# Permanent Crop Clinic Programme
# An Evaluation

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# FOREWORD

A strong extension service is a great necessity for a healthy and productive agricultural sector for a country. The prevailing system of extension which is in place has been grossly inadequate to meet the smallholder farming communities' need for information and advice on pest and disease diagnosis and management. A novel approach initiated world-wide and in Sri Lanka to provide solutions to pests and disease problems of farmers is the plant clinic or crop clinic. It is at this clinic or center where examination and diagnosis of samples of disease plans brought in by farmers are carried out and advice and solutions to pests and disease are provided.

This study evaluates whether this programme is an effective extension approach for pest and disease control in crop production. While discussing the pros and cons of the present programme the authors have discussed in detail how remedial measures can be instituted to make improvements to benefit the programme and the farming community. The report shows that through crop clinics there is a step towards a sustainable and pest free food crop sector.

**Haputhanthri Dharmasena**
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# EXECUTIVE SUMMARY

Permanent Crop Clinic programme is a plant pest and disease diagnostic and recommendation service implemented through farmer group structure called the Crop Clinics (CCs). Commencing in 2012 as a pilot project in Hambantota and Matara district, the crop clinic programme has today become an institutionalized extension programme in both provincial and inter-provincial extension areas covering all Agriculture Instructor ranges of the country. This study was based on a sample of 373 crop clinic participants chosen from Matara, Matale and Trincomalee districts.The study was carried out with the objective of evaluating whether crop clinics is an effective extension approach for pest and disease control in crop production. This was achieved by evaluating the activities and the extent to which the program has accomplished the objectives for which it was set up and the constraints and problems of the program.

From the farmers' point of view, the importance of crop clinics are twofold: its role as an extension tool and its contribution to promote sustainable agriculture. CCs is a unique educational experience for farmers since recommendations are made based on diagnosis of live samples and the recommendations are relevant and implementable at a low cost. Crop clinics encourage a greater interaction with extension personnel, which leads to sharing of knowledge on the pest and disease problems in the area and a method to gain new knowledge. It was found that CCs have educated farmers on the use of non-chemical pest control methods which had helped prevent farmers from applying pesticides unnecessarily with an ultimate reduction in the cost of production and lessened the necessity of crop clinic participants to depend on pesticide traders for advice. CCs had contributed to lessen crop damages, an increased yield and thereby an increase in income from farming.

The study finds that some of the objectives of setting up the crop clinic program have been achieved to a certain degree, however, the broader intention which is to pave the way for a sustainable and pest free food crop sector is lagging behind. To accomplish this, there is a necessity to expand the scope of CCs from present level of targeting subsistence farming to include commercial agriculture by greater collaboration between research and extension and research on IPM for vegetables and OFCs grown at large scale.

In order to minimize the existing weaknesses and to improve the effectiveness of the present program the study proposes: (a) The frequency of conducting CCs should take into account the adult education principle where repeated education is a must; (b) Timing of CCs is important and the critical phases of crop growth and maturity stage of crops is when CCs should be held; (c) Content of crop clinics should be geared to suit the target group i.e. thorough exposure of major crop growers through demonstrations on prevention, identification and control of pests and diseases; (d) Use of advanced teaching aids such as multimedia, lenses, leaflets and screening of videos and demonstrations; (e) Frequent and thorough training of extension personnel with all the

new knowledge on pest and diseases; (f) Ensure the ability to identify pest and disease incidence before it develops into an epidemic by expediting the mapping exercise by the HORDI.

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# ABBREVIATION

| | | |
|---|---|---|
| AI | - | Agricultural Instructor |
| ARPAs | - | Agricultural Research and Production Assistants |
| ASC | - | Agrarian Service Centre |
| ASD | - | Agrarian Services Department |
| CABI | - | Centre for Agricultural Bio-science International |
| CCs | - | Crop Clinics |
| CMI | - | Commonwealth Mycological Institute |
| DATC | - | District Agricultural Technical Committee |
| DOA | - | Department of Agriculture |
| GNDS | - | Grama Niladhari Division |
| GPC | - | Global Plant Clinic |
| HARTI | - | Hector Kobbekaduwa Agrarian Research and Training Institute |
| HORDI | - | Horticultural Crop Research and Development Institute |
| IPM | - | Integrated Pest Management |
| NGOs | - | Non-Government Organizations |
| OM | - | Organic Manure |
| PC | - | Plant Clinic |
| PCCCs | - | Permanent Crop Clinic Committees |
| PCCP | - | Permanent Crop Clinic Programme |
| PCs | - | Plant Clinics |
| PDOA | - | Provincial Departments of Agriculture |
| SMO | - | Subject Matter Officers |
| T&V | - | Training and Visit |

# CHAPTER ONE

# Introduction

## 1.1 Study Background

Plant or Crop Clinics are an initiative by the Centre for Agricultural Bioscience International (CABI) an international non-profit organization established to reduce crop losses of farmers. In Sri Lanka Permanent Crop Clinic Programme (PCCP) was initiated by the Department of Agriculture (DOA), the Provincial Departments of Agriculture (PDOA) and the Agrarian Services Department (ASD), with support OF CABI. The PCCP follows the model already established by CABI in countries of Asia, Africa and Latin America and advises farmers on pests and diseases affecting a crop and develops solutions to help mitigate crop losses.

On the request of the Horticultural Crop Research and Development Institute (HORDI) of the DOA, an ongoing evaluation of this PCCP in the country was conducted by the Hector Kobbekaduwa Agrarian Research and Training Institute (HARTI). This report was prepared based on the evaluation carried out by HARTI to help determine the extent to which farmers have utilized the services of the PCCP and whether this programme has been able to fulfill the objectives for which it was originally established. It could also be a guideline for the DOA to plan further improvement of the PCCP to assist farmers in maintaining healthy crops.

## 1.2 Permanent Crop Clinic Programme

Agricultural policies of most countries have focused on promoting Integrated Pest Management (IPM) as a pest control strategy in an effort to stem the misuse of pesticides in cultivation of crops. It has proven to be successful as it has decreased the reliance of farmers on the use of chemicals for the control of pests and diseases. IPM was used as the key strategy for pest and disease control in the PCCP which was implemented at field level through Permanent Crop Clinic Committees (PCCCs) organized for agricultural instructor ranges. The service rendered through these PCCCs was a plant pest and disease diagnostic and recommendation service for farmers, which was termed as Crop Clinics (CCs) or Plant Clinics (PCs). In plant clinics after a thorough examination and analysis of sample plant materials for fungal, bacterial, viral, nematodal or for any other pathogens, recommendations are given on how to treat the diseased plant. It focuses on controlling pests and diseases; maintaining the soil health and encouraging healthy agricultural practices to improve the plant and soil health.

The PCCP commenced in 2010 in Sri Lanka as a pilot project in the Southern Province in the Hambantota district, after which the PCCP spread to eleven districts in the Central, Eastern and Northern provinces of the country. These networks of free crop clinics were

established to help farmers to take care of plant health. A PCCC is staffed generally with four members/officials who are termed as plant doctors as crop clinics resembling the model of human health clinics. There is an Agricultural Instructor (AI) in the area, who is designated as the Team Leader, and two Agricultural Research and Production Assistants (ARPAs) and a farmer. All members undergo training with regard to the concepts and practical aspects of crop clinics. There are 104 plant doctors, working in the present 26 PCCCs in the districts of Hambantota and Kandy. In 2011, the programme was extended to Matale, Matara, Nuwara Eliya, Trincomalee and Batticaloa and Vavuniya districts and there were 48 PCCCs and 192 plant doctors. It was expected to complete the first phase of this programme, which is the implementation of the PCCP in each district within a four year period from 2010 to 2012. It was originally anticipated that 20 crop clinics will be conducted by each crop clinic committee per annum. The target per crop clinic was 50 farmers, therefore, what was envisaged was each PCCC would reach 1000 farmers per district per year. Generally, crop clinics function at the Agrarian Service Centre (ASC) or at any convenient place in the village.

Initially what set in place was a programme run by the HORDI through which 12 PCCP were to be set up for a district. This system was replaced in 2012 when the CC now called the Plant Clinic (PC) was set up in each AI range. The PC is now conducted by the AI who is termed as the 'Plant Doctor'. Farmers bring in diseased samples of plants which are identified, recorded and prescription slips with recommended treatment are then given to the farmer. Unlike in the previous system, it is solely AI who conducts a PC for the farmers.

The present system is in place only in a few districts to date (June 2014) with the other districts intending to switch to the new system in the near future. The present PCCP is managed under the aegis of the Plant Protection Services.

In setting up of the clinics what is expected is given below:

1. Providing recommendations for the control of pests and diseases immediately based on correct diagnosis at the crop clinics, thereby decreasing the cost of production due to excessive application of pesticides.
2. Prevention of farmers' dependence on private traders for advice on pesticide use.
3. Help farmers to reduce crop damages due to pest and diseases and thereby increase farmer income.
4. Ensure farmers' ability to have an increased understanding on the pest and disease problems in the area.
5. Ensure the ability to identify such occurrences before they it develop into an epidemic.
6. Minimize damage to the environment due to use of pesticides unnecessarily.

## 1.3 Objective of Evaluation

The main objective of this study was to evaluate whether PCCP is an effective extension approach for pest and disease control in crop production.

More specifically:

- To evaluate the activities of PCCCs.
- To assess the extent to which the PCCP has accomplished the initially outlined objectives.
- To identify problems and constraints of the crop clinic programme.
- To draw lessons from the PCCP and make recommendations on its continuity and/or for further improvement of this approach as an effective extension tool in promoting sustainable farming in the country.

## 1.4 Methodology

### 1.4.1 Study Location and Sample Selection:

The PCCP had been implemented in 12 districts in the country by 2013. For the purpose of this study, three districts from three provinces from where the programme was initially implemented were chosen. The districts are Matale, Matara and Trincomalee from the Central, Southern and Eastern provinces respectively. In the districts of Trincomalee and Matale, of the 12 PCCCs established half the number, which totals 6 PCCCs per district, was selected for the questionnaire survey. In the case of Matara district, 6 AI ranges were selected. Taking into consideration that each PCCC conducts an average of 10 crop clinics per year, 20-25 farmers per PCCC those who had participated in the crop clinics were interviewed to obtain their opinions about the programme. From the lists provided of participants of CC by the AI random sampling technique was used to select the required sample. The sample consisted of 123 farmers from Matale and Matara and 127 from Trincomalee districts. This totaled 373 farmers who had participated in crop clinics from the 3 districts.

Similarly, 10 farmers who had not participated in the PCCCs were randomly selected and interviewed. There were a total of 178 farmers**.** In addition, data was collected from 25 AIs and eight ARPAs from 30 AI divisions in 18 ASCs in study districts.

### 1.4.2 Data Collection

The data collection procedure comprised three major elements: (1) Focused questions (2) Events observation (3) Questionnaire survey.

**Events Observations:** The research team participated in a crop clinic to observe the process of CCs, farmer participation, involvement of officials, resource use and farmer

responses while they are engaged in learning activities. Personal interactions, non-verbal indicators of interest or paying/attention, leadership roles, performance levels, and conflict indicators were also noted.

**Key Informant Interviews Including Oral Histories and Storytelling:**
Interviews with key informants and farmer representatives helped in-depth exploration of the issues. Officials such as the AIs, ARPAs, SMOs and Deputy Directors of the DOA who performed as PCCP coordinators and Provincial agricultural directors were interviewed as key informants. Questions were open-ended to ensure in-depth unique responses are generated, which in turn provided information regarding reasons why the activities are viewed differently by different key informants. Individual oral histories with district leaders, inventor of PCCP and officials from the plant protection centre of the DOA revealed patterns of practice and the use of resources for this extension activity.

**Questionnaire Survey:** A survey was carried out for data collection that incorporated a structured questionnaire. This helped evaluate the extent of practice, preferences for appropriate technology and expectations regarding the future shape of PCCP.

### 1.4.3 Data Analysis

Data was coded and then entered and analyzed with the use of SPSS 20 statistical package.

## 1.5 Study Limitations

Even though it was expected to extend the study to analyze the impacts of PCCP on farmer income or reduction in the cost of pest control it was abandoned as no such marked changes were observed**.**

## 1.6 The Report

In addition to the introductory chapter, the rest of the content of this report is organized into five chapters. Second chapter attempts to explore the historical background and present context of implementing crop clinics worldwide, critically exploring the advantages and disadvantages and various other aspects. Chapter Three brings a description on implementation of PCCP in Sri Lanka. Chapter Four and Five present the perspective of learners and extension educators on PCCP respectively. Conclusions with recommendations are presented in the Chapter Six.

# CHAPTER TWO

# Crop Clinics as an Extension Tool

## 2.1 Introduction

For a healthy and productive agriculture sector which would meet the demands of country's market a decisive factor is a strong extension service. As most extension services worldwide and especially in the Asian sub-continent have been seen as being widely inadequate to meet farmers' demands a novel approach to address plant health problems was the crop clinics. These clinics were established for farmers to obtain information and advice on pest and disease diagnosis and management. This chapter explores the concept of crop clinics and the operation of these clinics worldwide and the pros and cons in setting up and administrating of the clinics.

## 2.2 Characterization of Crop Clinics

The plant clinic or crop clinic as they are referred to in Sri Lanka is a novel approach to provide solutions to pests and disease problems of farmers. A crop clinic is a centre where examination and diagnosis of samples of diseased plants brought in by farmers are carried out and advice and solutions for pests and diseases are provided.

The objectives of the programme were to enhance crop production by reducing production costs by either reducing or altogether shunning the use of agro-chemicals and controlling pests and diseases through natural and least harmful methods, thereby curbing environmental pollution and finally increasing rural household income**.**

Once a diseased sample is diagnosed, a safe affordable and locally available pest management solution is recommended. The recommendations follow the principles of IPM wherein initial pest control recommendations could be herbal, biological or mechanical methods. Chemical treatments with inorganic chemicals are recommended only in cases where other methods were deemed unsuccessful. Agrochemical recommendations are prescribed in writing, hence farmers can purchase them without consulting the pesticide traders. In case of a difficulty in diagnosing the diseased sample it is sent to the plant protection centre of the DOA for further examination and remedies.

Modeled on the human healthcare system crop clinics were viewed as the building blocks for a public plant health service. This was seen as a means to set up coordination between extension and research. The concept of the clinics and services were 'intended to be set up by demand' therefore whenever a need arose among the community a clinic was to be initiated.

## 2.3 Crop Clinics Worldwide

In Bolivia in 2000, a spread of potato pests led to a diagnostic laboratory being set up by a research organization called CIAT Santa Cruz (Centro de Investigación Agrícola Tropical). Local farmers began seeking help on all crop problems, to which scientists asked farmers to bring in samples of diseased plants for analysis and wrote recommendations out on a prescription pad, following the example of rural doctors everywhere. By 2009 there were eight plant clinics in Bolivia, serving over 6,000 farmers, and the idea had spread to nine countries in Latin America, Africa and Asia.

A system of plant clinics were developed by the Global Plant Clinic (GPC) in developing countries to bring accurate, up-to-date information to farmers; thus enabling them to care for their crops in the most effective way (DIFD 2013). The GPC grew out of the "diagnostic and advisory service", of the Commonwealth Mycological Institute (CMI) and is managed by CABI which is a non-profit organization having scientific research, publishing and international development at its core.

Even though plant clinics have been in operation in the developed countries such as the United States and in Europe, the network of plant clinics for the developing world emerged only in 2003. Starting with Bolivia the concept of plant clinics quickly spread to Nicaragua and Bangladesh. By 2013, there are more than 30 countries which have established clinics. Plant clinics should not be/are not development projects but a service; a new way to share information with farmers (Bentley *et al,* 2010). Despite intensive pest management efforts, about 50 percent of the world's crops are lost to pest and diseases, at an estimated annual cost of about $ 400 billion.

Around the world plant clinics function in collaboration with different agencies: Bolivia the clinics are managed by three institutions, in Nicaragua the government collaborates with farmer organizations, Non-Governmental Organizations (NGOs) and other agencies while in Uganda various agencies such as Caritas are involved. In the Asian subcontinent, Bangladesh has three schemes, one managed by an institute of the central government and the local municipal government, and two by NGOs. Vietnam has a small but stable plant clinic system based at a central government research and development agency in the Mekong Delta Nepal hosts regular as well as mobile plant clinics through NGOs with increasing involvement of the central and provincial governments. India has a public-private partnership with a private company which is developing bio control and natural pesticides.

In most of the developing countries clinics are conducted in public places mainly a market since these places are frequented by farmers. In most parts of the developing world the clinic generally constitutes a table and chairs and in most cases a banner displaying the name of the clinic. This is done on the basis that cost incurred should be kept at its minimum with more services being rendered to the farmer.

## 2.4 Advantages and Disadvantages of Crop Clinics

The crop clinics have a novel method in the delivery process of agricultural extension services. Designed initially to counter problems of plant disease and pest control this has extended to act as a means through which agricultural information is also disseminated to farmers. In countries where resources are scarce for extension services and there is an accessibility problem of farmers to extension personnel and vice versa, crop clinics have proved to be efficient and successful. Plant clinics are seen as a link between extension and research, which could reach more farmers using the existing resources more efficiently.

Normal extension services work with chosen groups of farmers or individuals chosen for given sessions while the rest do not receive the first hand interaction. However in crop clinics any farmer can seek help and advice when required. Some of the plant doctors are farmers or farmer leaders themselves.

Various evaluations of crop clinics carried out worldwide have shown an array of advantages from increased incomes to building capacity of farmers. A Bolivian study has shown how potato farmers improved their incomes while being benefited by an average of $800 per hectare per year. Similarly in Bangladesh farmers have seen a 24 percent increase in net income**.** There have been cases of reduced applications of pesticides in Bolivia. In South Asian countries crop clinics have helped improve gender equality by giving farmers direct access to independent and professional advice (http://www.plantwise.org).

One of the drawbacks observed in most countries of the present plant clinic system is the project approach which has led to the system being viewed as an isolated project. As the plant clinics have not been amalgamated into the extension system of the respective country there is generally a lack of human and physical resources, thus limits the frequency of crop clinics which can be held in any given instance.

## 2.5 Necessity of Crop Clinics in the Sri Lankan Context

There have been a number of approaches to extension delivery practiced over the years. Under the DOA in the 1980s the Training and Visit (T&V) Extension System was adopted. Then came the village-level extension workers (Krushikarma Viyapthi Sevakas) and in 1989 extension was devolved to the provinces. Thus the extension system in the country is complex and what is in place is a top-down and supply driven approach to most programmes and activities (Abeywardena, 2006). But due to various factors, extension has been limited to the farming community, affecting farmers and their productivity and profitability of farming.

The number of farmers to be covered by each AI varies depending on the geographical location. Due to an array of duties and various ongoing programmes and the lack of

resources available to the AI, there is very little contact that the extension officers have with the farmer and in most cases it was seen as grossly inadequate.

In certain remote areas located away from ASCs there are farmers who had never heard from their agricultural officers. There are other farmers who, if not involved in any ongoing agricultural programmes, have never met the officers. In the officers' perspective, due to limited resources they have never been able to visit farm fields which are situated in remote areas.

This has led to a dependence of farmers on private chemical dealers for advice with regard to farming. From the type of seeds to be used for cultivation to control of pests and diseases the farmers sought advice and instructions from the dealer. With the overuse of chemicals and thereby high expenses incurred, farming had gradually develop into an unprofitable venture to the community. In addition, the environmental consequences of the seepage of chemicals have had disastrous effects on the health of the farming community.

Initially established in 2010 in the Hambantota district, the programme was designed for enhancing crop production, reducing risk of crop failure by pests and diseases thereby increasing rural household income and minimizing environmental pollution resulting in due to use of agro-chemicals**.** An important factor of crop clinics that has been most effective is the accessibility of the farming community to obtain timely solutions to problems of pests and diseases affecting the crops. This programme as stated earlier has been initiated in more than 15 districts in the country at present.

## 2.6 Importance and Approaches for Evaluating Extension Programmes

There are several alternative approaches to extension programme evaluation. The correct choice is important because for each there are different opinions about the type of data that needs to be collected, how the data is to be collected and how to make judgements about the success of the programmes.

There are seven major approaches: (1) expert model (2) goal-free model (3) attainment of objectives model (4) management decision model (5) naturalistic model (6) experimental model and (7) participatory evaluation model (Brunner & Guzman, 1989; Greene, 1988). Of the foregoing approaches what was thought to be best fitted for the evaluation of the crop clinic programme was the naturalistic model.

Naturalistic model assumes that a programme is a natural experiment and that the purpose of evaluation is to understand how the programme is operating in its natural environment. According to Rubin (1982) there are three phases in the naturalistic evaluation: the familiarization phase, the action phase and the synthesis phase.

In the initial phase or familiarization phase the evaluator gets a basic idea of the field where to focus the study on by developing a system. While in the action phase through observation, interviewing and document reviewing the issue, the required data is conceptualized, categorized and analyzed and then proceeds to the final phase which is the synthesis of findings.

There is an assumption that programmes are negotiated realities among the significant stakeholders and that evaluation serves this value-laden negotiation (Cronbach, 1981; Guba & Lincoln, 1989). Data should be collected and analyzed from multiple perspectives. A point of the naturalistic method is that multiple viewpoints and values of respondents are carefully analyzed and presented.

Therefore the outcome of the evaluation is dialogue concerning disagreements about all aspects of the programme where suggested changes in methods or activities are recorded. Many positive collaborative changes can be made through this model of evaluation if conflict resolution skills are combined with evaluation. Another purpose of this model is to diagnose or to identify the causes for certain behaviour of some farmers, agency staff, or other development actors (Murphy & Marchant, 1988).

# CHAPTER THREE

# Permanent Crop Clinic Programme in Sri Lanka

## 3.1 Introduction

This chapter describes in detail the implementation of the crop clinic programme in Sri Lanka, the inputs allocated both physical and human and the districts in which the programme has been implemented. The chapter also includes in-depth details of the number of programmes conducted and the number of farmers who have participated in each district. Organizational/individual involvement, facilities, equipment, staff training, support from plant protection, organizational design, resource persons, and research knowledge dissemination are among the various aspects which are discussed largely based on the secondary data and key informant discussions for the three districts where the study was conducted.

## 3.2 Implementation of Crop Clinics in the Country

The PCCP commenced in Sri Lanka in 2010 beginning from Hambantota and Matara districts where 12 PCCCs were initiated. This was followed by the programme which has been extended to the districts of Matale, Kandy and Trincomalee and Nuwara Eliya in 2011, followed by the districts of Mullaitivu, Batticaloa, Ampara, Kegalle and Kalutara in 2012 and Anuradhapura in 2013. Each district initiated twelve PCCCs with certain districts having more than the required number. There are 172 crop clinic committees functioning to date in the twelve districts. Twelve crop clinics per year or rather one clinic per month were estimated as the requirement for a committee. But this has varied in the districts depending on the manpower availability (the number of AIs) and time constraints of farmers when they are involved in cultivation of crops.

In Sri Lanka each PCCC included the Agriculture Instructor from the area, two ARPAs and one farmer who was generally a farmer leader. District Deputy Directors (Agriculture) were appointed as coordinators for the programme in each district. The duties of the designated district coordinators were to collect information from the committees in the district, monitor their progress each month, tabulate the data on the computer and send it to the national coordinator. The coordinators provide the team members under their purview with relevant materials to enhance the quality of the clinics, and are responsible for further capacity-building of committee members with training and workshops.

The PCCP is a collaborative programme of research, extension and training and involves the plant protection centre of the DOA, Provincial Department of Agriculture (PDOAs and DAS in Sri Lanka and CABI in UK).

The PC programme which is in operation at present is manned by the AI of the area and 4 PCs are to be held each year. Unlike the prior PCCP where the AI, ARPA and a famer acted as the plant doctors in the present system, the CC is presided over only by the AI of the range.

### 3.3 Financial Allocation for Crop Clinic Porgramme

Given below in Table 3.1 are the details of financial allocation for the crop clinics held in the study locations.

**Table 3.1: Financial Allocation for Crop Clinic Programme in the Study Locations 2011-2013**

| District | Amount Allocated (Rs.) | | | Amount Spent (Rs.) | | |
|---|---|---|---|---|---|---|
| | 2011 | 2012 | 2013 | 2011 | 2012 | 2013 |
| Trincomalee | Nil | 250000 | 200000 | 21250 | 243472 | 179455 |
| Matara | 164800 | 144000 | 162000 | 121463 | 118085 | 49715 |

Source: Offices of the District Deputy Directors of Agriculture, 2013

As seen from the above table Matale district has had no separate allocation for the programme while Matara and Trincomalee districts have had an allocation for the crop clinic programme for 2011 and 2012 respectively. The amount allocated for the Trincomalee district has been considerably high. A reason is that in this district the programme has been coordinated and well received by the district in comparison to the other two districts. As funds required are minimal for the conducting of clinics and cash is required only for refreshment for the participants, a separate vote had not been allocated in the district. Most of the officers who conducted clinics had either utilized the funds of other programmes or combined crop clinic programme with other agricultural extension programmes.

Other allocations which were initially recommended to be used at each crop clinic are a microscope for the diagnosis of pests and diseases, a set of prescription books, caps and coats for the plant doctors and a banner. As there is a lack of funds allocated to the programme at the national level, the main appliances used for diagnosis are a small magnifying glass and a knife for cutting up diseased plant samples rather than the scientific method of using microscopes.

### 3.4 Permanent Crop Clinic Programme in Study Locations

As previously mentioned the support required for the running of a CC at a designated ASC is initially discussed at the level of the Provincial Ministry of Agriculture and at the District level initial yearly meeting. There is a financial allocation for CCs and all other

assistance is borne by the participating agricultural officers of the district and relevant research stations which are available.

The frequency of crop clinics varies from district to district with some districts holding clinics every month while other districts hold clinics only every season. This decision is taken after a discussion between farmers and officials depending on the cultivation pattern and need of the farmers. Given below is the description of how the surveyed districts conduct their clinics.

**Trincomalee District**: There are 47 AI ranges in the district and the number of Grama Niladhari Divisions (GNDs) covered are 230 (Table 3.2). The crop clinic programme is implemented on farmer group basis and 12 such farmer groups each representing 3-4 AI ranges have been formed for the purpose of crop clinics. Under a recent programme implemented islandwide, each group has been assigned a digital identification number.

During the initial stages only 3-4 crop clinics were conducted per month throughout the district. However, this has now changed with more clinics being held compared to the initial year of commencement (Table 3.2). Similarly, the farmer coverage has also increased per clinic from 0.6% in 2011 to 4.4% in 2013, evidence that there has been more dissemination of information about crop clinics and its usefulness among the farming community. It was originally expected to reach 1000 farmers per annum. The programme had exceeded the targets by reaching 2243 farmers in 2012 and 2652 farmers in 2013, reporting a considerable progress of 124% and 165% in two respective years. The number of GNDs in which CCs have been held also show a remarkable increase from 4% in 2011 to 24% in 2013.

The dates and the places for the advanced crop clinics programme are decided at the monthly progress review meeting held at the District Agricultural Technical Committee (DATC) held at the end of the month. The AIs working in the area are responsible for conducting the crop clinics for their respective areas. Clinics are conducted as planned unless there are requests from farmers to postpone due to emergencies such as funerals, and official meetings for the offices. Officials are reluctant to postpone dates, as it affects the attendance of higher officers at meetings.

**Matara District:** The district has 37 AI ranges but only 21 ranges have been included in the programme (Table 3.3). Initially in 2010, twelve AIs were trained from three zones of the Assistant Directors of Agriculture. From each zone only 3 AIs were initially trained due to lack of funds but by utilizing funds of other projects of the district all the AIs in the district underwent the training. In this district, crop clinics are held in each quarter thereby there are 4 clinics per AI per year. This arrangement was implemented having considered that conducting meeting every month would not be productive since only certain months in the crop calendar are crucial in terms of addressing the pests and disease attacks. Further, there are certain months when the land is left fallow before the commencement of the next crop, therefore it does not require any clinics. With the

number of clinics increasing and the concept becoming popular, number of farmers attending crop clinics have also increased. Another reason for better participation was the *Divineguma* programme which encourages homegardening. The crop clinics were seen as an outlet for advice for the farmers. There has been an increase in the number of farmers who have availed themselves of the crop clinic compared to the total number of farm families included in the PCCCs for the district and six percent have participated in the programme for 3 years when it was in operation. In the Matara district the targeted number of farmers (1049) has been reached only during the year 2011. In 2012 crop clinic programme in the Matara district under the PCCC the farmer coverage was 990 which was a slight decrease compared to the previous year. However, since the programme had an impact it was extended to all AI ranges in the district and there were 92 crop clinics reaching 1774 farmers throughout the district by the end of 2012. By the end of 2013 there were 56 crop clinics held in the district reaching only 1114 farmers in the district.

**Matale District:** There are 22 AI ranges and 2 interprovincial ranges in the district with 12 PCCCs for 12 AI ranges (Table 3.4). Of the 545 GNDs, 357 have been included in the 12 AI ranges where there are PCCCs.

The pattern of meeting which was initially recommended was 12 crop clinics throughout the year for each PCCC. With time the officials found that in the months of April and August which have proven to be busy months for both the farmers and officers, CCs cannot be conducted. To fulfill the requirement of the twelve meetings for the year in certain ranges two meetings per month were held.

The numbers of farmers participating in the CCs have increased from 2011 to 2012 as there was an added emphasis on homegardens through *Divineguma* programme. A decrease in 2013 can be attributed to the lesser number of CCs being held that year. The district has been able to reach the target in terms of farmer coverage which is 1000 farmers/year in the course of the programme.

## 3.5 Crop Clinic Procedure

### 3.5.1 Permanent Crop Clinic Committee

In general PCCCs consist of four members who are known as plant doctors. However especially in the North and Eastern provinces of the country where there are no ARPAs the crop clinic committee consists of AI from the respective AI range and other AI ranges in the district. In addition other officials such as Subject Matter Officers (SMO) and the Deputy Director Extension also constitute the committee.

## Table 3.2: PCCP Statistics in Trincomalee District: 2011 - 2013

| PCCC | Area and Personnel in each PCCC | | | | | 2011 | | | 2012 | | | 2013 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No of AI ranges included to the PCCCs | NO of GN divisions in the PCCCs | AIs available for PCCCs | No of AIs trained on PCCCs | No of farm families in the PCCCs | No. CCs held | GN divisions where CCs were held | Farmers participation at CCs | No. CCs held | GN divisions where CCs were held | Farmers participation at PCCs | No. CCs held | GN divisions where CCs were held | Farmers participation at CCs |
| Verugal/ Seruvilla | 6 | 25 | 3 | 2 | 6534 | 1 | 1 | 45 | 5 | 4 | 210 | 6 | 6 | 241 |
| Sampoor | 4 | 18 | 2 | 2 | 5154 | | | | 6 | 5 | 242 | 7 | 5 | 280 |
| Munnampodiveddai | 5 | 25 | 4 | 4 | 5178 | 1 | 1 | 68 | 5 | 4 | 160 | 4 | 4 | 170 |
| Kanthale | 5 | 19 | 5 | 5 | 8628 | 1 | 1 | 37 | 6 | 6 | 180 | 8 | 7 | 350 |
| Vanele | 2 | 4 | 2 | 2 | 2030 | 2 | 2 | 72 | 4 | 2 | 160 | 3 | 3 | 120 |
| Thampalagamam | 4 | 12 | 4 | 4 | 5419 | 1 | 1 | 34 | 4 | 3 | 172 | 4 | 4 | 180 |
| Nilaveli | 3 | 13 | 2 | 1 | 2707 | 1 | 1 | 27 | 5 | 4 | 190 | 6 | 5 | 252 |
| Kuchchaveli | 4 | 14 | 2 | 1 | 2252 | 1 | 1 | 28 | 5 | 4 | 210 | 4 | 4 | 172 |
| Kinniya | 5 | 31 | 5 | 5 | 9180 | 1 | 1 | 46 | 4 | 3 | 174 | 4 | 3 | 165 |
| Pankulam | 3 | 10 | 3 | 3 | 3028 | | | | 4 | 3 | 182 | 4 | 3 | 130 |
| Gomarankadawala | 4 | 20 | 3 | 3 | 6599 | 1 | 1 | 29 | 6 | 5 | 195 | 5 | 5 | 232 |
| Uppuveli | 2 | 39 | 1 | 1 | 3853 | | | | 5 | 4 | 168 | 8 | 6 | 360 |
| **Total** | **47** | **230** | **36** | **33** | **60562** | **10** | **10** | **386** | **59** | **47** | **2243** | **63** | **55** | **2652** |
| **Percentage** | **100%** | **100%** | **100%** | **92%** | **100%** | **NR** | **4%** | **0.6%** | **NR** | **20%** | **3.7%** | **NR** | **24%** | **4.4%** |
| **Average** | **NR** | **NR** | **NR** | **NR** | **NR** | **1** | **1** | **39** | **5** | **4** | **48** | **5** | **5** | **42** |

Source: District Coordinator's Office of the Crop Clinic Programme in Matara District, 2013

**Table 3.3: PCCP Statistics in Matara District: 2010 – 2012**

| PCCC | Area and Personnel in each PCCC | | | | | 2010 | | 2011 | | 2012 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | No of AI ranges included in the PCCCs | No. of GN divisions in the PCCCs | AIs available for PCCCs | No of AIs trained on PCCCs | No of farm families in the PCCCs | No of CCs held | No of farmers attended all CCs | No of CCs held | No of farmers attended all CCs | No of CCs held | No of farmers attended all CCs |
| Morawaka | 1 | 20 | 1 | | 6077 | 1 | 16 | - | - | 4 | 88 |
| Pasgoda | 3 | 42 | 3 | | 1230 | - | - | 2 | 30 | - | - |
| Kekanadura | 2 | 31 | 2 | 1 | 3600 | - | - | 4 | 85 | 4 | 68 |
| Kadawadduwa | 2 | 41 | 2 | 1 | 2560 | - | - | 3 | 157 | 8 | 160 |
| Mirissa | 1 | 20 | 1 | | 1230 | - | - | 1 | 25 | 3 | 52 |
| Borala | 1 | 23 | 1 | 1 | 1180 | - | - | 2 | 57 | 3 | 62 |
| Hakmana | 3 | 38 | 2 | 1 | 3100 | - | - | 6 | 128 | 12 | 207 |
| Kamburupitiya | 2 | 37 | 2 | 1 | 5622 | - | - | 4 | 69 | 3 | 46 |
| Puhuwela | 1 | 23 | 1 | 1 | 2380 | - | - | 5 | 122 | 4 | 64 |
| Ransegoda | 1 | 21 | 1 | | 3900 | - | - | 6 | 138 | 4 | 73 |
| Pitibaddara | 1 | 20 | 1 | | 4186 | - | - | 3 | 49 | 4 | 96 |
| Akuressa | 3 | 49 | 3 | 1 | 5260 | - | - | 5 | 189 | 4 | 74 |
| **Total** | **21** | **365** | **20** | **7** | **40325** | **1** | **16** | **41** | **1049** | **53** | **990** |
| **Percentage** | **100%** | **100%** | **100%** | **35%** | **100%** | **NR** | **0.04%** | **NR** | **2.6%** | **NR** | **2.4%** |
| **Average** | **NR** | **NR** | **NR** | **NR** | **NR** | **1** | **16** | **3** | **26** | **4** | **19** |

Source: District Coordinator's Office of the Crop Clinic Programme in Matara District, 2013

**Table 3.4: PCCP Statistics in Matale District: 2011 – 2013**

| PCCC | Area and Personnel in each PCCC | | | | | 2011 | | 2012 | | 2013 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | No of AI ranges included to the PCCCs | No of GN divisions in the PCCCs | AIs available for PCCCs | No of AIs trained on PCCCs | No of farm families the PCCCs | No of CCs held | No of farmers attended in all CCs | No of CCs held | No of farmers attended all CCs | No of CCs held | No of farmers attended all CCs |
| Dambulla | 1 | 41 | 1 | 1 | 13085 | 5 | 170 | 7 | 193 | 10 | 157 |
| Elakaduwa | 1 | 18 | 1 | | 2187 | 5 | 90 | 10 | 167 | 8 | 130 |
| Galewela | 1 | 34 | 1 | | 10220 | 4 | 149 | 5 | 81 | 7 | 72 |
| Illukkumbura | 1 | 11 | 1 | | 664 | 3 | 80 | 9 | 179 | 5 | 49 |
| Kimbissa | 1 | 18 | 1 | | 2900 | 6 | 141 | 10 | 161 | 8 | 120 |
| Kongahawela | 1 | 20 | 1 | | 2630 | 5 | 90 | 8 | 84 | 4 | 44 |
| Naula | 1 | 32 | 1 | | 6700 | 5 | 122 | 1 | 18 | 10 | 212 |
| Palapathwela | 1 | 52 | 1 | 1 | 6800 | 5 | 148 | 10 | 157 | 9 | 122 |
| Pallepola | 1 | 44 | 1 | | 5040 | 5 | 119 | 10 | 137 | 6 | 79 |
| Ukuwela | 1 | 31 | 1 | 1 | 2560 | 5 | 146 | 12 | 196 | 8 | 157 |
| Walawela | 1 | 17 | 1 | | 1368 | 5 | 148 | 10 | 166 | 7 | 67 |
| Yatawatta | 1 | 39 | 1 | | 3079 | 5 | 80 | 12 | 155 | 9 | 73 |
| **Total** | **12** | **357** | **12** | **3** | **57233** | **58** | **1483** | **104** | **1694** | **91** | **1282** |
| **Percentage** | **100%** | **100%** | **100%** | **25** | **100%** | **NR** | **2.6%** | **NR** | **3.0%** | **NR** | **2.3%** |
| **Average** | **NR** | **NR** | **NR** | **NR** | **NR** | **5** | **26** | **9** | **16** | **8** | **14** |

Source: District Coordinator's Office of the Crop Clinic Programme in Matale District, 2013

### 3.5.2 Date and Venue

After consulting farmers and the officers, particularly the AI, the venue, date and time of CC is fixed. Once a convenient date, time and a place are decided (especially weekdays) farmers are made aware of the date and the time via farmer leaders or neighbors through word of mouth. Crop clinics are conducted in a convenient place such as schools, temple premises and ASCs. PCCS have been conducted in different places for the convenience of participants. The most preferred venues are ASC, community centre, temples, farm households, farm fields and schools. In case there is a video presentation, ASC is the best option as there is a supply of electricity. When a majority of farmers cannot participate in a meeting another date and a time is decided by officers therefore farmer consultation is required before setting a meeting. Meetings are generally held during the mid of the cultivation season as this is the period when disease and pest attacks emerge.

### 3.5.3 Registration of Farmers

Farmers are advised to visit the clinics with samples of diseased plants or fruits. Each farmer who comes with a sample is given a token with a number on a first come first served basis. At the clinic each farmer is first registered along with a description of the disease or pest.

### 3.5.4 Diagnosis and Recommendations

To arrive at solutions with regard to problems arising at CCs, agricultural instructors are assisted by subject matter officers and other AIs who participate and in certain cases are referred to the agricultural research staff. A decision on the disease is made after a discussion between the plant doctors and other officials such as SMOs and other agricultural officers who are present at the clinic. In general, the audience is made aware of the problem with relevant information and recommendations to prevent control and treat the problem. A prescription is provided to the farmer on an agro-chemical. In case the officials present are unable to identify the problem it is referred via phone to key personnel who are expert in the particular subject. They are either from respective research stations or from the plant protection centre. In certain instances samples are sent to research stations for identification and solutions. The minimum time span for solutions to be referred back to farmer is generally estimated as two to four weeks.

In addition to discussions on pests and diseases, other issues raised by farmers with regard to cultivation of crops are discussed at the clinic. When relevant AIs or other agricultural officers deliver lectures on different issues of crop management and moreover, in districts where there are funds and facilities, farmers are shown video presentation.

# CHAPTER FOUR

# The Perspective of Farmers on Crop Clinics

## 4.1 Introduction

Farmer is the 'Receiver' of extension messages disseminated through crop clinics. This chapter first explains how farmers had responded to this new and innovative method of extension service in terms of their participation, institutional contribution and the procedure adopted in crop clinics. Then it discusses how farmers feel about crop clinics under three main aspects: relevance and appropriateness of the content, importance of crop clinics as a farmer education programme and its contribution towards promoting sustainable agriculture.

## 4.2 Socio-economic Characteristics of Respondents

As depicted in the Table 4.1 a majority of respondents who participated in crop clinics are over 36 years of age. The participation of relatively younger crowd at crop clinics is around 13 percent. With respect to education, the sample consists of 80 percent respondents who have educated up to O/L with the rest having an education up to A/L or above. Both males and females participate in crop clinics and there is no marked variation in terms of sex distribution of participants within the sample. A further breakdown within districts reveals that there is a higher female participation in the clinics in Trincomalee (71%) and Matara (57%) districts as compared to the male participation. However, in the Matale district 82 percent participants are males. One of the differences observed among the crop clinic participants across the districts is the male- female ratio of participants.

The respondents were categorized into full time and part time farmers based on their key involvement in agriculture as a source of income. Those who allocate the most time for farming were categorized as full time farmers (58%) and the respondents who help farming and are engaged in various other forms of employment were categorized as part time farmers (42%). Whilst the percentage of participants involved in full time farming varies across districts the highest percentage of full time farmers is reported from the Matale district (75%) with 61 percent form Trincomalee and the lowest (39%) from the Matara district. This variation in the distribution of full time and part time farmers across districts is the other difference observed among crop clinic participants.

**Table 4.1: Characteristics of Responding Farmers**

| Characteristics | No. | Percentage |
|---|---|---|
| **Age (years)** | | |
| 20-35 | 49 | 13 |
| 36-50 | 154 | 41 |
| 51-65 | 146 | 39 |
| >65 | 24 | 7 |
| **Educational Level** | | |
| Primary Education | 46 | 13 |
| Secondary Education | 94 | 25 |
| G.C.E. Ordinary Level | 160 | 42 |
| G.C.E. Advanced Level | 68 | 18 |
| Above Advanced Level | 5 | 1 |
| **Sex** | | |
| Female | 182 | 49 |
| Male | 191 | 51 |

Source: HARTI Survey Data, 2013

The data (Table 4.2) shows that, irrespective of the sex the key source of income of the large majority of crop clinic participants is farming. Around one fourth of the participants termed as farm helpers are not involved in full time farming but they do it for domestic consumption and when there is a surplus they sell it. Some of them help only in family farming activities. The rest of the participants also earn an income by engaging in part time farming but they have other primary means of income.

**Table 4.2: Key Source of Income of Respondents**

| Primary Source of Income | Female | | Male | | Overall | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| Farming | 97 | 53 | 117 | 61 | 214 | 58 |
| Farm Helpers | 52 | 28 | 45 | 23 | 97 | 25 |
| State Sector Employment | 9 | 5 | 10 | 5 | 19 | 5 |
| Private Sector Employment | 3 | 2 | 2 | 1 | 5 | 1 |
| Self-Employment | 13 | 7 | 4 | 2 | 17 | 5 |
| Foreign Employment | 1 | 1 | 5 | 3 | 6 | 2 |
| Non Agriculture Labourers | 7 | 4 | 5 | 3 | 12 | 3 |
| Pension | 0 | 0 | 3 | 2 | 3 | 1 |
| Total | 182 | 100 | 191 | 100 | 373 | 100 |

Source: HARTI Survey Data, 2013

According to the data (Table 4.3) it is evident that there is a marked variation in the income earned from farming by the crop clinic participants. A further classification of farmers by the income they earn from farming identified three farmer categories: Low income farmers (Rs. <10,000/month), Middle income farmers (Rs. 10,000 <30,000/ month) and High income farmers (Rs. 30,000 or above). Accordingly the sample comprised 21 percent low income farmers, 48 percent middle income farmers and 31 percent high income farmers. Part time farmers comprised 50 percent low income farmers, 36 percent middle income farmers and 14 percent high income farmers (Figure 4.1). Most of the low income farmers are involved in farming on part time basis largely in home gardening for consumption purposes and seldom sold produce in case of a surplus. The income levels of such farmers were estimated by taking into account the entire value of the harvest even though they have not sold the harvest. However, this category has also middle and high income farmers who are involved in commercial agriculture on part time basis.

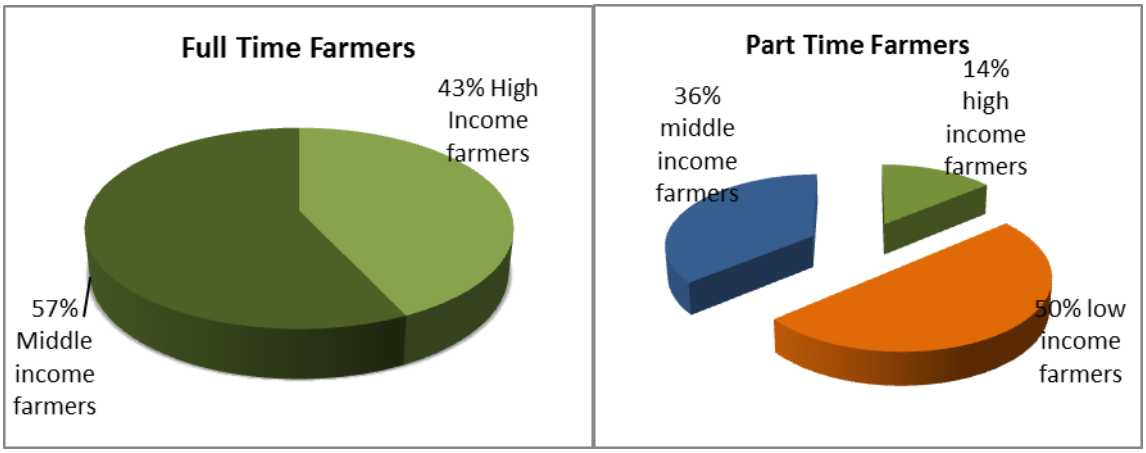
**Table 4.3: Distribution of Full-time and Part-time Farmers by Level of Agricultural Income**

| Income Category (Rs) | Full Time Farmers | | Part Time Farmers | | Overall | | Farmer Category | | |
|---|---|---|---|---|---|---|---|---|---|
| | No | % | No | % | No | % | Category | No | % |
| <5000 | - | - | 23 | 15 | 23 | 6 | Low Income Farmers | 78 | 21 |
| 5000 <10000 | - | - | 55 | 35 | 55 | 15 | | | |
| 10000 < 15000 | 45 | 21 | 21 | 14 | 66 | 18 | Middle Income farmers | 180 | 48 |
| 15000 < 20000 | 34 | 15 | 13 | 8 | 47 | 13 | | | |
| 20000 < 30000 | 45 | 21 | 22 | 14 | 67 | 18 | | | |
| 30000 < 40000 | 37 | 17 | 11 | 7 | 48 | 13 | High Income Farmers | 115 | 31 |
| 40000 < 50000 | 14 | 7 | 2 | 1 | 16 | 4 | | | |
| >50000 | 42 | 19 | 9 | 6 | 51 | 14 | | | |
| Total | 217 | 100 | 156 | 100 | 373 | 100 | - | 373 | 100 |

Source: HARTI Survey Data, 2013

None of the full time farmers belongs to low income category. They include 57 percent middle income farmers and 43 percent high income farmers. The average monthly income of full time farmers amounts to Rs. 30213/= whereas part time farmers earn an average income of Rs. 12793/= reporting a significant difference in the average income earned by two categories of farmers (t = 8.838; P = 0.000). Data shows that there is a significant difference in the income of high income farmers (t = 2.545; P = 0.010) between full time and part time farmers and their average monthly income amounts to Rs. 49380.43 and Rs 35000 respectively. It is understood from this data that some crop clinic participants are part time farmers who are involved in agriculture at commercial level but do not earn much higher income from agriculture like fulltime farmers. No such significant differences are found among the middle income farmers (t = -0.225; P =

0.662) between full time and part time farmers whose average monthly agricultural income amounts to Rs. 15993.55 and Rs. 16178.57 respectively.




Source: HARTI Survey Data, 2013

**Figure 4.1: Distribution of Full-time and Part-time Farmers by Income Category**

The data (Table 4.4 and Table 4.5) established that participants from Matale earn a higher income from agriculture than the participants from the Trincomalee district and the least agricultural income earners are reported from the Matara district.

**Table 4.4: Summary Statistics of Agricultural Income of Full-time Farmers by Districts**

| Summary Statistics of Income | District and Income (Rs) | | |
|---|---|---|---|
| | Matale | Trincomalee | Matara |
| Mean | 42103 | 21831 | 20674 |
| Median | 35000 | 20000 | 20000 |
| Maximum | 125000 | 60000 | 50000 |
| Minimum | 10000 | 10000 | 10000 |
| Mode | 30000 | 10000 | 10000 |

Source: HARTI Survey Data, 2013

**Table 4.5: Distribution of Farmer Income Categories by District**

| Farmer Income Category | Matara | | Matale | | Trincomalee | |
|---|---|---|---|---|---|---|
| | No | % | No | % | No | % |
| Low Income Farmers | 41 | 33 | 8 | 6 | 29 | 23 |
| Middle Income Farmers | 64 | 52 | 45 | 37 | 71 | 56 |
| High Income Farmers | 18 | 15 | 70 | 57 | 27 | 21 |

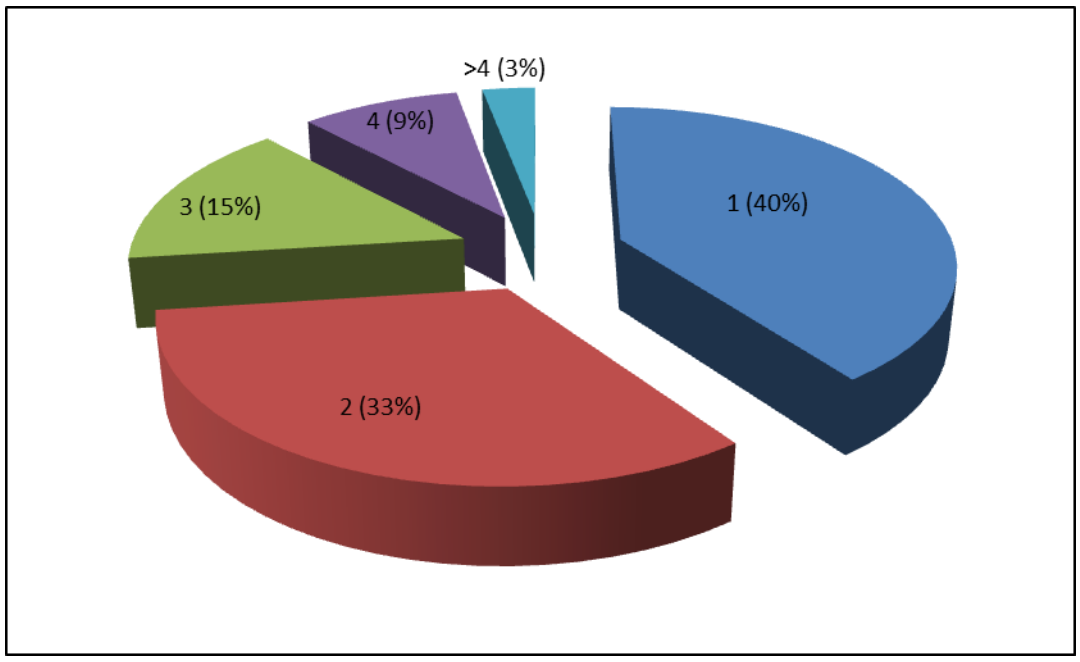
Source: HARTI Survey Data, 2013

The analysis of variance of agricultural income of full time farmers proves a significant income difference across districts (F = 27.853; P = 0.000). Accordingly the crop clinic participants also differ across districts in terms of level of income they earned from farming. The reason behind this is the representation of the sample by a large majority of full time farmers from the Matale district who are involved in commercial farming, particularly in onion cultivation. In overall the data establishes that the respondents from three districts show differences in sex ratio, degree of involvement in farming and income earned from farming.

### 4.3 Farmer Response towards Crop Clinic Programme

#### 4.3.1 Farmer Participation in Crop Clinics

The total number of crop clinics attended by the respondents from Matale, Matara and Trincomalee districts amount to 216, 248 and 298 respectively during the last year. The most number of farmers (40%) have participated in one crop clinic and another 33 percent in two crop clinics. There are few farmers (3%) who have participated in more than four clinics (Figure 4.2).




Source: HARTI Survey Data, 2013

**Figure 4.2: Number of Crop Clinics Participated By Respondents**

Accordingly the average number of chances that an individual farmer received to participate in crop clinics amounted to 1.76, 2.02 and 2.35 reporting a significant variation across districts (F = 6.280; P = 0.002). The crop clinic programme has been more active in the Trincomalee district and it was revealed through the key informant

discussions too. The farmers from Trincomalee were more enthusiastic and there were 68 percent farmers who had participated in more than two CCs. The reason lies in the fact that AIs in 3-4 AI ranges get together and conduct a CC in a GND to which farmers from surrounding GNDs participate in if they have a problem which needs to be addressed. Having more chances to participate in CCs is beneficial for some however, on the contrary some farmers would have lost the chance to participate in CCs. In general the majority of farmers (40%) in the study locations had participated in one CC with the rest having exposed to more than one (Table 4.6). The percentages of farmers who had participated in more than one crop clinic amounted to 45 percent in Matale, 62 percent in Matara and 68 percent in Trincomalee. Farmers have sometimes failed to recognize the PCCP as a special programme designed for plant protection as the initial communication of the very concept has not reached the farmers.

**Table 4.6: Farmer Participation in Crop Clinics by District**

| No. of Crop Clinics attended by Farmers | Matara | | Matale | | Trincomalee | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| 1 | 47 | 38 | 68 | 55 | 40 | 32 |
| 2 | 45 | 37 | 40 | 33 | 36 | 28 |
| 3 | 20 | 16 | 10 | 8 | 24 | 19 |
| 4 | 8 | 7 | 1 | 1 | 23 | 18 |
| Above 4 | 3 | 2 | 4 | 3 | 4 | 3 |
| Total | 123 | 100 | 123 | 100 | 127 | 100 |

Source: HARTI Survey Data, 2013

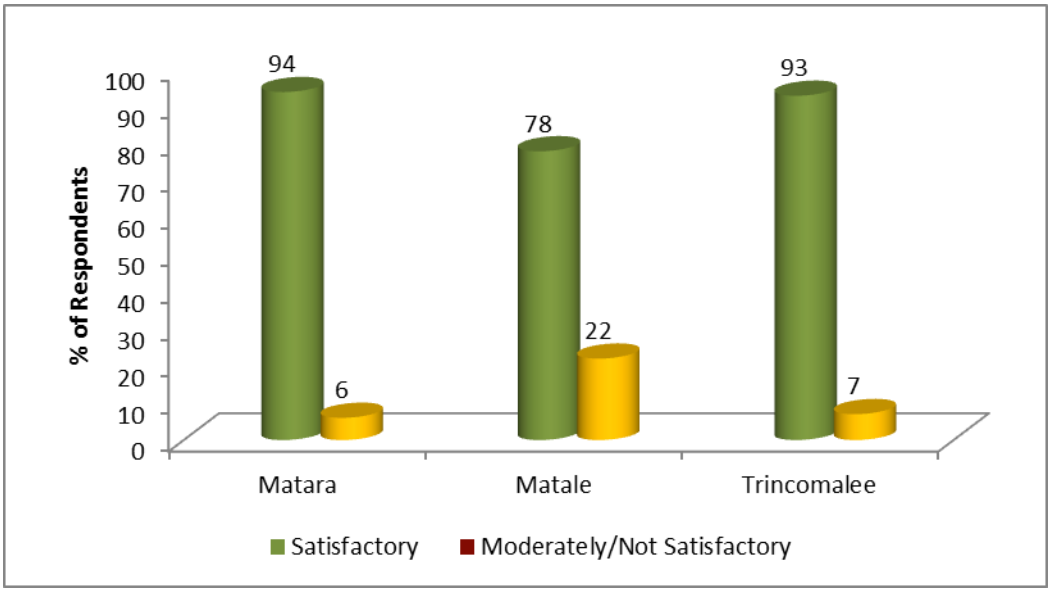
Most of the non-participants of CCs (60% of the sample) were aware of and had heard about crop clinics. Knowledge about the programme had been from neighboring farmers who had participated in CCs and from the AI in the area. Dissemination of information regarding CCs from farmer organization leaders and the ARPAs who are the other two main characters in a CC is poor as only a very few farmers have gained knowledge about the CC from them. Three main reasons for not attending CCs by non participants are:

(a) Farmers were not aware of the objective of the programme and how they could derive benefits by participating in the CC.
(b) Farmers were not interested in the programme as they are satisfied with how they presently solve problems of crop cultivation and,
(c) Some had a problem of time allocation as they were part time farmers who also sought advice from friends and neighboring farmers who participated in CCs.

### 4.3.2 Crop Clinic Procedure

#### 4.3.2.1 Venue Date and Time

Almost all the farmers from all study locations were satisfied with the venue of crop clinics organized except for six percent of farmers from the Matale district. A small sense of dissatisfaction about the location of meeting was observed and suggestions were made that meetings need to be held GN division level, village level or in the farm field. The time allocation for a CC varies but in general a meeting lasts for 2-3 hours depending on the number of farmers participating and the live samples brought in by the farmers. Most of the farmers (97%) were satisfied with how they were made aware of the crop clinics. However, the data shows that there is dissatisfaction to a certain degree with regard to the date and time of crop clinics conducted with a significant variation across districts 18.901; P = 0.000). A considerable percentage of farmers (35%) are dissatisfied over the date and time of crop clinics (Figure 4.4) comparatively with a high proportion of farmers from the Matale district (22%). Among these farmers 71% are full time farmers and 86% belongs to middle or high income farmer categories. Therefore, it is apparent from the data that proper planning of crop clinics is essential to ensure increased participation by commercial farmers.



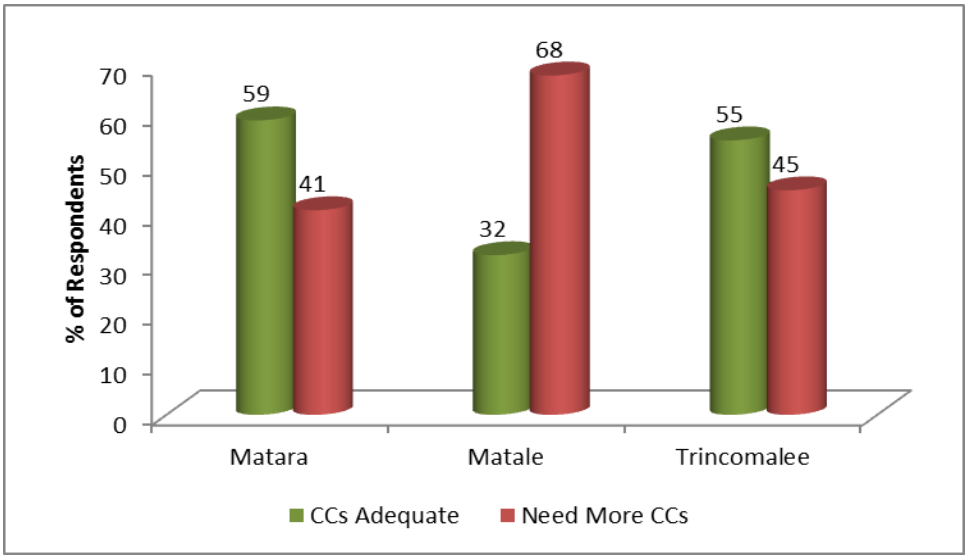

Source: HARTI Survey Data, 2013

**Figure 4.3: The Level of Satisfaction of Farmers on Date and Time of Crop Clinics**

#### 4.3.2.2 Frequency of Crop Clinics

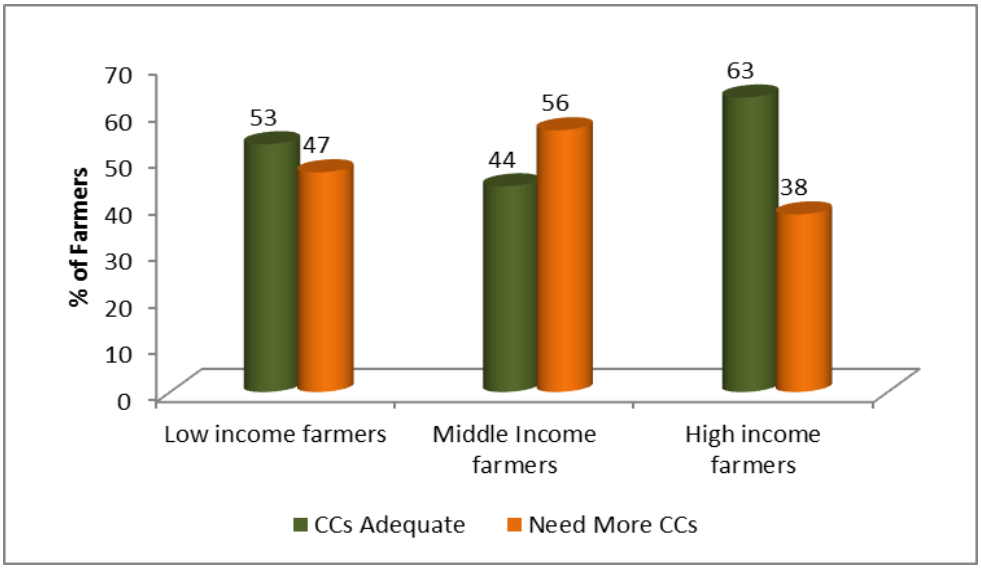
The number of CCs held has proved to be inadequate for 51 percent of the sample farmers with a significant variation across districts ($\chi^2 = 21.528$; P= 0.000) as shown in the Figure 4.4. Among the districts a majority of farmers (66%) from Matale have voiced

the need for more crop clinics (Figure 4.5) as most of them (55%) have participated in one crop clinic. They sought more crop clinics as they required more knowledge on pest and disease control in onion cultivation because those occurred time to time and the incidence is high during rainy seasons but no programmes are available during cultivating season. They sought more adaptive research programmes to be carried out at farmer level. The statistical evidence too establishes that the higher the income from agriculture the greater the necessity of crop clinics ($\chi^2$ = 9.631; P =0.008).




Source: HARTI Survey Data, 2013

**Figure 4.4: Adequacy of Conducting Crop Clinics by District**




Source: HARTI Survey Data, 2013

**Figure 4.5: Adequacy of Conducting Crop Clinics by Farmer Income Category**

Farmers had different opinions with regard to frequency of conducting CCs, however, the general consensus was to have clinics at the onset and at the end of both *yala* and *maha* seasons with a total of four CCs per year. The justification was that the pest and disease attacks are more prevalent at the initial growing stage of the crop and then most critical at the maturity of the crop therefore, there should be CC before harvesting to prevent any damage to the harvest. Therefore, the farmers needed to conduct CCs after establishment of crops in the field during the growing stage and at the stage of maturity in order to get the crops protected from any possible damages of pests and diseases.

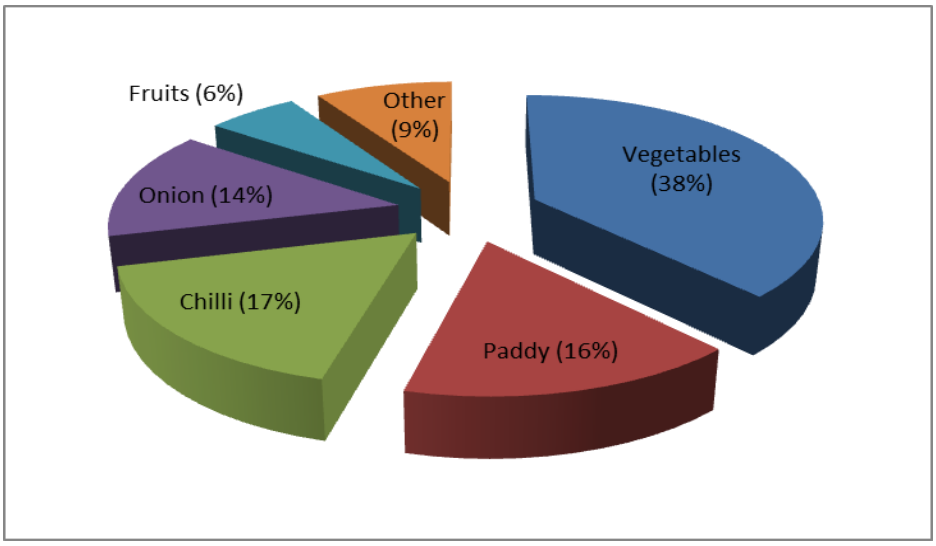
In contrast the rest of the farmers (49%) were of the view that the number of CCs held in their areas was sufficient due to three reasons: (a) Many low and middle income farmers sought advice on individual basis from the AI and private sector agrochemical dealers. ((b) Received information at the 'Kanna' meeting and (c) Thought more meetings would be an added burden to them.

#### 4.3.2.3 Use of Teaching Aids

The aids available to the plant doctors to be used at clinics in most parts are printed matter which is either circulated among the participants. On the availability of resources, each farmer is provided a copy of the printed leaflet. Recommended aids to support clinics are compact discs (CDs) of material pertaining to plant health and disease control. However, the numbers of laptops available to the AIs are limited therefore the CDs cannot be used as often as needed at the field level. Facilities for information technology such as the internet and laptops are available at district centers and not at the field level which thus restricts visual presentations of required knowledge which could be imparted to the participants. Each committee also has a microscope, a tool through which pests and diseases could be identified by the plant doctors and farmers.

#### 4.3.2.4 Content

Whilst 89 percent of farmers who participated in crop clinics had sought advice entirely for pest and disease control, the rest had participated for improving their knowledge. Advice was mainly sought for three main crop categories including paddy, vegetables and condiments. Vegetables are the prominent crop category for which the farmers sought advice other categories are condiments such as chili and onions (Figure 4.6) and paddy. Advice was also sought for fruit crops such as papaw, mango, pomegranate, lemon, banana, grapes, *uguressa* and *rambutan*. Among the other crops were anthurium, maize, green gram, cowpea, groundnut, coconut, pepper, betel and cassava.




Source: HARTI Survey Data, 2013

**Figure 4.6: Crop Categories Taken to Crop Clinics for Advice**

**Table 4.7: Crop Categories for which Advice is Sought at Crop Clinics by District**

| Crop Category | Matara | | Matale | | Trincomalee | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| Vegetables | 32 | 30 | 40 | 37 | 54 | 47 |
| Paddy | 32 | 30 | 7 | 7 | 15 | 13 |
| Chilli | 26 | 24 | 6 | 6 | 23 | 20 |
| Onion | 0 | 0 | 45 | 42 | 0 | 0 |
| Fruits | 8 | 7 | 6 | 6 | 6 | 5 |
| Other | 10 | 9 | 3 | 3 | 18 | 16 |
| Total | 108 | 100 | 107 | 100 | 116 | 100 |

Source: HARTI Survey Data, 2013

There are some district variations in the crop categories for which farmers sought advice at crop clinics. Still vegetables are the key crop category in all districts with district specific variations, for instance, paddy and chilli in Matara and Trincomalee and onion in Matale (Table 4.7). Accordingly advice for paddy and vegetables was mainly for the farmers from the Matara district while the majority was vegetable and onion farmers from Matale district. In Trincomalee the prominent crops for which advice was sought were paddy, chilli and vegetables. Brinjal, long beans, thibbatu and luffa were the main vegetables for which advice was sought by the farmers from Trincomalee district while Matale farmers sought advice for tomatoes, cabbage, beans and bittergourd. Prominent vegetables in Matara were brinjal, okra and long beans. Though seldom reported among the fruit crops were papaw, banana, pomegranate, lemon, *ugurassa* and *rambutan*.

Tables 4.8, 4.9 and 4.10 presents the prominent pest problems which the farmers sought advice for through crop clinics in Matara, Matale and Trincomalee districts respectively. Terms in parenthesis are local terms used by the farmers for different pests and diseases.

**Table 4.8: Prominent Pests and Diseases by Crops in Matara Districts**

| Crops | Pests |
|---|---|
| Paddy | Leaf caterpillars (Panu roga, Kola kodaweema, Kola hakulana dalambuwa, Karati vidina panuwan, Alu panu rogaya) Plant Hoppers (Keedawa), thrips (Pela Meakka, Lati), Paddy bug (Goyam massa), Kaha rogaya, Mites (Maita), Aphids (Kuudiththa), Yellow stem borer (Puruk panuwa) Damping off (Diyamalankama), Angamaraya, Karal vidina Panuwan, yellow stem borer (Sudu karal), (Goyam mareema, Kola agis mareema, Kola dirima, Ridigoba, Kola agis kahaweema, Burnt leaves), Other Fungal diseases (Hitumareema, Mul Kunuweeme). |
| Brinjal | Mealy bugs (Piti makuna), Stem borers (Karati vidina panuwan) Fruit fly (Ill Massa, Karal vidina panuwan), White fly (Sudu Messa), Powdery mildew (Pitipus), Plant hoppers (Keedawa), Thrips (Pela Mekka), Leaf caterpillars (Kola Kana dalambuwan, Kola hakulana dalambuwa, Panu roga), Aphids (Kuudiththa), Snails (Golubella), Leaf viral diseases (Kola kodaweema, Kolawala Iri), Mites (weya), Fungal diseases (Mul Kunuweema). |
| Okra | Leaf viral diseases (Kola kodaweema) Mites (Maita), Mealy Bugs (Piti makuna, Pus), Leaf caterpillars (Panu roga), Stem borers (Karati vidina panuwan). |
| Long Bean | Leaf viral diseases (Kola kodaweema), Leaf caterpillars (Panu roga, Kola hakulana dalambuwa) Pod borers (Karal vidina Panuwan), Thrips (Lati), Plant hoppers (Keedawa), Aphids (Kuudiththa), Mealy Bugs (Piti makuna, Sudu makuluwage Haniya), Bean Rust (Malakada). |

Source: HARTI Survey Data, 2013

**Table 4.9: Prominent Pests by Crops in Trincomalee District**

| | |
|---|---|
| Paddy | Paddy bug (Goyam messa), Caterpillars (Panu Roga, Kola Hakulana Dalambuwa, Karal vidina panuwa, Kola Kodaweema), Yellow stem borer (Puruk Panuwa), Insect Damages (Kola Pokutuweema), White fly (Sudu Messa), Rats, Fungal diseases (Sudu Pulli). |
| Chilli | Caterpillars (Kola kodaweema, Karal vidina panuwa), Fungal diseases (Hitumareema, Sudu pulli, karal kunuweema, dying of young leaves), Mealy bugs (Pitimakuna, Pitipus) Insect damages (Krumi roga, panu roga, Kola hakulana dalambuwa, Kola pokutuweema, White Fly (Sudu Messa), Viral Diseases (Kaha Rogaya), Mites (Maita), Ants, Thrips (Pela Makka). |
| Brinjal | Mealy bugs (Pitimakuna, Pitipus), Caterpillars (Panu roga, Kola Kodaweema, Karal vidina panuwa, Karati vidin panuwan, Krumi roga, Kola Hakulana |

| | |
|---|---|
| | Dalambuwa, Kola pokutuweema, dying of young leaves, Kola kana dalabuwan) Fruit Fly (Ill messa), Fungal diseases (Hitumareema, Sudu pulli, Mul kunuweema) Viral diseases (Kaha rogaya), Ants, Plant hoppers (Keedawa), Aphids (Kuudiththa), Fungal diseases (pus). |
| Long Bean | Caterpillars (Karal vidina panuwa, Panu roga, Krumi roga, Kola kana dalabuwan, Kola hakulana dalambuwa, Kola pokutuweema, Kola kodaweema, Karati vidin panuwan) Fungal diseases (Mul kunuweema), Mealy bugs (Pitimakuna, Pitipus) Fruit fly (Ill Massa), Paddy Bugs (Goyam messa), Aphids (Kuudiththa), Ants, Wilting of plants (Pala marima). |
| Luffa | Fruit fly (Ill messa), Mealy bugs (Pitimakuna), Paddy bugs (Goyam messa), Fungal diseases (Mul kunuweema) Viral diseases (Kaha rogaya), Caterpillars (Karal vidina panuwa, panu roga, Krumi roga, Kola hakulana dalambuwa, Kola pokutuweema, Karati vidin panuwan). |

Source: HARTI Survey Data, 2013

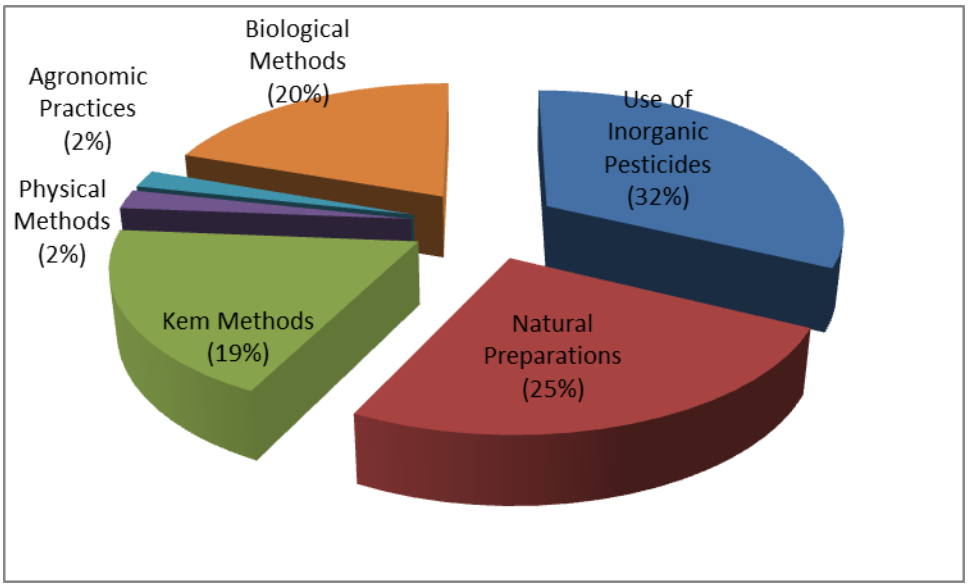
**Table 4.10: Prominent Pests by Crops in Matale District**

| | |
|---|---|
| Onion | Tatbunyama, Krumi roga, Caterpillars (Panu roga, Kolahakulana dalabuwa, Karati vidina panuwan, Kola kana dalabuwan, Kola pokutuweema) Viral diseases (Kaha rogaya, Kola kodaweema)Fungal diseases (Mul kunuweema, Lunubalba kunuweema, Fungus) Mealy bugs (Pitipus, Pitimakuna), kola pichchima, Dagarayame rogaya, Snails, Reddishness of plants, Not having many plants, Mites, Dying of young leaves, Kola pokuru ethiweema, Thrips (Palamekka, Kuditha), Bacterial diseases, Burning of leaf ends, Formation of creepers, Ants, Fruit fly (Ill Messa), Dam pulli rogaya, Mites. |
| Tomatoes | Mealy bugs (Pitimakuna), Viral diseases (Kaha rogaya), Caterpillars (Krumi roga, Kola pokutuweema, Kola kodaweema, panu roga), Fungal diseases (Takkali kunuweema, Fungus, Angamaraya, Kola kunuweema, Diyamala kaama, Sudupulli rogaya), Mites, Burning of leaves, Dying of young leaves, Rats. |
| Cabbage | Fungal diseases (Gowa kunuweema), Caterpillars (Panu roga, Krumi roga, Kola kana dalabuwan, Kola pokutuweema), Mealy bugs (Pitimakuna), Fungal diseases (Kola kunuweema), Angamaraya, Burning of leaves, Paddy bugs (Goyam Messa), Viral diseases (Kaha rogaya), White Fly (Sudu messa), Aphids (Ipiyan). |
| Beans | Viral diseases (Kaha rogaya, Vichithra rogaya), Fungus, Caterpillars (Krumi roga, Kola kana dalabuwan), Angamaraya, Fungal diseases (Diyamala kama), Mites. |
| Paddy | Paddy bugs (Goyam messa), Caterpillars (Krumi roga, panu roga, Kola Kodaweema, Kola hakulana dalambuwa, Kola pokutuweema, Karal vidina panuwa), Fruit fly (Ill Massa), White fly (Sudu Massa), Rats. |

Source: HARTI Survey Data, 2013

CCs have educated farmers on the use of a variety of pest control methods such as herbal preparations, *kem* methods, physical pest control methods, crop

sanitary/agronomic practices and the use of inorganic pesticides. Data collected from the respondents on the use of various pest control methods introduced at crop clinics for two major crops grown by them shows that most frequently made recommendation is to use inorganic pesticides if taken as a single method (Figure 4.8) followed by the use of natural preparations. It is important to mention that the use of *kem* methods and biological methods are also popular among the farmers as pest control methods.




Source: HARTI Survey Data, 2013

**Figure 4.7: Diverse Pest and Disease Control Methods Used by the Respondents**

There are slight variations in the use of pest control methods across districts (Table 4.11). The use of inorganic chemicals is largely found in the Matale district whereas natural preparations are mostly prevalent in Matara and Trincomalee districts. *Kem* methods are equally popular in all study locations. Use of physical methods and agronomic practices are popular in all districts but at a lesser degree.

**Table 4.11: Diverse Pest and Disease Control Methods Used across Districts**

| | Matara | | Matale | | Trincomalee | |
|---|---|---|---|---|---|---|
| **Pest Control Method** | **No.** | **%** | **No.** | **%** | **No.** | **%** |
| Use of Inorganic Pesticides | 40 | 24 | 82 | 54 | 41 | 22 |
| Natural Preparations | 47 | 28 | 22 | 14 | 58 | 31 |
| *Kem* Methods | 33 | 20 | 27 | 18 | 36 | 19 |
| Physical Methods | 4 | 2 | 6 | 4 | 1 | 1 |
| Agronomic Practices | 2 | 1 | 2 | 1 | 6 | 3 |
| Biological Methods | 41 | 25 | 14 | 9 | 44 | 24 |
| Total | 167 | 100 | 153 | 100 | 186 | 100 |

Source: HARTI Survey Data, 2013

The rest of the methods altogether comprise non chemical methods where the most important aspect is to recommend natural preparations as listed below.

1. Soap water
2. Neem extraction
3. Ash solution
4. Smoking by burning neem leaves at night
5. Dipping the plant( banana) in cow dung solution before planting
6. Solution prepared with chopped leaves and flowers of Gliricedia
7. Solution prepared with the leaves of *pawatta* and *nika* plants
8. Tobacco smoke
9. Solution prepared with soap, garlic and neem oil
10. Fermented solution prepared with chopped garlic and ginger
11. Fermented solution (1 day) prepared with fresh cow dung
12. Solution prepared with chopped *kala wel*
13. Solution prepared with burnt leaves of drumstick plants
14. Solution prepared with chopped papaw
15. Cattle urine
16. Fermented solution prepared with flower buds of *Araliya* plant
17. Solution prepared with chopped neem leaves and salt
18. Fermented solution (14 days) prepared after boiling the leaves of neem, tobacco and *pawatta*
19. Solution prepared by mixing kerosene oil with chopped garlic, green chillies, ginger and pepper
20. Solution prepared with chopped garlic
21. Solution prepared with extracts of neem leaves, garlic and soap
22. Solution prepared by fermenting tobacco stalks in water
23. Solution prepared by boiling tobacco, garlic and *kaduru*
24. Sugar solution
25. Solution prepared with the leaves of neem and *nika*
26. *Kahambiliya* extract
27. Mixture of neem, kerosene oil and soap
28. Solution prepared by boiling tobacco stalks mixed with soap and neem oil
29. Fermented solution (3 days) prepared with *gandapana* and neem leaves extract
30. *Kalawel* placed on *wakkada*
31. Solution prepared with wheat floor
32. Solution prepared by boiling tobacco stalks in water
33. Solution prepared with cow dung, urine and soap
34. Salt solution
35. Solution prepared with chopped garlic and pepper
36. Solution prepared with chopped garlic and *kochchi* leaves
37. Solution prepared with chopped *Thiththa wel*
38. Solution of chopped *kochchi*
39. Applying a mixture of paddy husk and salt around the plant

The reported *kem krama* are;

1. Apply blessed sand or water
2. Cultivation according to auspicious time
3. Seeding paddy on *amawaka* day

Among the physical pest control methods are;

1. Placing yellow colour polythene around the farm after applying grease
2. Other insects are repelled - when the sound an insect makes when it is squashed between paddy leaves
3. Attracting insects to a glow of a light and lamp
4. Establish lights in huts in the farm
5. String out coir threads on paddy fields which are soaked in kerosene oil
6. Use of thorny branches
7. Establish coconut leaves in the field for owls to trap and then feed on rats
8. Remove or burn infected plant parts
9. Removal of snails and insects by hand
10. Removal of insects with iron rods
11. Place chopped lemon in the four corners of the farm to repel paddy bug
12. Use covers
13. Place an insect on a lemon which is then placed on a stake
14. Dispersing insects by applying pressurized water
15. Applying a cover of coconut leaves
16. Hanging polythene applied with neem oil
17. Establishing a pole on the farm for the birds to rest from where they can prey on insects
18. Place pineapple leaves along the walking paths of the paddy field
19. Hanging CDs in the paddy field
20. Removal of mealy bugs with a brush
21. Using fire crackers
22. The smoke by burning coconut husks

Among the agronomic/sanitary practices are;

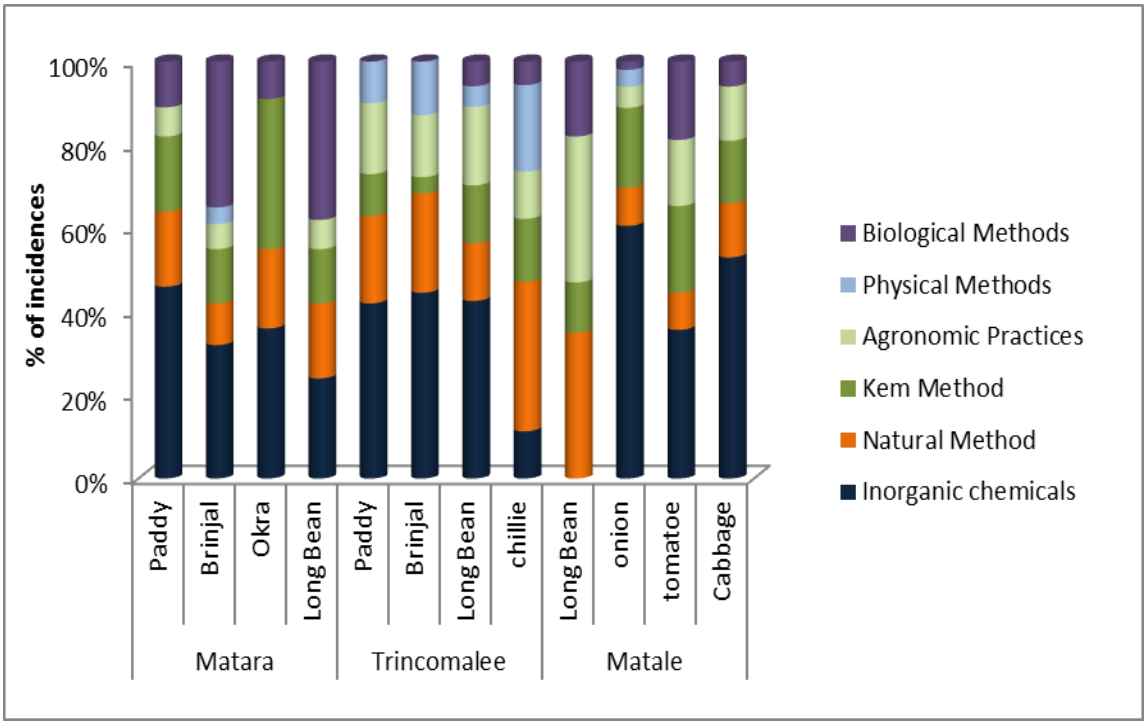
1. Water management
2. Cleaning of farm fields and surrounding
3. Soil sterilization/exposure to sun light/burning of paddy husk
4. Beginning of cultivation at the same time in the whole field
5. Use of organic manure
6. Use of self-produced seeds
7. Fallowing
8. Use of vermin compost
9. Application of dolomite

10. Covering the base of banana plant with a polythene after harvesting
11. Reduce or increase the use of urea as and when appropriate
12. Reduce the use of cattle dung
13. Budding

Among the biological methods are;

1. Use of pheromone traps
2. Planting *gandapana* plants/ marigold plants

The degree of practising the above pest control methods by the farmers varies across districts and crops (Figure 4.8). However, the use of inorganic pesticides has been the frequently reported pest control method irrespective of location and crop. Natural preparations have been used to a considerable level with other methods at varying degrees.




Source: HARTI Survey Data, 2013

**Figure 4.8: Diverse Pest and Disease Control Methods by Prominent Crop and District**

Besides the main focus of disease and pest control, knowledge and information on the use of new and recommended cultivation techniques such as soil testing and correct spacing, use of fertilizer and nurseries and water management techniques were imparted to the farmers. Among the cultural practices and remedies recommended were proper spacing of crops, use of organic manure, controlling of pests at the initial

stages, use of herbal and natural methods of pest control. Among the cultural practices recommended for onion cultivation were proper spacing of crops, use of organic manure, land preparation a month prior to cultivation, nursery management in for the control of fungal diseases and pest control through water management. Thus 80 percent of the farmers are satisfied with the additional information they received at crop clinics. Knowledge was also enhanced as they gained an understanding of inherent problems to the area, exposure to unknown pest problems and had an opportunity to confirm whether the knowledge they already had was correct or incorrect. For instance, some farmers were not exactly aware of the correct time to use the polythene bags to protect gourds. The CCs has both educated farmers in this regard and confirmed what they already knew about this.

#### 4.3.2.5 Changes Sought in Crop Clinics

Of the surveyed farmers 65 percent (241 farmers) had responded to the question 'whether the present crop clinic procedure requires any changes? Of them, the majority of 59 percent (142 farmers) were of different opinions that favored the answer 'need changes'. The data (Table 4.12) illustrates diverse responses of farmers who sought improvements in different areas of the crop clinic programme.

**Table 4.12: Changes Sought in Crop Clinics**

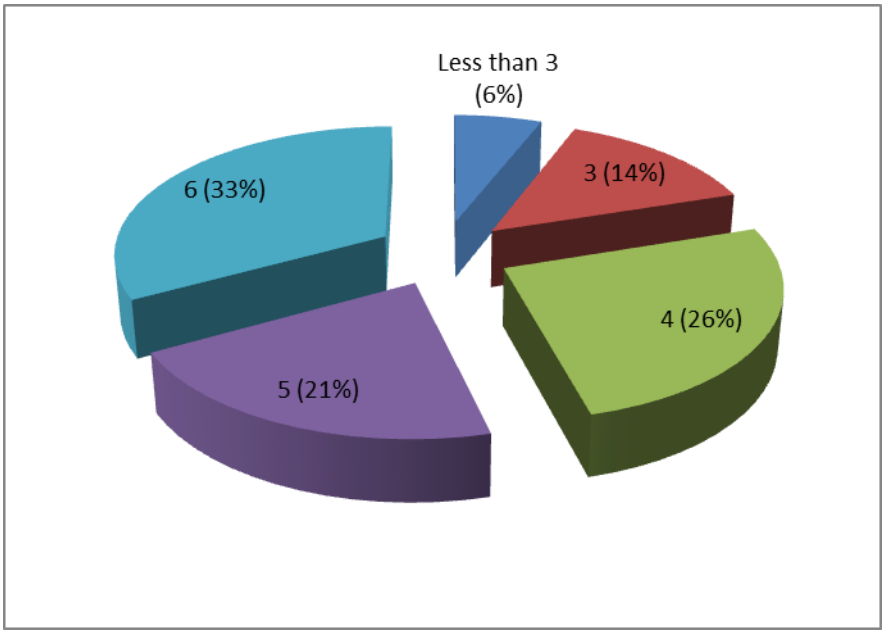
| Changes Sought in Crop Clinics | Matara | | Matale | | Trincomalee | | Overall | |
|---|---|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % | No. | % |
| Content of the Programme | 35 | 76 | 33 | 72 | 43 | 60 | 111 | 68 |
| The way Organized | 7 | 15 | 6 | 13 | 14 | 19 | 27 | 16 |
| Extension Personnel | 4 | 9 | 7 | 15 | 15 | 21 | 26 | 16 |
| Total | 46 | 100 | 46 | 100 | 72 | 100 | 164 | 100 |

Source: HARTI Survey Data, 2013

It seems that many farmers seek a change in the content of the programme through timely provision of new and important information on diagnosis and prevention of pests and diseases of crops they grow. This is an important area that the extension personnel need to pay attention to while planning and implementing crop clinics as this has been emphasized by the majority of farmers from all study locations. The other two areas are relating to participation and contribution from extension personnel as the farmers pointed out several drawbacks with regard to this aspect as detailed under the section 4.3.3. They sought not only an increased in the number of extension personnel participating in the crop clinics but also an increase interest of officials to contribute to the process. Changes in terms of timing, frequency and use of teaching aids were seen as needed in the crop clinic procedure as detailed under section 4.2.3.

### 4.3.3 Institutional Contribution for Crop Clinics

As discussed in Chapter Three, the number of officers participating in the various clinics within the district and among the sample districts varied depending on the emphasis placed on the importance of the programme in the district. Allocation of funds to the programme and the convenience of officers (their involvement in other programmes) play a vital role in terms of their involvement at meetings. Data shows that the majority of crop clinics (96%) were attended by three or more officers (Figure 4.9).




Source: HARTI Survey Data, 2013

**Figure 4.9: Officers' Participation in Crop Clinics**

The study also provides evidence that there is no significant difference in the number of officers participated across districts (Table 4.13), however, the designation of officials participating in crop clinics varies by district. Participation of AI is compulsory. ARPAs are the second prominent officials but in the Trincomalee district there are no ARPAs and farmers have been trained as per the crop clinic structure which is in contrast to Matara and Matale districts. There were instances where higher officers representing the agriculture sector such as district agriculture directors and provincial agriculture directors have participated in crop clinics.

**Table 4.13: Officers' Participation in Crop Clinics by District**

| No. of Officers Participated in Crop Clinics | Matara | | Matale | | Trincomalee | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| Less than 3 | 1 | 1 | 7 | 6 | 13 | 10 |
| 3 | 22 | 18 | 18 | 15 | 12 | 10 |
| 4 | 43 | 35 | 26 | 21 | 27 | 21 |
| 5 | 24 | 20 | 25 | 20 | 31 | 24 |
| Above 5 | 33 | 26 | 47 | 38 | 44 | 35 |
| Total | 123 | 100 | 123 | 100 | 127 | 100 |

Source: HARTI Survey Data, 2013

In addition, officials from line agencies such as irrigation and depending on the crops cultivated in the area officials from respective institutions also attend crop clinics eg: Coconut Research Institute and Department of Export Crops in Matara and Matale districts. GNs, Samurdhi officers, ASC officers, development officers and trained farmers too participate in CCs in certain instances. In some areas expertise on other problems/areas relating to bee keeping and fruit preservation were also given to the farmers by *Vidatha* centers which the farmers appreciated.

Participants affirmed their satisfaction with the institutional contribution due to following reasons.

(a) At crop clinic discussions, recommendations and solutions given were always clear and understandable as stated by 96 percent respondents as explanation was provided with the use of diagrams/live samples/videos/photographs. There were also field visits to demonstration farms which gave the participants a better grasp of the problems.

(b) Always written prescription was issued as similar to human diagnosis procedure by doctors to patients if chemicals are prescribed. This has enabled them to purchase the correct agro-chemical allowing no room for the dealer to mislead the farmer.

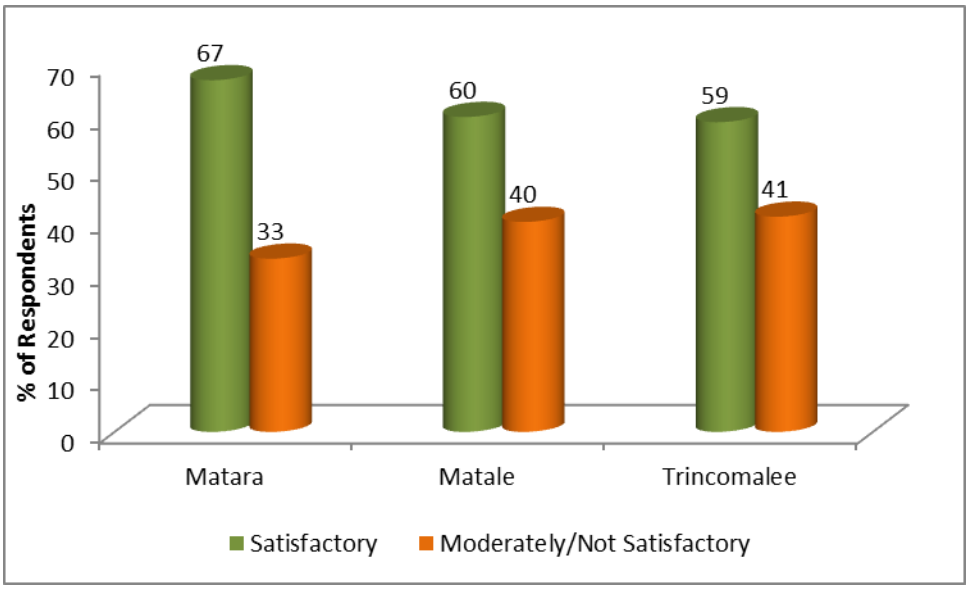
(c) Farmers (58%) were also happy with the responses given to their queries by experts over the phone. Across the three districts, nine percent farmers had sought further advice and solutions regarding pests and diseases via phone from subject experts.

(d) Around 64 percent farmers were pleased with the participation of and the ability to directly deal with higher officials who attended some of the meetings with no significant variation in the levels of satisfaction across districts ($\chi^2$ =2.937; P = 0.230). There were experts from research stations, universities,

subject matter officers (SMOs) and AIs from other divisions and experts from other fields in each district.

However, this was not the same scenario in all crop clinics and rest of the farmers (36%) had several complaints.

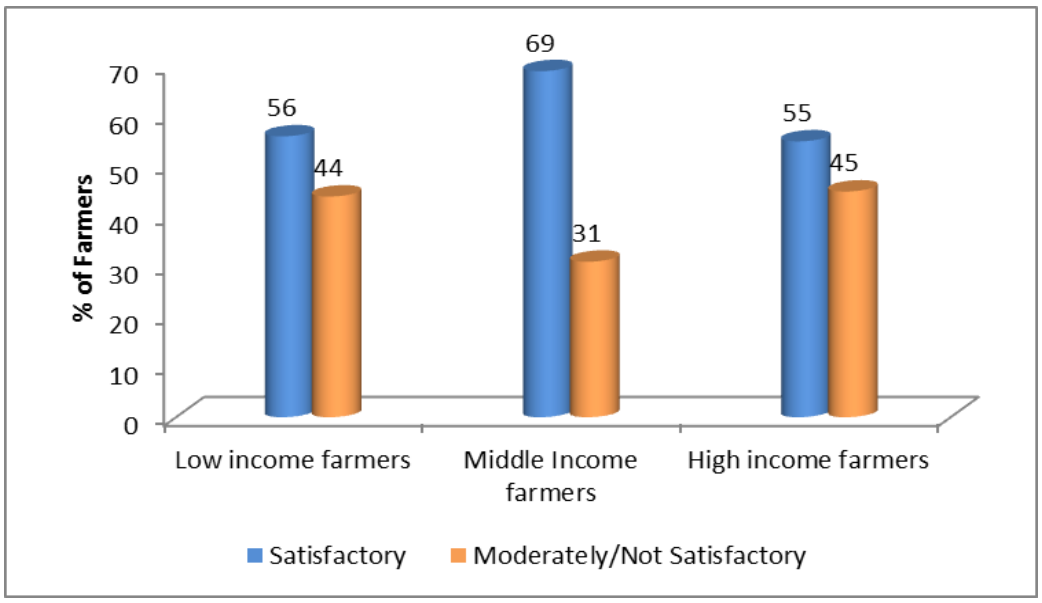
(a) SMOs did not attend all the meetings and the fact that experts' attendance at meetings gradually lessened with time.
(b) Shortage of officers in areas led to a lack of interest among the new AIs
(c) Contribution from ARPAs is minimal in certain areas and inconsistency of conducting CCs.




Source: HARTI Survey Data, 2013

**Figure 4.10: Level of Satisfaction of Farmers on Time Taken to Provide Answers by Districts**

(d) Some farmers (Matale - 40%, Matara 33% and Trincomalee - 41%) were either moderately satisfied or not satisfied with the time taken to answer queries to pest and disease problems with regard to crops such as onion (Figure 4.10). There were complaints that by the time solutions were given the cultivation season had been completed irrespective of the location ($\chi^2$ = 7.407; P = 0.116) and the level of farm income ($\chi^2$ = 2.552; P = 0.279). However the data (Figure 4.11) shows that more dissatisfaction prevails among the high income farmers.




HARTI Survey Data, 2013

**Figure 4.11: Level of Satisfaction of Farmers on Time Taken to Provide Answers by Income Category**

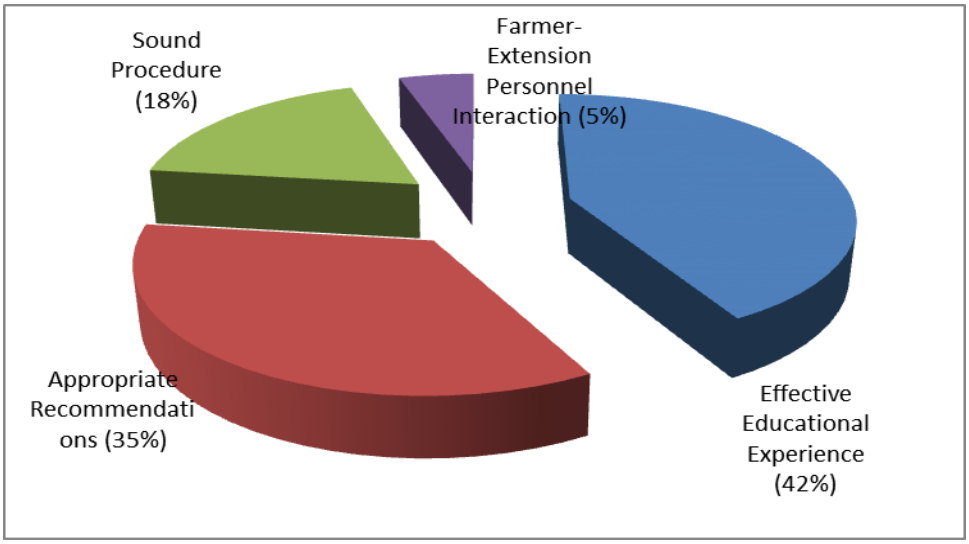
(e) A considerable percentage of farmers (42%) complained that AI were not accessible on the relevant contact numbers given to them. This had made this facility of obtaining advice via the phones redundant.

## 4.4 Importance and Contribution of Crop Clinics

The importance of crop clinics is viewed by the farmers as an educational experience and its contribution to promote sustainable agriculture.

### 4.4.1 Crop Clinics as a Farmer Education Programme

Overall the farmers accept the crop clinic programme as a valued extension effort due to four major reasons as per their first preference (Figure 4.12).




Source: HARTI Survey Data, 2013

**Figure 4.12: Reasons for Farmer Satisfaction on Crop Clinic Programme**

Variations were reported in the above ratings across districts (Table 4.14). Crop clinics are more important for the farmers from Matara and Matale districts as a learning experience than for any other reason. Trincomalee farmers value crop clinics for appropriate recommendations that led to better results. Even though crop clinics are important as a learning experience and as a forum where farmers can receive advice, most farmers are not satisfied with the crop clinics procedure and the extent of interaction between farmers and extension personnel.

**Table 4.14: Reasons for Farmer Satisfaction on Crop Clinic Programme by District**

| Reason for Satisfaction | Matara | | Matale | | Trincomalee | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | No. | % |
| As an Effective Educational Experience | 47 | 39 | 59 | 50 | 45 | 38 |
| Recommendations are Appropriate and Can Derive Better Results | 40 | 33 | 40 | 33 | 47 | 39 |
| Sound Procedure Adopted | 27 | 23 | 11 | 9 | 25 | 21 |
| Interaction between Extension Personnel | 6 | 5 | 9 | 8 | 2 | 2 |
| Total | 120 | 100 | 119 | 100 | 119 | 100 |

Source: HARTI Survey Data, 2013

### a. Crop Clinics as an Effective Educational Experience

The key reason for the satisfaction of the majority from all study locations is how crop clinics became important for them as an educational experience. Most of them (90%)

valued the role of CCs in improving their knowledge on the perennial problems of pests and diseases, a variety of pest and disease control methods and new information on various cultural practices and for making them aware of traditional knowledge as discussed in detail under the section 4.3.2.4. CCs are also valued as a forum wherein they meet a group of farmers with diverse experience, who grow a variety of crops. It was also seen as good learning experience for the youth. Farmers show an interest to participate in CCs as they can get the answers immediately (95%). Farmers had trust/confidence in the solutions provided at the clinics due to certain factors; solutions were recommended after the examination of samples and in certain instances supervision of the field. New knowledge gained at crop clinics are mainly shared with neighboring farmers and friends, thus there is a diffusion effect which takes place to a certain extent.

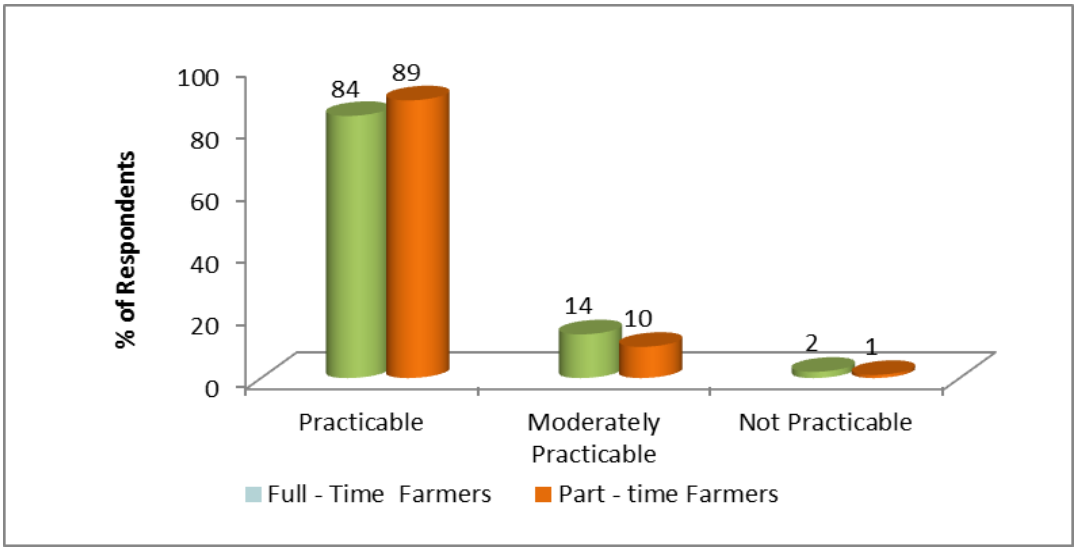
**b. Appropriateness of Recommendations**

The second reason for rating CCs as important was due to relevance and appropriateness of recommendations prescribed (90%) and the eventual good results they obtained through the practice of such recommendations which were low cost and can be easily prepared with raw material from the surrounding. Most importantly the recommended solutions had proved to be practically effective.

A majority of farmers (88%) across the three districts stated that they (87% from Matara, 85% from Matale and 91% from Trincomalee) utilized the advice given to them at the clinics to control pest and diseases. There is no statistical evidence to show that the following factors have a significant association with the use of advice given to them at crop clinics; district ($\chi^2$= 2.255; P =0.324), sex ($\chi^2$ = 0.093; P = 0.761), income category ($\chi^2$= 1.638; P = 0.441), degree of involvement in farming whether full time or part time ($\chi^2$ = 0.049; P = 0.482). Data also shows that there is no significant influence of the age of the farmers on following of advice. However, the level of education of the respondents has a nearly significant association with the use of advice ($\chi^2$ = 3.710; P = 0.054). Whilst the sample consisted of 80 percent respondents having educated up to O/L the rest had a higher education. The data showed that though 94 percent respondents who have been educated above O/L had made use of the advice, only 86 percent respondents who have been educated up to O/L or below had followed the advice. Thus it is apparent that higher the level of education, greater the chances of making use of the advice given at crop clinics.

In general in the three districts, over 95 percent farmers agreed that solutions given at the CCs are reliable as they have been recommended after examining the samples of the diseased crop and solutions are provided by experts in the field of agriculture. Farmers admitted that most solutions given were natural remedies which were low cost and could be prepared at home and therefore generally low cost and non-toxic. A reason for the use of advice given by CCs is that farmers have found that

recommendations given by agrochemical dealers have proved to be both expensive and ineffective. If chemicals were recommended at the crop clinics they were items which were readily available in the market. The majority of farmers were of the opinion that advice given at the crop clinics while being relevant to the problems discussed were practical and easily implementable (Figure 4.13). However, sixteen percent full time farmers and eleven percent part time farmers did not fully agree that the recommendations given at the crop clinics were fully practicable.

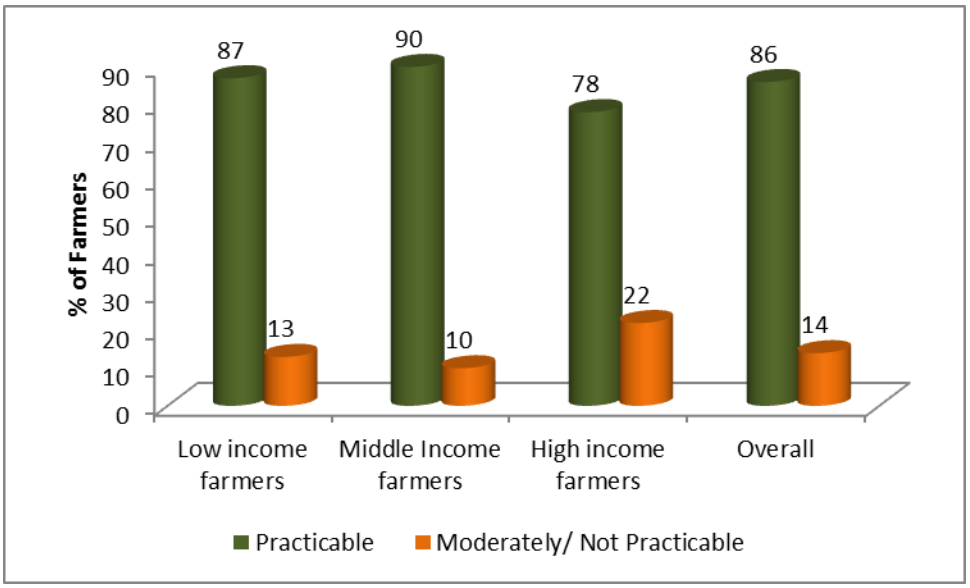



Source: HARTI Survey Data, 2013

**Figure 4.13: Practicability of Advice Given at Crop Clinics by Farmer Category**

When the income levels of such farmers are considered it is clear that a considerable portion of high income farmers (22%) have said that the recommendations given are not/fully practicable due to a number of limitations (Figure 4.14). Farmers were not ready to take the risk of destroying their crops grown at commercial scale by relying on IPM measures which they had not seen successfully implemented at a larger scale.

Other drawbacks of the solutions were; labour and time consuming nature of pest control preparations and their application, for instance, field by field application of water in onion cultivation and the use of compost, unavailability of raw material (eg neem) is unavailable in Matara, application of chemicals for mealy bugs affected taller papaw plants was being cumbersome and high cost of certain recommended chemicals prevented the frequent use.




Source: HARTI Survey Data, 2013

**Figure 4.14: Practicability of Advice Given at Crop Clinics by Income Category**

### c. Sound Procedure Adopted in Crop Clinics

The third most important reason was the entire satisfactory procedure of CCs including the way of organizing, conducting and using of teaching aids as discussed under the sections 4.3.2.1, 4.3.2.2 and 4.3.2.3.

### d. Farmer and Extension Personnel Interaction

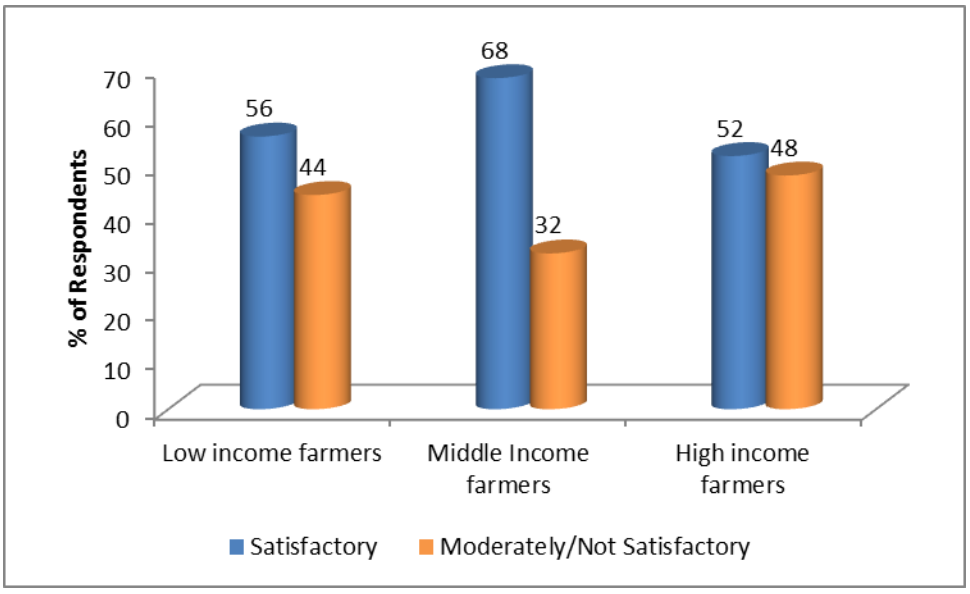
Finally, five percent of farmers had enjoyed the event as they could have one - one interaction with extension personnel of higher grades who are experts in the field of pest and disease control as detailed under section 4.3.3. It is also noteworthy that there is no marked deviation in the pattern of responses across districts.

## 4.4.2 Contribution of Crop Clinics to Promote Sustainable Agriculture

CCs had contributed to set the minds of farmers on sustainable agriculture via disseminating the message of non-toxic farming in several ways.

(a) At the crop clinics plant doctors make the maximum efforts to popularize natural preparations particularly for the prevention of pests and diseases and for control of the same. The importance of traditional/indigenous/local methods for pest control, nutrient deficiencies and also sanitary methods for pest prevention are discussed at the crop clinics. Also farmers are shown that most of the raw material required for the pest and disease control are within their reach. However, around 50% of the

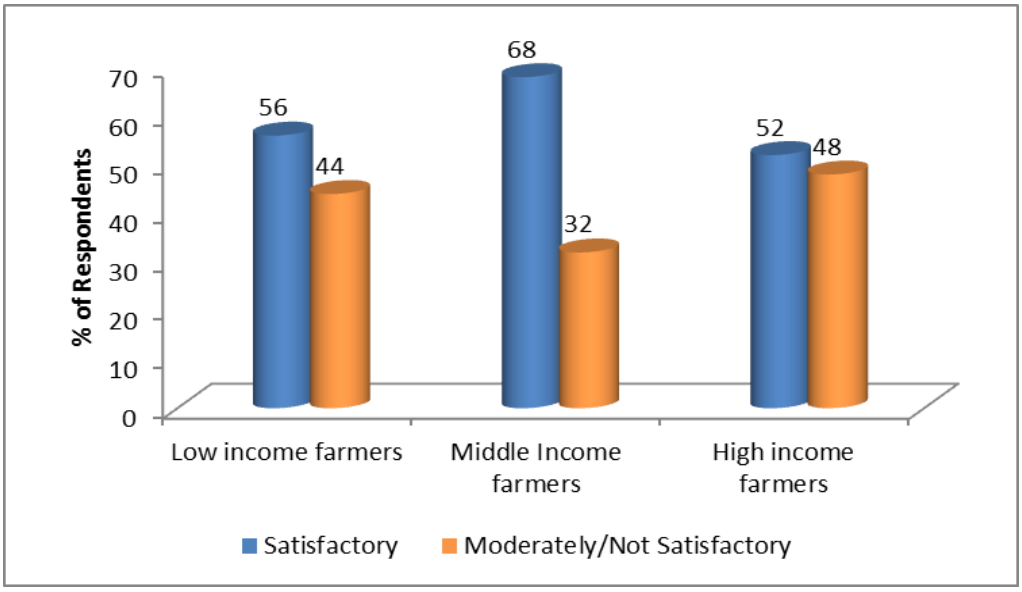
high income farmers are less/not satisfied with the recommendations provided at crop clinics (Figure 4.15).




Source: HARTI Survey Data, 2013

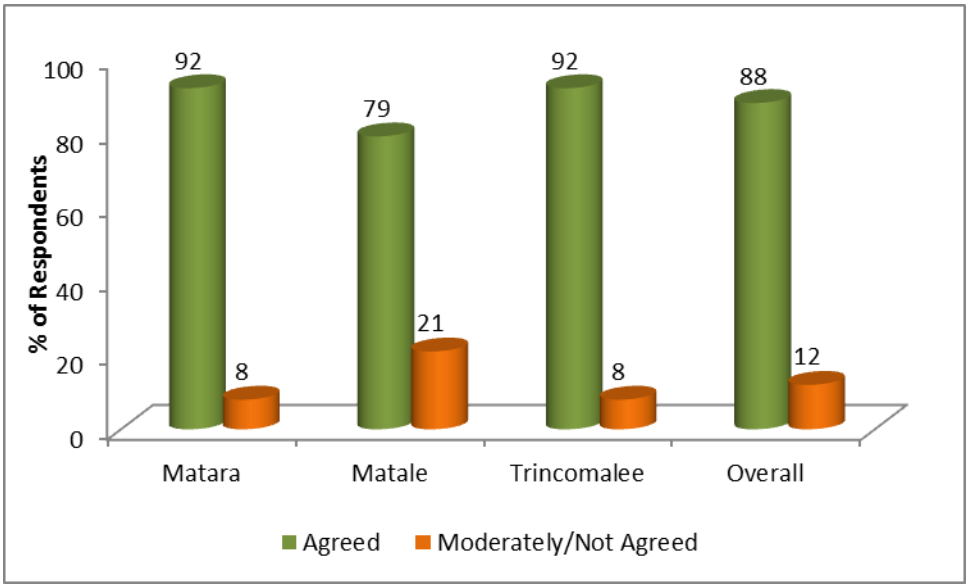
**Figure 4.15: Farmer Satisfaction with Recommendations by Income Category**

(b) Even though the CCs had frequently recommended to use inorganic pesticides such use is recommended as the last option due to an increased concern on environmental sustainability. Prescriptions endorse strict adherence to the instruction given in the labels, the use of safety kits and encourage the use of less toxic chemicals first and proceed to more toxic chemicals only if necessary. At the same time, farmers had been made aware of the importance of using less toxic chemicals to protect natural predators, the correct time for applying pesticides and that the effectiveness of the chemical gradually declines with continuous use and the need to reduce the use of chemicals/fertilizer, and the need for and the importance of maintaining the pre-harvesting period in the application of pesticides. The data (Figure 4.16) depicts the degree to which the farmers earning different income levels are satisfied with the recommendations to stop arbitrary use of pesticides. Data shows that a high number of high income farmers and a high number of farmers from Matale (Figure 4.17) are less happy with these recommendations.




Source: HARTI Survey Data, 2013

**Figure 4.16: Farmers' Dis /agreement on not to Use Pesticides Arbitrarily by Income Category**

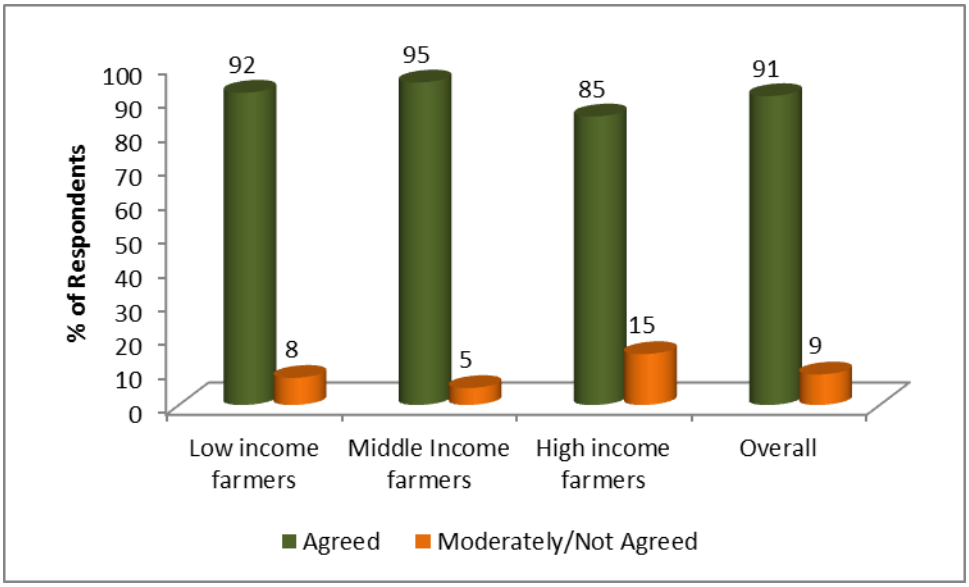



Source: HARTI Survey Data, 2013

**Figure 4.17: Farmers' Dis/agreement on not to Use Pesticides Unnecessarily by District**

(c) An important initiative promoted in CCs is the use of organic manure (OM) sometimes through demonstration of the preparation of organic manure. There had been awareness creation on the benefits of the use of OM for home gardening and that there is an impact on yield and the soil structure and the composition of

OM such as the micro elements which are found in chemical fertilizer at a lesser scale. In addition, necessary raw materials required for the production of organic manure had been distributed to farmers at a number of CCs, which could then initiate production and the use of organic fertilizer. In general nine percent farmers disagreed with the use of organic manure, more disagreement was expressed by high income farmers (Figure 4.18).




Source: HARTI Survey Data, 2013

**Figure 4.18: Farmers' Dis /agreement on the Organic Manure**

Some farmers found the alternative cultural practices recommended were not satisfactory when compared to chemical methods that give faster results and are easier to practice. It is the opinion of the farmers that there is a need to apply large quantities of OM than chemical fertilizer and therefore the cost is high. The production of OM is also bothersome and it requires more time for preparation. Finally, the farmers also alleged that they require more knowledge and time to use alternative methods introduced at crop clinics. There were cases where farmers particularly the onion farmers in the Matale district were dissatisfied with recommendation as they had not solved the disease and pest problem of the farmer.

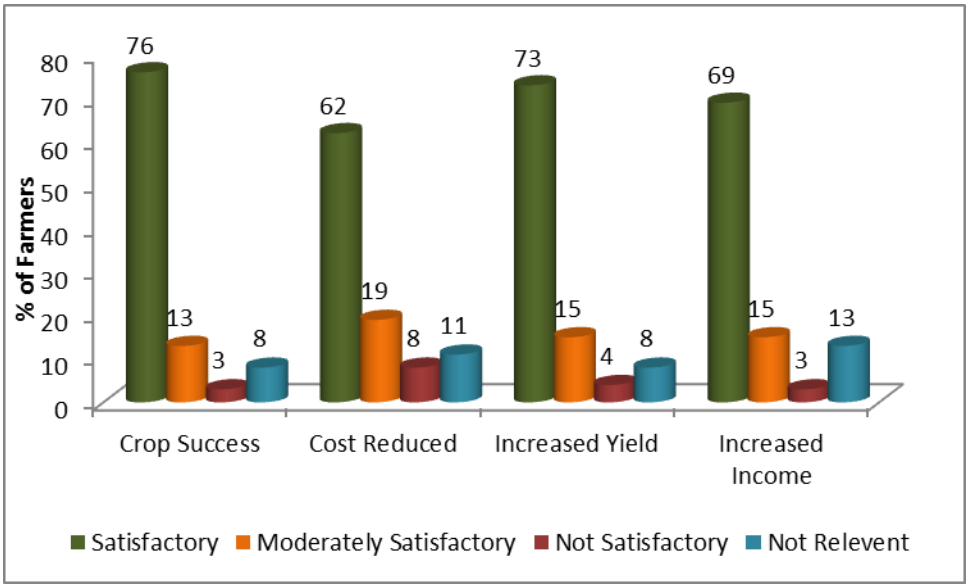
## 4.5 Farmer Satisfaction about Crop Clinics

Crop clinics had begun in the Matara district 2010 and in 2011 in Matale and Trincomalee districts and therefore this service had been in place for the past two years which gave the farmers sufficient opportunity to have an evaluation of the process. With that exposure the majority of farmers (92%) are satisfied with the crop clinic programme with one percent who are moderately satisfied and the rest (6%)

representing the not-satisfied group. Across the three districts, 95 percent of farmers state that they will attend crop clinics which will be held in the future.

### 4.6 Impact of Crop Clinic Programme

This study aimed to evaluate the activities of crop clinics and thereby to assess the extent which the PCCP has accomplished the objectives for which it was originally established. Such objectives at the farm level are to decrease the cost of production due to application of pesticides unnecessarily and to reduce crop damages due to pests and diseases and thereby increase farmer income. Due to lack of reliable data on the use of various pest control measures in terms of the cost and their outcomes with regard to changes in yield and thereby the income, the study was unable to estimate the above impacts and to make comparisons between crop clinic participants and non-participants. The only possible impact measurement was in terms of the perceptions of the farmers, thus the data was gathered on four aspects relating to effects and/or impacts of crop clinics namely; success of the crops cultivated due to prevention and control of pests and diseases with the knowledge gained through participating in crop clinics, reduction in cost due to prevention and control of diseases and non - use of agro-chemicals, increase in the yield due to above, resulting in an increase in the income. The data (Figure 4.19) shows that farmers have benefited from crop clinics in all the aspects mentioned above.



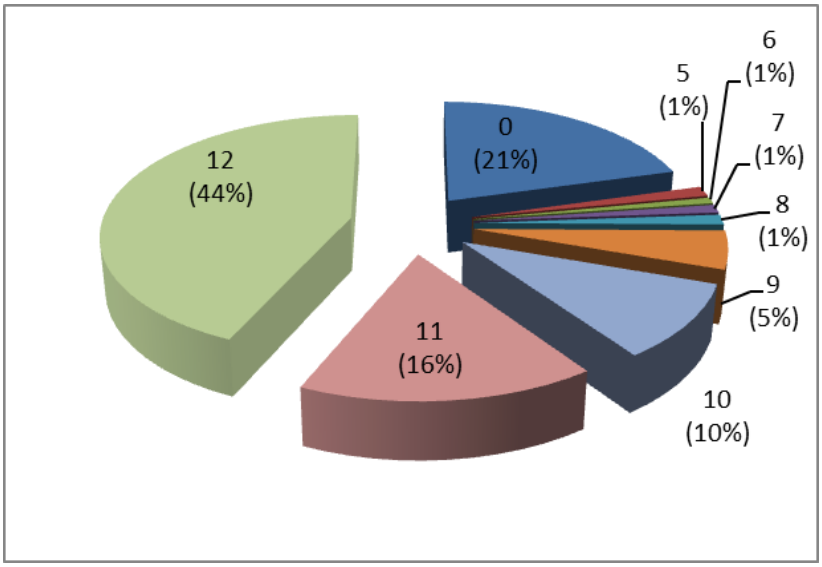

Source: HARTI Survey Data, 2013

**Figure 4.19: Impact of Crop Clinics**

The background scenario of the data depicted in the Figure 4.19 can be explained in the following way based on the information gathered from a variety of sources during the survey. It was the general consensus that the crop clinics had provided

recommendations for the control of pests and diseases immediately based on correct diagnosis as envisaged and the farmers who practiced such recommendations had experienced a remarkable growth of crops. There has also been a reduction in the cost due to use of remarkable non-chemical pest control methods against costly pesticides used on the direction of pesticide traders. As a result, farmers have been able to obtain a better harvest, thereby an increased income by selling the surplus.

An impact score was constructed for each respondent simply adding the values of their responses weighted at the rate of satisfactory = 3, moderately satisfactory = 2 and not satisfactory = 1. Accordingly the respondents can earn a total score from 0 to 12. Data (Figure 4.20) shows that the highest percentage (44%) of respondents have earned the total score whereas 21 percent have responded in the sample as having experienced none of the above effects.




Source: HARTI Survey Data, 2013

**Figure 4.20: Impact of Crop Clinics**

Statistical evidence shows that the impact score is positively correlated with the type of farming and the correlation is nearly significant ($\rho$ = 0.109; P = 0.061) establishing that the part time farmers had benefited more from crop clinics. The higher the income from farming the lower the impact score though the correlation is insignificant ($\rho$ = -0.072; P = 0.217). Statistical evidence is also available to prove that the higher the level of education, higher the impact score ($\rho$ = 0.116; P = 0.046), establishing a significant relationship.

# CHAPTER FIVE

# The Perspectives of Extension Educators on Crop Clinics

## 5.1 Introduction

One of the important elements in the extension education process of crop clinics is the extension personnel or **'Senders'** of extension messages who perform as plant doctors. This chapter presents the extension officials' perception of the crop clinics. Taken into account in this sample are AIs and ARPAs. In addition, this chapter contains the views of some other officers from the agriculture sector such as district coordinators of the programme. The views on farmers' reaction to the CCs and the positive and negative aspects of CCs as seen by the officials are also discussed in this chapter.

## 5.2 Some Characteristics of Respondents

The Table 5.1 depicts some characteristics of the AIs and ARPAs who responded to the survey.

**Table 5.1: Characteristics of Responding Officials**

| Characteristics | No. | Percentage |
|---|---|---|
| **Educational Level** | | |
| Primary education | 1 | 3 |
| Secondary | 7 | 21 |
| G.C.E. Ordinary Level | 21 | 64 |
| G.C.E. Advance Level | 4 | 12 |
| **Work Experience (years)** | | |
| <5 | 8 | 24 |
| 5<10 | 7 | 21 |
| >10 | 18 | 55 |
| **Number of CCs Conducted in the Division** | | |
| <4 | 5 | 15 |
| 4 | 18 | 55 |
| >4 | 10 | 30 |
| **Number of CCs Participated** | | |
| <4 | 5 | 15 |
| 4<10 | 13 | 40 |
| <10 | 15 | 45 |

Source: HARTI Survey Data, 2013

The majority of respondents was educated up to G.C.C. Ordinary level and had work experience ranging from one to 31 years. The most number (18 - 55%) of officers had conducted four crop clinics. The majority of respondents participated in more than ten crop clinics.

### 5.3 Farmer Participation and Reaction to Crop Clinics

The extension personnel involved in crop clinics claimed that there was a good response from the farmers to the advice and recommendations given due to a number of reasons. Farmers had experienced that the results after trials have been effective and they were interested in the use of natural preparations for pest control. Youth involved in the CCs were not many but are attracted to the new and innovative methods taught at the clinics. Due to the interface between farmers and officials, the CCs officials are more actively involved with the farmers, undertaking extra farmer field visits when required. The only disgruntled farmers are those who are not willing to change their present patterns of agrochemical use. This was mainly large scale farmers.

Organizing of crop clinic meeting was generally in consultation with farmers and officers. However, there were certain situations when difficulties arose mainly during the '*yala'* season as the extent under cultivation was less, and thus the importance of crop clinics was only for those who had cultivations.

Although officers agreed that the monthly meeting was vital for the farmers since this would be more helpful to farmers in sorting out problems regarding pest and disease attacks, it was an impractical suggestion due to the workload of both the farmer and the officers. It was thought that CCs held during the mid of the cultivation season were more productive as this would be the time the pest and disease attacks emerge.

### 5.4 Programme Content

Popularization of IPM practices with more attention to natural methods of pest control is prioritized in the crop clinic programme. Chemical methods are only recommended when the natural methods are futile or have proved to be unsuccessful but in case of large scale cultivation the use of chemicals as a means of pest control is often recommended.

As revealed through key informant discussions, most of the time CCs are allocated for solving the problems relating to pest and diseases which amount to over 95 percent of the problems. However, the CCs had incidentally become a forum for disseminating other important information on crop production to the farming community. The plant doctors had derived maximum benefits from CCs by educating farmers on various cultural practices. Accordingly, the rest of the information was on various other latest and accurate information on crop production techniques including land preparation, nursery management, fertilization, irrigation methods, spacing, pruning, pest and

disease and control and post-harvest handling. In addition, CCs had been able to set the stage for disseminating other vital agricultural information having national and regional importance including production and use of organic manure, mushroom cultivation and bee-keeping, identification and control of wild paddy varieties and home gardening techniques. There is also dissemination of information of all new agricultural knowledge which has been released to the sector.

## 5.5 Effectiveness of Crop Clinics as an Extension Tool

The programme of crop clinics had begun in 2010. Even though there is a national agricultural extension service in Sri Lanka, not many farmers have been able to avail themselves of the service and obtain the full benefit from the formal extension service. The reasons vary from the ratio of officers to farmers. In an area the excess duties and programmes which have to be carried out by the extension staff curtail their engagement with farmers and the distance that has to be covered by farmers to seek advice from the extension staff also have an impact.

As of the opinion of the majority of extension personnel (94%), crop clinics have been an effective extension tool due to following reasons.

a. In crop clinics there has been a concentrated effort to prevent and control pest and diseases which is the most risky aspect in crop production that sometimes can cause 100 percent crop losses. The CCs while giving advice on controlling the pests and diseases also have been a means through which farmers can minimize attacks and solve unidentified problems and obtain accurate advice and knowledge. With advice received from CCs there are a number of farmers who have changed their cropping pattern so that pests and diseases can be controlled. The reason for the change is that farmers had realized that due to continuous cultivation of the same crops over time, diseases and pest attacks had increased. However, this is only among five percent of the total sample farmers, the reason for which lies in the fact that farmers are not willing to risk the loss of their crops in case their knowledge proves to be faulty.

b. One of the main activities of the crop clinic has been the use of samples to illustrate the pest attacks and then make recommendations on pest control. This allows the farmer a chance to gain knowledge as well as practical experience on pest diagnosis and control. Therefore, this experience is entirely different from a general training programme and receiving advice from the pesticide dealer. Continuous participation at clinics provides the farmers the ability to make informed decisions with regard to pests and diseases and also cultivation practices.

c. A crop clinic is a forum to share knowledge and experiences among the fellow farmers and officials. This is a very important aspect of crop clinics as some farmers believe in fellow farmers than officers while others do not. Crop clinics equip farmers with diverse ideas and attitudes to share their knowledge and experience and come to an agreement with regard to best options for pest control. Another aspect of crop clinics is these meetings encourage the participation of silent learners.

d. Crop clinic has led to the appreciation of indigenous knowledge of farming. Officials have kept considerable room for popularization of indigenous methods within the overall IPM approach promoted through crop clinics.

e. In case a problem cannot be resolved it is forwarded to the plant protection centre at Gannoruwa or relevant research stations and mainly the advice is sought over the phone from the relevant official. There have been instances; eg: onion pulli disease, where samples are sent to Gannoruwa for recommendations.

f. Unlike in other extension programmes crop clinics follow a standard method for documentation in which there is a record kept for all pests and diseases which are bought to a CC for which solutions are then given. A summary of information is sent monthly to the district office from where it is sent to the HORDI in Peradeniya. Most of the officers maintain records as one of the main objectives of the CCs is that there is a library of all known pest and disease problems. Records have proved to be important in identifying location wise pest and disease attacks. Officers refer records when they warn farmers of impending or at the onset of problems and they have used those in decision making. The whole process if subject to proper documentation management would serve the purpose of developing an island wide IPM programme as an alternative tool against indiscriminate use of pesticides in crop production.

g. Crop clinics are seen as a good strategy for attracting farmers towards the state sector extension service as expressed by officials. Though the PCCP has proved to be an additional duty to the officers they are enthusiastic about the programme as they have greater accessibility to a wider number of farmers at a given time. Involvement and support for the continuation of programme has been good. Farmers have shown an interest to participate in CCs as they have realized that there is a lot to gain by participating in these programmes. As stated in the previous sections there is a tremendous support from district level agricultural officers. Officers find the PCC as a successful and timely programme as they find this system an easier method than meeting individual farmers. Also officers find this method a better extension technique to advice a number of farmers at any given time.

Therefore, officials emphasize the need for the continuation of crop clinic programme.

## 5.6 Programme Monitoring

The ARPA and farmer organization president motivate farmers to participate in CCs whereas in the Trincomalee district there are no ARPAs. The AI obtains help from farmer leaders to organize the CC. Officers find it difficult to conduct more than one meeting per month as they are also involved in a series of duties and in addition, the farmers outnumber the AI in terms of the ratio. Officers monitor farmer fields given the time limitation, although the visits are not frequent. When requested by individual farmers field visits are conducted. However, officers find field visits are difficult to conduct as the allocation for field visits is limited and visiting farmer fields which are located away from their regular route is expensive. This has a caused a friction between farmers and officials in certain instances forcing them prompting to complain that officials are evading their responsibilities.

## 5.7 View of Stakeholders from Other District

In an attempt to find out how CCs have been conducted in other districts besides the surveyed three districts officers-in-charge of the programmes were interviewed from the following districts.

| District | Responsible Officer |
|---|---|
| Kalutara | Deputy Provincial Director of Agriculture |
| Gampaha | Agricultural Promoting Assistant |
| Kegalle | Deputy Provincial Director of Agriculture |
| Anuradhapura | Subject Matter Officer (Plant Protection) |
| Jaffna | Agriculture Monitoring Officer |
| Vavuniya | Subject Matter Officer (Agriculture Extension) |
| Kandy | Subject Matter Officer |
| Ratnapura | Subject Matter Officer |
| Moneragala | Assistant Director of Agriculture |
| Mullativu | Deputy Director of Agriculture |
| Kurunegala | Subject Matter Officer |
| Badulla | Deputy Director of Agriculture |
| Batticoloa | Subject Matter Officer (Plant Protection) |
| Mannar | Deputy Provincial Director of Agriculture |

Source: HARTI Survey Data, 2013

In the Northern and Eastern Districts there is an interest in this programme from the farmers and the officials who find it a very meaningful and successful programme for the control of pests and diseases. One CC is held in an AI range every month with

attendance of around 20- 30 farmers. In the Jaffna district there have been instances where more than 70 farmers attending a CC. There is an active involvement of the Provincial level officers in these programmes. In the beginning of 2014 there was an allocation of money for each district to conduct the programmes. Certain weaknesses that the officials find with regard to the programme are the lack of internet and laptop facilities which would enable communication and clarification of plant pests and diseases, difficulties in reaching distant villages for officials, and in the Mullaitivu district, the absence of a SMO for plant protection. If these could be remedied the programme would benefit farmers in the province. There is an additional suggestion to maintain an online data bank which could be accessed when required. In addition, AI needs to be updated with the latest information regularly.

In Kalutara and Gampaha districts, PCCP are seen as a successful programme as AI can communicate and reach out to a larger audience rather than visiting individual farms. In the Gampaha district, farmers do not bring in live samples to the CC instead samples are collected by officials and then shown at the CC, for which remedies are given. This is done in this manner as the farmers in the district are not experienced, they are rather part time farmers or mainly home gardeners. The lack of funds to purchase required instruments and conduct CCs is one of the weaknesses. Another is the lack of coordination with the research stations to which the samples are forwarded.

In Kandy, Kurunegala, Kegalle and Ratnapura districts, the programme despite being successful has had problems due to lack of funds. Since the programme stretched to a couple of hours, refreshments for farmers are required for which personal funds are utilized. There is a dearth of officers from the plant protection unit for Kegalle district, in the Kandy district; there have been requests to hold CCs in a proper location rather than at field.

In Badulla and Moneragala districts, as in the other districts, this is viewed as a very successful programme where there are requests by farmers to hold the crop clinics plus there is willingness among the farmers to participate in the programme. One drawback is the lack of funds and equipment.

# CHAPTER SIX

# Summary of Findings Conclusions and Recommendations

## 6.1 Summary of Findings

1. The PCCP in Sri Lanka commenced its operation in Hambantota and Matara districts in 2010 with an ultimate goal of promoting environmental friendly farming through correct diagnosis, prevention and control of plant pests and thereby reducing the cost of production and increasing the farm income. The PCCP covered 14 districts island wide.

2. Initially, the programme was implemented with the special involvement of a scientist from the DOA and over time, the entire responsibility of the programme has been transferred to the plant protection centre of the DOA. Initially the programme has been implemented through a limited number of crop clinic committees organized in each district on the basis of one committee for a few AI ranges with the involvement of AIs, ARPAs and trained farmers termed as plant doctors. At present, the CCs are entirely managed by AIs in their respective ranges.

3. The study found that the programme was initially managed with no/less allocation of financial resources with a few trained staff and other resources. Today, the programme has a separate allocation either from the district or from the provincial agricultural budget. Also in certain districts the programme has been able to achieve the set targets in terms of farmer coverage which is 1000 farmers per year.

4. This study based on a sample of 373 crop clinic participants chosen from Matara, Matale and Trincomalee districts shows that there are no marked variations in regard to most of the socio-economic characteristics of the sample farmers across districts except for the sex ratio, degree of involvement in farming and income earned from farming.

5. More females participated in crop clinics from Trincomalee and Matara districts whereas from Matale, the most commercial oriented farming district among the study locations, the representation of males was high.

6. The sample consisted of both full time (58%) and part time farmers (42%) with the highest representation of full time farmers from the Matale district and the lowest representation from the Matara district.

7. The study employed a categorization of farmers based on their monthly agricultural income as per low income farmers (less than Rs. 10,000), middle income farmers (Rs. 10,000 > Rs. 30,000) and high income farmers (Rs. 10,000 > Rs. 30,000). Whilst all

the full time farmers included in the middle and high income categories, around half of the part time farmers were low income farmers.

8. Income from farming significantly varied between full time and part time farmers (t = 8.838; P= 0.000) and between high income farmers from full time and part time farmer categories (t = 2.545; P= 0.000). There are also significant variations in the agriculture income of full time farmers across districts (F = 27.853; P = 0.000), for instance, the highest average income is earned by farmers from Matale.

9. The majority of farmers (40%) in the study locations had participated in one CC with the rest having exposed to more than one CC. It was evident from the survey that the number of chances the farmers had received to participate in crop clinics significantly varied across districts (F = 6.280; P = 0.002). Farmers from Trincomalee district had received more chances with the lowest chances for Matale district farmers.

10. Most of the non-participants of CCs (60% of the sample) were aware of and had heard about crop clinics but non participation was due to three main reasons; lack of clear awareness about CCs, less/lack of interest and time constraints.

11. In general, venue, date and time of CC are set after consulting the farmers and the officers mainly the AI. The farmers are informed via farmer leaders or neighbors verbally. Crop clinics are conducted in a convenient place such as schools, temple premises and ASCs.

12. Nearly all farmers raised no objections on the venue and time of crop clinics. However, there was certain dissatisfaction among middle and high income farmers who are involved in full time farming with regard to date of crop clinics. Around 51 percent farmers stated that the number of crop clinics held were inadequate with the highest percentage of 22 percent reporting from the Matale district. The need for more crop clinics has largely been voiced by the farmers from Matale (68%) and also by high income farmers (63%).

13. Despite different opinions of farmers in regard to frequency of conducting CCs, the general consensus was to have four clinics per annum: two at the growing stage of crops in both seasons and the other two at the crop maturity in both seasons.

14. In contrast, some farmers were of the view that the number of CCs held in their areas was sufficient as most participants sought advice on individual basis from the AI or agrochemical dealers or receive information at the '*kanna'* meeting. They also saw more meetings as an added burden.

15. Farmers who participate in crop clinics with live samples are first registered by providing a description of the sample. Recommendations are made by plant doctors,

upon examination. In case the clinic fails to diagnose the problem, it is referred via phone to the plant protection centre and solutions are received within two to four weeks.

16. The study revealed that the majority of CCs (96%) held in study locations were attended by three or more officers with no significant difference in the number of officers across districts. There are no ARPAs in the Trincomalee district instead a few AIs getting together to conduct a crop clinic. In other districts AIs, ARPAs and trained farmers perform as plant doctors. In addition, other officers from the agriculture sector and other line agencies had represented crop clinics.

17. Participants expressed their satisfaction over the institutional contribution due to following beneficial characteristics of crop clinics; (a) Recommendations and solutions given by the plant doctors were understandable (96%) and can be easily prepared using the raw materials found locally at a low cost, (b) Written prescriptions which were made available on inorganic pesticides had enabled farmers to purchase the correct agro-chemicals leaving no chance for the dealer to mislead the farmer and (c) The farmers had been able to directly deal with higher officials and with a variety of experts (d) officers can be contacted via phone (58%).

18. Among the weak points in regard to institutional contribution; Gradual decline in the experts' attendance at crop clinics; shortage of officers and lack of interest of new AIs, minimum contribution from ARPAs; unsatisfactory solutions prescribed for some crops such as onions; lack of access to necessary phone numbers as AIs had not provided the numbers.

19. By considering all the problems and weaknesses of crop clinics farmers have sought several changes in crop clinics; (a). Timely provision of new and important information on diagnosis and prevention of pests and diseases of crops they grow (68%) (b) Organizing in terms of timing, frequency and use of teaching aids (16%) and (c).Increased contribution from extension personnel in terms of number and their self-interest (16%).

20. Even though farmers do not fully understand the importance of teaching aids in a programme such as crop clinics, officers showed their dissatisfaction over the very few teaching aids available in crop clinics. Sometimes no teaching aids were used at all. The research team too observed the same. In the absence of required financial resources, officers had sometimes organized crop clinics at their own expense.

21. Whilst 89 percent farmers who participated in crop clinics had sought advice for pest and disease control, the rest had participated in for improving their knowledge. Advice was mainly sought for three main crop categories including paddy, vegetables and condiments including onions and chili. In crop categories there were

district variations too. Prominent crops in Matara and Trincomalee were paddy and chili. In Matale it was onion.

22. CCs have educated farmers on the use of non-chemical pest control methods such as herbal preparations, '*kem krama*', physical pest control methods and crop sanitary/agronomic practices. Data shows that most frequently made recommendations (32%) were to use inorganic pesticides if taken as a single method. The rest of the methods altogether comprised non-chemical methods where the most important is to recommend natural preparations. The degree of using these pest control methods for the crops grown in such locations varies across districts.

23. As viewed by the farmers the importance of crop clinics is twofold: its role as an extension tool and its contribution to promote sustainable agriculture. Crop clinics are valued as an extension tool due to following features.

    (a) As unique educational experience that the farmers gain through participation in crop clinics wherein farmers learn a variety of pest control measures which are recommended through correct diagnosis from live samples, in consultation with experienced farmers and the experts in the field. Crop clinics have also been a source of new knowledge not only on pest control but other cultural practices of crops they that have grown/will be grown in the future crop production. It has provided an opportunity to learn through observation and further examination of live samples for plant pest diagnosis. The general consensus among the participants is that with the participation in CCs their knowledge was enhanced in the fields of diseases and pests of the area and also they had learned new and additional cultivation techniques and measures.
    (b) These are relevant and implementable at a low cost and good results are obtained.
    (c) Farmers are satisfied with the way the crop clinics are organized, conducted and used teaching aids for diagnosis of pests and diseases, being a knowledge sharing experience between farmers and expertise
    (d) Interaction between farmers and extension personnel including experts in the field.

24. Since its inception crop clinics have often made efforts to encourage non-toxic farming among the farming community. Whilst farmers have been educated on environmentally friendly means of pest control, importance of traditional/indigenous/local methods of pest control has been reminded over and again. Crop sanitary practices that help prevent pest attacks were also among the content of crop clinics. Recommendation to use inorganic pesticides became the last option. It was also clearly prescribed and due to being informed of the accurate chemical usage farmer was not misled by pesticide traders. Crop clinics also

emphasized the need for safe use of pesticides and adverse effects of using them indiscriminately.

25. It is also noteworthy that overall 14 percent farmers do not agree with the recommendations given at crop clinics as they are not practicable. Most of the farmers who disagreed are high income farmers. As a whole, a small percentage of farmers were not satisfied with the recommendations given and the dissatisfaction was largely among the high income farmers (48%).

26. However, 12 percent farmers did not agree with the recommendations made at crop clinics as they were less significant for commercial farming since farmers were not ready to take the risk of destroying their crops grown at commercial scale by relying on IPM measures; the cumbersome nature of some pest control methods introduced; unavailability of raw material and high cost of certain chemicals that were recommended.

1. As viewed by extension personnel CC is an additional burden to their already busy schedule but asserted that the programme facilitated their extension activities and strengthened the links between farmers and officials. They found that there has been a good response from the farmers to the advice and recommendations prescribed for a number of reasons.

   (a) CCs are seen as a concentrated effort to prevent and control pest and diseases which is the most risky aspect in crop production that can sometimes cause 100 percent crop losses. New and innovative methods taught at the crop clinics were new to the younger generation. The results after trials have been effective.

   (b) In CCs there has been a good interface between farmers and officials. In addition to the anticipated purpose, extension personnel had used CCs as a forum for updating the farming community in regard to all other agrarian information that they are responsible to convey to the farming community. Whilst CCs provided an opportunity to share knowledge and experiences among the fellow farmers and officials it has been an alternative means of admitting more farmers, given the less time and resources to reach each and every farmer amidst additional duties assigned to them.

   (c) As an entirely different exercise CCs had given the opportunity to farmers to gain both knowledge and practical experience on non-toxic farming. It is an appreciation of indigenous knowledge of farming. Efforts have also been made to strengthen research-extension linkages. Quick responses had been provided. It has been a workable strategy for attracting farmers towards state sector extension service as they have greater accessibility to a wider number of farmers at a given time. CCs had followed a standard method for documentation. The records kept are proved to be important raw material for identifying location wise pest outbreaks.

## 6.2 Conclusions and Recommendations

1. Despite limited financial allocations for the crop clinic programme which was reported as a key limitation from study areas, the gradual growth of the crop clinic programme over time and space demonstrates the vital role played by crop clinics as an innovative extension tool in promoting plant pest control through an integrated approach. With the reported success the crop clinic programme has today become an institutionalized extension programme in both provincial and inter-provincial extension areas of the country. Unlike many project based efforts which are eventually forgotten by both implementers and beneficiaries, the crop clinic programme has taught a valuable lesson, which is institutionalized development efforts perform effectively than many unsustainable project based efforts.

2. The crop clinic programme has also succeeded in terms of achieving some of the objectives for which it was originally established as highlighted below.

    - As anticipated CCs had provided **recommendations immediately based on correct diagnosis** and helping farmers to prevent and control pest damages in an integrated manner. Therefore, it was possible to control the pests and diseases with a single or few applications of pesticides making pest control both easy and cheaper. This has **helped prevent farmers from applying pesticides unnecessarily with an ultimate reduction in the cost of production**.

    - The advice given at CCs had also been trustworthy due to involvement of plant doctors and other experts. The standardized procedure adopted in **CCs had minimized the level of dependence of crop clinic participants on pesticide traders for advice**.

    - Prevention and control of pests and diseases through the practice of recommendations given at **CCs had contributed to lessen crop damages** as accurate recommendations are given at the first instance by examining the live samples. This has resulted in an **increased yield and thereby a higher income from farming.**

    - The crop clinic procedure which encouraged practical learning and two-way communication between farmers and extension staff had **improved farmers' understanding on the pest and disease problems in the area.**

3. Farmers view crop clinics as an effective educational experience which directed them to practice eco-friendly means of farming and therefore the continuation of crop clinic programme is worthwhile. Even though the programme encountered several challenges in the way it is presently carried out it demonstrates a revolutionary capacity to build a sustainable and pest free food crop sector if implemented more systematically. The changes required to improve the existing

programme as an effective source of information on pests and diseases control are detailed below.

**a. Frequency of Crop Clinics:** Crop clinics should be organized and conducted considering the adult education principle - repeated education is a must for adults. From the farmers' perspective, they should be ready to participate in crop clinics as the way they participate in *kanna* meetings. For the farmers who cultivate major crops in commercial scale a maximum of four crop clinics per annum per farmer in both seasons and a half the number for a farmer who cultivate in a single season is adequate. Seasonal basis is not a great consideration for the low income earning part time farmers including farm helpers and home gardeners.

**b. Timing of Crop Clinics:** Timing of crop clinics is a very important aspect. Farmers need advice when they come across pests and diseases in plants. At other given times they are not interested in participating in crop clinics. Crop growth and maturity stages are the critical times where live samples can be taken for diagnosis to address persistent pest attacks. If this will not happen farmers seek traders' advice as they need to take prompt corrective action to avoid crop damages. If crop clinics are to be an effective extension tool, they should be an essential part of the cropping management system. To accomplish these requirements;

i. Extension personnel require to allocate time in the annual plans for crop clinics on seasonal basis.
ii. The support from the ARPAs should be obtained for organizing crop clinics.
iii. Crop clinics should follow target group approach. For full time commercial farmers crop clinics need to be conducted at the growing stage of the crops to educate on how to prevent possible outbreaks and to control recurrent outbreaks in the middle of the season.
iv. For low income part time farmers such as home gardeners crop clinics can be conducted at any time.

**c. Content:** Despite the fact that the solutions given at crop clinics are found to be useful for small scale farming mainly for home gardening and smaller extents of cultivation, some recommendations were reported to be impracticable for the crops which are prominently grown in different locations, especially in commercial cultivations. But crop clinics had attempted to address all the problems including minor matters referred by a number of farmers wasting the time of the majority. Therefore, the content of crop clinics should comply with the needs of the above target groups. It will promote farmer participation and retain the attractiveness of crop clinics. In order to meet the above requirements the following recommendations are proposed.

i. Providing exposure to major crop growers on the prevention, identification and control of pests and diseases through demonstrations.
ii. Making a coordinated effort to disseminate practicable solutions particularly for commercial farmers.

**d. Use of Teaching Aids:** If crop clinics could be made a surprising event for the farmer it would be more attractive to them. Since crop clinic is a group extension activity the use of visual aids is essential to ensure that each and every farmer gets the message correctly and to limit the time taken to address individual matters. But there is the issue of inadequate funding for the districts for bringing in teaching aids such as posters, leaflets and screening of videos. Therefore, to make crop clinics more attractive:

i. They should be equipped with advanced teaching aids such as multimedia/lenses, leaflets as 'farmers believe what they see'.

ii. Crop clinics should also be linked to demonstrations of pest control methods for farmers to gain a wider practical understanding and use such methods with confidence that such methods are effective.

5. Those who participate in CCs know that advice of extension personnel is more accurate than any other source of information. However, it was reported that some officers are less interested and the experts' participation is gradually lessening. What was understood by the research team through the participation in a crop clinic was that officers should be prepared to answer not only on pest and disease problems but also to other crop production problems raised by the farmers. Recommendations given to the farmers' queries cannot be tentative or uncertain. There are pesticides in different names at the market, therefore, farmers seek written prescriptions at the crop clinics with both the trade name and chemical name in order to ensure that farmer gets the correct product from the market. Therefore, from the side of the officers they need to be updated with necessary knowledge, as there is a frequent changing of pest outbreaks and pest control measures. However, the plant doctors are not updated in this regard. They should also know the profitable crops which are not grown in the area and new techniques that farmers have never used. Therefore, the following recommendations are proposed.

i. Frequent and thorough training of extension personnel – the plant doctors- who are assigned to conduct crop clinics.
ii. They should be equipped with the latest information and technologies, equipment and required teaching aids to be used at crop clinics to make CCs a more attractive learning experience to the farmers.

6. Another objective of crop clinic programme was to ensure the ability to identify pest and disease occurrence before being developed into an epidemic. Even though this programme has not yet succeeded in this aspect, with the use of standard documentation of crop clinics it is now gradually developing into an exercise for mapping of pests and disease incidence on regional basis. This is an important development for the prediction of pest and disease incidence before they develop into epidemic level and for prompt detection of the same once developed. Such an effort for the development of an island wide IPM programme that helps early identification, prevention and control of pest and disease occurrence is vital. The following recommendation is proposed in this regard.

    i. To expedite the mapping exercise in collaboration with other relevant departments and institutions to come up with a regional IPM programmes for major crops grown in major food crops producing areas of the country.

7. Minimizing damage caused to the environment due to arbitrary use of pesticides was the ultimate expectation of crop clinic programme. However, the study does not provide sufficient evidence to prove that CCs have been successful in controlling pests and diseases in commercial agriculture. This is the key challenge the CCs face and needs to be overcome without delay. Therefore, while trying to disseminate and establish the message of non-toxic farming among the farming communities, the greatest obligation and the greater responsibility of CCs is to expand its scope from present level of subsistence farming to commercial agriculture. Greater collaboration between research and extension is a must to achieve this end. Research is essential on IPM for vegetables and OFCs grown at commercial/large scale where inorganic pesticides are indiscriminately used today. However, the present constraint is such technologies are hardly available to both extension staff and farmers and therefore the following recommendations are proposed.

    i. Research into non-toxic farming in commercial agriculture and optimal use of toxic-pesticides as the last option versus first option in food crop production and demonstration of results in commercial farming through strengthening research-extension linkages both at provincial and inter-provincial extension systems.

    ii. Genetic improvement of traditional varieties which are resistant to pest and diseases.

    iii. The extension and training division needs to educate farmers on the variety of environmentally friendly means for controlling of pests and diseases in their commercial cultivations so that they do not depend on pesticide agents who come to the field during the growing season and recommend their own products rather than to promote best products that fetch better results to the user.

iv. Programmes to encourage commercial farmers to substitute the use of pesticides with cultural practices and sanitary measures in a manner in which the farmer benefits in two ways: reduced cost for pest control and increased yield and thereby high income as a result of optimizing control of pest and diseases.

Overall, it is clear from the above discussion that crop clinic programme encounters both pros and cons and needs substantial improvement. One who is optimistic about crop clinics can see that crop clinics demonstrates its revolutionary capacity towards sustainable/pesticide free food crop sector in the country if implemented more systematically, beginning from pest management in place of pest control. However, the success of crop clinic programme lies in the hands of plant doctors and other officials above that level. The future direction of crop clinics should be to win the above two challenges indicated under five and six for which a strong link between research and extension is a must.

## REFERENCES


Abeywardena, P., (2006); A Survey of the Central and Provincial Agricultural Extension Approaches and Their Sustainability for Sri Lanka. Paper commissioned for the External review of the Sri Lanka Agricultural Research and Extension System, Council for Agricultural Research Policy (CARP), Colombo.

Bentley.J. Boa, E., Almendras, F., Franco, P., Antezana, O., diaz O., Franco, J., Uillarroel, J., *(*2011); How farmers benefit from plant clinics: An Impact study in Bolivia *International Journal of Agricultural Sustainability* August 2010. http://www/plantwise.org Retrieved May 28,2013.

Brubaker., J., Danielsen, S., Olupot, M., Rommy, D., Ochatum, N., (2013); Impact Evaluation of Plant Clinics: Teso. Uganda, CABI Working Paper. The CABI Development Fund (CDF) Annual Report to DFID 2011-2012 *r4d.dfid.gov.uk/ pdf/outputs/cabi/CDFAAnnualReport to DFID 2011-12.pdf seen* 4/7/2013.

Brunner, I., &Guzman, A., (1989); Participatory evaluation: A tool to assess projects and empower people. In R.F. Conner & M. Hendrikcks (Eds.), *International innovations in evaluation methodology*(p.9-18). New Directions for Programme Evaluation, no. 42. San Francisco: Jossy-Bass.

Cronbach, L.J., & Associates. (1981); *Toward reform of programme evaluation: Aims, methods, and institutional arrangements.* San Francisco; Jossy-Bass.

Deshler, D., (1998); improving agricultural extension. A reference manual www.fao.org/ docrep/w5830e0d.htm seen 2013/9/24.

Greene, J. C., (1988); Stakeholder participation and utilization in programme evaluation. *Evaluation Review, 12,* 91-116.

Guba, E.G.., & Lincoln, Y.S., (1989); *Fourth-generation evaluation.* Newbury Park, CA: Sage

http:/r4d.dfid.gov.uk/pdf/outputs/cabi/cdF Annual Reports to DFID-2011-2012 pdf

Murphy, J., & Marchant, T. (1988); *Monitoring and evaluation in extension agencies.* Washington, DC: The International Bank for Reconstruction and Development/The World Bank.

Rubin, B.M. (1982) Naturalistic evaluation: Its tenets and applications. http://www.jstor.org/page/info/about/policies/terms.jsp seen 4/10/2013