According to Dorward, capital bases contribute to overall income and also allow either consumption or exchange in periods when there's no income (see for example Dorward 2001). The distribution of natural and physical capital bases within the research area (*Anuradhapura*) is discussed at length in the following section of this chapter.

The research area *Anuradhapura* belongs to the North Central Province (NCP) which occupies the largest land area of the island (16.3% of the total land area). In fact, the most abundant natural capital bases identified in the research area - Anuradhapura, are the land and water resources albeit it's geographical location in the dry zone. The total land area of the NCP is reported as 9741 km^2 of which 731 km^2 are covered with inland water bodies.

Moreover, the highest number of water bodies or lakes in Sri Lanka are found in the NCP comprising Anuradhapura and Polonnaruwa administrative Districts, despite its geographical location in the dry zone (North central Department of Agriculture 2015)

More than 15,000 small tanks are distributed across the province in the form of distinct 'cascades'[42]. These tanks are part of a water management system which is unique to Sri Lanka and has been in existence since pre-colonial times. The tanks are themselves a combination of natural and constructed storage ponds. A cascade of tanks is made up of 4- 10 small individual tanks that combine as a series of successive water bodies (see for example, Panabokke 2009). The unique feature of this ancient hydrologic system is the presence of downstream reservoirs to capture the excess water flowing from the upper reservoirs in the cascade. This enables the capture and reuse of water resources. Historically, these ancient irrigation systems were constructed to irrigate the paddy lands in this part of the island, where large extents of lowlands are under paddy cultivation.

[42] A cascade system is a connected series of tanks organized within a micro-catchment of the dry zone in Sri Lanka. The tanks are used to store water from a seasonal stream and then conveyed to other tanks downstream.



Source: IUCN 2016

Figure 7-1 A Cascade Irrigation Tank System

Considering the cultivation practices in the area study area, farmers cultivate paddy as the traditional staple crop in all segments selected for the study. In areas where water is a limiting resource for lowland paddy, farmers have opted to cultivate subsidiary food crops in paddy fields and *chenas* during the dry season (*Yala* season which is the minor season).

Analysis of capital bases show notable variations among the four segments, regarding the availability and distribution. For example, availability if physical capital bases such as irrigation water and infrastructure differed among the four segments albeit the similarities in the natural, environmental and climatic factors including topography and temperature. Availability of irrigation water is a decisive factor in crop selection in the area, thus paddy cultivation is extensively practised in localities where irrigation facilities are available.

While analysing this situation further, it is noticeable that smallholder farmers in *Kallanchiya* and *Kahatagasdigiliya* benefit from the irrigation systems, more than the farmers in other segments. The main irrigation tank in the cascading irrigation system in *Kallanchiya* (*Kallanchiya wewa)* surrounds 65 peripheral small tanks distributed in the area, *Illakkama wewa* and *Puhudivula wewa* being two examples. Similarly farmers in *Kahatagasdigiliya* cultivate paddy with the irrigation water distributed from a number of reservoirs in the cascading system namely, *Kahatagasdigiliya maha wewa, Kanhindigama maha wewa, Pahala Kanhindigama wewa ,Nikawewa, Koonwewa, Ranbawewa and Amunawetiya wewa.* These tanks are located in different AI ranges [43] within the *Kahatagasdigiliya* division enabling 6047 farmer families to make their living through agriculture.

Table 7-1: Distribution of irrigation tanks within AI ranges in the research area.

AI range	**Command area (ha)**			**Total**
	>100	50- 100	< 50	
Kahatagasdigiliya	14	16	65	95
Kallanchiya	05	30	89	124
Nochchiyagama	05	12	42	59
Ranorawa	06	08	59	73
Thirappane	06	16	53	75

Source: North c (Placeholder2) (Department of Census and Statistics 2016)entral Provincial Department of Agriculture Reports

[43] Refer the selection of sample in Methodology.

Chena cultivation was the prominent cropping pattern in *Nochchiyagama* and *Ranorawa* AI ranges belonging to the *Ipalogama* [44] segment. Farmers cultivate vegetables especially Pumpkins, Ash Pumpkins, Luffa, and OFC in upland *chenas* in this area with a variation of crop selections depending on the availability of water for cultivation. As an alternative, they usually cultivate Sesame in *chena* lands during the dry season (*Yala*) when water is a limiting resource for farming. Several crops including Sesame are recommended by the DOA as rain fed crops for the dry zone farming systems (see the crop recommendations below) where irrigation facilities are not available.

When compared with other three divisions, farmers in *Thirappane* have opted to cultivate a combination of upland crops including *chena* and home gardens alongside lowland paddy.

The ADA divisions are the four main administrative divisions managed by the Assistant Directors of Agriculture (ADA). As detailed in the sample selection in the Methodology chapter, Each ADA division consists of 8 AI ranges. One AI range from each ADA division was selected only exception being selecting two AI ranges From the Ipalogama division.

Table 7-2: Crop combinations adopted by farmers in the research area.

ADA Division	AI Range	Village cluster	Crop combinations	
			Yala season	Maha season
Kahatagasdigiliya	Kahatagasdigiliya	Kanhindigama	Paddy & OFC	Paddy & Maize
		Kiriibbewa	Paddy & OFC	Paddy & Maize
		Ellewewa	Paddy & OFC	Paddy & Maize
		Ranpathwila	Paddy & OFC	Paddy & Maize
Anuradhapura	Kallanchiya	Kallanchiya	Paddy & *Chena*	Paddy & Maize
		Meemalwewa	*Chena* & Home Gardens	Paddy & Home Gardens
		Rotawewa	*Chena*	Maize
		Kappriggama	Paddy & *Chena*	Paddy, Maize , *Chena*
Thirappane	Thirappane	Galkulama	Paddy & home gardens	Paddy, Maize ,Vegetables
		Karuwalagawewa	Paddy & *Chena*	Paddy , Maize
		Wannammaduwa	Home Gardens	Paddy, home gardens, *Chena*
		Uttimaduwa	*Chena*	Paddy & *Chena*
		Sembukulama	Home Gardens	Home gardens
Ipalogama	Ranorawa	Bogaswewa	*Chena*	Paddy & *Chena*
	Nochchiyagama	Katumulugama	*Chena*	Paddy & *Chena*
		Thalgaswewa	*Chena*	Paddy & *Chena*

Source : Field Survey,2015

Further to the findings discussed in this chapter regarding the impact of resource availability on crop selections, it is important to note that the Department of Agriculture usually make crop recommendations based on the availability of natural and physical resources. Even though it is not explicitly stated, parameters such as agro climatic conditions, rainfall patterns, topography and elevation are considered in making crop recommendations. Thus the recommendations appear as upland /lowland crops grown either in *Maha* or *Yala* seasons as rain fed or irrigated crops. Crop recommendations are helpful for farmers to adopt the best crop combination based on the availability of natural and physical resource bases in a particular locality.

Crop recommendations issued by the DOA for *Kahatagasdigiliya* division as presented in the table below exemplifies this situation.

Table 7-3: DOA Crop recommendations for *Kahatagasdigiliya*

Maha				**Yala**			
Upland		**Lowland**		**Upland**		**Lowland**	
Rain fed	Irrigated	Rain fed	Irrigated	Rain fed	Irrigated	Rain fed	Irrigated
Chilli	Chilli		Paddy	Sesame			Paddy
Brinjal	Red onion		Chilli	Pigeon Pea (Ratoon)			Chilli
Green gram			Capsicum				Large Onion
Groundnut			Cowpea				Red Onion
Maize			Green Gram				Gherkin
Cassava			Groundnut				Cowpea
Cucurbits			Soya Bean				Green Gram
Finger Millet							Ground nut
Pigeon Pea							Soya Bean
Sweet Potato							Sweet Potato

Source: www.doa.gov.lk

Thus far this chapter has been analysing the impact of natural and physical resources in making crop selection decisions for each season. Akin to the climatic factors and water resources, this chapter intends to discuss the significance of land availability as a primary resource concern in conventional agriculture. When land becomes a limited resource the implications as elaborated by Scoones, would be limited options in the type of activities farmers can engage in, and limiting the levels to which economies of scale can be achieved, and the extent to which capital can be mobilised for investment (Scoones ,2009)

7.2.1.1 Land Availability and Land Use Patterns in The Area

Total cultivated land extent in the *Anuradhapura* district accounts for 33.16 % of the total land area. While 36.08 % of total land extent is uncultivated , 30.76 % of total land area is covered by forests (Department of Census & Statistics 2016).

Land ownership in the four divisions selected for the survey takes several forms, for instance, cultivating their own land (either inherited or purchased) share cropping or cultivating encroached state land. The majority of farmers in the area (60 %) cultivate their own land inherited from their parents while a considerable number of farmers are cultivating on state land. Out of this, some farmers held permits to cultivate state land (12.5 %) whereas others (15%) had encroached state land for their farming practices. It was notable that 60% of the farms in the study sample are of less than 5 ha in extent. These farmers pertinently operate on smallholdings and 17 .5% farmers in the sample own less than 1 ha. Average size of a land considered as small holding is 0.8 ha (Narayansuwami 2000). However, a noteworthy observation during the field survey was that the decisions of farmers regarding the extent of cultivation depended on the availability of other inputs [45] such as irrigation water, seeds or planting material

[45] One of the farmers in the sample had abandoned a plot of land already prepared for maize cultivations due to the unavailability of weedicides. That was immediately after the banning of Glyphosate in Sri Lanka.

, agrochemicals and labour etc. There are occasions when farmers are advised to limit their extents of cultivation due to limitations in irrigation water supply. Generally this decision is taken at the pre - cultivation meetings depending on the capacity of the reservoirs during the particular season.

Having analysed the natural and physical capital bases in the area, the chapter next focuses on financial capital. According to Scoones, the availability of financial capital can be a fundamental requirement for deciding upon crop and enterprise combinations (Scoones 2009).

7.2.2 Financial Capital Bases

Livelihood literature suggests that the financial capital base determines the investment capacity and thereby the scale of operation of individual farms. The research therefore investigated sources of investment capital, formal and informal sources of credit and off farm income generation capacities, as components of the financial capital base available to local farmers.

Findings related to the financial resource bases, revealed that several sources of capital and credit are used by farmers in the sample. The main source of capital is savings from previous season's income as reported by 59.5% of farmers, followed by borrowings (17.5% of farmers) and pawning assets such as jewellery (10.3% farmers). Formal borrowings comprised bank loans obtained from the state banks and the Samurdhi[46] Development Bank. Occasionally, there were farmers who invest their pension fund as capital for farming. This category however, accounts for a smaller percentage (7.6%) representing those who have retired from government service.

[46] Samurdhi programme is the National strategy for poverty alleviation through rural participation launched by the Sri Lankan government in 1994.

Furthermore, some rural organizations for instance, farmer organizations and women's societies, also known as 'thrift & credit societies 'are valuable sources of credit with easy access. A considerable percentage of farmers (25%) have benefited from the loan facilities extended by the farmer organizations. Despite the fact that women's societies function as a lending circle, borrowings form these societies are not directly invested for farming activities. More often farm women do the transactions with these societies and they utilise the money for developing their off farm income generation activities.

The notable improvement in relation to financial resources is, improving the habit of saving. As it was noted above 59.5% of the farmers invest their savings to start cultivations in the next season. This development can be attributed to several factors for example, services rendered by reliable financial institutes such as state banks, expansion of the services offered by farmer organizations and government interventions through rural banking and credit programmes (e.g. Samurdhi programme).

All state banks have their own packages to support the agricultural sector. For example the Bank of Ceylon has introduced a new comprehensive rural credit scheme to cultivate paddy, other field crops (OFC) and vegetables in addition to the credit schemes to purchase farm equipment. Further, the government has facilitated rural credit schemes through the Development Banks[47] with the aim of providing financial assistance farming activities. Rural farmers have not been neglected by the private banks in the country. They too assist the farmers by offering credit facilities. Rural Credit Schemes offered by the Hatton National Bank, Seylan Bank and the Commercial Bank can be cited as examples.

[47] *Lanka Puthra* Development Bank offers "*Ran Aswenna*" meaning 'Golden Harvest' special loan scheme.

There are several rural credit programmes offering financial assistance to the farming community in Sri Lanka as reported in 'Seeds of credit for farmers' (see for example Attygala 2014). The Dry Zone Livelihood and Partnership Programme (DZLiSPP) has introduced a revolving fund programme in *Moneragala, Badulla, Kurunegala* and *Anuradhapura* Districts. The scheme involve refinance loans where the borrower receives funds at an annual interest rate between 9-12 % and refinancing at the rate of 3-4.5%. There are several other microfinancing schemes and cultivation loans provided by a number of organizations. While some of these microfinance schemes are donor funded (for instance, IFAD[48] and JICA[49]), others are financed by the government, The Central Bank or other banks with interest rate subsidies from the state. The new comprehensive rural credit scheme and the cultivation loan scheme granted loans amounting to Rs.9.4 billion and Rs.8.2 billion in 2012 and 2013 respectively. Apart from paddy, coconut is the main crop facilitated by the cultivation loan scheme and short term crops including pulses, oil seeds, roots & tubers and vegetables are among the other crops supported by this loan scheme (Attygala,2014).

Having discussed the financial resource bases contributing to farming practices in the research area, the next section in the chapter discusses the 'Human Capital'.

7.2.3 Human Capital Bases

In line with the capital bases described in the livelihood analysis, human capital is recognized as skills, knowledge, physical capability, good health and ability to labour (Scoones, 2009). This study is therefore focused on the capacity of farmers to engage in off farm income earning activities, part time jobs and business orientation etc. Whilst these capabilities act as indicators of human capital their entrepreneurial abilities and skills that make some farmers adopt distinct approaches.

[48] International Fund for Agricultural Development
[49] Japan International Corporation Agency

The majority of the farmers (90 %) engage in off farm income generating activities, which is a positive indication of their potential. Some of them (17.5%) are self-employed, meaning that they engage in small business enterprises or earn off farm income by hiring tractors, farm machinery, trishaws etc. Carpentry and masonry has been chosen as off farm employment by some skilful farmers (7.5%) , demonstrating their capabilities in choosing diverse livelihood path ways. Meanwhile, a similar percentage of farmers who do not possess any special skills have resorted to work as labourers during the off season.A special case that can be highlighted is a farmer representing the *Ipalogama* segment the case is presented below;

Box 3 – Success story of a farmer

This farmer who is 50 years of age cultivates a total land extent of 16 ha. Whilst his main crop is Pumpkin, he has adopted a diversified cropping pattern with 6 ha of Paddy with vegetable crops and fruits in the chena. He has been involved in farming since his childhood and possesses a wealth of knowledge in the field. He cultivates Sesame and Water Melon in the dry season (Yala). Interestingly, this farmer has come to know about the profitable Pumpkin cultivation, from a fellow farmer from another village. His knowledge on farming along with his experience has contributed to his success. For instance, he believes that cultivations must commence at the right time and adhere to the cropping season when they adopt rain fed farming. Otherwise need to irrigate the crops at the correct intervals. He has built two agro wells to irrigate the crops. Crop selection for each season is based on the demand and market prices whereas other farmers mainly consider climatic factors for crop selections. Marketing of the output is not seen as a problem by this farmer as he directly transports the produce to the Dambulla economic center using his lorry.

Referring to his cultivations in the previous season he revealed how he managed to reap a good Pumpkin harvest by adopting correct strategies. He had established pumpkin seedling in polybags and kept them ready before the rains started so that he managed to do the field planting with the onset of rains. He has gained the advantage by reaping an early harvest and sending the produce to the market before others, avoiding the peak time of production during which markets get flooded with the same variety of vegetables has been his successful strategy.

Displaying his entrepreneurial capabilities, he has embarked on small scale businesses related to farming. He operates as a distributor of chemical fertilizer using storage facilities and his lorry. Further he makes off farm income by hiring two wheel tractor and ploughing implements. He has invested his income earned through farming to purchase those assets in addition to the loans obtained from state banks. Through the years of experience as a farmer, he has developed the skill of producing Chillie seeds and selling seeds is another source of income.

While the majority of farmers in the area operate as ordinary peasant farmers with limited exposure several others were found in every division, who possessed extra capabilities. For example, in *Kahatagasdigiliya* segment the presidents of two farmer organizations were retired government servants. The possession of managerial and entrepreneurial capabilities along with previous experiences, seem to have shaped their behaviour to take the lead. Such leadership can immensely contribute for the development of the farming community in the area.

The discussion thus far has been analysing the natural, physical, financial and human capital bases influencing farming practices in the research area. Social capital bases which is the remaining component in the asset pentagon will be discussed in the next section while referring to the farmers' links with rural organizations in the four segments.

7.2.4 Social Capital Bases

Farming being a social activity necessarily involves collective decision making, related to many practices, including irrigation and water management, share cropping, technology transfer and sharing of agricultural information etc. There are other social needs for instance infrastructural maintenance, coordination of social activities and resolving disputes among farmers, which demand the functioning of a collective body. Moreover, a collective approach by way of an organization maybe assumed to be appropriate for gaining access to resources such as farm inputs, credit and extension and market opportunities. The concept of livelihood analysis incorporates an analysis of both formal and informal social relations, affiliations, associations, and social networks, as attributes of social capital. This study therefore investigated several aspects related to village level organizations as a measure of social relations and networks.

7.2.4.1 Rural Organization as Social Capital Bases

While there are a number of village level organizations supporting farmers, this chapter intends to present the findings regarding the participation of farmers in rural organizations and the functions performed by rural organizations in satisfying social needs. Among the many rural organizations in the research area, Farmer Organization[50] is in the forefront, linking farmers with the government through representation of the community at decision making forums.

A Study related to Farmer Organizations (FO) in Sri Lanka (see for example Giragama 1999), reveals that the formation of FO is based on hydrological boundaries while their major functions include procurement and distribution of agricultural inputs on a cooperative basis and efficient water management. In addition the adoption of innovative cultivation methods, development of credit and marketing skills and resolution of farmer conflicts are among the functions of FO's (Giragama 1999).

Besides Farmer Organizations, Womens' societies act as leading village level organizations. Having identified this potential of farm women, the DOA has introduced a number of projects through the initiation of Women's Societies in rural area. This was revealed by the Subject Matter Specialist in charge of the 'Farm Women's Programmes', conducted by the Provincial Department of Agriculture in Anuradhapura. One successful project has been the development of food outlets managed through the farm women's societies. [51]The DOA had taken the initiative to establish these sales centers to promote nutritious local food items prepared using the local ingredients such as rice flour, finger millet, sesame, yams and tubers such as Sweet Potato and Cassava and fruit juices prepared using local fruit varieties.

[50] Farmer organizations have been set up under the Agrarian Services Act No 58 of 1979 and the concept underpinning this initiation was promoting 'self-reliance' of the farming community.
[51] These popular food outlets are situated island wide and they are called '*Hela Bojun'* meaning authentic Sri Lankan food.

The required training in food preparation is given by the extension and training division of the DOA to the members of the women's associations. The first of this kind of food outlets was established in *Gannoruwa* and by now there are 15 outlets [52]successfully functioning island wide (Department of Agriculture n.d)

As it was revealed by the respondents of the survey, women's societies are functioning as village level informal thrift and savings organizations. Members borrow money for farming as well as to fulfil various other financial requirements, through this society. Interestingly, they encourage the development of the habit of saving money, as the members can maintain their own accounts at the women's society. DOA has introduced income generation activities through these societies for example mushroom production, bee keeping, cut flower production and preparation of dairy products such as yoghurt. These projects are further explained in the chapter on 'Field extension programmes in Anuradhapura'.

Other organizations operating in the research area include rural development societies, young farmers' clubs, seed producer's societies and cut flower producer's society etc.

Besides these production oriented organizations, social and religious societies for example death benevolent society, elder's society, cooperative society and the *Samurdhi* association etc. exist and are used by local people to plan to achieve common objectives related to social, religious and welfare needs.

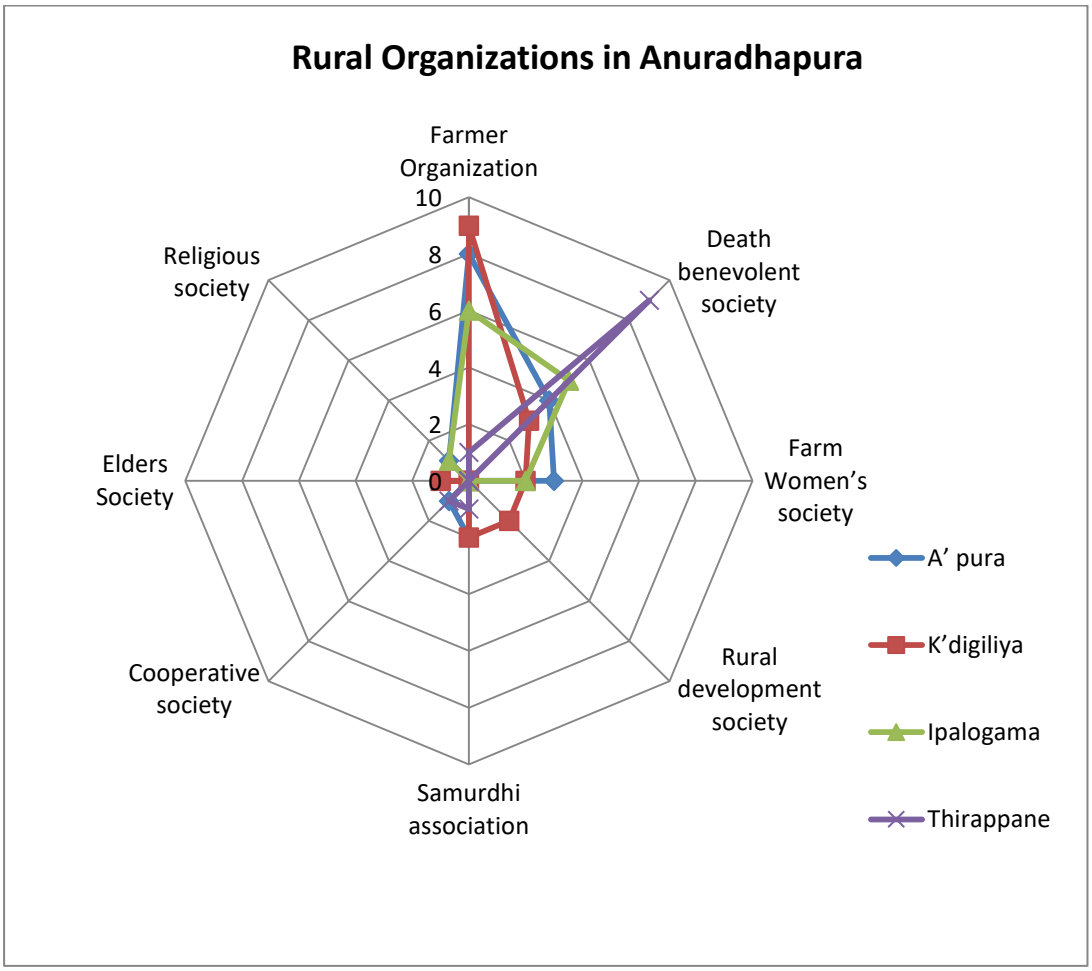
Farmers perceptions of the role and functions of these organizations were more frequently linked to the benefits received through their membership. During the period of primary data collection, it was observed that farmers refer to affiliations with the organizations based on their perceived importance of the organization. For

[52] *Gannoruwa, Peradeniya, Kandy, Kundasale, Nuwaraeliya, Kegalle(Pinnawela), Mahiyangana, Anuradhapura, Polonnaruwa, Palwehera, Ampara, Jaffna, Labuduwa, Bataatha and Baththaramulla*.

example, all farmers in the sample are members of their respective farmer organization. However, farmers who grow home garden and *chena* crops, referred to their membership in other societies for instance Death Benevolent society, rather than the Farmer Organization, while farmers who adopt paddy as their main crop referred to their membership in the FO.

Realising such variations among the divisions the discussion now explores how farmers have linked with the societies and rural organizations in the four segments. This is a simple analysis of the membership in each organization, based on their responses given during primary data collection.

The following figure illustrates the responses of farmers regarding their affiliations with rural organizations.



Source: Field Survey, 2015

Figure 7-2 Farmer Participation in Rural Organizations in the research area.

Out of the four segments, the most active and well organised farmer organizations were found in *Kahatagasdigiliya*, where paddy cultivation is practiced under the "*Kahatagasdigiliya* main irrigation tank". As was documented in literature, farmer organization is formed within the hydrological boundary which is irrigation tank and the distributary canal system (Giragama 1999)Interview survey with the office bearers and members of two farmer organizations i.e. *Perakum farmer organization* and *Nirmala farmer organization*, revealed that several farmer organizations are operating in *Kahatagasdigiliya,* encircling the hydrological boundaries of the peripheral irrigation tanks.

Distribution of inputs (fertilizer, seeds) and water management are the main functions of the farmer organizations (FO) especially in thesepaddy growing areas. Even though the main responsibility for managing the tanks and the irrigation systems lies in the hands of the Department of Irrigation, farmer organizations share this responsibility at the village level. Benefits gained from the village irrigation tank is not limited to obtaining water resources for crop cultivation.It is an additional income source for the farmers. For example Farmer Organization enter into lease agreements with private entrepreneurs to implement 'inland fisheries 'projects using the irrigation tank. Such income earned through various projects, along with the collection of membership subscriptions, generate the capital base of the farmer organization. This capital is used to provide short term loans to the membership as well as for hiring machinery for cleaning and maintenance of the irrigation canals.

While the Farmer Organizations (FO) perform many functions for the benefit of the members, The Agrarian Services Center (ASC) acts as the hub that connects a number of farmer organizations. ASC is the meeting place for farmers to organize common activities and the following information provided in the box provides evidence for farmer interactions at the ASC in *Kahatagasdigiliya*.

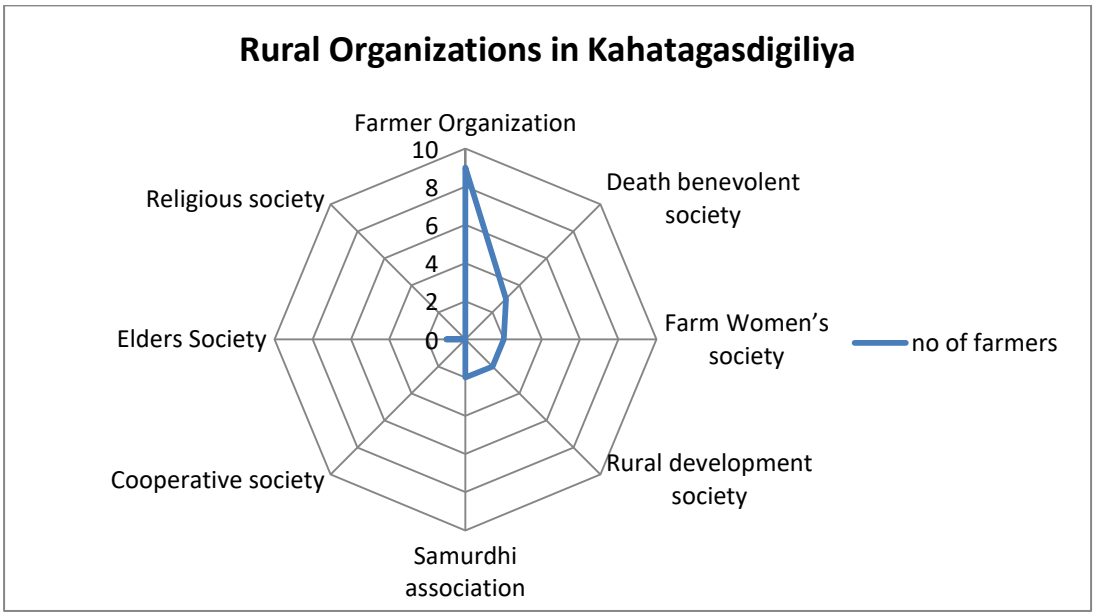
Box: Observations at the Agrarian Services Center, *Kahatagasdigiliya*.

- *Sharamadana campaign (offering free labour by a group of farmers) organised by the DO to clean the premises, with the participation of the members of FOs.*
- *Group of farmers preparing a heap of compost manure at the premises of the ASC under the guidance of the DO.*
- *Members receiving certified seed paddy issued by the ASC and transporting those to be distributed among the members of the FO.*
- *Farmers visiting the ASC to purchase hybrid maize seeds.*
- *Members consulting officers at ASC to obtain crop insurance against crop damages.*
- *Group of farmers getting organised to clean distributary canals of the village tank and bunds of the field with the onset of the rainy season for efficient use of water resources.*

The activities described in above section were organised at the ASC, according to the instructions of the DO and the ARPAS were responsible for informing the farmers about the activity. There were around fifty farmers both men and women who participated in the *Shramadana* campaign. At the end of the activity all participants enjoyed the refreshments served by the officers of the ASC. Funds required for these interventions are usually allocated from the annual budgets depending on the planned programmes and estimates submitted by the officers. Farmers in this division show close affiliations with ASC and they visit the centre frequently to get various services. Distribution of seed paddy is a responsibility taken up by the Farmer Organizations in collaboration with the ASC. They usually prepare lists according to the requirements of the members and place the orders for the required quantity of seed paddy. The suppliers[53] distribute the seeds to the ASC and then each farmer organization hire Lorries and transport the seeds to the farmer fields.

[53] There are farmers who supply seed paddy to the farmer organizations. The DOA provides technical knowledge and training for these farmers as a part of its extension interventions.

Most of the time the members of the FO visit the ASC either for individual purposes or to represent the FO. In addition to the FO these farmers are members of several other village level societies and the figure illustrates their links with those organizations.



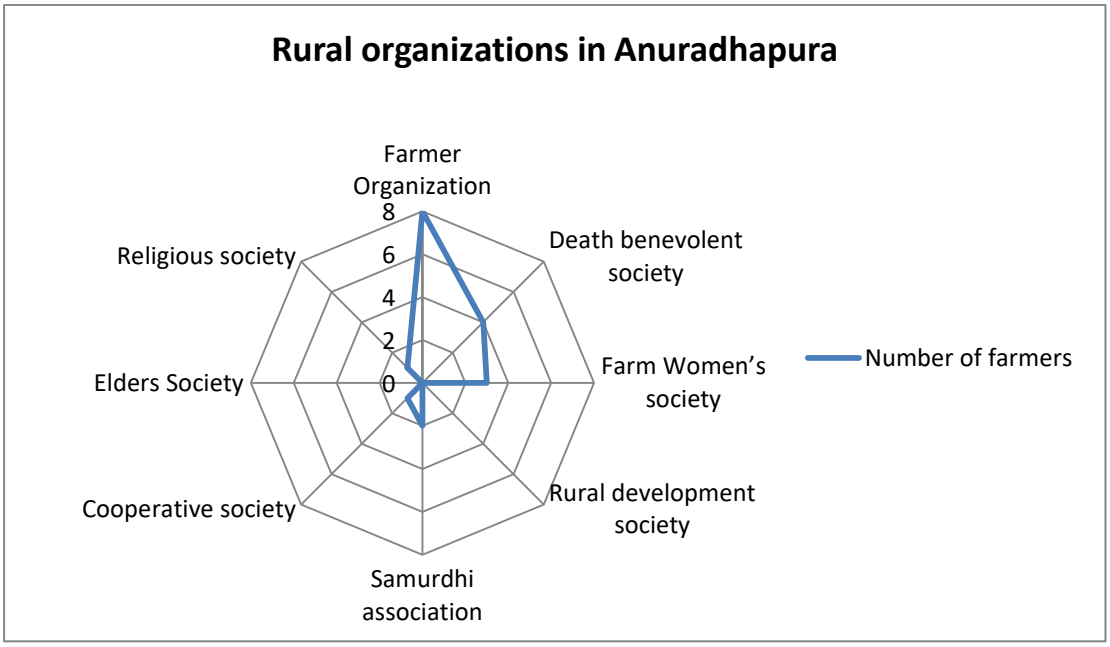
Source: Field Survey, 2015

Figure 7-3: Farmer Participation in Rural Organizations in *Kahatagasdigiliya* segment.

The FO was the most active village level association in *Kagatagasdigiliya* with 90 % of farmers participating in its activities, while the Death Benevolent Society has a membership of 30%. Other associations, for example the Womens' Association, Rural Development Society and Samurdhi Association [54] with 20 % membership in each, are less active in this division. Interestingly, farmers in this segment had links with many organizations including the elders' society (5%), as the sample included three farmers above the age of 60 years.

[54] See for example foot note 5 above

Similarly, farmers in *Anuradhapura* division maintained close affiliations with the farmer organization with 80 % of farmers in the sample mentioning that they were members of the FO.

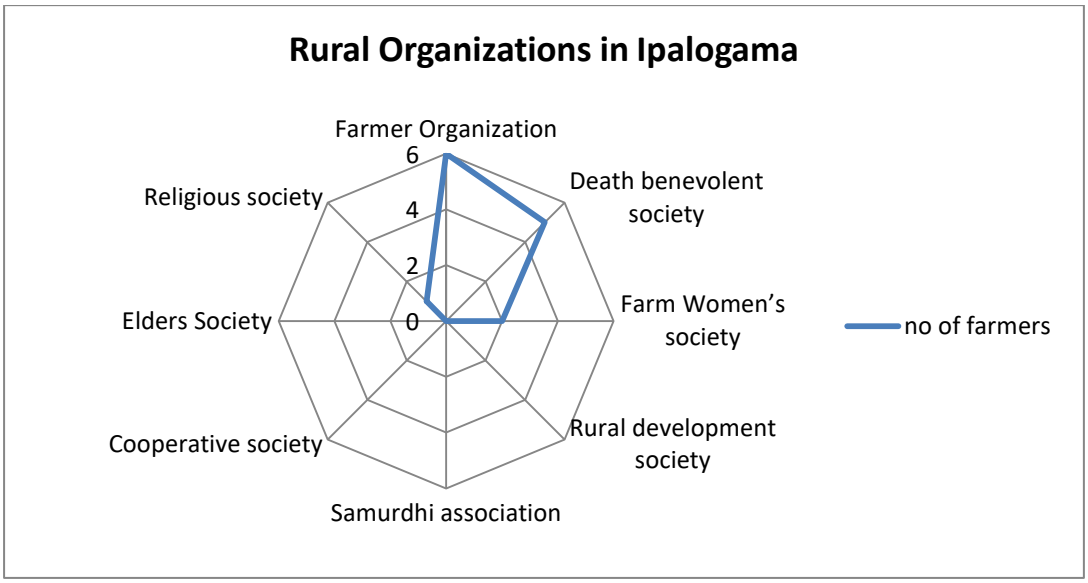


Source: Field Survey, 2015

Figure 7-4: Farmer Participation in Rural Organizations in *Anuradhapura* segment

Farmer participation in the other rural organizations was comparatively at a poor level when compared with the FO. For instance, the only 40 % of the farmers said that they were members of the Death Benevolent Society. Women's society was a popular choice of the members (30 %) while only 20 % of farmers are members of the Samurdhi Association. Cooperative society and religious society were mentioned by few farmers (10 %) while members of the rural development society and elders' society were not found within the sample.

Even though observations during field visits to *Ipalogama* segment revealed very poor relationship with the ASC and the extension officers, 60% of farmers who were interviewed, acknowledged that they were members of the FO. Farmer Organization is perceived as important by the farmers because this membership makes them eligible to receive the fertilizer subsidy. However, their relationships with all other village level organizations were remote, as illustrated in the diagram below.

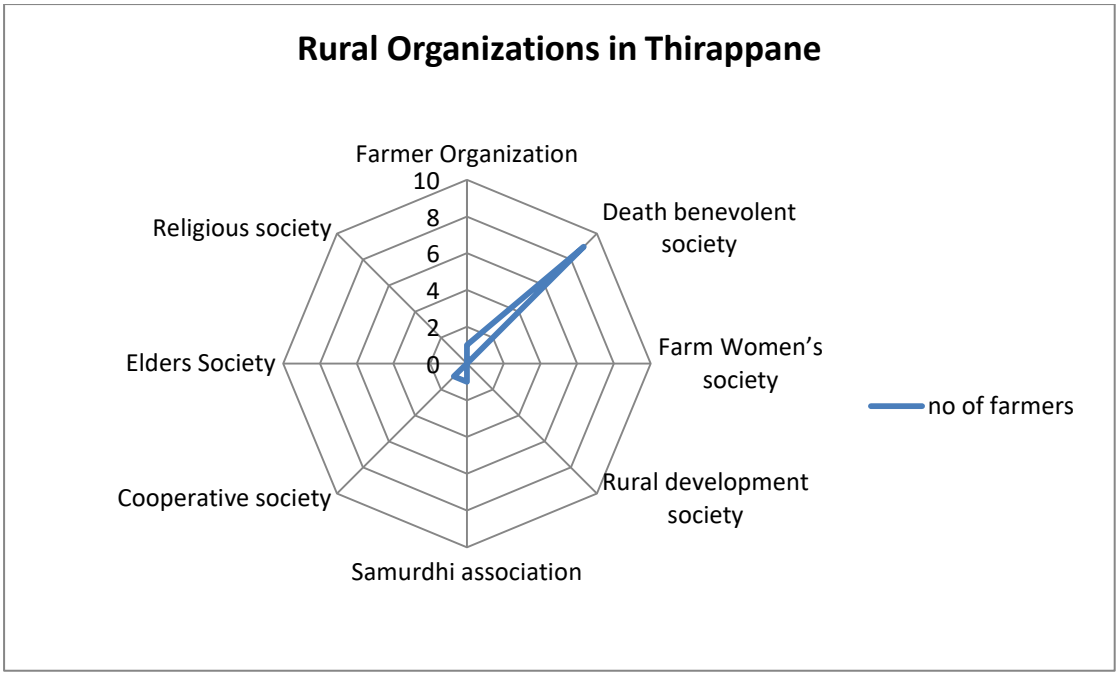


Source: Field Survey, 2015

Figure 7-5: Farmer Participation in Rural Organizations in *Ipalogama* segment

Farmers in *Ipalogama* had developed links with only three rural organizations including Death Benevolent Society (30 % farmers), Farm Womens' Society (20% farmers) and the Religious Society (10% farmers), according to their responses. Farmers in this segment more often resorted to individual farm operations, rather than getting involved in collective activities or seeking the assistance of the extension officers. Further discussions related to this behaviour will be continued in the chapter on 'Farmers' perspectives'.

When asked about their links with rural organizations, farmers in the *Thirappane* segment have responded in a different way, as illustrated below;



Source: Field Survey, 2015

Figure 7-6: Farmer Participation in Rural Organizations in *Thirappane* segment

According to the primary data nine out of ten respondents in the sample, maintained closer relationships with the Death Benevolent Society. When compared with other segments, farmers in this sample did not have a strong link with the Farmer Organization. Cooperative Society, Farmer Organization and Samurdhi Association were given equal importance by the Farmers. The reasons for these remote links will be analysed in the chapter on 'Farmers' Perspectives'.

Summary

The primary data presented in this chapter were analysed on the basis of the concept of 'livelihood resources' widely discussed in the sustainable livelihood framework especially the five capital bases elaborated in the 'Asset Pentagon'.

The presence of spatial variations among the four divisions regarding access to natural, physical, financial, social and human capital bases, suggests that it has a bearing on the variations in cropping patterns among the four segments.Although little variation was observed in natural capitals such as topography and temperature,

physical capital bases including irrigation water and infrastructure show noticeable variations among the four segments. Paddy cultivation is extensively practised in the areas with natural lakes and manmade irrigation systems, reiterating that availability of irrigation water has been a decisive factor in crop selection.

Findings on financial capital bases reveal that farmers have developed the habit of saving to invest on farming activities in the forthcoming season. Farmers have access to credit facilities provided by the state banks and other financial institutions. On top of this, farmers receive financial assistance through the extension programmes organized by the DOA, as it is widely discussed over several chapters in this thesis.

In summary, it clearly shows that farmers make judgements concerning their associations membership of organizations based on the perceived importance of the functions performed by the organization. Although they are members of some organizations they would not mention that if they do not perceive them as beneficial. Such choices depend on their judgements on functions including input distribution, disbursement of subsidies, providing credit facilities and achieving common goals. For example, Farmer Organizations are more active and considered as important in areas where paddy cultivation is prominent in the cropping system. Similarly, Death Benevolent Societies are operating in every rural village performing social and welfare functions. It is the village level association that brings villagers together and maintain social ties irrespective of the gender, social class and other disparities.

Whilst this chapter provided an overview of the spatial distribution of resource bases and their influence on livelihood choices of smallholder farmers, forthcoming chapter will be addressing the views of the farmers regarding access to resources with special reference to extension and advisory services.

CHAPTER 8

VOICE OF SMALLHOLDER FARMERS: EXTENSION IN THE FARMERS' PERSPECTIVE

8.1 Introduction

This thesis which investigates the 'role of extension' in this context, it is argued that extension outcomes are the result of encounters between extension workers and smallholders at field level. The actions and perceptions of smallholder farmers are as vital as the perceptions of the extension officers in exploring how the system of extension advisory services in Sri Lanka actually works in practice. The main research question of the study enquiring into 'what factors are affecting the sharing of agricultural information?' sets the background for analysing the views of smallholder farmers, concerning the extension services. This chapter aims to do this by presenting the opinions of farmers, pertaining to the extension services delivered by the Provincial Department of Agriculture in Anuradhapura.

As has already been discussed the Agricultural Instructor (AI) is the government extension agent, responsible for delivering extension and advisory services to the grass root level. It is his duty to organise the field extension programmes and oversee the distribution of seeds, planting material and other equipment among the farmers, besides carrying on their routinely field visits. It is during these interactions that such officers interact with members of the farming community. The outcome of these interactions are shaped by the different perceptions and the interest of the participants. The implementation of such services are ultimately the outcome of interactions between extension workers and farmers. The chapter on 'Extension officers' perspective' will subsequently explain the duties and responsibilities of the AIs, alongside their attitudes and perspectives on the service. This chapter focusses on the farmers' perspectives with regards to extension and advisory services delivered by the Provincial Department of Agriculture. In doing so, this chapter investigates the factors influencing the farmer –extension link in each of the four divisions selected for the study.

This chapter examines farmers' perspectives on the extension interventions in the area, already discussed in the chapter 6 which examined extension interventions in Anuradhapura'. The table presented below summarises these interventions.

Table 8-1: Extension interventions of Provincial Department of Agriculture Anuradhapura.

Type of crops	Extension Programme	Intervention
PADDY	Promotion of seed production (Paddy Tract Programme)	Providing seed paddy traditional varieties
	Parachute Paddy Nursery	Providing parachute plates. Conducting method Demonstrations
	IPM and IPNS	Providing seed paddy, Conducting method Demonstrations.
OTHER FIELD CROPS		
Finger Millet	Promoting Finger Millet production	Providing seeds. Establishing demonstration plots
Green Gram	Promoting Green Gram production (extension of season)	Providing seeds.
Black Gram	Promoting Black Gram production	Providing seeds.
Soy Bean	Promoting Soy Bean production	Providing seeds.
Cowpea	Promoting Cowpea production	Providing seeds.
Ground nut	Promoting Ground Nut production	Providing seeds.
COMMON	all these crops (OFC)	Establish seed production units
		provide seeds
Chillies	Promoting seed production	Establish seed production units provide seeds
	IPM with Chillies	Provide seeds/demonstrations.
Big Onion	Promoting Bulb production/ off season production	Providing big onion seeds
	Promoting seed production	Providing big onion bulbs
FRUITS		
Passion Fruit	Promoting production	Providing seedlings
Papaya	Promoting export quality production	providing seeds
Guava	Promoting production	providing seedlings
Mango	Promoting export quality (TOM EJC) production	Providing planting material
All Fruit crops	Minimize post- harvest loss by controlling fruit fly damage	Demonstrations on controlling fruit fly.
	Introducing proper crop management techniques	Providing pruning kits
VEGETABLES		
Vegetable crops	Promoting vegetable seed production	Establishing seed production units in farmer fields.
	Promoting low chemical use	Conducting method demonstrations

Source: Filed survey, 2015

The next section in this chapter discusses the perceptions of the farmers regarding these extension and advisory services in addition to their perceptions on the services delivered by the extension officers.

The discussion is based on primary information collected through the interview survey with 40 farmers representing the four divisions managed by the PDOA (10 farmers representing each division).

8.2 How Do Farmers Respond?

The research question ‘What factors are affecting the sharing of information with farmers’ encloses the supplementary question ‘How do farmers respond', as a vital part of the study leading to the analysis of farmer’s perspectives. The framework for data gathering for this analysis included several support questions covering the following aspects.

- Farmer participation in extension programmes in each division.
- Frequency of face to face interactions with AIs.
- Guidance and support received from AIs in crop selections, crop management and post-harvest technologies
- Farmer perceptions on the role of the PDOA.
- Benefits gained by farmers through their participation in extension activities.
- Continuous application of the techniques for better livelihood outcomes.

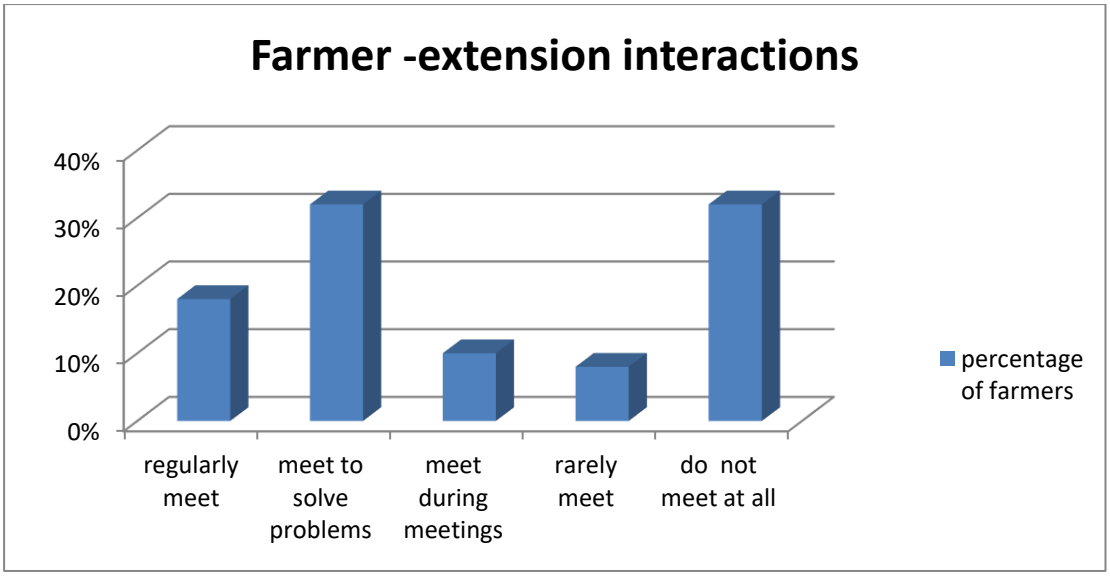
This chapter attempts to answer some of these questions by analyzing the primary data gathered through the field investigation employing in depth interviews with farmers.

8.2.1 Farmer Extension Link

There are a number of ways in which farmer – extension interactions occur in the field. Regular fortnightly visits made by the AI to the farmer fields, has been the norm according to previous extension strategies such as the Training and Visit system, [55] although it is not widely practiced at present. Instead, extension officers make periodic visits on the request of farmers to assist them in solving field problems. In addition, they organize common meetings with previously set agendas and implement special extension project activities in the field. Admittedly, all the farmers do not get the opportunity to participate in these special extension programmes, the reason being the targeted nature of such programmes. Often, the extension programmes are organized to promote specific crop types or to introduce new extension practices concerning selected crops, as detailed in the chapter on 'extension interventions in *Anuradhapura*'.

The frequency of face to face interactions, is considered in this study, as an indication of the link between farmers and extension officers (AIs). The overall analysis of responses received from 40 farmers representing four segments under the purview of the PDOA in the North Central Province, shows several forms of interactions between farmers and extension officers as presented in the figure below.

[55] See for example chapter on 'policies and extension approaches'.



Source: Field Survey, 2015

Figure 8-1: Different forms of farmer extension interactions in Anuradhapura.

Only a smaller percentage of farmers (17.5%) were found in all four segments who regularly interact with the extension officers. Instead, a sizable percentage of farmers (32.5%) contact extension officers when they confront with uncontrollable problems in their fields - but not otherwise. More frequently, farmers have the habit of consulting the extension officers, to get advice during adverse field situations such as severe pest attacks, which they cannot handle by themselves. This is a common situation observed in all four segments irrespective of the variations in cropping patterns. Surprisingly, many farmers (32.5%) have indicated that they never interact with the extension officers. Few farmers have confined their interactions with extension officers to special extension programmes such as crop clinics, demonstrations and field days etc. This category comprises only 7% of farmers and can be considered as a temporary relationship which may dilute with the termination of the project.

While the overall response of the sample of 40 farmers representing the research area remain at that level, the table underneath, specifically highlights the variations prevalent among the four segments in this regard.

Table 8-2:Frequency of interactions between farmers and extension officers in the four segments.

Division	Meet regularly	Meet in case of severe problems	Meet during special programs/meetings	Rarely meet	Do not meet at all
Anuradhapura	30 %	30 %	10 %	10 %	20 %
Ipalogama	0 0 %	20 %	10 %	30 %	40 %
Kahatagasdigiliya	30 %	40 %	10 %	00 %	20 %
Thirappane	10 %	40 %	00 %	00 %	50 %
Overall contact	**17.5%**	**32.5%**	**7.5%**	**10%**	**32.5%**

Source: Field Survey, 2015

Farmer – extension interactions in the four segments show clear variations with regards to the frequency of meeting the extension officers. However, *Kahatagasdigiliya* and *Anuradhapura* divisions display a similar pattern with relatively higher frequency of interactions. In both cases a sizable percentage of farmers frequently interact with the extension officers as asserted by 30 % of farmers representing each area. Comparable percentage (20%) in each division declared that they do not meet extension officers at all. The category of farmers who meet extension officers only during the special extension programmes, includes 10 % in each division i.e. *Anuradhapura* and *Kahatagasdigiliya. Kahatagasdigiliya* however, shows significantly positive interactions among farmers and extension officers. As it was observed during the data collection, every day several farmers visit the ASC for various requirements such as purchasing seeds, apply for compensations for crop damages and to meet the AI or the DO etc. They can meet the AI on Wednesdays which is his office day.

While analyzing the linkages in the other two segments we can identify a completely different situation there, to be precise, farmers and extension officers do not so

closely interact. Only 10 % of farmers in *Thirappane* maintain regular contacts with extension officers whereas in the *Ipalogama* division this percentage is at zero level.

On the other hand, percentage of farmers who have no connection with the extension service, show higher values in these two segments, amounting to 50% and 40 % respectively. However, some farmers (40%) do not hesitate to contact the extension officers when they encounter severe problems in the field, indicating their dependency on extension services in difficult situations. A farmer who cultivate both paddy and *chena* crops for his livelihood, had this to say.

'I can usually identify diseases and manage through my experience. But When I observe new & unfamiliar situations I call the AI and inform. Then he would visit the field and give necessary instructions. Sometimes I take the infected plant part to the office and get advice.''[56]

In brief, this twofold nature of the extension interactions within the research area imply the perceptions of farmers on extension services. While the cropping patterns adopted in each area have possibly contributed to farmers' perceptions on extension services, certain lapses from the side of the extension service, are also among the contributory factors. For instance, in the areas where farmers adopt paddy - based cropping patterns (*Anuradhapura* and Ka*hatagasdigiliya* segments in this context) they maintain better contacts with extension services. In contrast, in the segments where chena and home garden cropping patterns are prominent farmer extension linkages are poor. For example, primary data highlight that in *Thirappane* where *chena* and home garden cropping patterns are prominent, 50 % of the farmers do not have links with the extension services. Similarly, farmers in *Ipalogama* segment, especially *Ranorawa* AI range where farmers cultivate vegetable crops in *chenas*, demonstrate poor farmer extension link.

[56] Farmer code - IN (332)5

This poses a question concerning the patchy nature of access to extension services within one segment. One contributory factor for this issue is, perhaps excluding the *chena* cropping in the extension agendas so that chena farmers have got no reason to link with extension services. In parallel to this, absence of a continuous extension service within certain AI ranges is another factor contributing to poor link between farmers and extension services.

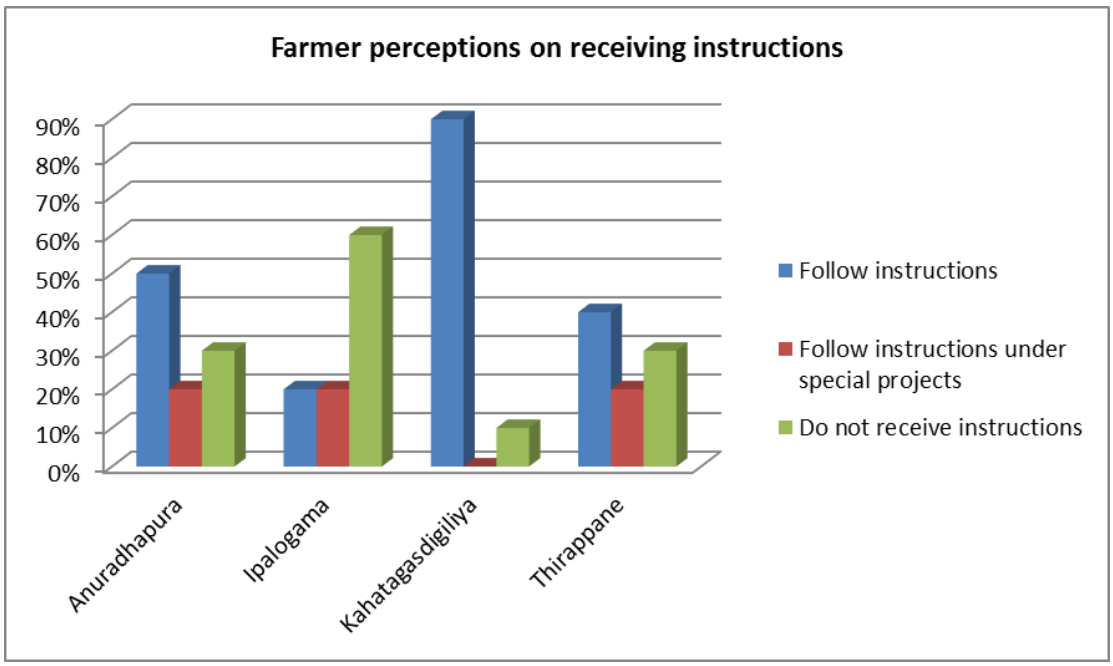
Farmers who demonstrated poor interactions with the extension services i.e vegetable and *chena* cultivators,supported the view that regular extension and advisory services do not reach them (See the quote below).

"*I do not receive information on chena crops. I follow instructions given by the AIs regarding paddy cultivation."*[57]

While this response reiterates the priority given to the paddy crop within the extension agenda, it is important to find out about the perceptions of the farmers regarding instructions given by the extension officers. The percentage of farmers who accept and follow the instructions, is considered as a positive indicator of the farmer -extension link, for the purpose of this analysis.

Variations in their responses among the four segments are illustrated in the figure below.

[57] Farmer code -IP (332)7



Source: Field Survey, 2015

Figure 8-2: Variations among segments on receiving instructions.

While comparing the feedback of the farmers representing the four segments, response of farmers in *Kahatagasdigiliya* stands at a favourable level with regards to accepting extension and advisory services. The advisory services in this segment are delivered by the AI as well as the DO attached to the ASC. While the DO is responsible for delivering information on paddy cultivation, the AI is responsible for delivering general extension services. Similarly, 50% of the farmers representing Anuradhapura segment usually accept the extension advice.

There is another group among the farmers who have a different perspective in this regard and follow extension instructions delivered through 'special extension projects'. These farmers fall in to the category who interact with extension officers only during the implementation of the special extension projects. They refer to the extension interventions discussed in chapter 6, (for example IPM project) which are implemented by the PDOA. While elaborating on this development, surprisingly, little variations are visible among the segments, *Kahatagasdigiliya* being an exception. Similar percentage of farmers representing each segment were referring to their participation in these special projects.

Commenting on such interactions a farmer commented;

"*I usually do not receive advice on ordinary cultivation practices. But they inform me when there are special programmes and I participate in those."* [58]

There are some farmers within the sample (including the above) who reported during the interviews, that they manage the cultivations with their own experiences and capabilities. Such farmers, as they revealed, do not depend on the general extension and advisory services, but participate in special programmes that introduce new practices.

The intriguing question that arises from this situation is that 'why do extension officers reach these farmers', particularly when they implement special extension projects and not otherwise?' When answering this question, it is worthwhile considering the information gathered from the extension officers (AIs) for the purpose of clarity as well as reliability. Some of these projects launched by the PDOA give much significance to their success, thus some tasks are assigned to the AIs in the form of targets. Within this context, the AIs tend to choose better performing farmers who are capable of adopting new practices and take their advices, in order to achieve the expected results. It is a coping strategy adopted by the extension officers which will be discussed further, in the next chapter on extension officers' perspectives.

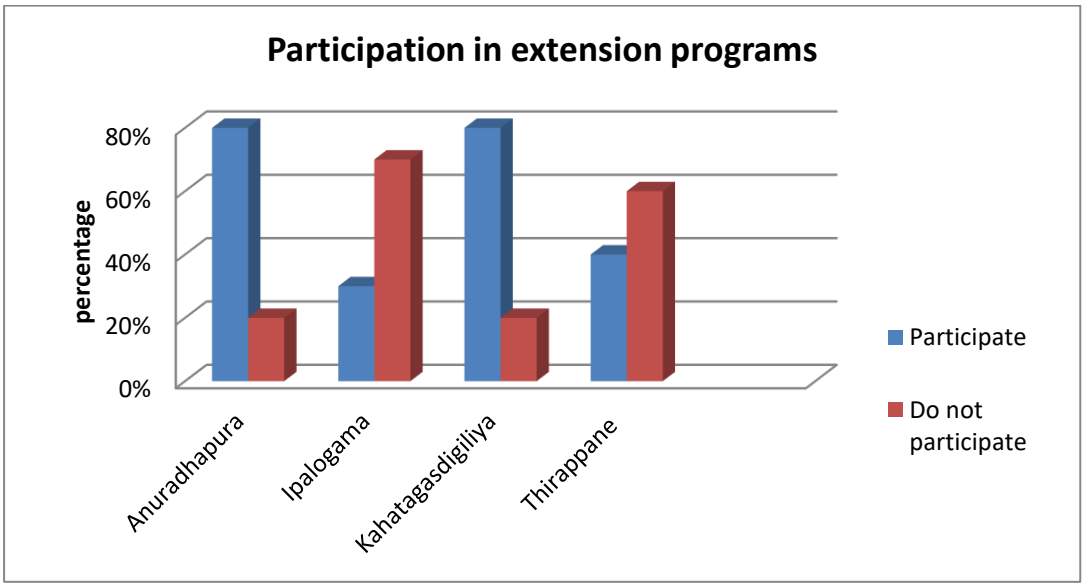
This situation therefore provides evidence for the existence of a system within which farmers as well as extension officers attempt to have a compromise between extension delivery and adoption. This selection of a group of farmers is referred to as 'creaming' in the theory presented by Michael Lipsky and the process involves choosing of clients who are likely to be successful in achieving the targets given through the extension projects (see for example Lipsky, 2010).

[58] Farmer code IR (324)1

The process of 'creaming' as it is actually practiced by the AIs, while they are arranging field extension work is better described in the next chapter on 'Extension officers' Perspectives'.

While analysing the data gathered through the interview survey, it becomes clear that the farmers in the four segments demonstrate different views and opinions regarding extension delivery. Exploring these viewpoints further, the chapter from this point, presents findings on farmers' participation in the extension programmes launched by the PDOA.

The figure illustrates the variations among the four segments.



Source: Field Survey, 2015

Figure 8-3: Farmer participation in extension programmes in the four segments

Responses given by farmers regarding their participation in extension programmes demonstrate a high degree of variation among the segments (See figure 8.3 above). In *Ipalogama* segment their level of participation in programmes remained as low as 30 %. In *Thirppane* segment which follows a similar trend, level of participation is comparatively higher (40 %) but most famers do not participate (60%).

Exploring this situation using the provisions in the meteorology of this study for data triangulation, let us consider the interpretations of the Extension Officers in this regard.

Answers given by several extension officers to the particular question 'Do you often come across farmers who are not willing to participate in extension programmes?[59] are as follows;

a) *''Yes, 75% of the farmers do not participate''*[60]
b) *''Around 85% of them do not participate''*[61]
c) *''There are many farmers who do not participate, and this number is gradually increasing ''* [62]
d) *''Half of the population do not participate but they expect knowledge & information. However, they seem reluctant to devote time for extension activities''* [63]

This condition regarding extension services pose many questions concerning extension delivery, thus the discussion continues to find reasons underlying the situation. As the central research question of this thesis inquires 'what factors are affecting extension delivery?' there can be many factors including extension approaches, government policies, role of extension agents as well as the attitudes and behaviors of farmers themselves.

Having considered the factors analysed so far in this thesis, it is now possible to identify a regular pattern among the segments with regards to their interactions with the extension services.

---

[59] Question No 14 of the questionnaire regarding farmer-extension contact.
[60] Extension officer code (AI- K3)
[61] Extension officer code (AI- K1)
[62] Extension officer code (AI - K7)
[63] Extension officer code (AI-T8)

It is clear that, in most situations, farmers in *Anuradhapura* and *Kahatagasdigiliya* segments rely on the extension services whereas the farmers representing the other two segments namely *Ipalogama* and *Thirappane* are less likely to avail of extension services, thus raising questions as to why these differences occur.

During face to face interviews farmers were given the opportunity to present their views concerning extension services, for example, as to whether they get the help of extension officers to solve their farming problems or not.

In this exercise, farmers representing the four segments presented different views and the table below elaborates these responses. While the positive responses indicate that they get the assistance from extension services, negative responses imply the farmer –extension gap.

Table 8-3: farmers' responses regarding extension support.

Division	**Yes**	**No**	
		Do not expect	Manage with experience
Anuradhapura	50%	30%	20%
Ipalogama	10%	70%	20%
Kahatagasdigiliya	70%	20%	10%
Thirappane	00	60%	40%

Source: Field Survey, 2015

Adhering to the same pattern as in many other instances, farmers representing *Ipalogama* and *Thirappane* divisions have given negative judgements regarding extension support. The reasons given by farmers for not consulting extension services, are similar in both divisions albeit slight variations in the response rates. For instance, 70% in *Ipalogama* and 60% in *Thirappane* division do not expect the guidance and assistance from the extension services. Admittedly, another 20 % in *Ipalogama* and 40% in *Thirappane* use their own experience in farming activities, without depending on the extension services.

These responses collectively imply that they have low expectations of the extension services, which in turn signify the gap between farmers and extension services. In this wide analysis of factors affecting extension delivery, a crucial point to consider, is the feedback of the farmers who do not expect any assistance from extension services.

This feedback of the farmers has a bearing on several factors including geographical locations, cropping patterns and attitudes of farmers etc. Considering *Ipalogama* segment, this study included two AI ranges namely *Ranorawa* and *Nochchiyagama* for the analysis. It is worth reiterating that the predominant livelihood strategy of the farmers included in the sample was chena cultivation. Similarly, in *Thirappane* it was *chena* and home gardening. The majority of respondents in the two segments being *chena* farmers, believe that they can manage with their experiences. Moreover, these farmers who do not participate in the extension activities, apparently have no trust on the extension service.

Notwithstanding the strong farmer -extension link in some of the segments, there were evidences of mistrust. For instance, one criticism by a farmer [64]was that the extension officers extend support to members of certain political parties but not others. This criticism was particularly levelled against the village level ARPAs who were appointed on the basis of their political affiliations. According to the theory of street-level bureaucracy advocated by Michael Lipsky (See for example Lipsky, 2010), this is s a situation where the street-level bureaucrats [65] exercise control over their clients through sanctions. While reviewing the theory of Lipsky, Erasmus explains that the clients often misunderstand the actions of street-level bureaucrats, as the policies of the government agencies they work for. This is because a citizen most often and directly experiences policy as the decision that the street-level bureaucrat makes about their particular case.

---

[64] Farmer code (KK (235) 8)[64]

[65] "Street-level bureaucrats are the frontline workers or policy implementers in government agencies such as the health service, schools or police service who directly interact with recipients of government services". In the context of this thesis it refers to the government extension agents.

Having discussed about the farmer -extension links and farmers' attitudes, it is equally or more important to discuss about their capabilities. Interestingly, there are farmers who do not care about extension instructions and continue with their own methods, strongly believing in their experiences and capabilities. A farmer included in the sample for this study displayed similar behavior[66].

He is one among those respondents who meet the AIs only to get advice for severe problems. He who strongly believed in his capabilities and 25 years of experience in farming, works hard to cultivate his *chena* land. He selects the crops for each season, depending on the water availability and maintains the cultivation with the help of his wife.

At the end of this section which highlighted varying responses of farmers regarding extension services, it is important to note that farmers in *Anuradhapura (*50%) and in *Kahatagasdigiliya* (70%) have acknowledged the support of the extension and advisory services, leading to an enquiry in to the two distinct patterns of perceptions. Therefore, the analysis is extended to include further details about extension services.

Table 8-4: Farmers' responses on the services delivered by the PDOA.

Division	Information & technology	Distribute Inputs	Training on technology	Promotion of selected crops	No support
Anuradhapura	40 %	30 %	00 %	10 %	20 %
Kahatagasdigiliya	60 %	40 %	00 %	00 %	00 %
Ipalogama	10 %	20 %	10 %	00 %	60 %
Thirappane	30 %	20 %	20 %	00 %	30 %

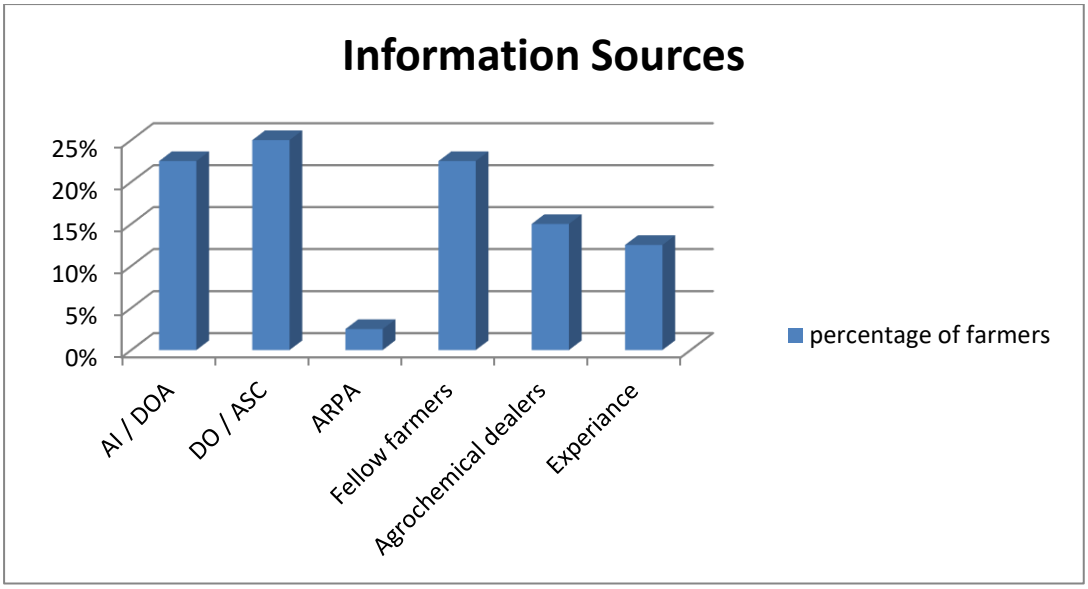
Source: Field survey, 2015

[66] Farmer code (TT (520)1

The main concern regarding the support extended by the PDOA is, whether farmers in all four segments receive extension and advisory services to improve their farming practices. While many farmers are of the view that distribution of inputs and technology dissemination are useful functions performed by the PDOA, distinct variations are visible concerning the views of farmers representing the four segments. For example in *Kahatagasdigiliya* the majority of farmers (60 %) perceive 'dissemination of information & technology' as the main service provided by the PDOA while the other 40% perceive ' input and planting material distribution' as a valuable service. Unlike in other segments, a productive work relationship was observed in *Kahatagasdigiliya* between the DO in charge of the ASC and the AI representing the PDOA who was also stationed at the ASC. Usually they adopt a participatory approach in planning and implementing programme thus members of the Farmers Organization (FO) also get the opportunity to participate in the planning process. Such collaborative approaches are helpful in shaping the positive responses of the farmers.

With a different perspective, the majority of farmers in *Ipalogama* (60%), followed by a sizable percentage of farmers in *Thirappane (30 %)* show negative perceptions, indicating that they do not receive any extension and advisory services from the PDOA. A large percentage of farmers in *Ipalogama* division (60%), who mentioned that they do not receive extension and advisory services, operate on their own, with limited external support. This critical response of the farmers, raises further questions concerning the delivery of extension services within the North Central Province which will be debated at the end of this analysis.

Having evaluated the extension functions, this thesis henceforth, focuses on the farmers' views on information sources. Before analyzing the differences among the segments, the following figure illustrates the overall perception on information sources.



Source: Filed Survey, 2015

Figure 8-4: Farmer perception on information sources

The significant outcome here is that many farmers perceive 'fellow farmers' as their preferred source of information, as much as they perceive the AI. Farmers thus get information from both formal and informal sources. While the formal sources of providing, agricultural information include the Agrarian Development Officer (DO), Agricultural Instructor (AI) and the Agricultural Research and Production Assistant (ARPA), informal sources include fellow farmers and agrochemical dealers.

However, the choices vary among the farmers in the four segments and the table presented below elaborates the formal and informal sources of information used by farmers in each division.

Table 8-5: Responses of farmers regarding Information sources

Division	Formal information sources				Informal information sources			
	AI	DO	ARPA	Total	Fellow farmers	Agrochemical dealers	Own experience	Total
Anuradhapura	10 %	30 %	10%	50%	20 %	20 %	10 %	50%
Ipalogama	20 %	10 %	00 %	30%	40 %	10 %	20 %	70%
K'digiliya	20 %	60 %	00 %	80%	00 %	20 %	00 %	20%
Thirappane	40 %	00 %	00 %	40%	30 %	10 %	20 %	60%

Source: Field Survey, 2015

Farmers in the two segments where paddy crop is predominant in the cropping system, for example *Kahatagasdigiliya* and *Anuradhapura,* the DO is the main source of agricultural information. Evidently, in *Kahatagasdigiliya*, 60 % of farmers rely on the DO for information followed by 30% in *Anuradhapura*. Contrary to these findings, DO was not at all considered a source of information in the *Thirappane* segment where the only formal source of information, as mentioned by farmers, was the AI. In all the four segments farmers get information from the AIs although the fractions varied between 10% - 40% across the segments. Primary data presented in the table above shows that farmers do not rely on ARPAS to get information. Other than a lower percentage of farmers in Anuradhapura division (10%), respondents from other three divisions have not considered ARPA as a source of information.

Even though the farmers did not mention about the ARPA as a source of information (in response to the direct question), several farmers in *Anuradhapura* segment acknowledged the service of the ARPA during the discussions, in the following manner;

a. *"ARPA is a villager, so we get information when we meet him informally. We do not go to the office to meet AI. Can meet the ARPA easily in the field, without going to the office.''* [67]
b. *''ARPA is in the village, so we can contact easily"* [68]

Farmers however, in certain situations have expressed their resistance and mistrust regarding this category of field assistants. It would be informative to report an incident (while maintaining confidentiality of information) which was observed while carrying out the field survey in one of the segments. It is considered important to elaborate on this point because the decision of the government to recruit this category of field assistants does not seem to have served the purpose. The government has taken the policy decision to recruit ARPAs to streamline the services rendered by the Agrarian Services Centers.

As highlighted in literature, direct observations act as a credible source of evidence[69]. Hence it is considered worthwhile to report this observation to exemplify the implications of a controversial policy decision.

[67] Farmer code AK (95)10
[68] Farmer code AK (98)8
[69] See for example Trochim, 2006.

Box 5: Field Observation

This was experienced during the first visit to the segment. As it is described in the methodology, in the section explaining making access to the field, the field officers were involved in introducing the farmers. The ARPA covering duties in this area, who came to introduce the farmers was completely ignored by them. Farmers even refused to communicate with him. As it was revealed by the same group of farmers later on, this official happened to be one of their relatives. The ARPA, despite his relationship, has not been attending to the extension needs of the farmers over the previous seasons. Failing to convince the farmers who were busy in their fields, the ARPA directed us to the adjoining field where a female farmer was scraping the land. Having done that the officer left the field. We carried out discussions with the female farmer, while she was attending to her work. During the tea break we were also invited to the temporary hut in the field where farmers from the adjoining fields also gathered to have tea. During this informal chat it was revealed that all these farmers were members of the same extended family and the ARPA is one of their relatives. However, the farmers eventually participated in the survey without any hesitation and provided valuable information regarding their relationships with the extension services.

This incident proves that there are instances where the farmers are not very comfortable with the officials appointed to serve them. Usually the ARPA s are selected from among the families in the same locality and sometimes there is resistance from the community for these selections. This field vignette reveals the presence of unforeseen factors influencing the link between the farmers and extension services. Further, the findings show that certain factors associated with kinship relationships for example conflicts and disputes within the farming community, also have an influence on the farmer- extension link. However, one reason underpinning this kind of negative perception on ARPAs is the ad hoc policy decision to recruit this category of field extension assistants from among the villagers.

Having considered the role of extension agents as a formal source of information, the chapter now directs its attention towards farmers' perceptions on informal sources. The noteworthy feature here is the role played by agrochemical dealers and fellow farmers in sharing agricultural information. Farmers use these informal sources to get information about pest and disease management and crop selections.

The Wholesale Economic Center in *Dambulla* as it is well known locally, acts as the hub of vegetable marketing in Sri Lanka. Farmers from all vegetable growing areas bring their produce to *Dambulla* and it is a center where extensive interactions among

farmers take place. Besides, agrochemical dealers sell their products at the same location for the convenience of the farmers. Farmers generally consult these chemical dealers and purchase treatments for pests and disease conditions prevailing in their fields. Such recommendations by the dealers are generally based on the symptoms described by the farmer, more often, without correctly diagnosing the pest or the disease condition.

Reiterating this situation prevailing in the country for a long period of time, Saminathan has reported the following in the 'National study: Sri Lanka (Saminathan n.d.)

"*Although Integrated Pest Management (IPM) is now official government policy, many farmers still use more than the recommended level of chemicals, especially insecticides. Most farmers still depend on private retail suppliers for advice on the use of agrochemicals''*

Overuse or inappropriate usage of agrochemicals is a common practice in the country today, leading to many health hazards. Despite the warnings and chemical free agricultural practices for example IPM and Good Agricultural Practices in fruit and vegetable farming, promoted through extension programmes, farmers continue to use chemical control methods with the recommendations of the agrochemical dealers.

The firsthand field experience presented below, substantiates the findings related to over use of chemicals by a farmer in the research area.

Box 5: Observation on chemical use for pest management.

A farmer who came to the ASC, to meet the AI reported about the damage in his Guava crop and the AI agreed to visit the field in a while. Interested in observing this situation, I too visited this field with the AI to find that the fruit trees were overgrown and infested with fruit flies. Farmer had not followed the instructions previously given by the AI to prune the trees at a recommended height in order to maintain a healthy tree. At the same time this farmer had tried all possible chemical sprays recommended by the chemical dealers to control the fruit fly attack. He had neither consulted the AI nor adhered to previously given instructions such as pruning and destroying affected fruits to avoid completion of the growth cycle of the pest. It was alarming to observe the heap of empty pesticide cans under a tree which he had already tried without any successful results.

Looking at the situation in another perspective, informal sources can be used as effective channels of information sharing, if they are placed within a regulatory mechanism.

A new development in this regard, as revealed by a farmer[70] during the interview is that the agrochemical dealers are now being trained by the companies. Informal communications further reported that there is an initiative to register the private agrochemical dealers and train them to provide correct and reliable information to the farmers.

Apart from the information about agrochemicals, farmers share knowledge about crop cultivations from through informal sources. Primary data gathered through the survey show that 'fellow farmers' either in the neighborhood or from other villages are effective agents in delivering agricultural information. As already discussed, this is the main source of information used by vegetable farmers the *Ipalogama* segment. The success story of a farmer[71], presented in chapter seven, can be cited as an example[72].

[70] Farmer code KK (235)4
[71] Farmer code IR (324)1
[72] Please see page 232

The economic center in *Dambulla*, as it was discussed previously in this chapter, has become an informal knowledge sharing hub where farmers from many areas interact freely and share agricultural information. Here farmers can observe the transactions and get an idea about the demand for various agricultural produce. They can also get price information. This sort of informal interactions gives an opportunity for farmers to meet successful farmers from other areas and share their stories. Given its significance as a source for information it may be worth paying attention about informal information services provided at the economic center. This is perceived as a reliable information source by many farmers in vegetable growing areas.

Having dealt with the role of informal sources of information, especially with the influence of agrochemical dealers, the next section of this chapter discusses the role of extension services in pest and disease management.

As it was revealed as an outcome of the survey, the most common method adopted by farmers (53%) is the chemical control. They seem to use this method as a quick and easy alternative to control pest and diseases in crops. While 19 % of farmers have adopted Integrated Pest Control measures a similar percentage has opted to make use of **indigenous methods**[73] such as spraying with locally made pest repellents**.** However, farmers usually do not adhere to one single method of pest and disease management for all crops, but they use several methods instead. Despite the availability of many options, 9 % of the farmers in the sample had failed to control pest and disease attacks in their fields and they have experienced crop losses.

[73] The rural folk knowledge associated with farming practices in Sri Lanka is a rich knowledge base. There are farmers who have strong faith on certain rituals and they adopt these in protecting their crop fields. There was this particular farmer in *Yakalla* AI range in *Thirappane* who adopt such rituals to protect his Big Onion crop. He usually does not allow anyone to observe his fields other than the extension officers. According to this ritual the farmer pleads to the gods to protect his fields and makes a vow. It is done by tying up a well cleaned coin wrapped up in a piece of cloth in the fence built around the crop field.

Evidently, farmers have not recognised pest and disease management as a support services rendered by the PDOA. For instance, a farmer reiterated this by saying *''We experience pest and disease problems in the crop cultivations but do not receive any advice for controlling these .So we use chemical* sprays"[74] This farmer was observed, while spraying chemicals to the Chillie, during the field visit.

Even though there were successful vegetable cultivations in this area farmers attributed it to their own knowledge and experience rather than support of the extension and advisory services. Apart from these successful farmers, there were others who were isolated and striving to make a living. During the interviews with these farmers, it was realised that poor access to market information increase their vulnerability. As one of these farmers revealed, they have the practice of searching for market prices before taking their harvests to the markets. By the time he took his harvest[75] of Green Chillies to the market in the next day, he had found that the prices have dropped drastically.

Sharing a similar experience about price fluctuations a female farmer in the same area said the following;

'' I sold vegetables to middlemen but did not receive reasonable prices for the vegetables. The problem is that the prices are not fixed, frequently change. When we take the harvest there we must sell at the prevailing rate. No purpose of checking the prices beforehand. Middlemen come to the farms in Lorries from Dambulla and Thambuttegama. We prefer to sell in Dambulla as the price is little higher there".[76]

[74] Farmer code IR(324)3
[75] Farmer code IR(324)3
[76] Farmer code IR (324)4

The marketing mechanism adopted by farmers in the four segments is similar and the two options available for them are either to sell produce to the middlemen or sell at the Dambulla economic center. Rarely there are village level collection centers operated by middlemen. Farmers from the four segments use these options based on the type produce and available infrastructure facilities. For instance, a farmer who produce grains (OFC) sell his produce to the village collection center.

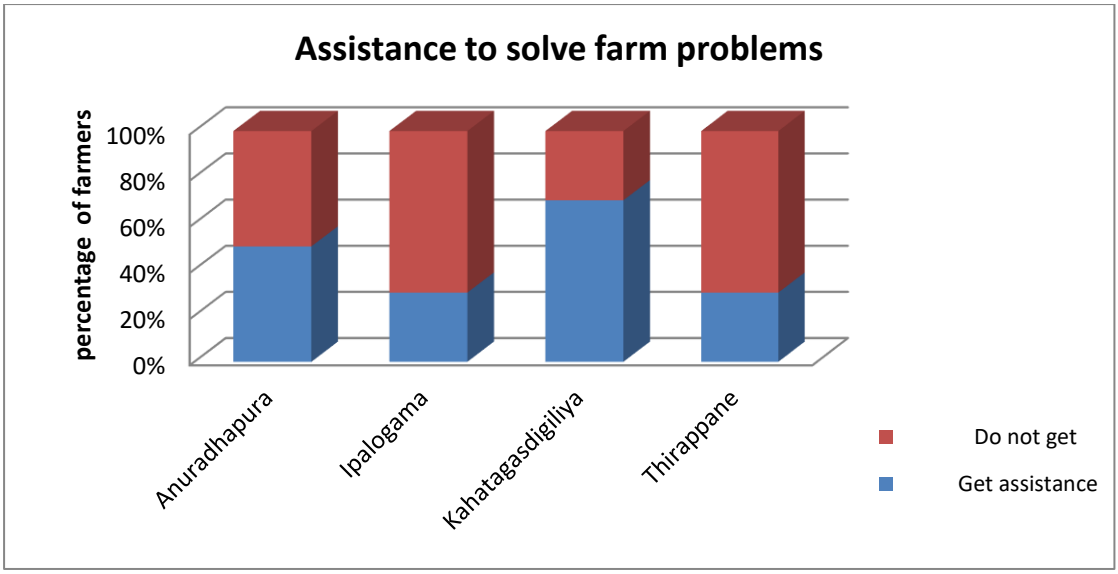
"I get the help of the middlemen and collectors to sell my produce. There is a trader who collects Cow pea, Green gram, Black gram and Finger millet. He decides on the prices. There's no proper mechanism in place[77]*."*

In the absence of a proper marketing mechanism, some farmers however have found their own methods of selling the produce. Some farmers have developed contacts with traders outside the village and transport their produce to Colombo (see example below).

'' I sell vegetables and chilies at the Economic center, Dambulla, take the B onion harvest to the Manning market, Colombo. There are lorries that transport produce from Vavunia (in the adjoining province) to Colombo. They go passing our village and help us to transport our produce. Middlemen in the market provide accommodation and we stay there overnight. We sell Big onions at the rate of Rs. 60- 70 /kg here but we get rates as higher as Rs. 100-150 in Colombo"[78]

At the end of the survey, when farmers were asked the question as to whether they seek the assistance of the extension officers to overcome their problems related to farming, the responses were the following.

[77] Farmer code AK (89)5
[78] Farmer code AK (88)4



Source: Field Survey,2015

Figure 8-5: response of farmers on assistance to solve farming problems.

While the reasons for these different feed backs are summarised below, the views of the extension officers concerning the delivery of their services will be discussed in the next chapter.

Summary

According to the discussion, farmers in the four segments, perceive the extension services in different frequencies. Farmers in the paddy growing areas namely *Kahatagasdigiliya* and *Anuradhapura* divisions demonstrate a positive attitude towards the extension and advisory services. One clear reason for better responses is the responsibility taken by the ASC to distribute farm inputs and provide information to the farmers.

Participation of farmers in extension programmes was at a poor level in *Thirappane* and *Ipalogama* divisions where *chena* and home garden cultivations were prominent in the cropping system. A poor tendency in accepting instructions given by the extension officers, is indicated by the responses of the farmers in both segments.

Similar feedback was given about the connection with the extension agents i.e. AIs and ARPAs, exhibiting a poor relationship albeit many extension interventions at field level.

Extension interventions related to pest and disease management and marketing did not show variations among the four segments. However, farmers have come up with temporary arrangements to overcome issues related marketing in the absence of extension support.

Having investigated the actual field situations at the end of this chapter, it is vital to consider the factors influencing the delivery of extension and advisory services in the province. The factors highlighted in the text below are the inferences made after this investigation.

Farmer extension linkage show clear spatial variations caused by heterogeneity in cropping patterns and farming practices. The four divisions demonstrated two distinct patterns in many aspects, thus the paddy farmers' link with advisory services stand at a stronger level compared to that of the *chena* and vegetable farmers.

(1) There are farmers who do not expect the advices of extension officers for farming practices. They rather trust their own knowledge and experiences in farming than the external assistance. In all segments, there were farmers of this category who do not interact with the extension personnel, while this percentage is higher among *chena* cultivators. Such farmers who cultivate traditional crops do not often seek the assistance of the AIs.

(2) The positive perception and the close link of the farmers in paddy prominent cropping systems is attributed to the well-structured input distribution mechanism of the ASC. Even though a strong extension and advisory service is already available in the province, it has not been successful in delivering advisory services in an equitable manner to all farmers, irrespective of their cropping patterns.

Having analysed the farmers' perspectives with regards to a number of aspects related to the access to extension and advisory services, the next chapter deals with the perceptions of the extension officers. Both parties being active participants in the extension system, analysing the views of farmers and extension officers, is considered as vital before passing judgements about the farmer extension link.

CHAPTER 9

LIAISING ROLE OF EXTENSION AGENTS: EXTENSION IN THE BROKERS'PERSPECTIVE

9.1 Introduction

Previous chapter of this thesis, could paint a clear picture of the perceptions of the farmers on the delivery of extension and advisory services by the Provincial Department of Agriculture, Anuradhapura. Considering the viewpoints of both the farmers and extension officers, in the investigation of **'**factors affecting the delivery of extension services' would undoubtedly facilitate drawing conclusions in an unbiased manner. In view of this, this thesis investigates two main components survey methodology ; the first being the interview survey with farmers and the next the questionnaire survey with the extension officers. The overall objective of this chapter therefore is to investigate the role of extension officers as the brokers between the government and the farmers in a broader sense and then to specifically look into the existing interactions such as farmer –extension linkages, factors affecting such linkages, factors influencing carrying out of extension programmes and their success /failure and finally to find a solution to the research question on 'what factors are affecting the delivery of extension services in Anuradhapura?

Before progressing into the analysis of the field performance of the Extension agents it is worthwhile to be familiar with the roles and responsibilities of extension Agents .Literature highlights that " Extension workers should identify farmer's problems and production constraints. Working closely with subject matter specialists and research workers, extension workers should disseminate useful information about new technology and teach farmers how to use it successfully to increase production and incomes. Clearly, this set of responsibilities is educational in nature and, given the number of farmers to be served in most Third World countries, is a full time job. On the other hand, where extension workers serve as agricultural representative of government at the local level, they will largely be low level administrators rather than educators. These types of non-extension assignments usually result in serious role conflicts for field level personnel to the detriment of the extension function.

Therefore, the extension organizations fail to carry out the essential education and communication functions effectively that are very necessary for agricultural development" (History & Development of Agricultural Extension,2009)

The duty of an extension worker, according to this interpretation cannot be narrowed down to merely making farm visits to provide technical assistance, but demands a wider range of obligations. In meeting such obligations extension workers need to interact with farmers as well as the policy makers thus acting as catalysts. With this understanding the thesis seeks to investigate the interactions of extension workers with farmers as well as the government as the institution they are representing.

This chapter is therefore looking at the following aspects referring to institutional and personal attributes of the extension organizations and the extension workers in carrying out their responsibilities towards achieving agricultural development goals in the country.

1. Education, training and experience of Agricultural Instructors.
2. Span of Coverage – out reaching farmer families.
3. Resources for effective extension delivery; Availability and constraints
4. Role perceptions of the Agricultural Instructors.
5. Comments & suggestions for the improvement of extension and advisory services

Having set this framework, the chapter henceforth continues with the discussion on 'Extension officers' the perspectives' beginning with the professional and educational background of the Agricultural Instructors serving in the Provincial Department of Agriculture, *Anuradhapura*.

9.2 Education, Training and Experience For of the Agricultural Instructors

Having reviewed the responsibilities of an extension agent in the preamble to this chapter, it is clear that the job requires individual capacity to balance diverse responsibilities.

Further to the direct responsibility of educating farmers, Agricultural Instructors as the field level representatives, are compelled to carry out government or ministry programmes. Also they are expected to allocate their time for many non – extension related activities for instance, input distribution, providing data and statistics for national programmes and resolving dispute among farmers groups etc. Developing coping strategies to handle such situations certainly demands managerial capabilities and experiences from the side of the extension workers.

Educational qualifications in support of this capabilities therefore become important criteria in recruiting suitable persons to the positions. In keeping with the standards, the DOA recruits Diploma Holders educated at the Schools of Agriculture, [79]for the post of Agricultural Instructors (AI) . Schools of Agriculture offer two-year diploma programmes with wide ranging practical modules and hands on learning experiences. Most of the schools are located closer to the research stations or state farms to facilitate the use of resources for practical learning (Jayaratne 1992). Before the commencement of Agriculture degrees offered by the state universities in Sri Lanka, Schools of Agriculture played the major role in producing qualified people in the field of agriculture

Besides the Diploma qualifications, Agricultural Instructors receive continuous 'In - Service Training' organized by the DOA. Citing Prasad, Sulaiman and Mittal (2015), Wanigasundara highlights in a working paper ,that "Capacity development of

[79] Read Chapter 5 for more details.

extension personnel is often understood as enhancing technical capacity of extension personnel to deal with current and emerging technological bottlenecks in the field" (see for example (Wanigasundara 2015)) This report has identified the growing need for capacity building of the extension personnel, not only to fulfill the task of efficient delivery of advisory services, but to contribute in planning and devising best agricultural practices to meet the provincial as well as national production targets.

This thesis therefore investigated the type of trainings received by the AI s and found out that they usually participate in many trainings at the In-service Training Institute and at the government research stations (table 9.1) Such training programmes generally focus on knowledge updates on day to day technical matters at the expense of long term capacity building. The training packages are usually designed by the extension and training division of the DOA, according to the immediate field requirements for the particular season. The AIs however adhere to these schedules and participate in the trainings amidst their ordinary field visits and other field extension activities.

While the trainings offered by the DOA focus on knowledge building, extension officers who are enthusiastic on other aspects of training for example developing managerial skills, language skills and enhancing their IT skills have fulfilled their training requirements at other training organizations[80]. Having identified the need for a variety of skills for professional development these officers, although few in number, have opted to go for further training.

[80] According to the codes assigned to identify of extension officers this group includes AI-3, AI-6, AI 11,
AI-12, AI-13 & AI – 19.

The table below illustrates the different types of trainings received by the AIs in the research area.

Table 9-1: Types of trainings received by extension officers (AI) in Anuradhapura district.

	Type of training	Training institute
Technical training packages	Farm machinery & Micro Irrigation.	Farm Machinery Training Center. Anuradhapura.
	Mechanical harvesting and processing.	Farm School –Anuradhapura.
	OFC production.	Mahailluppallama Field Research Station.
	Soil conservation. Bee Keeping.	Department of Agriculture.
	Landscaping & floriculture.	Botanical Gardens, Peradeniya.
Extension Training packages	Integrated Pest Management.	Department of Agriculture.
	Good Agricultural Practices (GAP).	
	Farm Business Schools.	
	Plant Doctor Training.	
Capacity Building	Language Training (Tamil/ English).	Private Training Institutes.
	Management Training.	
	ICT Training.	

Source : Field Survey,2015

Aside from trainings that reflect competence and capacity development, field experiences and exposure are considered as equally important criteria that add value to the personal profile. These factors are believed to have an influence on the elements in the process of extension delivery, farmer extension link in particular. Therefore the study included an analysis of the experience of AIs in terms of total number of years they have served in the field and the period they have been involved in field activities in the current work station (respective AI ranges) in the Anuradhapura Province.

The table below presents the information on the experience of the extension officers.

Table 9-2: Years of experience of AIs in *Anuradhapura*

Years of experience	No of respondents	
	Current position.	Total experience
1-5 years	10	05
6-10 years	08	12
11- 15 years	00	01
16- 20 years	00	00
>20 years	01	00
No response	01	01

Source: Field survey, 2015

Work experiences possessed by the AIs considered for the purpose of this study and presented in the table show that 50 % of the AIs attached to the PDOA in Anuradhapura, have been working in their current stations for less than five years. Except for one senior AI, there were no officers who have served for more than ten years in their current stations. Other than this officer all others have joined to serve as AIs in the DOA after year 2005. Also an important point to note is that there are no AIs who have joined the service within period between year 1995 and 2005 indicating a noticeable gap in the service within the period (11- 20 years of service). This is the period during which the Interprovincial Extension Approach was introduced and more emphasis have been diverted towards providing resources, including human resources to the interprovincial areas within this period.

While this situation can be attributed to the policy decision to split the management of the national extension service between the central government and the provincial councils, its implication however is creating a vacuum in the field force in the provincial extension service.

Furthermore, due to this gap some of the valuable field experiences of the senior extension officers are likely to disappear with their retirement, without having an

opportunity to share with the new recruits. The majority (90 %) of the extension officers who are currently serving in the PDOA in Anuradhapura have apparently, joined the service after introducing the Commodity Development Participatory Extension Approach in 2006 and their field exposure is confined to the present system of extension management.

Having explored the field experience of the extension officers, the thesis intends to direct the focus towards the distribution of their workload. Each AI range, as it was elaborated clearly in the methodology, is divided into several village clusters and the AI has to deliver extension services to the farmer families in these clusters. The coverage is measured in terms of farmer extension ratio and the following discussion is based on the coverage of farmer families by the extension officers.

9.3 Span Of Outreach: Coverage and Interactions With Farmer Families

One of the major constraints in Agricultural Extension, as it was widely discussed in literature is the farmer- extension ratio or the coverage. It was highlighted in the history of agricultural extension approaches discussed in a previous chapter. Accordingly, one of the main approaches, T &V system was introduced in 1980s with the objective of improving the coverage. This was attempted through a contact farmer system and extension to farmer ratio was maintained as 1: 1200 (Gunawardana, A.M.I., Chandrasiri, A., 1981) Even though it was a healthy ratio, continuation of the strategy was constrained by the availability and the mobility of the field officers. Similarly, the present extension strategy, Participatory Commodity Development Extension Approach was proposed as a strategy to improve the coverage through a group extension approach by employing scheduled visits to clusters of farmer groups in the AI ranges.

The survey on this present approach however, revealed that the number of farmer families covered by the Agricultural Instructors ranged between 1000- 6000.

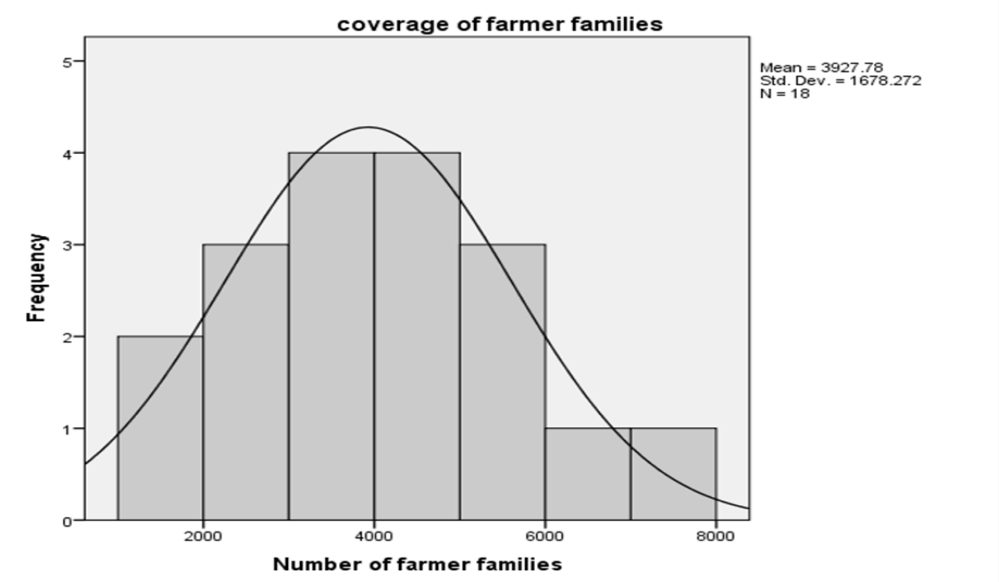


Figure 9-1: Distribution of the number of families covered by extension officers.

The mean value of distribution of the number of farmer families, as shown in the figure above, is 3927, meaning that the average number of families covered by a single officer is around 4000. Even though slight spatial variations are noticeable among the four segments, the overall results highlight that a considerable number of extension officers (45%) have to serve more than 4000 farmer families.

However, the number of visits made by an extension officer to meet one particular farmer depends on several factors including the number of farmer families to cover, distance, type of crops grown, request of the farmers and time availability etc. The low frequency of field visits in the present extension service can be attributed to the resource constraints elaborated in the discussion on Training and Visit (T &V) system in chapter 4. One clear reason that was repeatedly highlighted in several sections in this thesis, was the elimination of the field extension workers (KVS) with the political and subsequent administrative changes that took place in 1987[81].

[81] See for example chapter 4

One main objective of the T & V approach was improving the coverage by limiting the number of farmer families allocated to a single extension worker. While this strategy was being implemented in 1979, the extension officer to farmer ratio stood at 1:800. Nevertheless, it was not a pragmatic approach in the long run due to the limitations in manpower for example field extension officers and Subject matter Specialist (SMO) required to serve the large number of farmer families.

Yet, the Training and Visit (T & V) system was the extension model which specifically defined the number of farm visits as the 'fortnightly visits' and the biweekly training for the AIs.

The schedule of this bi weekly training and visit model is illustrated in the figure below;

Table 9-3: Fortnightly farm visit schedule in the T & V system

	Mon	**Tue**	**Wed**	**Thurs**	**Fri**	**Sat**	**Mon**	**Tue**	**Wed**	**Thurs**	**Fri**	**Sat**
AI	F1	F2	O all AIs	OA	F3	OA	F4	F5	OA	O	Tr	OA
AI/OIC	O	F	O	F	F	OA	O	F	O	F	Tr	OA
AO SMO	SO	F	Dis office	OA	F	OA	F	F	SO	F	Tr	OA

Source: Emitiyagoda, 2009.

F - Field visit (AI should be in the village whole day) O – Office

F1- F5 Number of clusters Tr – Fortnight training class

SO – Segment office OA – Other activities

Twelve days in this schedule are allocated for various extension functions of which one day is allocated as the training day for all the extension officers. Having updated their technical knowledge through this bi weekly training, they start the next cycle of the field visits in order to assist the farmers with their field issues. Even though the T & V system was seen as beneficial in terms of frequent contacts farmer – extension contacts, the rigid nature of this bi weekly visits, was highlighted in as a weakness of this approach[82].

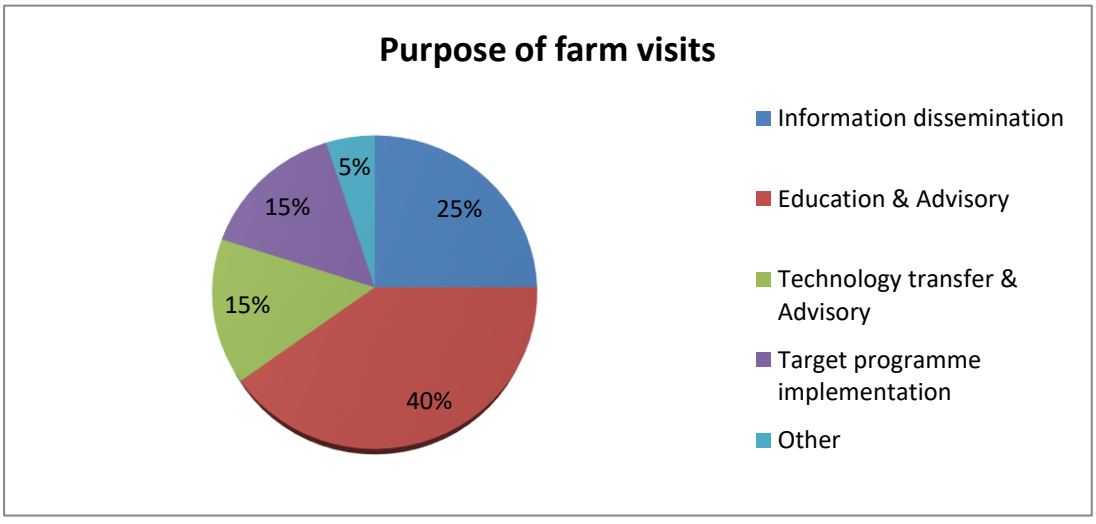
The present extension strategy which can be considered a modification of this model is a 'farmer participatory commodity based mixed extension approach'. In parallel to the implementation of the present extension strategy, The Provincial Department of Agriculture (PDOA) in Anuradhapura has introduced many field programmes that have already been discussed under the title 'Field Extension programmes in Anuradhapura'. These programmes are implemented as special extension programmes and funds are allocated at the beginning of the financial year from the provincial specific development grants. It becomes the duty of extension officers, AIs in this context to carry out these projects in their respective AI ranges, in doing so, each AI is assigned with a target for instance, encouraging farmers to cultivate a certain extent of big onions to meet the provincial target of big onion production. According to this system, AIs are faced with the challenge to convince farmers in their AI ranges to cultivate the particular crop in that season. The same situation exist with the introduction of new technologies such as the parachute paddy nurseries. In such situations AIs more often than not, pick progressive farmers and distribute the inputs (given on concessionary rates), among them and continue to work with them. For the reasons above, the clientele of the present extension service i.e. farmers are virtually divided into two categories.

[82] Read section 4.2.3. Open Economic Policies and T & V system for more details

There is a group of ordinary farmers who practice traditional methods trusting upon their own experiences versus the other group motivated by AIs and participate in the special extension projects and try out the new techniques. On the one hand, the variation between farmers who are and others who are not ready to adopt these new techniques within one cropping season, presents a challenge to the AIs . How they work put this challenge may have a bearing on how they go about their work. Theoretically, this be explained as a process of 'diffusion of innovations' (Rogers, 2003). Those farmers who choose to follow the AI's advice may be seen as early adopters. As promotion of the new technique is assigned to the AIs, in the form of target accomplishment, AIs more frequently visit this category (early adopters) of farmers to motivate them.

While there are several objectives of these farm visits, for instance educate farmers, disseminate technical information, a new objective added to this list is 'promoting target programmes' which is identified as the purpose of their farm visits by several (15 %) AIs in the sample.

The figure below illustrates the response of the AIs regarding the purpose of farm visits.



Source: Field survey, 2015

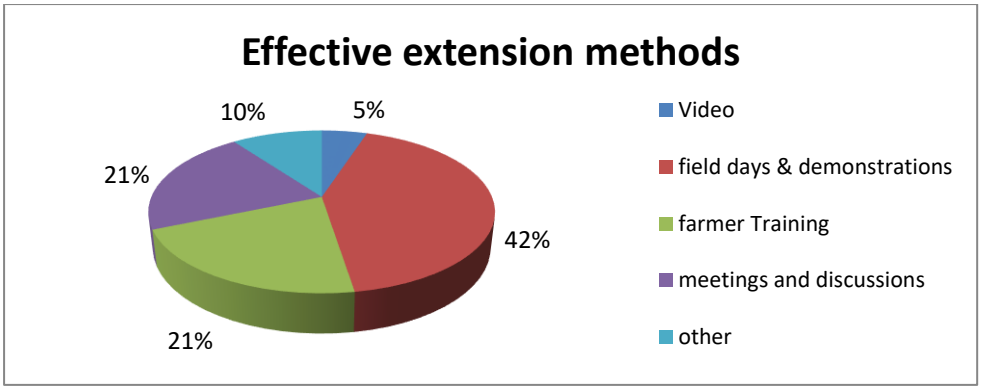
Figure 9-2: Extension Officers' perception on farm visits

According to the survey, the AIs more frequently visit those farmers who are involved in the targeted programmes than the others. As it was overtly revealed by the AIs, they meet ordinary farmers once or twice during one cropping season whereas they make 5-6 regular visits to those farmers participating in their special projects.

Moreover, Agricultural Extension is a system of educating farm people, for increasing production efficiency through the application of scientific knowledge. Regular meetings and farm visits indeed become important extension methods in this process of scientific knowledge dissemination. Likewise, the AIs perceive (40%) farm visits mainly serve education and advisory purposes while dissemination of information and technology transfer are perceived as other important purposes by 25% and 15 % of the AI s respectively. The noteworthy feature in this finding is that 15 % of the AIs visit or meet the farmers mainly for the purpose of promoting the special programmes assigned to them as target agenda by the provincial department of agriculture. Notwithstanding the short-term accomplishment of extension objectives through this approach, actual outcome will be further debated in the final chapter, after considering the perception of the farmers who are the beneficiaries of the programme.

Other than the farm visits which happen in different frequencies, there are many other methods through which farmer – extension contact occurs. The description on extension methods explains various techniques used by the extension officers to deliver knowledge and information to the farmers.

There are both conventional and modern techniques available for disseminating scientific information to the farmers of which demonstrations and field days, are perceived as the most effective methods by 42% of the AIs in the Provincial Department of Agriculture, *Anuradhapura* (See figure below).



Source: Field Survey, 2015

Figure 9-3: Extension methods used by the AIs

It is the widely-used method in the research area to educate the farmers, especially those who are involved in the special projects, for example B onion seed production, Integrated Pest Management with chillie crop, fruit crop cultivation (Guava & Mango) and Green Gram production in between seasons. While the method demonstrations are used to introduce new techniques, result demonstration is considered a useful way of sharing the experiences of fellow farmers.

Field days are usually organised by the AIs with the participation of other officers SMOs, ARPAs and farmers from other areas etc. These methods, as experienced and emphasised by the AIs are evidently the most effective extension methods due to their practical orientation and involvement of several modes of communicating the information. For instance, farmers can meet successful fellow farmers and share the success stories, observe new techniques being used in field situation and most importantly observe the successful application through result demonstrations. However, the noteworthy feature of these selections is that these are activity based and face to face interactions where quick feed - back is facilitated for clarification and better understanding. Also, these are methods involving all three domains of learning i.e. knowledge, skills and attitudes, in a more practical learning environment which is in most instances the farmer field. As adult learners farmers may feel more comfortable in familiar learning environment with fellow farmers as peer learners.

Besides these interactive methods, extension officers have rated farmer training sessions and face to meetings as two effective methods of delivering extension information. This rating has been given for each method by an equal percentage (20%) of officers. However, mass approaches such as videos, which require the availability of additional resources including audio visual equipment, are not rated as effective extension methods. Extension officers, pointing out the constraints, reported that lack of facilities and poor access to resources prevent them from using some of the modern methods for extension delivery. The next section of the paragraph is a description about these requirements and constraints.

9.4 Resource Requirements for Effective Extension Delivery

The role of the field extension officer is not generally confined to the physical function of merely educating farmers. It expands to a level where more social and human dimensions are involved in building up healthy relationships with the farming community. In performing these multifaceted duties Agricultural Instructors (AI), as government officers invariably confront with numerous hardships. Especially, resource limitation for implementing programmes has become a common issue thus the views of the extension officers are discussed below.

There are many physical requirements to be fulfilled when implementing field extension programmes among which infrastructure facilities, equipment and funds are important. According to the response of 40% of the field extension officers, they are heavily constrained by lack of necessary equipment for the field extension programmes. This outcome is long –established with the revelations made by the AIs on the resource requirements as well as their suggestions to improve the extension service. In both instances, they have prioritized the long-felt necessity of equipment such as Audio Visual Material, Computers, models, specimens and samples etc. which can be used under field conditions. Going by the principles of extension, field extension activities are generally organized when farmers are relatively free or just before starting the season. In this context, activities in several divisions may overlap putting pressure on resource allocation.

The reason is that the four divisions under the purview of the Provincial Department have to share the common resource for instance Audio Visual equipment owned by the PDOA.

More frequently than not, meeting halls and buildings are not provided by the PDOA and extension officers have to arrange the activities in common places in the village such as schools, temples or community halls. Such premises at times are not conducive for the planned activity for the reasons including inadequate capacity, improper seating arrangements, external disturbances and non-availability of facilities for the use of audio visual material. Adoption of participant observation as a tool for gathering data for this research, paved the way to experience this condition while attending some meetings and crop clinics in *Kahatagasdigiliya* and *Thirappane* divisions. On both occasions, the crop clinics were conducted in temples in these villages and there was another crop clinic held in a school classroom observed during the preliminary filed visits.

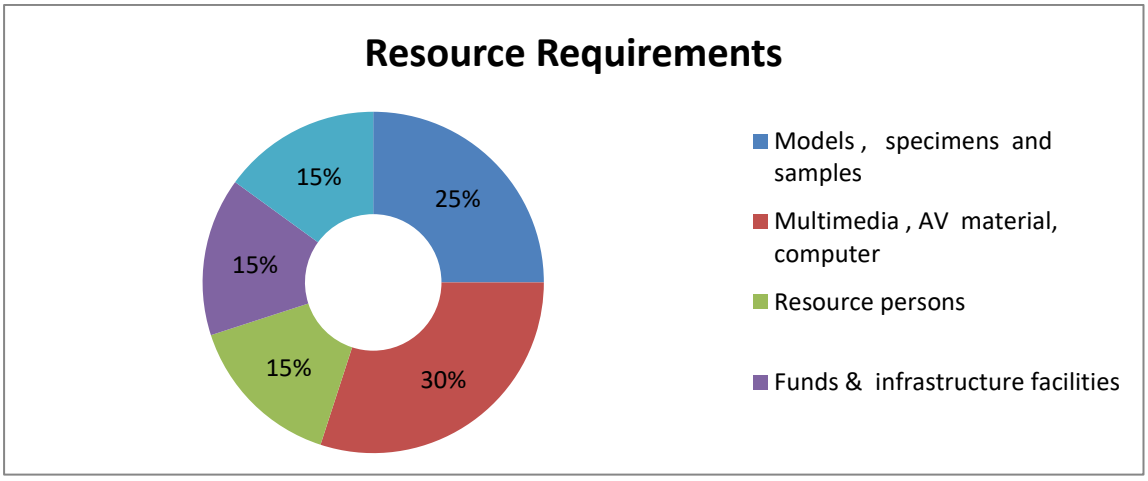
In all instances, the AIs had to attend to activities such as arranging the premises in order to accommodate the gathering and to display the specimens. Also they had to look into providing suitable seating arrangements for the Provincial Director, Deputy Director (Extension), ADAs and other guests. In every occasion they faced the problem of not having sufficient space to display the specimens. One field experience of a crop clinic is shared below.

Box 6: Experience of a crop clinic

Usually they arrange refreshments, for example a cup of tea served with some local sweets prepared with the help of farm women's group. In one occasion, they had to serve the refreshments in a house nearby as the hall in the temple was not suitable for the purpose. However, some of the participants who were less interest in the programme had left after the tea break. So, the programme had to be continued with a lesser number of participants.

The implication here was that sometimes participants consider it as a waste of time to move from place to place during a programme. Especially during the non-formal educational sessions where farmers who are with extrinsic motivation participate to fulfill the expectations or recommendations of someone with formal authority (AI in this case) It is therefore important to make sure that the participants are provided with facilities without external disturbances that act as barriers of motivation.

In parallel to this discussion on resource allocations for field extension activities, many extension officers (30%) were of the view that greater availability of modern equipment for instance, multimedia and computers and would facilitate the efficient delivery of the extension and advisory services (See figure below).



Source: Field Survey, 2015

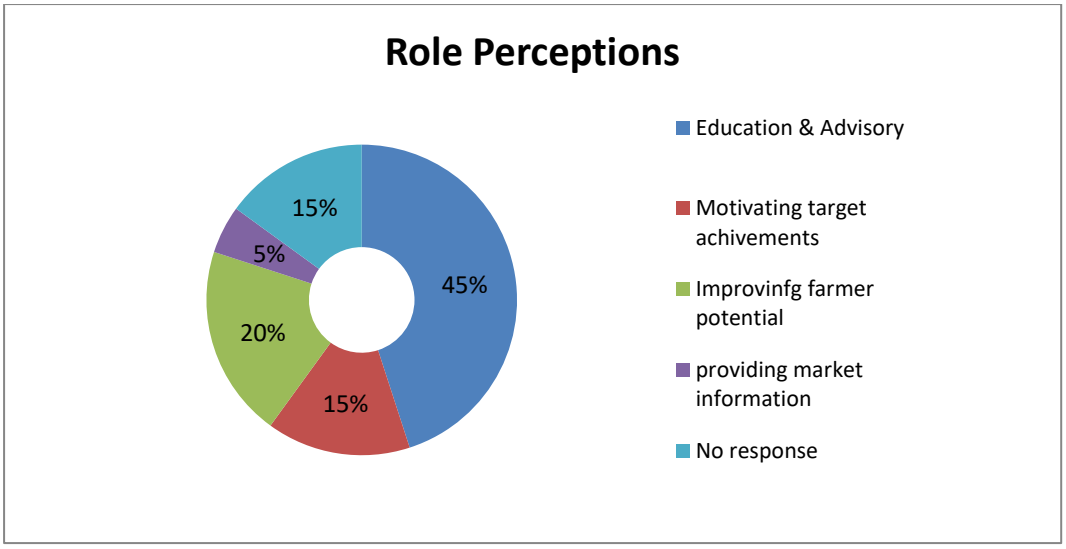
Figure 9-4: Extension officers' perceptions on resource requirements for extension activities.

Likewise, models, specimens and samples which are generally used as visual aids in demonstrations can enhance the level of understanding thereby increasing the efficiency of the field activity, as perceived by 25% of the extension officers. Moreover, they consider (15% of respondents) allocation of sufficient funds, providing proper infrastructure facilities and employing suitable resource persons to deliver the programs, as equally important resource requirements.

When reading through this chapter on 'extension officers' perspectives' it is evident that these field officers, as the representatives of the government play multiple roles. They shoulder diverse responsibilities besides numerous challenges they face while performing their duties. During the time of the survey, there were several instances when the AIs had to postpone our meetings due to unplanned work that they were assigned by the authorities. Field officers being state workers have to perform their duties at polling station during election periods. Prior to that they have to participate in the relevant briefing sessions concerning such responsibilities so that they sometimes are compelled to postpone or cancel the field activities they have already arranged. While gathering data for the purpose of this thesis, a crop clinic was postponed for this reason and the opportunity to observe that activity was forgone.

Field extension officers collaborate with research and training institutes in order to implement the technology dissemination programmes. In the same way they take part in village level institutional forums for example the cultivation committee or the *'Kanna'* meeting organized before the commencement of each season. Equally important as the cultivation committee is partaking in meetings organized by the Farmer Organizations in each AI range, as well as the Death Benevolent Society which records the highest membership in any village. Moreover, AIs play a part in small group activities such as women's organizations, mushroom growers' associations or cut flower producers' associations etc. either formally or informally, as a courtesy.

While bearing in mind that the AIs have to perform non- extension duties as well, it is thought of as important to find out how these officers perceive these multiple roles. For this purpose, an open question was included in the questionnaire to get their own ideas about the roles they play as brokers between farmers and the policy makers.The feed back received for this question is summarised in the figure.



Source : Field Survey,2015

Figure 9-5: Role perceptions of the extension officers.

Role perceptions of the extension officers, according to the survey, remains within a limited range. The perception of the majority of the officers (45%) is that they have to play the role of educationist or the advisor which is the conventional role of an 'extensionist'. Deviating from this traditional concept, role perception of a sizable percentage (15%) of officers have captured the recently added extension function 'target achievements' or promoting the new projects and reaching the previously set production targets as the expected role. Even though the role is not clearly defined, 20 % of the officers work with the farmers with the aim of 'improving farmer potential'. The least importance is given to the role of 'providing market information' despite the importance of market information to farmers, in this competitive open market setting. Merely 5% of the extension officers have perceived it as an important role.

This is because, as it was pointed out at the beginning of this chapter, 'marketing ' per say is not realized as an essential function of agricultural extension , as much as the emphasis given to ' production' or commodity development.

The Food Production National Programme of the Ministry of Agriculture which is implemented with the objective of increasing food crop production, mainly focuses

on increasing production and productivity of food crops including paddy and supplementary crops. This programme however includes 'marketing' as one of the 14 'Thrust Areas' [83]identified as essential for agricultural development. Despite this listing in the food production plan, smallholder farmers (other than paddy farmers) are left with limited options such as the *Dambulla* Economic Center for marketing their products. Paddy farmers benefit from the Guaranteed Price Scheme imposed by the government for purchasing paddy

This in fact is a thorny issue today as we find many instances especially during bumper harvests, where farmers cannot sell their produce. They are compelled to either sell those in bulk at very low prices or just dump on waste. Market information being a vital component in marketing of agricultural products, due their perishable nature, is therefore an important but a lacking part in the agricultural extension agenda.

For this reason, government extension agents do not perceive it as one of their roles and they realer involve in providing market information to the farmers. The analysis of role perceptions becomes a valid concept used for the purpose of investigating the research question 'What factors are affecting the delivery of extension services'. This is due to the fact that the behavior and the performance of individuals is influenced by the level of role perceptions(see for exapmle Arpita,2008). Role perceptions , as found through previous studies, play a key role in an individual's peformance . A clear role perception can positively influence the performance of the individual whereas a misty perception can lead to poor performance.

Thus the question arises as to whether the extension officers operate in the field with a clarity of their roles. The considerable percentage of officers in the sample (15%)

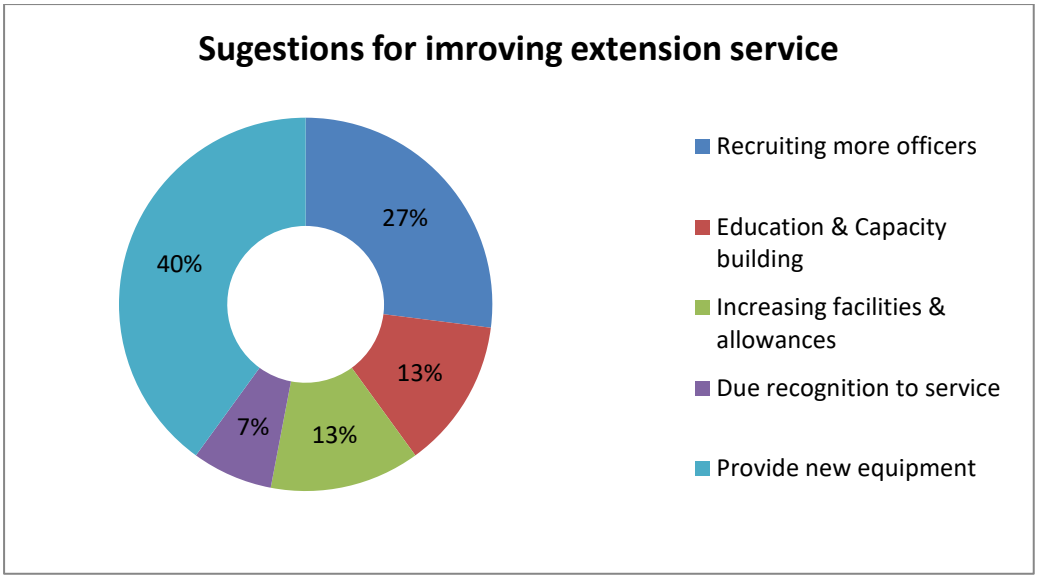
[83] Input management, Empowerment of farmers, Marketing, Natural Resources Management, State & private Sector Partnership, Youth and Women Participation in Agriculture, Knowledge Management, Traditional Knowledge and Practices, Research & Technology Development, Consumer Health & Satisfaction, Food Security, Legal & Regulation Framework, Improvement of Irrigation Infrastructure Facilities and Institutional Co - ordination.

who refrained from answering the qustion regarding role perceptions, supports the idea that there is a state of ambiguity regarding their role expectations.

Customarily, field level officers carry out the orders passed down by their superiors albeit the 'participatory' decision making adopted in the current extension strategy. Their adherence to the conventional function of educating the farmers implies that they have been officially assigned with this duty and they do not deviate from the original approach. Likewise, the target achievements which was introduced through the PDOA and the interprovincial areas under the present extension strategy, is a role assigned by the higher authorities. Amidst performing these assigned roles, the field extension officers are compelled to allocate time to take part in meetings organized by the PDOA as well as the Ministry of Agriculture. Many of these meetings quite often are ad hoc meetings which disrupt the scheduled field plans of the extension officers. These officers are frequently sought after to obtain data for preparing divisional and provincial level reports and plans required to be presented at the higher-level meetings such as the District Development Committee meeting[84]. Thus, they are at times not interested in or reluctant to fill up forms and questionnaires.

Having identified the constraints and drawbackes in delivering extesnion services, finally the extension officers proposed methods of improving the advisory services for the benefit of all stakeholders.

[84] See chapter 5 for more details



Source: Field Survey, 2015

Figure 9-6: Suggestions of the AIs to improve the extension service.

Discussing further about improving the extension service, Agricultural Instructors (26.6 %) indicated that their services could be delivered more efficiently and effectively when the extension to farmer ratio is improved. In other words, they suggest increasing the number of field officers so that each AI would be assigned with a manageable number of farmer families. Not surprisingly, there were other common suggestions to improve their working conditions, for instance, increasing their facilities and transport allowances. While these are treated as common and conventional suggestions, most importantly, the suggestion made by the AIs for capacity building and assigning due recognition for their service can be considered as more rational propositions in the long run. This suggestion can be supported by the document produced by the GFRAS on capacity building of Extension and Advisory Service (EAS) providers which proposes "EAS should have capacities to perform the range of innovation management functions[85].

[85] "Innovation is a process of constant learning and adaptation. Capability to learn to work in new ways and to incrementally build new capacities is an important part of innovation capacity at the

Apart from this they should also have technical and functional capacities to promote appropriate agricultural technologies, apply participatory approaches, help organize producers, understand markets and value chains and address changing forms of climate, social and economic vulnerability" (Rasheed and Davis 2012).

Feedbacks of the extension workers to the survey questionnaire and the interviews revealed some important points related to the development of the field of extension as experienced by the field level officers. The following are some quotes.

> (i) "*Amalgamation of the services of the DOA, Dept. of Agrarian Development , Irrigation Department at the level of Agrarian Services Centers to uplift the agricultural economy of Sri Lanka. It is useful to cover all farmer needs including, seeds, fertilizer, agro equipment, agro chemicals (inputs) and facilities such as infrastructure and solving irrigation problems at the Agrarian Service Center level with the contribution of the above agencies*" (AI-K7)
>
> (ii) "*Proper coordination of activities between the DOA and the Department t of Agrarian Services right from upper management level. Correct identification of the duties and the role of the DOA and avoiding duplication of activities within the portfolio of the DOA. It is highly necessary to give priority to delivery of extension and advisory services" (AI- K1*)
>
> (iii) "*At present the priority of extension service is the distribution of inputs and organizing programmes to provide subsidies and equipment to the farmers. Less priority is given to the extension and advisory services. Therefore it is vital to divert attention towards efficient engagement in extension and advisory services*." (AI -Ip1)

organization and sector level. The focus on capacity building therefore should include not only technical expertise but also strengthening the capacity for interaction, learning and adaptation" (New Extensionist- GFRAS report pp 5)

Further they went on to comment on the gap between the superiors at the level of programme planning and decision making and the field level staff who are implementing the projects.

> *(i) "Planning and implementing projects by higher officers to secure their positions has resulted in the deterioration of the extension service. These officers must prepare plans for the development of the extension service"* (AI-K3)

> *(ii) "The relationship and trust between extension agents and their superiors is deteriorating. It is important to avoid this situation in order to maintain an efficient extension service"* (AI-T8)

> *(iii)"There is a gap existing in the hierarchy of the extension administration. The Assistant Directors represent the Agricultural Service whereas the AIs belong to the technical service. We sometimes feel discriminated when certain decisions are taken" (AI-T2)*

> *(iv)"Directing the extension programmes with the assistance of officers who have sound knowledge on social sciences and possess capabilities on human resource management and Introducing scientific measures / yardsticks for progress evaluation."*(AI-K1)

Finally, they made some valuable comments regarding the utilization of agricultural knowledge bases for the benefit of the farming community.

> (i) *"Establishing an educational institution for extension and advisory services or coordination with universities for research purposes." (AI-K1)*

While this comment reiterates the lack of research conducted in the field of extension it suggests making use of the knowledge bases in the agricultural faculties in the state universities.

A similar remark was given by another officer who compared the agricultural graduates and the diploma holders.

(ii) "*Agricultural graduates are not usually assigned to do jobs in the field. It's only the two year diploma holders who work as field extension officers. There should be a mechanism to get the services of agricultural graduates who pass out from National Universities to support the development of the country"* (AI-T2)

These responses by the extension officers while revealing certain loopholes in the system, suggest the specific areas needed to be addressed by the policy makers in order to improve the extension and advisory services to be more effective in catering to the smallholders. At the same time, these suggestions would pave the way for strengthening relationship among stakeholders in the extension channel and for motivating them for performance.

Concluding the discussion that addressed many aspects related to the delivery of extension and advisory services, this thesis emphasizes the need to revisit the current extension strategies. The views expressed by the extension officers and their suggestions reflect on the training needs as well as the resource requirements for delivering better programs. In addition the overall outcome of this discussion on extension officers perspectives reveal their interest in building up the present extension service to cater to the needs of the farmers with an efficient advisory service.

Summary

The chapter on the extension officers' perspectives has been unravelling the field conditions of extension delivery, under the purview of the Provincial Department of Agriculture, Anuradhapura. The discussion included several aspects associated with the delivery of extension.

This summary highlights some of the important findings.

(1) The majority of extension officers working in the field have less than 10 years of experience so that their exposure to different extension approaches is limited. Some policy consequences for example the policy decisions at the time of devolution of power and elimination of the post of grass root level extension officers, has created a gap between two generations of extension officers.

This withdrawal of experienced extension agents from their filed jobs has further affected negatively on the sharing of knowledge and experiences between the two generations.

(2) The next point to be highlighted in this summary is about the training received by the extension officers. At present, many of the training packages offered by the DOA are related to knowledge updates on technical aspects at the expense of long term capacity development.

(3) Coverage of farmer families or the farmer extension ratio stands at an average of 4000 families for one officer. Regular visits to farmers has become a practically difficult target amidst many other obligations such as attending training programmes, meetings and other field extension activities. Apparently, extension officers have come up with a coping strategy to meet the farmers who regularly participate in their programmes and to either ignore others or to visit the fields on their requests to attend to uncontrollable field problems. This strategy however has widened the farmer – extension gap. The chapter at the end of this thesis on 'Revisiting the research question will further discuss this point.

(4) Extension officers have selected field days as the most effective method of extension delivery. One occasion when they organize field days is to demonstrate successful adoption of practices which is called result demonstration or to conduct method demonstrations. Field days are usually conducted in farmer fields and require less resources. This is a successful method because farmers can actively participate in an outdoor field environment and they can get prompt

(5) clarifications for their problems from the specialists. These specialists who participate as resource persons upon request of the AIs are quite often scientists from research stations.

(6) One important finding of the study is the perception of the extension officers of their role as field officers. The drawback identified in relation the role perception is the conventional nature in which they have prioritized the multiple roles they play. While it has long been that the country has adopted open economic policies, the policy makers in the agricultural sector have failed to incorporate the market competition in the present extension strategies.

(7) Finally, the valuable suggestions made by the extension officers in this chapter are considered useful for drawing conclusions and making recommendations. Especially their proposals regarding capacity building and gaining due recognition for their service deserves the focus of attention of the policy makers.

CHAPTER 10

CONCLUSIONS

10.1 Overview of Findings

This concluding chapter at the end of this thesis, serves to summarise the findings of the study which investigated the role and functions of present extension services, alongside the interactions among the various elements in the path of extension delivery. While extension organizations and extension agents are at one end of this path, delivering agricultural information, farmers being the users of agricultural information are at the receiving end. Thus, the central research question examined in this thesis considers, both farmers and extension agents as main elements involved in the process, in addition to government as the national policy maker. Thus, the research question attempts to investigate in a broader sense **'What Factors are affecting the process of sharing agricultural information with farmers?**'

Accordingly, the main components investigated by this research question include state policies, extension approaches, role of extension agents and smallholder farming systems. The thesis further examined the links between research and extension, farmers and extension and the knowledge interface between farmers and extension officers. The conceptual framework (figure 10.1) illustrates these elements in the research question.

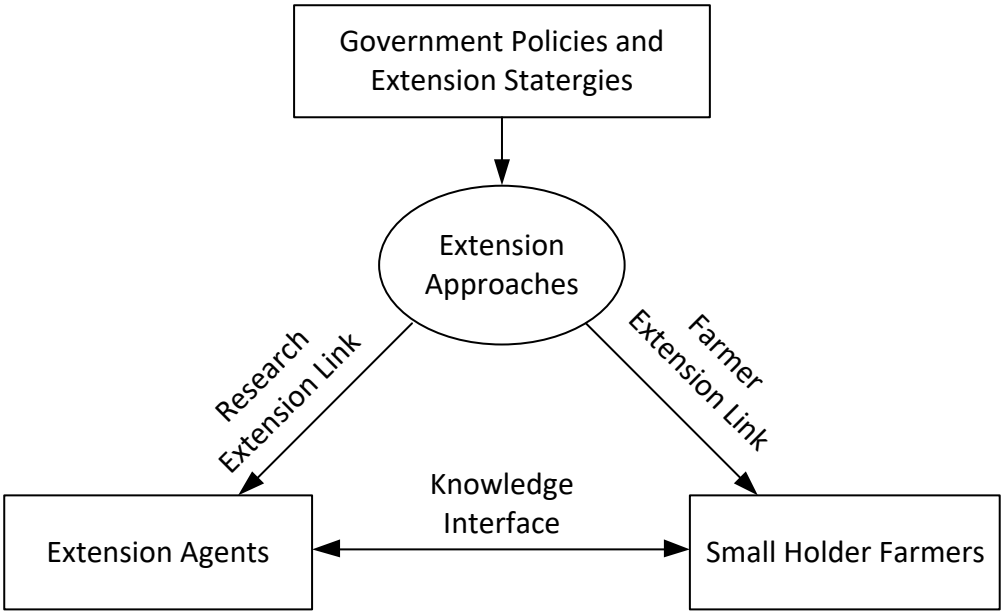


Figure 10-1: Interactions among the elements in the research question.

10.2 Revisiting research questions

The sub questions formulated at the beginning of the thesis included a broader inquiry in to the;

1. Role of existing extension services in providing information to the Small holder farmers in Sri Lanka
2. Role of extension agents and their perceptions of the farming community and
3. Perceptions of the farmers on extension officers and the extension intervention programmes implemented in the area.

Review of these sub questions at the end of the discussion provide a better understanding of the overall outcome of the study. Therefore, the findings of the research are outlined under each sub question as presented below;

10.2.1 Performance of Existing Extension Services

The broader analysis on extension strategies reviewing the past and present extension approaches in the form of an evolutionary process, provided responses to the following sub questions:

i. How did the present extension strategy evolve?
ii. How did the government policy formulations affect extension strategies in the past?
iii. What is the current extension structure in the country?
iv. What methods are used by extension workers to deliver advisory services?
v. What are the priorities of the extension programmes at field level?
vi. How is this decision-making procedure connected to departmental plans?

The chapters in this thesis on 'Changing Policies and Extension Approaches' and 'Extension Interventions in *Anuradhapura'* widely analysed these responses nevertheless, some of the key points are reiterated in the section below.

The chapter on 'Changing Policies and Extension Approaches' in this thesis, specified the present national extension strategy which is called the 'Participatory Commodity Development Extension Strategy' as an advisory service extended by the Department of Agriculture. The two-fold extension delivery, for instance the extension and advisory services provided by the central government and the provincial councils, is the policy of extension delivery at present. The central government provides advisory services in the areas which are categorized under major irrigation schemes, through the Interprovincial Extension Service, while the Provincial Departments of Agriculture provide extension and advisory services to the smallholder farmers in the respective provinces.

As it was already discussed in chapter 4, the current extension approach promotes greater farmer involvement in agricultural production and planning, thus the strategy

focuses on farmer group approach. Individual farm visits are not encouraged other than in special situations such as attending to the needs of the large scale commercial farmers, which is not very common.

However, this 'participatory approach' is successful in areas where the group formations are effective, and the community-based organizations are operative. It is found less helpful for smallholder farmers who operate on small farm plots. For example, in the segments where the farmers adopt a paddy-based cropping system, farmer organizations are actively functioning, and this group extension strategy is well fitting. Opposing this situation, in other segments where there are many farmers cultivating vegetable crops in *chena* cropping systems, this extension approach shows limited contribution in sharing agricultural information . This is simply because these farmers are not organized in groups like the paddy farmers do and therefore, extension officers find it difficult to meet individual farmers due to resource constraints.

Despite the concept behind the participatory approach, farmer involvement is limited in many areas within the study sample making this yet another top down approach through which preplanned extension programmes are passed down to the farmers. Neither the farmers nor the field level extension officers (AIs) actively participate in the process of decision making. Many extension programmes (as described in chapter 6) have been designed at the national and provincial levels, with the aim of meeting national targets they have failed to make a marked impact, particularly on the livelihoods of smallholder farmers. A proper mechanism does not exist within the system to evaluate the effectiveness of the programmes other than monitoring the number of programmes conducted in each segment during a particular season.

Having discussed the performance of the overall extension services, next, this chapter intends to revisit the findings of the study related to the role of the extension agents.

10.2.2 The role of extension agents and their perceptions

The sub question related to the role of extension agents, further investigates the Extension Officers' Perspectives and broadly discusses how extension officers interact with farmers during the process of extension delivery. Investigation was based on the following support questions;

i. How often do extension officers meet farmers?
ii. Do they meet the same group of farmers over a period?
iii. What strategies are used by extension workers to motivate non-participants?
iv. What criteria do they use to select farmers for extension programmes?

The role performed by the extension agents (AIs), according to the findings, is not an independent role. They have to follow the directions that are passed down from the higher levels of management. As it was widely discussed in this thesis, the decisions regarding the implementation of the government extension agenda is initiated at the ministry level and reach the AIs in the field, after passing through the provincial and the segment management hierarchies respectively. The AIs, over a long period, have been practicing this system of implementing programmes passed down to them in the form of performing a duty, rather than developing a clear vision of their own, about their roles and responsibilities. They sometimes need to allot time from their agenda to participate in the programmes implemented by the ministry, for example meetings and activities related to the 'national food production programme', which constraints their time allocation for field visits.

Their role perceptions on the other hand are more target oriented than client oriented and hence their priority in a particular season, is to deliver the extension packages assigned to them as targets. While attempting to meet such targets, they work with the selected farmers rather than delivering their services to the entire smallholder farming community within the AI range. Thirdly, the research question looks at how farmers respond to these interventions.

10.2.3 How do farmers respond? Farmers' Perspectives

In a situation where the extension officers are trying to promote selected programmes, the main research question analyzing the factors affecting extension delivery, encompass the following sub questions to find out how farmers respond to such interventions.

i. Do the farmers seek the advice of extension officers in crop selections crop management and post-harvest technologies?
ii. Do they meet extension officers regularly?
iii. Do the farmers participate in the extension programmes and continue to follow the instructions given by the extension officers?
iv. Do the farmers often accept what is proposed to them by extension officers as useful?
v. Why are some farmers successful while others are not?
vi. Does resource availability influence livelihood of smallholder farmers?

The research question dealing with the perceptions of the farmers, seeks to investigate why farmers have accepted or rejected the extension services. Furthermore, the study includes basic investigations on the farmer - extension links as well as policy – extension influences within the province.

Farmer extension linkage show clear spatial variations caused by heterogeneity in cropping patterns and farming practices, thus the paddy farmers' link with advisory services stand at a stronger level compared to that of the *chena* and vegetable farmers. There are farmers who do not expect the advices of extension officers for farming practices indicating their mistrust on the extension agents.

The questions related to the influence of the available resources on the livelihoods, was built upon the concept of 'livelihood resources' widely discussed in the sustainable livelihood framework especially the five capital bases elaborated in the 'Asset Pentagon'.

The variations in resource availability have had a bearing on the crop selection decisions of the farmers which had resulted in slight variations in cropping patterns among the areas.

The study reveals that the farmers in the four segments studied for the purpose of this thesis, perceive the extension services in different frequencies. Thus, farmers representing the paddy growing areas demonstrate a positive attitude towards the extension and advisory services whereas the others were rather negative.

Participation of farmers in extension programmes was at a poor level in the segments where *chena* and vegetable cultivations were prominent in the cropping system. Similarly, they exhibit poor relationship with the extension agents i.e. AIs and ARPAs, albeit many extension interventions carried out by the PDOA at field level.

Within this scenario it is clear that the extension officers, while performing their duties as facilitators in the filed level, are eternally facing the challenge of balancing their roles and responsibilities as brokers between farmers and the policy makers. Hence the concluding discussion on the wider research question would be the conversation about the coping strategies of the extension agents.

10.2.4 What are the coping strategies for better service?

Support questions that formulate the answer to this question include;

i. How do extension officers manage their work load?
ii. How do they manage the gap between the target and the reality?
iii. What are the personal coping strategies to overcome complex settings

Coverage of farmer families depicted in the 'farmer extension' ratio in the province stands at an average of 4000 families for one officer. Regular visits to farmers has virtually become a difficult target amidst many other obligations such as attending training programmes, meetings and other field extension activities. Apparently, extension officers have come up with a coping strategy, to select farmers for their

programmes. They sometimes select better performing farmers who regularly interact with them and introduce new extension programmes to the same group of farmers. In common, extension officers deliver information through extension interventions such as field days, method demonstrations and crop clinics while they meet the other farmers upon their request to solve field problems.

Having reviewed the findings related to the main research question, this chapter intends to review the main objectives of the study.

10.3 Revisiting the objectives

This chapter at the end of the thesis on the 'Conflicting and complementary views of farmers and extension officers' which analyses the impact of development policies and extension approaches on the smallholder farming system in Sri Lanka' serves to summarize the comprehensive discussions carried out over the last ten chapters and to draw conclusions based on the following objectives of the study.

(i) Examining the resource availability governing the livelihood pattern of the smallholder farming community, including particular focus on the institutional support from the government in terms of providing production incentives and sharing of information through extension and advisory services.

(ii) Identifying constraints faced by farmers while accessing the extension services as well as the constraints faced by extension officers while performing their duties.

(iii) Analysing the relationship between smallholder farmers and extension workers within the existing political, environmental, economic and policy framework in Sri Lanka.

Having set these objectives, the study finally examines three main elements in this broader context encompassing Policy, Extension and Farmers. While the previous section of this chapter has summarized the findings of the research, highlighting the interplay of these three elements of the research question, this chapter at the end of the wider discussion, intends to draw conclusions based on those findings.

10.3.1 Research Objective 1

Agricultural extension services at present, operate in Sri Lanka, with the contribution of government, private and nongovernmental extension agencies. In addition, there are many other institutions for instance, Tea Research Institute, Rubber Research Institute, Sugar Research Institute and the Department of Export Agriculture etc. which provide location specific and crop specific extension services. Presence of numerous organizations within the country, to provide extension and advisory services is a positive point despite the fragmented nature of the operating system which results in duplication of services.

In spite of this heterogeneity in extension delivery, the national extension plan of the country aims at delivering efficient extension and advisory services to the farming community in Sri Lanka. The present extension approach, the 'Participatory Commodity Development Approach' is successful in areas where the group formations are effective, and the community-based organizations are operative. It is less helpful for smallholder farmers who operate on isolated small farm plots.

10.3.2 Research Objective 2

The extension agents involved in implementing government extension agendas, act as bottom line representatives who carry out the orders of the policy makers, by adhering to the top down decision-making processes. They demonstrate target-oriented personalities rather than client oriented personality of a trustworthy agent who takes the responsibility of his actions. They are identified as individuals who are less focussed on their responsibilities as facilitators. Upon all these attributes, the Agricultural Instructors possess sound knowledge on their subject and in most of the cases, are capable of providing technical solutions to the issues raised by farmers.

Unlike in many other regions of the world, for instance in Sub- Saharan Africa[86], where 85% of extension officers join their career with a poor knowledge of agricultural sciences and limited skills, the extension officers in the local extension framework, start their careers with a two year Agriculture Diploma, which is a positive attribute. In addition, they undergo in-service training which contributes to their day to day performance related to knowledge dissemination.

10.3.3 Research Objective 3

In the previous chapters, this thesis discussed the functions performed by many government research stations for the development of the agricultural sector. Many collaborative field programmes are conducted by the DOA with the scientists from these research stations. Most often such research programmes are focused on scientific methods such as improving yields, genetic improvements, breeding, developing new varieties and pest and disease management etc. Little attention is focused on conducting research related to techniques of extension delivery or conducting studies in the form of needs analysis to deliver extension information with high efficiency. However, according to the findings of the study, there was no marked impact of knowledge dissemination in developing the sustainable livelihood strategies for smallholder farmers. The recent developments in the extension delivery systems introduced by the DOA for instance ICT based Cyber Extension project and the Toll-Free call system to get agricultural information, are not used by the famers who participated in the survey reasons being lack of awareness and poor access to such facilities. New technology, knowledge and information have not, in such cases reached the majority of farmers, indicating the presence of a knowledge gap between farmers and extension services. In conclusion, there are two clear paradigms in which extension officers are at one end equipped with scientific knowledge whereas on the

[86] See for example The Sasakawa Africa fund for Extension Education (SAFE) in www.meas.extension.org (Naibalcelao 2013)

other end farmers remain constrained by traditional knowledge systems and limited institutional support, awaiting long-term solutions to bridge the knowledge gap.

The schematic representation of this scenario presented in the figure given below, highlights the proposition for human capital development for the benefit of the smallholder agricultural sector.

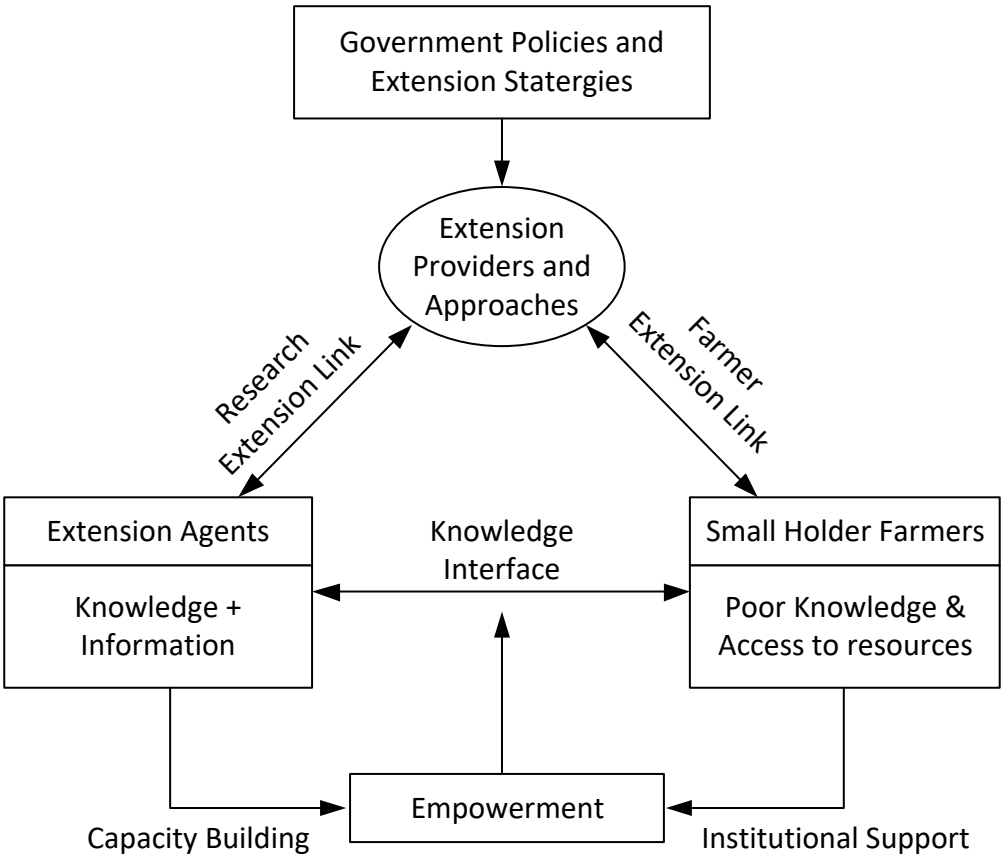


Figure 10-2: Proposition for human capital development.

10.4 Conclusions

There are three main findings in parallel to the three objectives of the research.

1. **This study emphasises the limited institutional support extended to the smallholders. Precisely, the discrimination of *chena* farmers within the agricultural policy framework, thereby depriving them of gaining the benefits of diversified cropping systems and contributing to national food security.**

Chena cropping system which is a livelihood strategy for a sizable population of smallholder farmers in the non-plantation agriculture sector, has not been included in the extension agendas and their problems have not been adequately addressed by the policy makers. Without having reliable market information and other support services, *chena* farmers, who produce heterogeneous crops have failed to gain the advantages of crop diversification.

Chena farmers cultivate their plots in isolation, without actively interacting with rural organizations. They are most often voiceless compared to paddy farmers who are well organized around the Farmer Organizations and receive the support services through the Agrarian Services Centers.This multi -cropping system which includes traditional crop varieties which have been used over a long period of time, in the subsistence farming systems have the potential of contributing to the national food production. Developing this diversified system has a bearing on ensuring national food security amidst the challenges of climate change for which the staple food crops are more vulnerable.

Hence this study emphasises the need for extending institutional support to the *chena* farmers within the national agricultural policy framework.

2. The findings of this study reveals the existence of spatial variations with regards to farmer- extension linkages and access to information.

The link between farmers and extension services demonstrate an irregular relationship across the four segments studied for the purpose of this thesis. While paddy farmers are benefited from the availability of support services as a result of continuous government attention given to the paddy sector, small holder farmers representing *chena* farming systems receive less attention. This is attributed to the intervention of ASC in providing support services to paddy farmers in some segments, which leads to the conclusion that the nature of farmer extension link depends on the cropping patterns. Similarly, access to information depends on the cropping patterns.

3. The findings of this study reveals a gap between the capacities of extension officers and their educational qualifications & technical expertise in the relevant field.

Extension officers are however, constrained by resources and facilities to carry out their duties, lack of incentives, poor recognition of their services and consequently, lack of motivation. This thesis draws attention to the merits of improving their capacities in decision making and managerial capabilities, enabling them to come up with viable coping strategies for better performance.

Summary

The thesis attempted to find out whether appropriate strategies can be devised to improve the livelihood of small scale farmers, based on the existing strengths of small holder farming systems**.** In doing so, the thesis adopted the sustainable rural livelihoods framework as its theoretical base (see for example, Scoones1998) which enquires the following combination of factors affecting sustainable livelihoods;

'Given a particular context (within the enabling environment, for example) what combination of livelihood resources (capital bases) result in the ability to follow what combination of livelihood strategies with what outcomes'?

Within the present open economic policy context and the system of participatory commodity development extension delivery, access to livelihood resources varies according to the cropping patterns. Social capital bases are vital in making access to information while human capital bases need to be enhanced to capture more diversified livelihood strategies, encompassing off farm employment.

All three factors elaborated in the research question i.e. farmers, extension workers and the government, affect the sharing of agricultural information. While it is required to change the conventional and negative perceptions of the farmers, it is equally or more important to improve the capacities of the extension workers, as human and social capital bases have a bearing on the sharing of information. Above all, policy makers need to consider 'extension and advisory services' as a separate and vital component within the national policy framework.

In conclusion, the thesis brings in the proposition to establish a National Agricultural Extension Policy encompassing strategies for capacity building of the extension workers for an effective extension delivery while empowering the smallholders through institutional support to achieve sustainable livelihood goals.

At the end of this concluding chapter, the table given below summarizes the original contribution of this thesis.

Table 10-1 Summary of the original contribution of the thesis

Existing gap	Original contribution of the thesis
Non availability of coherent information on Extension services.	The in depth analysis covered by the central research question of this qualitative study on smallholder farming systems is a wider case analysis encompassing a variety of individual cases especially cases of small holder farmers representing *chena* cropping systems in the non-plantation agricultural sector in Sri Lanka. Overall, this thesis through its comprehensive analysis of three key components in the research question, for instance extension approaches, farmers and extension agents compiles a compendium of information related to the smallholder cropping system in general and *chena* cropping system in particular.
Lack of opportunities for extension agents	In addition to the cases of individual farmers, this thesis carried out an extensive analysis of the extension workers perspectives, employing questionnaire survey, personal interviews and field observations including participant and non-participant observation. The chapter on **'Liaising Role of Extension Agents: Extension in the Brokers' Perspective'** which furnished a platform to voice their opinions, is an original contribution to the literature.
Lack of experimental data	The methodology employed in the thesis for data gathering, for instance relying on primary data originating from the in depth interviews and questionnaire analysis, contributes to the originality of the research. Applying several data gathering methods and information sources facilitates triangulation which adds to the originality through validation of primary data. Carrying out two parallel field surveys with farmers and extension officers ensures authenticity of the findings through further triangulation of data.
Gaps in social science research methodology	The thesis, while shedding light on the merits of extensive field survey, shares the field experiences and emphasizes the importance of field exposure in the process of planning and implementing social science research projects. Using narrations of respondents in delivering the findings of the thesis is novel to the local literature.
Lack of an Agricultural Extension Policy Framework	Review of literature on past development policies and extension approaches examines the development trends and builds up scenarios that are useful in drawing up conclusions leading to recommendations for policy formulations.
Gaps in social science research methodology	Further, this approach used for studying smallholder farming systems within a specific locality (for example dry zone farming systems in *Anuradhapura* district) can be applied to investigate other farming systems meaning that the methodology used in this thesis can be used as a model to investigate similar scenarios.

Appendix A: Letter of Permission

20th September 2015.

Department of Agricultural & Plantation Engineering,

The Open University of Sri Lanka.

Provincial Director of Agriculture,

North Central Province,

Anuradhapura.

Information for Field Research

Dear Sir, I am a senior lecturer attached to the Department of Agricultural & Plantation Engineering, The Open University of Sri Lanka. I am reading for the PhD and planning to carry out my field research work in Anuradhapura district. A socio-economic survey on the livelihoods of farmers, will be carried out in Anuradhapura, Kahatagasdigiliya, Thirppane and Ipalogama segments.

I will be collecting information from farmers as well as Agricultural Instructors and other government officers involved in agricultural extension in the research area. I write to seek your consent to meet the officers and gather necessary information for the research.

I assure that the information will not be disseminated without your consent.

Also, I wish to thank you for providing me with the opportunity to observe the field extension activities carried out in your area.

Thank you,

Yours sincerely,

Nandani Herath.

Appendix B: Farmer Coding

Segment	AI range code	Cluster code	Detailed farmer code	Corresponding AI code
Segment K	K	88	AK(88) 1	AI -A-1
		88	AK (88) 2	
		88	AK (88) 3	
		88	AK (88) 4	
		89	AK (89) 5	
		89	AK (89) 6	
		98	AK (98) 7	
		98	AK (98) 8	
		98	AK (98) 9	
		98	AK (98) 10	
Segment T	T	520	TT (520) 1	AI T - 2
		520	TT (520) 2	
		520	TT (520) 3	
		526	TT (526) 4	
		526	TT (526) 5	
		527	TT (527) 6	
		527	TT (527) 7	
		549	TT (549) 8	
		550	TT (550) 9	
		550	TT (550) 10	
segment I	R	324	IR(324) 1	AI- Ip-6
		324	IR (324) 2	
		324	IR (324) 3	
		324	IR (324) 4	
		332	IN (332) 5	AI- Ip-2
		332	IN (332) 6	
		332	IN (332) 7	
		332	IN (332) 8	
		332	IN (332) 9	
		332	IN (332) 10	
Segment K	K	197	KK(197) 1	AI K-1
		235	KK(235) 2	
		235	KK(235) 3	
		235	KK(235) 4	
		235	KK(235) 5	
		235	KK(235) 6	
		235	KK(235) 7	
		233	KK(233) 8	
		233	KK(233) 9	
		196	KK(233) 10	

Appendix C: Interview Guide for Primary Data Collection

INTERVEIW GUIDE FOR FARMERS.

Division	
AI Range	
Thulana	

Section 1.General information/context.

Start with an informal discussion on background information.

1. Name of farmer _____
2. Address _____
3. Age _____
4. Is this your native place?

   _____

   _____

   _____
5. How long have you been involved in farming in this land?

   _____

   _____

   _____
6. Were your parents farmers too?

   _____

   _____
7. Dou you have your relatives, siblings, children, living in this village?

   _____

   _____

8. Details of family members.

Member / Relationship	Age	Occupation

Section 2. Crop cultivation.

Gradually develop the conversation by asking about the mast familiar topics.

9. What type of crops do you cultivate?

Yala 2015	Extent / quantity	Maha 2015	Extent / quantity.

10. Crop selection.
    i. Why did you select this particular crop/ crop combination?
    ii. How did you come to know about these crops?

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

1. Discuss about pest and disease controlling measures.

   I. What are the pest attacks that damaged your crops in the recent past?
   II. What measures did you take to control pests & diseases in your cultivations?
   III. Do you know of alternative methods of controlling the above P & D problems? E.g. Ingenuous methods

Crop	Pests & diseases	Control measures	
		Chemical	indigenous

Section 3. Farm inputs and resources.

Gather information regarding the resource availability and access to resources.

a. Land

2. What is the total land extent under cultivation?

_____

3. Do you own the land? _____

4. How did you come to own it? (Land grant/inherited)

_____

b. seeds

How do you find planting material / seeds required for each season?

Do you keep/store seeds for the next season?

Do you exchange / borrow seeds from other farmers?

_____
_____
_____
_____
_____

5. i. Have you received training /advice from DOA for seed production? Please give details?

_____
_____
_____
_____

_____

i. Were you able to produce your own seeds after receiving the training?

_____
_____
_____
_____
_____

b. labour

6. What was your labour requirement for the last season?

_____
_____
_____
_____
_____

7. Do you get the help of your family members?

_____

_____
_____

8. Do you get the help of fellow farmers? Exchange / hired basis.

_____
_____
_____

9. How much did you spend approximately to hire labour last season?

_____
_____
_____

10. Do you work in the fields of other farmers? Exchange / hired

_____
_____
_____

11. What do you do during off seasons?

_____
_____
_____

c. Credit Facilities.

12. Discuss the following to get information on their capital requirements and sources.

i. How do you find money for farming/ expansions etc?
i. Do you have access to credit facilities from the banks?
ii. Are there any other organizations that provide credit facilities to farmers?
iii. What are other sources that you can rely on for borrowing money?

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

_____
_____
_____
_____
_____
_____
_____

d. Water resources.

13. Talk with them about the availability of water sources and irrigation facilities in the area.

iv. Do you practice rain fed farming or irrigated farming?
v. How do you irrigate your fields?
vi. How do you bear the cost for irrigation?
vii. Are there any natural water sources available in the area?

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

e. Machinery.

14. Information on machinery usage.

i. What are the farming practices you are doing using machinery in farming practices?
ii. Do you hire machinery?
iii. What are the manual practices done?

Section 5. Organizations and local institutions.

15. *It is important to know about their affiliations with various organizations and support services helpful for their farming operations.*

i. What are the supporting organizations operating in the area?
ii. What are other government and non- governmental organizations that support framing activities?
iii. Are you a member of any village level (local) organisations / institutions?

Name of Organization	Functions / benefits.	Membership

Section 6. Farmer – extension link.

16. **Get information from farmers about the accountability of the extension service and the usefulness of the service**.

i. How do you find information needed for your farming activities e.g. new varieties, markets, pest & disease control methods etc?

_____
_____
_____

ii. What support and guidance do you receive from the Dept. of Agriculture?

_____
_____
_____
_____

iii. How often do you meet extension officers?

_____

_____

iv. Do they visit your fields/ do you go to the office?

_____

_____

v. Do you find it easy to meet them whenever you have a problem in the field?

_____

_____

_____

_____

vi. Do you participate in the activities (meetings, trainings , field trips, crop clinics and demonstrations organized by extension officers?

_____

_____

_____

vii. Do you follow instructions given by the extension officers and are they useful?

_____

_____

viii. Do they help your decision making regarding crop selection?

_____

_____

_____

_____

ix. Do you get their help to solve your farming problems pest & disease control/ marketing/ resource constraints.

_____

_____

_____
_____
_____
_____

x. What are the other sources of information?

_____
_____
_____

xi. Which source is the most reliable?

_____
_____

xii. What are the reasons for this selection?

_____
_____

Section 7. Marketing of farm produce.

Get information about sale of farm produce and constraints faced by farmers.

i. What was your output last season?
ii. To whom did you sell? Government /private.

Crop type	Harvest	Home consumption	Sold @ the rate

iii. Did you get a reasonable **price** for your produce last season?
iv. Do you look for **market information** / prices before you sell.

v. **How do you transport** the producing?

_____
_____
_____
_____
_____
_____

Comments.

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Appendix D: Questionnaire for Primary Data Collection

QUESTIONNAIRE FOR EXTENSION OFFICERS

Section 1. General Information.

Name (optional):

Designation

Gender:

AI Range

Academic Qualifications:

Diploma Degree Other

In addition to academic qualifications what types of training have you undergone?

(1) _____

(2) _____

(3) _____

(4) _____

(5) _____

Years of experience.

(I) years of service in the present station

(ii) Any previous experiences:

_____

_____

_____

Section 2. Farmer - extension contact.

1. **Coverage**

   How many farmer families do you have to cover?

2. In general, how often do you visit one particular farmer during one cropping season?

   _____
   _____
   _____
   _____

3. How are these visits arranged?

   _____
   _____
   _____
   _____

4. What would you describe as the main purpose of these visits (list)?

_____
_____
_____
_____

5. What methods do you use to disseminate information to farmers?

_____
_____
_____

6. Who decide on these methods / programmes?

_____
_____
_____
_____

7. What is the most effective method, according to your experience?

_____
_____
_____
_____

8. Do you feel that the services you provide are useful to farmers?

   Can you give examples?

_____
_____
_____
_____

9. Do farmers usually tell you about their field problems?

   If so how do they contact you?

_____
_____
_____
_____

10. In your opinion how much scope do you have for making decisions concerning the advice given to farmers and actions taken?

_____
_____
_____
_____
_____

11. What in your opinion are the **most important factors considered by farmers in making** decisions regarding crop selection, and marketing?

_____
_____
_____
_____

12. What do you see as your role in farmer's decision making?

_____
_____
_____
_____

13. In cases where you provide information could you tell me what type of information is provided and how you come to decide on what information the farmers require?

In other words;

(i) What type of information do you provide to the farmers?

_____
_____
_____
_____

(ii) How do you decide on what information to give?

_____
_____
_____
_____

14. Do you often come across farmers who are not willing to participate in extension Programmes?

_____

_____

15. What do you do in such cases?

_____
_____
_____
_____

16. Please provide the following information in the table given below.

(i) How many days per week do you work in the field in general?
(ii) How many days in your monthly schedule are allocated for official meetings?
(iii) How many days in your monthly schedule are allocated for meetings with farmers?

(e.g. farmer organizations, women's group etc.)

Month	No of days			
	In the field with farmers.	Official meetings	Trainings for AIs	Other activities
July				
Aug				
Sep				
Comments				

Section 3. Resource Availability

17. Can you briefly describe the facilities/ resources provided by the DOA for the extension programmes?

What are the available sources?

Items	DOA	Other sources	Facilities	DOA	Other sources
AV Material multimedia			Transport		
Stationary			Halls		
computers			Meals & Refreshments		
Cameras /video cameras			funds		
Models / specimens			Resource persons		
Others			Others.		

18. In your opinion which of these do you find is the most important for our programme to be successful?

_____
_____
_____
_____

19. What are the biggest the constraints regarding resource availability?

_____
_____
_____
_____

20. Are there other forms of training and resources which could help you to improve the services you offer to farmers?

_____
_____
_____
_____

Section 4. Organizations & institutions.

21. (i) Do you collaborate with other government / private organizations to facilitate the farmers?

Can you give examples in the table?

Name of organization	Purpose

(iii) Do you work with any village level organizations? E.g. farmer organizations.

Name of organization	Purpose

Section 5. Extension Agenda and Suggestions.

22. How has the extension service changed over the course of your career to date and what are the priority areas of government extension agenda at present?

_____
_____
_____
_____
_____
_____
_____
_____

23. How does the government support OFC farmers? Maize, Millets, gingelly, Black gram, green gram etc.

_____
_____
_____
_____

24. What are your suggestions for the improvement of the OFC sector?

_____
_____
_____
_____

25. Finally, what can you suggest to improve the present extension service?

_____
_____
_____
_____
_____
_____
_____

BIBLIOGRAPHY

i. Book/Book Chapter/Journal Article/Working Paper/Conference proceedings

Abeyratne, E. 2000. "Historical Perspectives of the Transition from Subsistance Farming to Commercial Farming." In *Hector Kobbekaduwa Felicitation Volume*, by S.G. Samarasinghe, 17-28. Colombo: Hector Kobbekaduwa Trust.

Arasasingham, S.R. 1981. "Agricultural Extension in Sri Lanka." *Tropical Agriculturist, vol 137.* 41-53.

Ariyaratne, D.M. 1998. *Towards A New Agriculture : Through fifty Years of Independence.* Colombo: Ministry of Agriculture and Lands.

Ashley, C.,Hussein,K. 2000. *Developing Methodologies for Livelihood Impact Assessment: Expereince of the Afraican Wildlife Foundation in East Africa.* Working Paper 129, London: Overseas Development Institute.

Bebbington, A. 1999. "Capitals and Capailities:A Framework for Analyzing Peasant Viability,Rural Livelihoods and Poverty." *World Development , vol 27,no 12* 2021-2044.

Berg, Bruce l.,Lune,Howard. 2012. *Qualitative Research Methods for the Scial Sciences (8th ed).* Boston: Pearson.

Brock, K. 1999. "Implementing A sustainable Livelihod Framework for Policy Directed Research:Reflections From Practices in Mali." Working paper 90.

Chambers, R., Conway,G.R. 1991. *Sustainable Rural Livelihoods: Practical Concepts for the 21st Century.* IDS Working Paper 296, Institute of Development Studies.

Chandrapala, H.A. 1986. "Performance in Agricultural Sector." In *Facets of Development in Independant Sri Lanka* , 219-276. Colombo: Ministry of Finance and Planning, Sri Lanka.

Conway, G. 2011. "On Being a Smallholder." *IFAD Conference on New Directions for smallholder Agriculture.* Rome: International Fund for Agricultural Development .

Damayanthi, N.,Gamage, D. 2012. *Major Dimensions of Contemporary Smallholder Agriculture Sector in Sri Lanka.* Research Report No 146, Colombo: Hector Kobbekaduwa Agrarian Research and Training Institute (HARTI).

Damayanthi, Nedeeka,M.K . Nanayakkara,V.K. 2008. *Impact of the Provincial Council System on the Smallholder Agriculture in Sri Lanka.* Researcvh report No 128, Colombo 7: Hector Kobbekaduwa Agrarian Research and Development Institute.

Denzin, Norman,K.and Yvonna S.Lincoln. 2000. *Handbook of Qualitative Research.* Thousand Oaks,CA:Sage.

Department of Census and Statistics. 2016. District Statistical Handbook. Accessed 10 21, 2017. http://www.statistics.gov.lk.

Dorward, A.Anderson,S.,Clark,S.,Keane,B.,Moguel,J. 2001. "Assest Functionns and Livelihood Strategies:A Framework for Pro-Poor Analysis,Policy and Paractice." Paper produced for EAAE seminar on Livelihoods and Rural Poverty.

Douwe, van der Ploeg. 2010. "The Peasants of the Twenty First Century;The Commoditization Debate Revisited." *Journal of Peasant Studies vol 31, no 1* 1-30.

Dowe, van der Ploeg. 2010. "The peasantries of the twenty first century: the commoditization debate revisited." *Journal of Peasant Studies 37 (1)* 1-30.

Ellis, F. 2001. "Diverse Livelihoods and Natural Resources: A Research Context, SLSA working paper 7." *Sustainable Livelihoods in Southern Africa:Institutions,Governance and Policy Processes* 2-16.

Emitiyagoda, S.S. 2009. "Experiences and Challenges in Agricultural Extension:Meeting Farmer Needs." *Proceedings of Agricultural Extension Conference.* Kandy: Sri Lanka Agricultural Extension Association. 77-97.

Farmer, B.H. 1982. "Farm Power and Emploment in Asia ." *proceedings of the Regional Seminar held at the Agrarian Research and Training Institute.* Colombo: Agricultural Development Council, Bangkok,Thailand.

Giragama, W.M.G.B., and Sri Gowri,M.S.:Samarakoon,S.M.A Sanker. 1999. *Development and Strengthening of Farmer Oraganizations through farmer conventions: Finsl evaluation report on the impact of farmer conventions held in Anuradhapura and Matale Districts.* Colombo: Hector Kobbekaduwa Agrarian Research and Training Center (HARTI).

Glendenning, C.J.,Basu,S.,Asenso-Okyere,K. 2010. *Review of Agricultural Extension in India.* discussion Paper 01048, International Food Policy Resaecrh Institute.

Goonaratne, W.,Wickremasekara,P.,Samad,M.,C.M.Wijayaratne. 1980. *Rainfed Farming in the Dryzone of Sri Lanka, .* Colombo: Agrarian Research and training Institute.

Gunawardana, A.M.I.,Chandrasiri,A. 1981. *The Training and Visit System in Extension.* A paper based on the experiences in the T & V system of extension under the Kurunegala Rural Development

Project ., Colombo: Agrarian Research and Training Institute.

H.A.Chandrapala. 1986. "Performance in Agricultural Sector." In *Facets of Development in Independant Sri Lanka*, 219- 275. Colombo: Ministry of Finance and Planning.

Hathurusinghe, C.P.,Rambukwella,R., Vidanapathirana,R.,Somaratne,T.G. 2012. *Production And Marketing of Other Field Crops: A review.* Research Report No 144, Colombo: Hector Kobbekaduwa Agrarian Research and Training Institute.

Hathurusinghe, L.K. 2010. "Agriculture Extension in Sri Lanka." *Workshop on Rural Development for High- Level Officers of AFACI member countries.* Suwon,Korea.

Henegedara, G.M. 2011. "Agricultural Globalization, WTO policiesand Domestic Agriculture in Sri Lanka." In *Agriculture and Rural Development in Sri Lanka,A Felicitation Volume in Honour of Dr.S.M.P Senanayake*, by Wijithapure Wimalaratana, 27-45. Colombo: Development Resource Center, Department Economics,University of Colombo.

Herring, Ronald J. 1987. "Economic Liberalization Policies in Sri Lanka: International Pressures,constraints & Supports." *Economic& Political Weekly ,Vol 22,No8*, February 21: 325-333.

2009. "History And Development of Agricultural Extension" In *AEM 5246 Agricultural Extension , Unit 1*, pp 5. The Open University of Sri Lanka.

Jayaratne, Lionel. 1992 . *Agricultural Taining Institutes in Sri lanka.* staff papers ,study No 92-06, Colombo: Office of the Agriculture & natural Resources, United States Agency for International Development.

Jayasuriya, L. 2004. "The Colonial Lineages of the Welfare State." In *Economic Policy in Sri Lanka: issues and Debates*, by Saman (ed) Kelegama, 403-421. Sage Publications.

Kashem, M.A. 2009. "Global advancement in Knowledge and Information Management for Meeting Farmres' Needs with Special Empahasis to Technology Transfer Process in Bangladesh." *Agricultural Extession Conference.Experiences and Challenges in Agricultural Extension:Maeeting Farmer Needs.* Peradeniya Sri Lanka.: Sri Lanka Agricultural Extension Assosciation (SLAEA). 1- 18.

Krantz, Lasse. 2001. *The sustainable livelihood appraoch to poverty reduction.* Swedish International Development Coorporation Agency.

Lindara, L.M.J.K. 2016. "Strategies for Enhancing Governance of Extension and Advisory Services in Export Agriculture Sector." *National Conference in Agricultural Extension - 2016.* Kandy: SriLanka Agricultural Extension Association. 1-14.

Lipsky, Michael. 1980. *Street Level Bureaucracy: Dilemmas of the Individual in Public Services.* New York: Russel Sage Foundation.

M.K.Nadeeka Damayanthi, V.K.Nanayakkara. 2008. *Impact of the Provincial Counci System on the Smallholder Agriculture in Sri Lanka.* Research Study No 126, Sri Lanka: Hector Kobbekaduwa Agrarian Research and Training Institute.

Mahaliyanaarachchi, R.P. 2002. "Agricultural Extension Service in Sri Lanka." *BeraterInnen News* 10-15.

Murray, F.J., Little.D.C. 2000. "The lowland dryzone of Sri Lanka; site for study of Aquaculture Development within farmer managed irrigation systems and methodology for participatorysituation appraisal." working paper SL 1.1, project R 7064.

Muzari, W.,Gatsi,W,Muvhunzi,S,. 2012. "The impacts of technology adoptions on smallholder agricultural production in sub saharan Africa;A reveiw." *Journal of Ssustainable Development* (Canadiian Center for Science and Education) 5 (8).

Narayanasuwami, C. 2000. "Capacity building for Agricultural Development ." In *Hector Kobbekaduwa Felicitation Volume*, by S.G.(ed) Samarasinghe, 73-106. Colombo: Hector Kobbekaduwa Trust.

Osman, B.E.,Ahamad,N.G.,Zakieldin,S. 2005. *sustainable Livelihood Approach for Assesssing Community Resilience to Climate Change.* Working Paper No 17, Sudan: Higher Council for Environment and Natural Resources.

P.L.Yapa, H.K.S.G. Gunadasa, G.N.L.M.Ranasinghe. 2014. "Sustainable Development in the North Central Province of Sri Lanka Through Ecological Agriculture." *International Journal of Geology Agriculture and Environmental Sciences Vol 2,issue 3* .

Panabokke, C.R. 2009. *Small Village Tank Systems of Sri Lanka: Thier Evolution,Setting,Distribution and Essential Functions.* Special Publication, Colombo 07: Hector Kobbekaduwa Agrarian Reseach and Training Institute.

Peiris, G.H. 2006. *Sri Lanka : Challenges of the New Millenium.* Kandy: Kandy Books.

Raddon, Arwen. 2010. *Early Stage Research Training: Epistomology & Ontology in Social Science Research,Generic Skills training for Research Students.* Center for Labour Market Studies ,College of Social Science , University of Leicester, Leicester, February.

Rasheed, Sulaiman., and Kristin. Davis. 2012. *"The New Extensionist"Roles,Strategies and new capacities to strengthen Extension and Advisory Services.* Switzerland: Global Forum for Rural Advisory Services(GFRAS).

Reddy, M.N. 2009. "ATMA model:A current approach in agricultural extension in India." *Experience and Challenges in Agricultural Extension: Meeting Farmer Needs.* peradeniya, Sri Lanka: Sri lanka Agricultural Extension Association. 19-33.

Rogers, Everett. 2003. *Diffusion of Innovation.* 5th edition,Simson & Schuster.

Samansiri, B.A.D,. 2016. "Status of Advisory and Extension Services in the Tea Sector." *National Conference in Agricultural Extension-2016.* Kandy: Sri Lanka Agricultural Extenion Organization. 1-4.

Samarasinghe, S.W.R.de A. 1977. *Agriculture in the Peasant Sector of Sri Lanka.* Peradeniya: Ceylon studies Seminar.

Saminathan, V. n.d. *National Study Sri Lanka.* Nugegoda: Helvetas Sri Lanka.

Sandaratne, Nimal. 2004. "Agricultural Development:Controversial Issues." In *Economic Policy in Sri Lanka; Issues and Debates*, edited by Saman Kelegama, 195- 212. New Delhi/Thousand Oaks/London: Sage Publications.

Scoones, I. 2009. "Livelihoods Perspectives and Rural Livelihoods." *Journal of Peasant Studies, vol.36, No1.*

Scoones, I. 1998. *Sustainable Rural Livelihoods: A Framework for Analysis.* IDS Working Paper 72, Brighton: Institute of Development Studies , University of Sussex.

Scoones, Ian. 1998. *Sustainable rural livelihoods, A framework for analysis, IDS working paper 72.* Sussex, UK: Institute of Development Studies.

Silva,K.T.,Silva,S.B.D.de.,Kodithuwakku,S.,Razaark,M.G.M.,Ananda, J.,Gunawardena,I.M.,Lux,D. 1999. *No Future in Farming? The Potential Impact of Commercialization of Non Plantation Agriculture on Rural Poverty in Sri Lanka.* Kandy: Centre for Intersectoral Community health Studies (CICHS).

Singh, Chandni.,Dorward,Peter.,Oshabr,Henny. 2016. "Developing a holistic approach to the analysis of farmer decision making - Implications for adaptation policy and practices in developing countries ." December 31: 329-343.

Somaratne, W.G. 2002. "Globalization and the Sri Lankan Agriculture: Challenges and Opportunities." *Sri Lankan Agriculture for the Next Decade: Workshop on Agriculture and environmental resource Management Division.* Colombo: Hector Kobbekaduwa Agrarain Research and Training Institute (HARTI). 11-22.

Soren Kopke, Sisira withanarachchi, Pathiranage Ruwan Chandana wickremaarachchi,Angelika Ploeger. 2015. "Political Ecology of Irrigation Agriculture in the DryZone Sri Lanka." *XV IWRA water World Conference.* Edinburgh,UK.

Sulaiman, Rasheed V and Hall, Andy. 2005 . "Extension Policy at the National Level In Asia." *Plant Prodcution Science 8(3)* 308-319.

Swanson, Burton,E. 2006. "The Changing Role of Agricultural Extension in a Global Economy." *Journal of International Aricultural Extension Education* 6-17.

Syed Sajidin Hussain, Derek Byerlee,Paul W.Heisey. 1994. "impacts of the training and Visit System on farmers' knowledge and adoption of technology: Evidence from Pakistan." *Agricultural Economics 10 , Elsivier* 39-47.

Syed, S.H., Derek,B., Paul,W.H. 1994. "Impacts of the Training and Visit Extension System on Farmers'Knowledge and Adoption of Technology:Evidence from Pakistan." *Agricultural Economics* 39-47.

W. Goonaratne, P Wickramasekara,M Samad,C.M.Wijayaratne. 1980. *Rainfed Farming in the Dry Zone of Sri lanka ; A case study of two village clusters in the North central Province.* Research Study No 36, Colombo: Hector Kobbekaduwa Agrarian Research & Traiing Institute.

Wanigasundara, W.A.D.P. 2015. *Status of Extension and Advisory Services in Sri Lanka , AESA working paper 2015-001.* Agricultural Extenssion in South Asia (AESA).

Weerakkody, P.R.,Kumara,S.K.,Wickremasinghe, W.D. 2011. *Adoption of Parachute Technology by the Farmers in Anuradhapura District.* Research Report , Colombo: Hector Kobbekaduwa Agrarian Research and Training Institute (HARTI).

Weerakoon, L. 2012. *Sustainable Homegarden Development-Grow it Right.* Movement for Land and Agricultureal Reforms (MONLAR).

Weerawardana, I.K. 2000. "Hector kebbekaduwa and the Land Reform Programme in Sri Lanka." In *Hector Kobbekaduwa Felicitation Volume*, by S.G. Samaranayake, 51-66. Hector Kobbekaduwa Trust Fund.

Weinberger, K.,Lumpkin,T.A. 2005. *Horticulture for Poverty Alleviation - The Unfunded Revolution, .* Working Paper No 15, Taiwan: The World Vegetable Center, AVRDC.

Wickramasooriya, B.C.,Kendaragama, K.M.T.,Wijayathilaka. 2009. "Approaches adopted in rural transformation related to livestock sector." *Agricultural Extension Conference 2009.* Kandy: Sri Lanka Agricultural Extension Association. 98- 11.

Wickremasinghe, S.I. 2006. "National Agricultural Research System in Sri Lanka with special reference to food crop subsector; issues related to Science Policy." *Journal of the National Science Foundation of Sri Lanka 34 (2).*

Wijedasa, K.H.J. 2000. "Impact of Rural Landlessness and Land Tenure on Domestic Agriculture." In *Hector Kebbekaduwa Felicitation Volume*, by S.G. Samarasinghe, 29-40. Colombo: Hector Kebbekaduwa Trust.

Wirasinghe, S.,Emitiyagoda,S,S. 2000. "Rice Productivity Improvement in Sri Lanka: Yaya (Tract) Programme." *ASDA* (Department of Agriculture) 295-408.

Zoysa, de S. 2014. "Private Sector Involvement in Agricultural Extension." In *Agricultural Extension: Recent Interventions for Development in Sri Lanka.*, by M.,Mahaliyanaarachchi,R.P Wijeratne, 32-48. Kandy: Sri Lanka Agricultural Extension Association (SLAEA).

ii. webresources

Arpita, Saha. 2008. "Role Perception: The role it plays." *SSRN.* Accessed 05 14, 2017. https://ssrn.com/abstract=1106548.

Bhattacherjee,Anol,2012 *"Social Science Research:Principles,Methods, and Practices''*. Textbooks Collection.Book 3.http://scholarcommons.usf.edu/oa_textbook/3

Connolly, Michael. n.d. "Private Extension and Private -Public Partnerships." *worldbank Web Site.* http://siteresources.worldbank.org.

Department of Export Agriculture. 2010. *Training.* June 17. Accessed November 20, 2017. http://www.exportagridept.gov.lk.

Department of Agriculture. n.d. http://www.doa.gov.lk.

Soil and Land Development . n.d.Accessed 10 20, 2017. http://www.wikigoviya.goviya,lk.

Department of Census and Statistics. 2016. *District Statistical Handbook.* Accessed 10 21, 2017. http://www.statistics.gov.lk.

Department of Irrigation. n.d. Accessed 10 21, 2017. http://www.irrigation.gov.lk.

DIFID. 1999. *DIFID Sustainable Livelihood Guidance Sheets.* Accessed March 27, 2013. http://www.enonnline.net.

E.Eramus. n.d. "Summary of Street Level Bureaucracy Thoery." *Health Policy and Systems Research web site.* Accessed November 24, 2017. http://www.hpsa-africa.org/images/Street_level_bureaucracy_final_for_web.pdf.

"History of Sri Lanka." n.d *http://mahavamsa.org/history-of-sri-lanka/.* Accessed 07 29, 2017.

IUCN. 2016. *Ecological Restoration of Kapiriggama Tank System.* Accessed 06 11, 2018. http://iucnsrilanka.org.

M.K.Trochim, William. 2006. *Research Methods Knowledge Base.* www.socialresearchmethods.net/kb/

Naibalcelao, Deola. 2013. "The Sasakawa Africa Fund for Extension Education (SAFE)." *MEAS HRD Case Study series, No1.* January 13. Accessed 10 06, 2018. www.meas.extension.org.

North Central Provincial Department of Agriculture. 2015. *North Central Provincial Department of Agriculture web site.* 7 22. Accessed 11 15, 2015. http://www.agridept.nc.gov.lk.

Ministry of Agriculture and Coorporatives,Republic of Zambia. 2009. "Participatory Extension Approach, Filed Implementation Manual." https://www.g-fras.org.

Ministry of Agriculture. 2016. *Food Production National Program 2016-2018.* August 25. Accessed 07 04, 2016. www.agrimin.gov.lk.

Modernizing Extension & Advisory Services(MEAS). 2015. "Extension & Advisory Services Terminology and Glossary." *MEAS website.* Accessed June 10, 2018. www.meas.extension.org.

P.M.Wijerathne. 2011. "Dry Farming- Untapped Potential in dry zone for field crops." *Colomboherald.* Accessed November 15th , 2017. http://www. colomboherald.com.

Qamar, M.K. 2012. "Worldwide Extension Study." *Global Forum for Rural Advisory Services (GFRAS) web Site.* August. Accessed January 28, 2016. http://g-fras.org.

Rivera, W.M,Qamar,M.K. 2003. "Agricultural Extension,Rural Development and the Food security Challenge." *FAO website* . Accessed 06 10, 2018. www.fao.org.

Soil and Land Development . n.d.Accessed November 27, 2017. http://wikigoviya.goviya.lk.

Sujatha Premaratne, G.G.C.Premalal. n.d. "Climate & AgroEecological Zones." *Food and Agriculture Organization website.* Accessed 08 07, 2017. http://www.fao.org.

Toner, A. 2003. "Exploring Sustainable Livelihood Approaches in relation to Two Interventions in Tanzania." Accessed 10 02, 2015. www.interscience.wiley.com.

Toner, A. 2003. "Exploring Sustainable Livelihood Approaches in relation to Two Interventions in Tanzania." Accessed 10 02, 2015. www.interscience.wiley.com.

Wijeratne, P.M. 2011. "Dry Farming : Untapped potential in dry zone for field crops." 6. Accessed 08 13, 2017. http://www.colomboherald.com.

World Bank. 1992. "Sri Lanka -Second Agricultural Extension Project ." *world Bank web site Washington,DC.* http://documents.worldbank.org.

http;//www.navagoviya.org. 2014. Accessed 08 13, 2017.