E2147 v2

MINISTRY OF ECONOMIC DEVELOPMENT
THE WORLD BANK

Pest Management Plan

SECOND COMMUNITY DEVELOPMENT AND LIVLEHOOD IMPROVEMENT PROJECT

March 2013



Table of Contents

List of Abbreviations

CCM	Chief Community Mobilizer
CRP	Community Resource Persons
CDD	Community Driven Development
DOA	Department of Agriculture
EMSF	Environmental Management and Social Safeguards Framework
FFS	Farmer Field School
FAO	Food and Agriculture Organization
IPM	Intergraded Pest Management
NGO	Non-Governmental Organizations
OPR	Office of Pesticide Registrar
OP/BP	Operational Policy/Bank Policy
PG	Producer Groups
PMP	Pest Management Plan
PIU	Project Implementation Unit
SCDLIP	Second Community Development and Livelihood Improvement Project
VO	Village Organization
VSCO	Village Savings and Credit Organization

1 Introduction

1.1 Pest and pesticide management implications of project activities

The Second Community Development and Livelihood Improvement Project (SCDLIP) are currently implementing its second phase in nine districts in Sri Lanka. The project focuses on livelihood development in nine districts in the Uva, Central, Sabaragamuwa, Southern and North Central Provinces of Sri Lanka.

The districts of Badulla,Moneragala,Ratnapura,Polonnaruwa, and Hambantota have villages where phase one and two are being implemented and Nuwara Eliya and Kegalle implement only phase two of the project. The Kalutara and Kurunegala districts are currently demonstrating the Community Driven Development (CDD) approach through Government institutions.

The main objectives of the project cover two key areas; increasing the size and diversity of livelihood activities through producer groups and infrastructure development to responding to connectivity constrains among villages. Even though the project does not specifically deal with agriculture, it directly assists communities partaking in agriculture to improve their livelihood through increased productivity and more sustainable practices. Investments on intra and inter-village connectivity sub projects triggered World Bank Environmental Safeguards Policy OP/BP 4.09 (Pest Management), the triggering of this policy entails that the project will focus on ensuring that sustainable pest management mechanisms are implemented during project interventions. It ensures that pesticide use is either reduced or replaced by alternate means of managing pests.

It is envisioned that beneficiaries of the micro finance programs, post project restructuring, may use credits received for the purchase of pesticides in agricultural practices. Thus it is essential that the project focuses on ensuring that the use of pesticides is managed within its area of influence. The project also works on strengthening Producer Groups (PGs) that partake in agricultural practices as well as promote the establishment of poly tunnels and promotes Intergraded Pest Management (IPM) for improved crop production. Financial and technical strengthening have the potential to increase the area and amounts cultivated as well as the varieties of crops typically cultivated in the project areas. This can lead farmers to depending heavily on pesticides to safeguard production and increase their use further. It is the same with poly tunnels, where there are instances of sustainable pest management mechanisms being adopted along with pesticides as well. The aim of the proposed Pest Management

Plan, PMP is to address the concerns relating to the risks associated with potential increases in the use of pesticides for agricultural production and to strengthen national capacities to implement mitigation measures to minimize the risks.

All districts has been implementing livelihood development activities with the micro finance assistance from the Village Savings and Credit Organization(VSCO).The total VSCO loan amount obtained for agricultural purposes is around 3800 million rupees .A quick survey on the utilization of VSCO loans were done in three Districts, Badulla, Ratnapura and Hambantota. The survey revealed that 10% to 15% of the VSCO loans obtained for Paddy, Vegetable and Tea cultivation by local farmers have been utilized for the purchasing of pesticides. Up to 40% of these funds were utilized for soil conservation and organic manure. Therefore, the preparation for this pest management plan would be able to minimize the potential negative environmental and social impacts of the application of pesticides. Thus the following Pest Management Plan (PMP) has been prepared in order to address the concerns related to the risks associated with the envisioned increase in the use of pesticides that will result from project interventions.

The following PMP also identifies stakeholders and the institutional arrangements via which it is to be implemented. Since the project is currently in the restructuring process, the Environmental Management and Social Safeguards Framework (EMSF)will also be revised in accordance. The PMP will be a distinct component of the SCDLI project and its structure is consistent with the requirement for compliance with the World Bank's safeguards policies, OP/BP 4.09, which focuses on pest management.

1.2 Environmental consequences of pesticide use

In all instances where pesticides- dependent pest control practices are adopted, pesticide misuse is known to be common and results in a number of environmental consequences that can threaten the subsidence of agriculture and life itself in localities they are used. Some of the key consequences that have been eminent are listed below.

- Destruction of pollinators of crop plants leading to poor crop yields
- Elimination of the natural enemies of pests and consequent loss of natural pest control that keeps the population of crop pests very low.
- Development of pest resistance to pesticides, encouraging further increases in the use of chemical pesticides

- Contamination of the soil and water bodies
- Pesticide poisoning of farmers and deleterious effects on human health
- Loss of bio-diversity in the environment, particularly of aquatic species.

Considerable attention must therefore be paid to the environmental consequences of current pest management practices in the SCDLI project. Key mitigation measures are therefore required to address those concerns , these are highlighted in **Table 1** below.

Table 1-Key Mitigation Measures to be Included in the proposed PMP to combat major issues identified.

Major Issues	Actions required
1.Increased use and reliance on chemical pesticides	Promote adoption of IPM practices through farmer education and training Move farmers away from pesticide dependent pest control practices and promote use of botanical pesticides and biological control
2.Change current pest management practices	Allocate adequate resources to implement National Plant Protection policy, Increase IPM awareness among policy makers and farming community
3.IPM research and Extension	Strengthen IPM research at National level and strengthen IPM extension
4.Environmental hazards of pesticide misuse	Create public awareness of the hazards of pesticide misuse through public awareness campaigns Regular assessment of pesticide residuals in irrigated agricultural production systems and in harvested produce Monitoring of pesticide poisoning in farming and rural communities

2 Pest Management Approaches in the Project Area

The project area spans across eleven districts, (Phase 1 and 2), where a range of agricultural practices are adopted based on agro-ecological conditions of each district. On the whole major crop species cultivated by farmers residing in the project area are vegetables, potatoes, maize, cereals and fruits. The main agricultural products produced within the project area, extent and number of beneficiaries is highlighted in Table 1 below. Crops are grown in private plots, owned by local farmers and range between 1-2 acres.

Table 2-Main Agricultural Products of the SCDLI Project Area

Crop	Extent (Ha)	Beneficiaries	Districts*
Maize	13,808	35,627	B,M
Paddy	23,849	49,208	P,M,H
Potatoes	1,028	753	B,NE
Vegetables	4,769	13,977	B,NE,M
Banana	17,738	15,211	M,R,H
Mango	79	141	H,R
Pomegranate	81	271	M
Passion fruit	264	601	M
Papaya	485	786	R,M,H
Cinnamon	2,550	3,574	G, MA
Pepper	2,572	3,722	R/B
Tea	11,887	27,317	R/B
Rubber	957	1,989	M/R
Green Gram	829	558	M
Soya Bean	22	4	M
Home Garden	471	1,051	All Districts
Other	554	762	All Districts

**Districts: B- Badulla, G-Galle, H-Hambantota, MA-Matara, M-Monaragala, NE-NuwaraEliya, P-Pollonnaruwa, R-Ratnapura*

Under the project activities micro financing and technical knowledge transfer are provided for the establishment and management of poly tunnels for agricultural practices. Under this component 42 poly tunnels have already been established at various locations within the project area. Typical crops cultivated in these poly tunnels include bell pepper, capsicum, strawberry and tomatoes.

Based on consultation with local farmers and records from the Department of Agriculture (DOA), a number of key species of pests have been noted in the project area. The major pest species that account for up to 80% of crop damage are presented in table below. Insecticides that target these species are commonly used in order to safeguard from crop loss.

Table 3-Major Pests in Project Area

Common Name	**Scientifc Name/Order**
White fly	Aleyrodidae
Diamond Black Moth	Plutellaxylostella
Thrips	Thysanoptera (O)
Leaf eating carepillers	Lepidoptera (O)
Mites	

According to the DOA, 25 to 30 percent cost would have been incurred to control major pests. The DOA standard of pesticide application is 1.5 to 2kg active ingredient per Acre. Approximately 15000 to 20000 liters of pesticide used annually in the project area.

Table 4-Current and Proposed Pest Management Practices in the project area

Current practices	**Proposed practices**
Application of series of pesticides to control pests	Develop pest population studies in collaboration with Agriculture Department for upcountry vegetable crops which has not so far been done
Selection of pesticide has been done in consultation of dealers	Training of farmers on pest management including identification of pests, selection of pesticides, safe application of agrochemicals.
Application of pesticides is done without practicing safety measures	Develop training materials on the safety measurers

Farmers knowledge on pest and pesticide application are unsatisfactory	Training of farmers
Application of Integrated Pest management practices is negligible	Introduce IPM as a pest management strategy.

Local farmers buy pesticides from local pesticide vendors, the same vendors usually provide them with the information with regard to use, such as number of applications, means of application etc. The pesticide vendors do not have formal training nor are they certified under any schemes of the DOA.

A study conducted by the Department of Agriculture (DOA) in four major vegetable growing
Districts in Sri Lanka showed that 85% of farmers in the Badulla district applied pesticides to their crops before the appearance of any pests or symptoms. In the Nuwara Eliya this was recorded at66%. This shows that even though chemical controls are used even before pest damage has exceeded economic threshold levels and the use of pesticides as a precautionary measure has become common.

2.1 IPM Strategies in Sri Lanka

IPM was introduced as the most appropriate stratergy for pest control in the agriculture policy prepared by the Government of Sri Lanka in 1995. The DOA playes a vital role in the promotion and preparation of the country's IPM programmes and are responsible for conducting research, training and transfer of technology via their existing extention services islandwide. Local nongovernmental organizations such as the 'Sarvodaya Movement' also provide training on IPM practices to rural farming communities. In 1984, the DOA launced the Rice IPM Programme, with the assistance of FAO. Termed the Intergrates Pest Control (IPC) programme, at its inception, it focused on applied research in the field and conventional approaches to extension. Demonstration plots were prepared and used to educate farmers on the various components of IPC. This included the use of resistant varieties of paddy and use of native biological controls against common pests. Over a 100,000 farmers were trained under the IPC programme over a course of five years up to 1990. The IPC also used Strategic Extension Campaigns (SEC) via a national level multimedia campaign for rice IPC addressing

specific issues identified during the field research stage, which was designed specifically to address. Even though the IPC program was successful at its inception subsequent evaluations on the impact of IPC on the farmers indicated that it was difficult for IPC trained farmers to arrive at correct decisions on what action to take when they were faced with pest problems in the field. They depended on extension officers for these decisions, creating a setback in its adoption.

However, in 1994 the IPC program was renewed with a revised objective. It made an emphasis on improving the quality of training with the objective of making farmers independent decision-makers for their own cultivation practices. Farmer Field Schools were established and up until 1998 and, 76 master trainers and over 300 extension officers from the government sectors and 90 officers from the private sector NGOs along with about 10,000 farmers were exposed to this approach according to the FAO. Thus this program currently runs via the extension services that run island wide. A number of donor funded projects, such as the FARM project implemented pilot Programs for Food Security has included IPM in their programme and FFS as the training approach. In 1998 The Ministry of Agriculture and Lands also launched a programme to increase the production of rice through large tract demonstration. This programme targeted to obtain a yield of over 6 tons/ha. The government provides seed and fertilizer on loan. IPM is taught through FFS, thereby making those farmers good managers of their crop. It was post 1998 that the DOA began extending IPM practices to pther field crops, predominantly to high value crops such as Chilli. At present, Research Division of DOA has developed IPM technology packages for vegetables such as bitter gourd, snake gourd, luffa, okra, brinjal, capsicum, tomato and radish. These packages have been put into practice in farmer fields in Hambanthota district during the Yala Harvesting period from 1998- 2000 and yielded good results.

Support services for IPM does exists in Sri Lanka, even though a particularly planned startergy is yet not in place, Traditional IMP knowledge as well as via programmes run by the DOA and other organizations farmers do use IPM practices in the field. However no studies have been conducted to deduced the extent to which IPM is practiced nationwide. The DOA documents that IPM is gaining increasing popularity amongthe local farming community since the adoption of experimental learning approach of FFS. The trainedfarmers are more knowledgeable about both theenvironment and agriculture. Pesticide use has changed with farmers adopting a more rational approach it its use. Follow-up studies in 1999 showed that the IPM-FFS programme has created a clearly discernible impact with desirable consequences. This can be taken as a positive

indicator that the DOAs attempts to implement IPM has succeeded to a certain degree and can be further strengthened.

2.2 IPM Experience in the project area

In the project area, there is no evidence on the application of IPM practices. Very little resources are currently invested for IPM research. At present The DOA demonstrates some IPM practices only for paddy cultivation outside the project area, details on IPM activities and potential are discusses in the following sections.

3 Pesticide Use and Management

3.1 Trends in pesticide use and pest control in Sri Lanka

Pesticides have been in use in agricultural practices in Sri Lanka since the 1950s, yet pesticides are not manufactured in Sri Lanka to date. Due to the positive trends observed via the scope and use of pesticides their import has grown over the years. All pesticides are imported as finished or formulated products or as technical grade materials for local formulation. There is very little solid statistical data available in the country to deduce the amounts and variations based on geography of pesticide use. Statistics on pesticide imports are among the few reliable indicators of quantities of pesticides used in agriculture. The DOA has conducted studies on pesticide use and attempt to monitor their use as well. In 1977, liberalized policies lead to an increase in the import of pesticides, favoring direct importation of finished products rather than intermediaries required for local formulations. According to the DOA, annual pesticide imports comprise mainly of herbicides, insecticides and fungicides and their use has shown a notable increase during the 1990s. It is clear that pesticide consumption has risen over time and continues to fluctuate with changes in planted acreage, infestation levels and other factors such as farm product prices. Herbicide consumption fluctuates around 2,300 tons per year. Insecticide consumption had increased by 25 per cent in 1999 (2,428 tons) compared to the previous year (1,942 tons), as per the data collected by the DOA. A list of banned pesticides is maintained by the DOA and made available to the public as well (Annex 1). However the DOA has not sorted and compiled different lists for herbicides.

The DOA also records that insecticide use in rice declined as a result of the Integrated Pest Management (IPM) Program, but increased on vegetables and other field crops like chili and onion. Vegetable growers most commonly depend on insecticides, typically used in heavy doses, followed by fungicides. Weedicide is not used to a great extent in vegetable production, except by farmers who cultivate onions. An array of insecticides is adopted and very little attention is paid to conforming to application frequencies, quantities and health and safety indications. Local farmers commonly misuse pesticides, mixing different varieties and striving to over application for better results, unaware that toxicity levels often increase and misuse facilitates greater environmental and health hazards. According to pesticide consumption data from 1995 to 2000, collected by the Food and Agriculture Organization (FAO), organophosphates were the highest used pesticide category within insecticides, amides in herbicides and dithiocarbamates in fungicides, within Sri Lanka.

Locally, pest control depends mostly on the use of synthetic pesticides. Ready-to-use products that can easily be procured from local vendors and applied when and where required. Abuse and misapplication of pesticides is a common phenomenon in Sri Lanka. Farmers often totally disregard recommendations and strive to indiscriminate use of pesticides based on their own experience. Some farmers do not have sufficient information and knowledge on the safe and efficient use of pesticides also. . Even though many farmers are aware of the detrimental effects of pesticide use, due to the economic gains involved it still remains the most popular method of pest control. Awareness on implications to human health, the environment and crop ecosystems have still not been able to drive a strong push towards alternatives to exclusive chemical pest control, like varietal resistance and IPM. Thus awareness and transfer of technical knowledge structured over the economic benefits of green/sustainable agriculture plays a key part in altering existing trends in pesticide use and pest control.

3.2 Control of pesticide use in Sri Lanka

According to the FAO continuous dependence on use of pesticides had brought a dramatic increase of imports since the enactment of the Pesticide 31 Law, from 2 309 metric tons in 1980 to 5 120 metric tons in 2003 A comprehensive pesticide control procedure is in existence within the country yet enforcement is low. The process includes; the registration of products, risk/benefit analysis, field monitoring and enforcement, laboratory testing, imports regulations and banning and restricting. Over the years, the use of 4 pesticides has been prohibited and these products have been banned. Only registered pesticides can be imported in to the country and they are also classified under the customs ordinances. A stringent process that allows only limited trial quantities of 10lites/kilograms and requirement of written approvals by relevant officials is in place. However even with controls and awareness facilitation programs are in place they are not exercised at the user level fully, the long term consequence of misuse are often overlooked.

3.3 Circumstances of pesticide use and competence to handle products in the project area

Presently, farmers in the project area have been noted to use pesticides more as a precautionary and/or typical practice rather than as a requirement. Types of pesticides commonly used are; Admire, Imdacloprid, Thamethofam, Acetamiprip, Sulphur and Abamecgin. All these pesticides are systemic substances. The frequency of application recommended is 3 to 4 times depending on the crop period. However

consultations with local farmers indicate that frequency of pesticide application in the area exceeds the times recommended. In the long run this can create pestresistance towards pesticides.

Even though awareness programs on the handling, proper attire and safe practice associated with pesticide use is conducted via training and media campaigns, it is observed less in the field. Protective gear is expensive and not worn in most cases due to the high cost. Thus pesticide users are not sufficiently protected during use. Proper storage of pesticides is also not conducted in a safe manner. Half full pesticide bottles are often disposed at the sites or with municipal solid waste, leading to contamination of water ways. 90% of farmers use knapsack sprayers while only 10% use power sprayers. The major issue in the project area encountered in terms of pesticide application is the nozzle used. The recommended nozzle is hollow cone and most of the farmers use flat fan nozzle where outflow is doubled when compared, according to the DOA. The cost incurred for this is doubled creating a lot of environmental issues as well as toxins are directly sprayed in to the air contaminating the surrounding environments as well.

Both local electronic and print media, in collaboration with Non-Governmental Organizations (NGOs) and/or the DOA conduct campaigns to inform the public and farmers if consequences of indiscriminate use of pesticides. Technical information if disseminated via extension services and district agriculture officers as well. Demonstration programs, agricultural radio/television programs on the detrimental effects of pesticide misuse and proper means of use are conducted. There is also an increasing lobby by the public and NGOs for stringent control of pesticide use and a growing market for organic produce.

The project will focus on strengthening awareness and education via comprehensive trainings and continuous support. The project expects via its PMP to train farmers on the safe handling of pesticides, proper storage ,selection of appropriate application equipment, enhance farmers knowledge and understanding the hazards and risks of pesticides and safe removal of containers etc. One of the main aims is to help strengthen the existing agricultural extension services in the project areas on pesticide management to ensure the sustainability of the existing system and that farmers have support post the project activities.

3.4 Assessment of risks

Studies and data on pesticide poisoning and environmental contamination caused by pesticides are hard to come about in Sri Lanka. There are no systems in place that regularly monitor the risks associated with the use of pesticides. There are reports of health problems such a liver disorders, cancers often attributed to long term exposure to pesticides as well as lung disorders and skin disorders associated with short term exposure, recorded by local health clinics. However no validated and statistically analyzed data is available. The only quantified human health risk related data with regard to pesticides is on suicide rates. Studies have identified Sri Lanka as having one of the highest suicide rates in the world with 80% of this being attributed to Pesticides. Training that is to be provided to farming communities via this project will therefore focus some attention on risks associated with pesticide use and methods of minimizing and managing pesticide poisoning when they occur.

3.5 Promoting IPM in the context of current pest control practices

A small number of farmers also use IPM but along with nominal amounts of pesticides in poly tunnels and home gardens. The project already promotes IPM as part of its environmental management practices among communities in the project area. Activities such as awareness, training and technical guidance are provided to those who partake in agriculture. According to the project IPM has been able to reduce dependency on pesticides to a small extent. It was recorded that via IPM implementation farmers were able to benefit by 25-30 % saving/profit in an acre. The prevailing situation where pesticides are readily available at nominal prices affordable to farmers encourages "unreliable quick-fix pest control approach" which very apparent throughout Sri Lanka. This also creates a major disincentive for farmers to adopt integrated pest management practices which is the most sustainable and environmentally sound strategy for pest management. Even though the government promotes IPM within the paddy agriculture, neither the Department of Agriculture nor any other organization has focused implementing IPM as a national program in vegetable and other crop production. Some farmers do have an indigenous and traditional knowledge for pest control but rarely implement these strategies. There is a general awareness on the benefits of adopting IPM but farmers require much more awareness and education in this arena as well as technical support throughout to help them make the switch in a sustainable manner.

It is proposed to encourage and introduce bio-pesticides as a part of IPM. The project expects to work closely with Department of Agriculture and registrar of Pesticides to strengthen IPM activities in a manner that will sustain.

4 Policy, Regulatory framework and institutional capacity

4.1 National Environment Act

Sri Lanka's National Environmental Act of 1980's controls the discharge and disposal of pesticides in to the environment. Based on the limits set by Australia, European Commission countries, India, Malaysia and the Codex Committee on Pesticide Residues, the maximum permitted residue levels of pesticides in food have been set by the Sri Lanka Standards Institution.

4.2 Control of Pesticides Act

The Control of Pesticides Act No. 33 was enacted in 1980 for the licensing of pesticides, in order to impose controls on the pesticide industry. The regulatory framework looks at the import, packing, labeling, storage, formulation, transport, sale and use of pesticides. It also deals with the criteria for the appointment of a licensing authority for pesticides, for the establishment of a pesticide technical and advisory committee and for matters connected therewith or incidental thereto. All regulations with regard to pesticide products, including those used in agriculture, public health, domestic, industrial and veterinary etc. come under the purview of the Act.

4.3 Office of Pesticide Registrar

The Office of Pesticide Registrar (OPR) was established in 1983, with the authority to set regulations and standards for pesticides in Sri Lanka. The OPR deals with a number of complicated issues when controlling pesticides, aspects such as the use of less toxic chemicals, and the economic implications-for the country and for individual farmers when imposing limits on the availability of certain pesticides. The public health implications of the Registrar's decisions are obviously of great import. The office of the Registrar of Pesticide has the national responsibility to ensure that only pesticides of the highest quality and are least hazardous to human health and the environment are available in the local market. The following activities are those that are currently conducted by the OPR.

1. Registration of pesticides: A pesticide can be registered as valid for use for a period of 3 years. For re-registration, every pesticide is re-assessed based on new standards and information on safety and efficient use in relation to human health and environmental aspects.

2. Field enforcement: The pesticide dealer certification scheme is carried out in collaboration with the provincial field enforcement staff and the Mahaweli Authority of Sri Lanka. The certificate mandated to a particular pesticide dealer has a validation period of a year, unless otherwise cancelled for specific reasons.

3. Inventory of Persistent Organic Pollutants: To execute the National Implementation Plan under the Stockholm Convention, an inventory of POP was prepared in collaboration with the Ministry of Environment and Natural Resources. Although the nine pesticides designated under the convention have already been banned, adverse effects on human health and the environment could occur due to residues from past use as this group of pesticides is long persistent and bio-accumulated.

4. Pesticide quality: Quality of a pesticide is a major factor determining its efficacy and impact on the environment and human health. Quality pesticides should have the correct active ingredients, other adjutants and solvents with required physical and chemical standards as set out by the FAO and World Health Organization. The quality is also monitored and noted by the OPR.

4.4 Pesticides Technical and Advisory Committee

The Pesticides Technical and Advisory Committee is the statutory body of the Control of Pesticides Act that makes national policy related to pesticides and assists the Registrar of pesticides on technical issues related to enforcement of the Act. This committee consists of experts and ex-officio members of relevant institutes. These members include the General of Agriculture (Chairman), Registrar of Pesticides (Secretary), Director General of Health Services, Director General Sri Lanka Standards Institute, Director General Central Environmental Authority, Commissioner of Labor (Occupational Health), Government Analyst, Director of Tea Research Institute, Director of Rubber Research Institute, Director of Coconut Research Institute, a representative of the Attorney General, and five expertise in related discipline.

4.5 Process of pesticides control

Sri Lanka has set up a comprehensive pesticide control process which includes the registration of produces, risk/benefit analysis, field monitoring and enforcement, laboratory testing, imports regulations, and banning and restricting of pesticides. Up to 41 pesticides have banned and their use prohibited and the use of 11 insecticides has also been restricted. Support is to be provided via extension services run by DOA as well.

4.6 Effectiveness of legislation

In spite of the legislations and institutional mechanisms in places, pesticides are heavily misused posing both environmental and health hazards. It is estimated that annually about 16,000 pesticides related poisonings are reported in Sri Lanka. . Approximately 700,000 kilograms of pesticides are imported annually. Almost every rural grocery store has shelves full of many brands of pesticides and over 100 chemicals, including malathion in more than 200 formulations, are sold. Liquid preparations of pesticides can be lethal in minute doses. Enforcement of these regulations and strengthening of the existing institutional structure is essential to ensure pesticide management is conducted in a manner sustainable and the detrimental effected they have are controlled.

5 Implementation of the Pest Management Plan

The activities of the PMP are designed to ensure that implementation of the SCDLIP complies with the world bank safeguards policy OP/BP 4.09-Pest Management. The PMP has been designed to build on, and to some extent strengthen, existing national capacities for the promotion and implementation of IPM and other PMP practices and promote IMP in the producer groups established under the project.

5.1 The activities of the PMP

1. Assessment of existing situation and preparation of action plan

There is no considerable information to implement a reasonable IPM program in the project area. Therefore, the PMP proposes that a rapid assessment of the pest management practices in the area is conducted. The results of this assessment are then to be used in the strengthening of the proposed action plan, prior to full implementation.

2. Awareness creation and preparation of strategic communication materials

Awareness creation will be done targeting various stakeholders residing in the project area, including the community, government officers, project staff and local politicians. Awareness material developed will be technically sound, comprehensive and made legible for layman in order to disseminate the message effectively. These will be prepared in the native languages, either Tamil/Sinhala, based on the project area. Awareness materials include posters, flyers, brochures, etc. These will be made available via the Village Organization (VO) and PGs will be targeted.

3. Training

Training of relevant stakeholders on pesticide management and safe use of pesticides will be conducted with the following areas in mind.

- Detrimental effects of pesticide use to human health/environment
- Decision making in use pesticides
- Transport, storage ,handling and distribution of pesticides
- Safe application of pesticides
- Risks on handling and use of pesticides
- Managing risks and pesticide poisoning via green mechanisms
- Intergraded Pest Management

Training programs will first be conducted among the project/field staff and will also target local DOA officers, stationed in the project area and will be structured as Training for Trainers Program. It is proposed that this program be conducted by reputed pest management specialists with experience working in Sri Lanka. This will thus provide the existing project staff with the capacity to conduct training programs in the field. Training material will be prepared comprehensively and cover the key areas highlighted prior, fashioned as a guidance book for long term use and support post training.

4. Research and Development

Research and innovations are important to test new IPM practices especially for vegetable and potatoes cultivations which are major crops cultivated in the project area. The DOA is yet to implement IPM practices for these crops. The project will support IPM research and development through Farmer participatory IPM research to be funded from competitive research grants that are available locally and internationally. Research opportunities can either be given to students from local universities studying agriculture or DOA staff members.

5. Field Demonstrations

Field demonstrations are the practical way of convincing farmers on IPM practices, establishment of a Farmer Field School (FFS). FSSs can actually show farmers the successful crop yields that can be expected by IPM implementation and demonstrate user friendly mechanisms. This will assist in changing set mindsets and educate farmers on the programs, driving them to implement them as well.

5.2 Proposed implementation action plan

Activity/Sub activity	Number	Timeframe	Budget (SLRs.)
Initial Assessment			
1.Awareness creation and preparation of communication materials			
1.1National level program participating Director General/Agriculture department,Registrar of Pesticides,Project Director and other relevant institutional heads	02	February/2012	100000.00 X2 =200000.00
1.2 Awareness program for the field level project staff and the	03	February	50000.00 x3=150000.00

staff of the line agencies			
1.3 General awareness programs for farmers of the project area on social and environmental impacts of pesticide application	25	March to August	10000.00X25=250000.00
1.4 Preparation of communication materials on IPM, safe use of agrochemicals, risk and hazardous impacts of pesticides	5000 per each	March	500000.00
1.5 Preparation of documents on successful IPM practices	03	August - September	40000.00 X3=120000.00
1.6 Documentation of indigenous knowledge and practices of IPM	One Assignment	August-September	250000.00
2.Assessment of existing situation of pesticide application, its effects to the society and the environment, preparation of action plan	One Assignment	February	250000.00
3.Training			
3.1 Training of project staff on IPM	05	March	50000.00X5=250000.00
3.2 Training of producer group members on IPM	10	March to April	20000.00X10=200000.00
4.Research and Development			
4.1 Study on pest population in upcountry vegetables	02	MARCH - APRIL	150000.00
4.2 Introduce IPM package for up country vegetables	02	MAY	100000.00
5.Field Demonstrations			
5.1 Field demonstration on Vegetable (Farmer Field Schools)	05	April - May ,November, December	15000.00X5=75000.00
5.2 Field demonstration on Rice (Farmer Field Schools)	05	April-May ,November, December	15000.00x5=75000.00

5.3 Proposed Institutional Arrangement

Effective supervision and monitoring of implementation of the PMP will be done through the organizational plan already in existence for this project. Implementation of IPM program, it is expected to use the following three institutional levels set up for effective implementation.

1. Village Level-These rvice of Community Resource Persons (CRPs) will be used. The CRP is a community representative who has the required skills and experience via whom the projects Village Development Plans are implemented. Each CRP has been appointed by the general assembly and is paid by the Village Organization (VO) out of the profit generated by the VO. Communication of PMP related activities and practices with the people will be done by the CRP.

2.Project Implementation Unit (PIU)-A Pest Management Committee (IPM Committee) will monitor and implement the PMP from the PIU level. The PIU IPM committee will be represented by the Chief Community Mobilizer (CCM), CRPs, representatives from the producer groups and the Agriculture Instructor of the DOA. This IPM Committee will meet once every month to review activities and make decisions with regard to PMP implementation. They will also review and clear documents produced for awareness, communication and training and also finalize the training curriculum.

3.District Level- A District level Advisory Committee will look after the overall implementation of the allocated PMP activities for that district. This District Advisory Committee will be represented by the Assistant Director, Regional Environmental Coordinator, District Livelihood Coordinator and Deputy Director of the DOA. This District Advisory Committee will meet once every two months and the main role will be monitoring and solving field level implementation issues.

4. National Level Strategic Committee - The National Level Strategic committee will be represented by the Additional secretary of the DOA, Senior Program Officer (Environment and Social safeguards, registrar of Pesticides, Assistant Directors. The main role of the National Level Strategic Committee is to convergence on the best practices on IPM among stakeholders and to develop policy guidelines that will strengthen nationwide pest management practices.

5.4 Actors and Partners

The Major Actors include the following;

1.Producer Groups- As the principle beneficiaries of the project will organize its members into groups for training and adoption of IPM practices. They will set up Community IPM Action Committees to coordinate IPM activities in their areas via the VOs.

2. DOA- already designated by the Government as National coordinator for IPM activities. DOA will provide technical support to the project by contributing field staff to be trained as IPM Trainers and who will subsequently train communities to implement IPM practices. In collaboration with the OPR, the DOA will assist in policy guidance/oversight for implementation of the PMP.

3. The FAO– to be a valuable source of technical information and to provide technical support for training, planning and field implementation of IPM in Farmer Groups.

6 Plan for Monitoring and Evaluation of PMP

Successful implementation of the PMP requires regular monitoring and evaluation of activities undertaken. The focus of monitoring and evaluation will be to assess the buildup of PMP/IPM capacity in the VOs and the extent to which IPM techniques are being adopted in crop production, and the economic benefits that farmers derive by adopting IPM in the villages.

The inclusion of an IPM specialist in project supervision missions is strongly recommended.

Activities that require regular monitoring and evaluation during project supervision missions include the following:

- IPM capacity building in membership of PGs. Numbers of farmers who have successfully received IPM training in IPM methods; evaluate the training content, methodology and trainee response to training through feedback.
- Numbers of VOs that nominated members for IPM training; emphasize the number of women trained; assess VOs understanding of the importance of IPM for sustainable crop production.
- Numbers of farmers who have adopted IPM practices as a crop protection strategy in their crop production efforts; evaluate the rate of IPM adoption.
- In how many crop production systems is IPM applied?; Are the numbers increasing and at what rate?
- How has the adoption of IPM improved the production performance of PGs ?
- What are the major benefits that members of PGs derive by adopting IPM ?
- Extent to which pesticides are used for crop production ?
- Efficiency of pesticide use and handling
- Level of reduction of pesticide purchase and use by the PGs for crop production.
- Number of IPM sub-projects successfully funded from competitive grants
- Number of IPM participatory research projects have been completed.
- Influence of the results of IPM participatory research on implementation of IPM and crop production.
- Overall assessment of (i) activities that are going well (ii) activities that need improvements and (iii) remedial actions required.

6.1 Monitoring and supervision plan

During the first year of project implementation, the project EO will design the instruments to be used in evaluation of the activities described in the pest management plan. This will be done with the projects monitoring and evaluation team. The following monitoring and supervision plan is proposed as a basis for initiating supervision; this plan will be modified according to progress in the implementation of the PMP.

Activities	Village level monitoring	PIU monitoring	District level monitoring	National level monitoring
1.Awareness creation and preparation of communication materials		CCM	AD	SPO/ESS
1.1Condcut national level program participating Director General/Agriculture department ,Registrar of Pesticides, Project Director and other relevant institutional heads				SPO/ESS
1.2 Conduct awareness program for the field level project staff and the staff of the line agencies		CCM	Regional Environmental Coordinator	SPO/ESS
1.3 General awareness programs for farmers of the project area on social and environmental impacts of pesticide application	CRP	CCM	Regional Environmental Coordinator	SPO/ESS
1.4 Preparation of communication materials on IPM, Safe use of agrochemicals, Risk and hazardous impacts of pesticides			Regional Environmental Coordinator	SPO/ESS
1.5 Preparation of documentaries on successful IPM practices			Regional Environmental Coordinator	SPO/ESS
2.Assessment of existing			Regional	SPO/ESS

situation of pesticide application, its effects to the society and the environment, preparation of action plan			Environmental Coordinator	
3.Training			Regional Environmental Coordinator	SPO/ESS
3.1 Training of project staff on IPM			Regional Environmental Coordinator	SPO/ESS
3.2 Training of producer group members on IPM	CRP	CCM	Livelihood coordinator and Regional Environmental Coordinator	SPO/ESS
4.Research and innovation				SPO/ESS
4.1 Study on pest population in upcountry vegetables			Regional Environmental Coordinator	SPO/ESS
4.2 Introduce IPM package for up country vegetables			Regional Environmental Coordinator	SPO/ESS
5.Field Demonstrations			Regional Environmental Coordinator	SPO/ESS
5.1 Field demonstration on Vegetable (Farmer Field Schools)	CRP	CCM	Regional Environmental Coordinator	SPO/ESS
5.2 Field demonstration on Rice (Farmer Field Schools)	CRP	CCM	Regional Environmental Coordinator	SPO/ESS

7 Annexes

List of Banned Pesticides in Sri Lanka (Source-Department of Agriculture)

Active Ingredient	CAS Registry Number	Chemical Family	Chemical Name (IUPAC)
2,4,5-T	93-76-5	phenox	2,4,5-trichlorophenoxy acetic acid
arsenic (arsenites and arsenates)	7440-38-2	inorganic	arsenic
binapacryl	485-31-4	nitrophenol	2-sec-butyl-4,6-dinitrophynyl 3-methylcrotonate
bromacil	314-40-9	uracil	5-bromo-3-sec-butyl-6-methyluracil
captafol	6/1/2425	thalimide	1,2,3,6-tetrahydro-N-(1,1,2,2-tetrachloroethylthio)phthalimide
chlordane	57-74-9	organochlorine	1,2,4,5,6,7,8,8-octachloro-2,3,3alpha,4,7,7 alpha-hexahydro-4,7-methanoindene
chlorobenzilate	510-15-6	organochlorine	ethyl 4,4 -dichlorobenzilate
DDT	50-29-3	organochlorine	1,1,1-trichloro-2,2-bis (4-chlorophenyl)ethane
dibromoethane (EDB)	106-93-4	-	1,2 dibromoethane
dichloropropane	542-75-6	-	1,3 dichloropropane
dieldrin	60-57-1	organochlorine	2,7,3,6-dimethanonaphth-2,3-b/oxirene, 3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-
			octahydro-(1a.alpha,2.beta,2a.alpha,3.beta,
			6.beta,6a.alpha,7.beta,7a.alpha)

dinoseb/dinoseb salts	88-87-7	dinitrophenol	2-sec-butyl-4,6-dinitrophenol
ethyl parathion	56-38-2	organophosphate	O,O-diethyl O-4-nitrophenyl phosphorothioate
ethylene dichloride	107-06-2	-	1,2-dichloroethane
ethylene oxide	75-21-8	epoxide	dimethylene oxide
fluoroacetamide	640-19-7	luoroacetamide	2-fluoroacetamide
HCH (mixed isomers)	608-73-1	organochlorine	hexachlorocyclohexane
heptachlor	76-44-8	organochlorine	1,4,5,6,7,8,8-heptachloro-3alpha,4,7,7alpha-
			tetrahydro-4,7-methanoindene
hexachlorobenzene (HCB)	118-74-1	organochlorine	hexachlorobenzene
leptophos	21609-90-5	organophosphate	phosphonothioic acid phenyl-O-
			(4-bromo-2,5-dichlorophenyl) O-methyl ester
lindane	58-89-9	organochlorine	1alpha,2alpha,3,b4alpha,5alpha,6B-
			hexachlorocyclohexane
maleic hydrazide	123-33-1	pyridazine	6-hydroxy-2H-pyridazine-3-one
mercuric chloride	7487-94-7	inorganic	mercuric chloride
mercuric oxide	21908-53-2	inorganic	mercury(11) oxide

mercury	7439-97-6	inorganic	mercury
mercury chloride	7546-30-7	inorganic	mercury chloride
methamidophos	10265-92-6	organophosphate	O,S-dimethyl phosphoramidothioate
methyl parathion	298-00-0	organophosphate	O,O-dimethyl O-4-nitrophenyl phosphorothioate
pentachlorophenol	87-86-5	organochlorine	pentachlorophenol
hosphamidon	13171-21-6	organophosphate	2-chloro-2-diethylcarbamoyl-1-
			methylvinyldimethylphosphate
quintozene (PCNB)	82-68-8	organochlorine	pentachloronitrobenzene
endrin	72-20-8	organochlorine	2,7,3,6-dimethanonaphth-2,3-b/oxirene, 3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-
			octahydro- (1a.alpha,2.beta,2a.beta,3.alpha,6.
			alpha,6a.beta,7.beta,7a.alpha)
aldrin	309-00-2	organochlorine	1,4,5,8- dimethanonaphthalene,1,2,3,4,10,10-
			hexachloro-1,4,4a,5,8,8a-hexahydro-
			(1.alpha,4.alpha,4a.beta,5.alpha,
			8.alpha,8a.beta)
mirex	2385-85-5	-	-

toxaphene	8001-35-2	organochlorine	toxaphene
aldicarb	116-06-3	carbamate	2-methyl-2-(methylthio)propionaldehyde O-methylcarbamoyloxime
chlordimeform	6164-98-3	organochlorine	N -(4-chloro-2-methylphenyl)-N,N-dimethyl-
			methanimidamide
dibromochloropropane (DBCP)	96-12-8	-	1,2-dibromo-3-chloropropane
thalium sulphate	7446-18-6	inorganic	thalium sulphate