Country Strategy Paper
Lao PDR
Extension period: July 2010-June 2013

Pesticide Risk Reduction "IPM Component"/Towards a non-toxic environment in South East Asia – Phase I

(GCP/RAS/229/SWE)

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1 Background and Rationale

1.1 IPM training and implementation in Lao PDR

The Lao National IPM Programme

1.1.1 Brief history:

As a result of the Lao PDR joining as member country of the FAO Regional Rice IPM Programme, the Lao National IPM programme was initiated in 1994. The farmer education programme was implemented by the Agricultural Extension Agency (AEA) under the Department of Agriculture (DOA). The first IPM Farmers Field Schools were piloted in lowland irrigated rice ecosystems in Vientiane from 1994 onwards, initially with financial support from the INGO CIDSE. When FAO funding became available in 1996, FFS training in irrigated lowland rice ecosystems was up-scaled to 8 provinces in the central and southern parts of the country. However, with the re-organization of the Lao Ministry of Agriculture and Forestry in 2000, the national programme underwent several subsequent leadership changes and was institutionally moved to the newly-established National Agriculture and Forestry Extension Service (NAFES) in 2001. Subsequently, the programme was transferred back to DOA in July 2005 and is now implemented by the Plant Protection Centre (PPC) based in Salakham. Since 2005, four National IPM Project Coordinators (NPCs) (including two Acting NPCs) were appointed successively. These changes in national, institutional and project leadership have been detrimental to programme development and have weakened national ownership and capacity to implement the IPM programme. Despite these set backs, FAO has continued its support for IPM training capacity building given the tremendous need for basic farmer education on sustainable crop production and protection in the Lao PDR. Over the last decade, various donors have supported the national IPM programme under several FAO Regional IPM Programmes and their associated projects. In recognition of the importance of IPM and farmer education for human resource development in the country, the Lao Government also started to provide co-funding for programme implementation as part of the Ministry of Agriculture and Forestry's Five Year Development Plan (2006-2010). From 2006 onwards the annual government contribution towards strengthening of plant protection networks amounted to Kip 50 million (US$ 6,163). During the last decade, the National IPM Programme also worked with several NGOs such as with World Education and Global Alliance for People and the Environment (GAPE), with Cooperation International Development and Solidarity (CIDSE) for FFS and curriculum reform activities in Agriculture Colleges, with Oxfam-Belgium on capacity building for biological control and integration of Good Agricultural Practices in Vegetable FFSs in Vientiane Province and with INGO SEARICE/Oxfam-Belgium on FFS development for plant genetic resource management and sustainable utilization of agro-biodiversity.

Given the expanding contract and concession farming industry in recent years and the increased use of pesticides in these schemes, efforts to promote pesticide risk reduction have become increasingly important within the context of the FAO-IPM supported work in Lao PDR. FAO is assisting the government to strengthening pesticide regulation and develop an licensing and inspection system for the retail sector. The IPM Programme has focused in recent years on curriculum development and training for community education for pesticide risk reduction. The training work has expanded to two new provinces (Sayabouly and Xiengkhouang) as to address increased concerns over indiscriminate use of pesticides, particularly herbicides, negatively affecting farmers' health and the

environment. In recent year, the national programme has also expanded its collaborative work with new project partners (Phonsoung Agriculture Development Project (PADP) funded by Oxfam Belgium on IPM-GAP FFS, Non-profit Association Lao Development (NALD) and Sustainable Agriculture and Environment Development Association (SAEDA)) on pesticide risk reduction.

1.1.2 The FAO Vegetable IPM Programme in Lao PDR

The Lao PDR joined the FAO Regional Vegetable IPM Programme in April 1996. This Regional Programme has coordinated FAO's support to the Lao National IPM Programme ever since under the following Netherlands, Australia and Norway Government-funded projects: GCP/RAS/160/NET (1996-2001), FNPP/GLO/002/NET (2003), GCP/RAS/191/AUL (2002-04), GCP/RAS/209/NOR (2005-8). This work is now supported primarily by project GCP/RAS/229/SWE (2008- June 2013). Initial efforts in Lao PDR focused on capacity building for farmer training in *rice* IPM, due to the crop's centrality in the country's agricultural makeup. In 1998, FAO supported field studies for *vegetable* curriculum development and the first pilot FFSs were implemented in 1999, followed by a season-long Vegetable IPM Training of Trainers (TOT) in 2000. Subsequently, vegetable IPM-FFS training was upscaled to 7 provinces. During the last decade, FAO supported numerous shorter-duration IPM refresher courses, workshops, seminars and study tours. FAO in recent years has focused its support on development of curricula and training for community education on pesticide risk reduction.

1.1.3 Community Education for Pesticide Risk Reduction (2008-10):

Major activities and achievements aimed at capacity building for community education on pesticide risk reduction, supported by the GCP/RAS/229/SWE Phase I Project during last quarter of 2008 up to mid June 2010 are listed below:

- Baseline surveys were conducted in two provinces (Sayabouly and Xiengkhouang) in March 2009. Survey results confirmed that farmers in these two provinces use pesticide heavily and indiscriminately, particularly herbicides in large scale in corn production for export;
- A five day training workshop on a design for a study of impact of pesticides on health and environment was organized in Vientiane (May 2009). Some 20 participants from four districts of Vientiane Capital, interns and staff from National and FAO-IPM projects participated in the training. Subsequently, surveys were conducted in eight villages of four Districts in Vientiane Capital. Farmers in these villages realized heavily on pesticides for weed, pest and disease control. Pesticide handling (including storage, mixing, during spraying, after spraying and disposal) practiced by farmers were found to be improper, putting their health and the environment at risk.
- Three TOT courses on IPM-GAP, PRR FT and IPM-PRR were organized in Vientiane and Sayabouly Province (May 2009 – mid 2010). A total of 78 district, provincial agriculture and project partner staff, IPM trainers and farmers hailing from 4 provinces (including 18 trained in IPM_GAP, 33 trained in PRR FT and 27 trained in IPM-PRR) participated in these training events.
- 52 3-day PRR Farmer Trainings were conducted by TOT graduates/PRR Trainers in 52 villages of 13 districts in Sayabouly, Xiengkhouang and Vientiane Provinces. Some 2,065 farmers (including 708 women) participated in these PRR training events. Community action plans on pesticide risk reduction for each village were also formulated;
- Five field studies on PRR in water melon, cucumber and yard-long bean conducted in Vientiane Province with 20 farmer families (March 2009). The purpose of the studies was to explore way of reducing the use of pesticide in vegetable production and to develop an IPM training curriculum for PRR. The result of the studies showed that occurrence of pest and diseases were similar in both plots although chemical pesticides use in PRR field study plot was lower than in the farmer practice plots (e.g. from 11 times to 5 times for water melon, from 21 times to 7 times for yard-long bean, and from 11 times to 3 times for cucumber). As a result, farmers who participated in the studies have followed plant production and protection techniques learned from the field experiments;

- Six FFSs (four in yard-long bean and two in cucumber; and five of them were IPM-GAP FFS) (June - September 2009 and February-April 2010) were conducted in collaboration with its project partners, Non-profit Association Lao Development and Environment (NALDE) and Phonsouang Agricultural Development Project, in Vientiane Capital and Province. Some 119 farmer families benefitted from participation in these training events. Purpose of these FFSs was to train farmers to reduce chemical pesticides use and to provide farmers with alternative measure to control pests and diseases in vegetable production; IPM-GAP also aimed to facilitate market access for farmer groups;
- Two Post-FFS field studies on IPM-GAP on yard-long beans were conducted by IPM-GAP farmer alumni in 2 districts of Vientiane Province. Purpose of the studies was to compare yield between wet and dry season. Study results showed that dry season yields were 30% higher despite of insufficient water supply;
- Intensive FFS training on Diamond Back Moth (DBM) bio-control was conducted in Salavan Province (June – July 2008) with thirty five cabbage farmers. Purpose of the training was to train farmers on how to conserve and make sustainable use of natural enemies, particularly the DBM parasitoid *Diadegma semiclausum.* The training focused on enabling farmers to understand and make more optimal use of natural biological control and allow them to gradually reduce chemical pesticides to control pest and diseases in cabbage production;
- Refresher Training and Evaluation Workshop on Farmer Field Experiment/Studies on Vegetable Diseases and Pest Management organized (June 2010). This was followed with the implementation of 9 field studies in cucumber, tomato, yard-long bean and chili by IPM farmers and Trainers in Vientiane Capital and Province. Purpose of the workshop was to review results of the studies/experiments and also to ensure a sound design and implementation of the studies to be conducted from August 2010 onwards;
- Two refresher Training and Evaluation & Planning Workshops of PRR FT held in Vientiane and Sayabouly Province with 51 participants (including DAFO Heads/Deputy Head) from three provinces (Vientiane, Sayabouly and Xiengkhouang);
- Proof reading Lao version of the translation of a Practical Manual for Agriculture Producers and Exporters from English to Lao. Status of publication is still pending on DOA/GOL technical comments/clearance.
- As part of awareness raising activities, articles on the effects of pesticides on health and environment were developed in Lao language for publication in weekly local newspapers (Pasason) twice a week since July 2009 up to present;
- Training materials developed:
    - Session guides/field exercises on IPM-GAP and PRR were produced, revised and distributed to trainers for use in running IPM-GAP FFSs and PRR FTs;
    - Draft curriculums on PRR FT, IPM-PPR FFS, IPM-GAP FFS were developed in Lao language, revised and tested;
    - Poster on signs and symptoms of pesticide poisoning was translated into Lao language. Some 2,500 copies were printed for distribution to trainers for use as training tool and also to distribute to local hospitals & village/district level medical clinics for information;
    - Video clip on correct and incorrect handling of pesticides was produced in collaboration with Media Division of the MAF. The clip is undergoing editing.

1.2 Current Context and Rational for Community Education for Pesticide Risk Reduction

1.2.1 Agriculture production, plant protection and pesticide use in Lao PDR

1.2.1.1 Agricultural Production

Rice is a main crop grown in Lao PDR accounting for 68% of the total cultivated area of 1.8 million ha. (MAF: Strategy for Agriculture Development 2011-2020). Total paddy rice production reached 3.1 million tons in 2009. Other important crops produced in the country include coffee, maize,

soybeans, peanut, job's tear, sesame, cassava, taro, vegetables, fruits, legumes, rubber and jatropha, the latter for biodiesel production.

Major vegetable crops grown in Lao PDR include cabbages, Chinese kale, onions, garlic, lettuce, tomato, cucumbers, melon, yard long beans, mustards and chilies. In the wet season (June - September), most production areas are planted to rice and, hence, fewer vegetable crops are cultivated.

Various kinds of fruit trees are grown scattered throughout the country, largely produced and marketed for domestic consumption.

Most commercial production of vegetables is grown in most provinces. Vegetable production also takes place at higher elevation areas in Vientiane Province and on the Bolaven Plateau in Salavan and Champasack. The remaining vegetable production areas are located along the Mekong River and its tributaries from north to south. In general, pests and diseases of commercially-produced vegetables are managed with frequent applications of chemical pesticides.

According to a March 2009 baseline survey, commercial production of other important crops also involves heavy use of chemical pesticides. Weed management of commercial production of maize in Northern Provinces, particularly in Vientiane and Sayabouly, mainly used herbicides including Paraquat, Glyphosate and Atrazine. Commercial production of other important crops (e.g. black bean, sesame and job's tear) and vegetables for household consumption and local markets in these provinces also used chemical insecticides, including Cypermethrin and Dicrotophos.

Planted and harvested areas, yield and production of major crops including vegetables and fruits grown in the country are given in table 1 below:

Table 1: Statistics of crop production in Lao PDR in 2008-2009 & 2009

Crop types	Planted Area (Hectare)	Harvested Area (Hectare)	Yield (Ton/Hectare)	Production (Ton)
1 Maize (Total)	**175,965**	**175,965**	**4.82**	**848,745**
(2008-9 Dry Season)	23,050	23,050	4.27	108,815
(2009 Wet Season)	152,920	152,920	4.84	739,950
2 Sweet corn (Total)	**24,740**	**24,740**	**3.35**	**80,365**
(2008-9 Dry Season)	10,350	10,350	3.40	35,200
(2009 Wet Season)	14,390	14,390	3.14	45,165
3 Soybean (Total)	**12,635**	**12,635**	**1.54**	**19,425**
(2008-9 Dry Season)	7,100	7,100	1.60	11,385
(2009 Wet Season)	5,535	5,535	1.45	8,040
4 Mungbean (Total)	**3,235**	**3,250**	**1.36**	**4,415**
(2008-9 Dry Season)	2,100	2,100	1.51	3,170
(2009 Wet Season)	1,150	1,150	1.08	1,245
5 Peanut (Total)	**20,920**	**20,920**	**2.14**	**44,665**
(2008-9 Dry Season)	6,120	6,120	2.34	14,300
(2009 Wet Season)	14,815	14,815	2.05	30,395
6 Black & red bean (Total)	**2,560**	**2,560**	**1.02**	**2,610**
Black bean (2008-9 Dry Season)	435	435	1.23	535
Black bean (2009 Wet Season)	2,125	2,125	0.98	2,075
7 Job's tear (Total)	**15,340**	**15,340**	**2.24**	**34,305**
(2008-9 Dry Season)	-	-	-	-
(2009 Wet Season)	15,340	15,460	2.24	34,305
8 Tobacco (Total)	**4,830**	**4,830**	**10.01**	**48,355**
(2008-9 Dry Season)	4,185	4,185	10.25	42,890
(2009 Wet Season)	705	705	8.33	5,875

Crop types	Planted Area (Hectare)	Harvested Area (Hectare)	Yield (Ton/Hectare)	Production (Ton)
9 Sesame (Total)	**12,835**	**12,835**	**1.15**	**14,745**
(2008-9 Dry Season)	-	-	-	-
(2009 Wet Season)	12,835	12,835	1.15	14,745
10 Sugar cane (Total)	**13,830**	**13,830**	**31.34**	**433,500**
(2008-9 Dry Season)	-	-	-	-
(2009 Wet Season)	13,830	13,830	31.34	433,500
11 Starchy roots (Total)	**30,990**	**30,990**	**11.86**	**367,425**
Cassava	10,375	10,375	14.71	152,590
Sweet potatoes	5,770	5,770	11.74	67,740
Potatoes	540	540	24.95	13,475
Yam bean	405	405	11.00	4,455
Taro	13,900	13,900	9.29	129,165
Starchy roots (2008-9 Dry Season)	**8,230**	**8,230**	**10.05**	**82,740**
Cassava	-	-	-	-
Sweet potatoes	1,030	1,030	9.93	10,225
Potatoes	405	405	24.44	9,900
Yam bean	850	850	8.75	7,435
Taro	5,945	5,945	9.28	55,180
Starchy roots (2009 Wet Season)	**23,480**	**23,480**	**12.33**	**289,480**
Cassava	10,375	10,375	14.71	152,590
Sweet potatoes	4,740	4,740	12.13	57,515
Potatoes	145	145	25.00	3,625
Yam bean	265	265	6.66	1,765
Taro	7,955	7,955	9.30	73,985
12 Vegetables (total)	**118,705**	**118,705**	**8.73**	**1,035,825**
Leafy stem vegetables	66,170	66,170	9.39	621,445
Root, bulb & Tuberous crops	10,465	10,465	5.93	62,085
Fruit & leguminous crops	42,070	42,070	8.37	352,295
Vegetables (2008-9 Dry Season)	**70,825**	**70,825**	**8.87**	**621,585**
Leafy stem vegetables	42,170	42,170	9.40	396,295
Root, bulb & Tuberous crops	6,405	6,405	5.40	34,570
Fruit & leguminous crops	22,250	22,250	8.57	190,720
Vegetables (2009 Wet Season)	**48,185**	**48,185**	**8.70**	**419,205**
Leafy stem vegetables	24,000	24,000	9.38	225,150
Root, bulb & Tuberous crops	4,060	4,060	6.78	27,515
Fruit & leguminous crops	20,125	20,125	8.28	166,540
13 Fruits (total)	**39,363**	**37,470**	**11.90**	**445,960**
Fruit tree	13,121	11,330	8.04	91,120
Banana	13,599	13,590	12.80	173,900
Pineapple	3,827	3,770	12,14	45,780
Papaya	1,810	1,810	8.86	16,045
Water melon	6,370	6,370	18.02	114,780
Lemon	531	495	6.16	3,050
Cantaloupe and other melons	105	105	12.24	1,285
Fruits (2008-9 Dry Season)	**5,450**	**5,450**	**17.16**	**93,520**
Fruit tree	-	-	-	-

Crop types	Planted Area (Hectare)	Harvested Area (Hectare)	Yield (Ton/Hectare)	Production (Ton)
Banana	-	-	-	-
Pineapple	-	-	-	-
Papaya	740	740	11.32	8,380
Water melon	4,690	4,690	18.10	84,890
Lemon	-	-	-	-
Cantaloupe and other melons	20	20	12.50	250
Fruits (2009 Wet Season)	**34,093**	**34,093**	**11.01**	**354,665**
Fruit tree	13,121	11,330	8.04	91,120
Banana	13,599	13,599	12.80	173,900
Pineapple	3,827	3,770	12.14	45,780
Papaya	1,070	1,070	7.16	7,665
Water melon	1,750	1,750	17.59	30.775
Lemon	531	495	6.16	3,050
Cantaloupe and other melons	195	195	12.18	2,375

Source: 2008-2009 & 2009 Crop Statistics: Planning Division, DOA, MAF (June 2009 & June 2010)

1.2.1.2 Plant Protection

All practical plant protection matters are dealt with at the Plant Protection Center in Salakham whereas the DoA and its Regulatory Division in Vientiane plays a key role in pest and pesticide management policy reform and legislation review. The Plant Quarantine Division of DOA, in addition to the inspection of pests and diseases, carries out the inspection of pesticides import through the plant quarantine check point located at borders and airports. The plant protection infrastructure remains limited and understaffed. Plant protection expertise is restricted to only a few individuals within – mostly Vientiane-based- government institutions and human resource development –both formal and non-formal- for plant protection capacity building remains limited. Roles and functions of the Plant Protection Centre in Salakham include (1) Strengthen Plant Pest Surveillance System; (2) Strengthen Plant Pest Diagnostic Capabilities; (3) Develop specimen conservation system; (4) Strengthen quality testing analysis capacity of chemical and bio pesticides and fertilizers; (5) Strengthen pesticide residue analysis in vegetables and fruits; (6) Set up an inventory of pests and diseases of some selected crops necessary for plant quarantine work; (7) Strengthen human resource development in plant protection field; and (7) Development of an Information Management System.

In general the tropical monsoon climate of Lao PDR is conducive to a variety of pests and diseases. Pest and disease incidence and severity may become more acute with the development of new export crops, off-season production, and the introduction of new high yielding crop varieties. Climate change and increased trade of agricultural materials along the major GMS economic corridors bring the risk of introduction of new pest and diseases. The coconut hispine beetle and cassava pink mealybug are recent examples of such invasive pests. A brief summary of the major pests and diseases encountered in Lao crop production is given in *Appendix 1*.

1.2.1.3 Pesticide Use

Whereas no production and formulation takes place in the Lao PDR, pesticide use has increased steadily in recent years. According to FAO-IPM commissioned pesticide surveys conducted in selected provinces during 2007-2009, the list of pesticides recorded from the surveys included the following -WHO Hazard Class I- products: Dicrotophos, Methomyl and Zinc-phosphide. Paraquat is heavily used for weed control in the contract/concession farming industry. All pesticides are imported as formulated products, mostly from Thailand, China and Vietnam. Long and land-linked borders, facilitating uncontrolled cross-border trade in pesticides, make it difficult to control illegal and

unregistered importation of agro-chemicals from elsewhere in the GMS region. Among the general public, there is little or no awareness about the regulations on the distribution and use of pesticides and a lack of knowledge on potential health hazards when handling pesticides or consuming agricultural produce laced with pesticide residues.

A survey of pesticides available at shops and markets in four Northern provinces (Luang Prabang, Phongsaly, Oudomxay and Luangnamtha), jointly conducted by FAO and DOA staff in January 2008, confirmed that: 1.) Paraquat, a toxic herbicide, mostly imported from China, Thailand and Vietnam, is used widely in contract and concession farming and is sold at various unregistered/non-licensed sales points; 2.) none of the pesticides, mostly originating from either China or Thailand, carried labels in Lao language; and, 3.) licensed shops did not sell adequate personal protective equipment supplies. The survey found a much reduced number of WHO-Class I pesticides on sale compared to earlier such surveys, most likely the positive result of recent (2006) production, use and export banning of such products by the Chinese National Government. However, the use of toxic herbicides (most notably Paraquat) was much more extensive than earlier reported. The survey also showed that farmers indiscriminately use pesticides and that this trend is increasing, most notably in contract and concession agriculture. In addition, a quick survey conducted by the FAO IPM Program in Vientiane Capital and Province in early June 2008 showed that the use of herbicides (Paraquat, Glyphosate, and 2-4D Sodium Salt) among smallholder Lao farmers is gradually increasing. Lao farmers often use over-dosages ranging from 15-25 liters of formulated pesticides/hectare. Toxic products, like Paraquat, are often mixed, used and disposed off with minimal exposure protection. Pesticides are also inappropriately stored in the household, often at easy accessible places for little children and livestock in and around the homestead. The above survey findings make it clear that there is a great and urgent need for human resource development on pesticide risk reduction among Lao farmers and contract/concession scheme workers in the Lao PDR.

1.2.2 Pest and Pesticide Management Policy and Regulatory Context

1.2.2.1 Pest & Pesticide Management Policy:

The Ministry of Agriculture and Forestry plays an important role in the development and implementation of policies on clean agricultural production, poverty eradication, agricultural commodity production for export, opening up the market for ASEAN Free Trade Area and readiness of Lao PDR to enter the World Trade Organization. In 2005, the World Bank conducted a Diagnosis Trade Study and in 2006 prepared an Action Plan for Sanitary & Phyto-sanitary (SPS) Management Capacity Building. Lao PDR continues its efforts to become a permanent member of WTO and currently receives assistance from several donor sources with regards to building WTO-SPS capacity.

Lao PDR participates in the development of ASEAN GAP. This AusAID funded ASEAN initiative was aimed at the development of a Good Agricultural Practices model standard to be considered, as alternative standard to Global GAP, for use and promotion in the ASEAN region in preparation for the envisioned 2015 ASEAN common market. The Department of Agriculture has set up a center, Clean Agriculture Development Centre, specifically focused at the development and promotion of a Lao set of GAP standards, modeled on ASEAN-GAP.

According to a draft of the Seventh National Socio-Economic Plan for 2011-15, Lao PDR aims to promote its agriculture sector to ensure food security, promote commodity production for domestic use and export, improve productivity and enhance end-product quality as to prepare for entry into the ASEAN common market by 2015.

The Ministry of Agriculture and Forestry –and its Department of Agriculture in particular- has proclaimed policies aimed at reduction of agro-chemicals in Lao agriculture. In recent years, MAF has attributed an important role to IPM in its clean agricultural production programme. For example, for implementation of the 'Clean Agriculture' initiative, the Provincial Agriculture and Forestry Service (PAFO) of Vientiane Capital makes extensive use of IPM trainers who were intensively trained by the FAO IPM Programme. The government is tasked to set up 'safe vegetable' production -known as GAP- farmer groups. A number of organizations and projects are promoting organic production such as the Lao Farmer Association and the Promotion of Organic Farming and Marketing (PROFIL) project. This project works mostly with IPM-FFS farmer graduates who are interested and motivated 'in taking

the extra step' in moving towards organic production. The government encourages this development and regards organic production as a way to find a niche on quality-oriented international markets for export of Lao high-quality produce.

1.2.2.2 Pesticide Legislation:

The Department of Agriculture is responsible for the formulation and enforcement of pesticide legislation. A Regulation on the Control of Pesticides in Lao PDR, No. 2860/MAF, dated 11 June 2010, was promulgated by the Ministry of Agriculture and Forestry as an instrument to control the importation, distribution and use of pesticides. A need has been identified to develop a licensing system for the pesticide retail sector and to train district and provincial staff on inspection of pesticide dealers with regards to ensuring that banned pesticides are no longer on sale and that correct advice/label information is given to customers. Although the Regulatory Division of DOA has the mandate to register pesticides, it lacks the resources and expertise to test pesticides. Up to present, there is still no pesticide registration board with representation of relevant ministries.

The National Authority for Science and Technology (NAST, formerly known as STEA) received external expert assistance in drawing up a General Law on Hazardous Substances to reflect new requirements of the Globally Harmonized System of Classification and Labeling of Chemicals (GHS), which concerns both agricultural and industrial chemicals.

With the Pesticide Control Regulation now approved, the DoA will focus on enforcement after training of inspectors and shop dealers. A need has been identified to set up a pesticide dealer licensing system as practiced elsewhere in the Asia region. If successfully employed and enforced, this system should help eliminate from the market the most hazardous, unregistered and adulterated chemicals as well as ensure that products on sale can be expected of reasonable quality, are labeled well and that dealers can provide sensible advice to farmers.

1.2.2.3 International Conventions & Standards

On 21 September 2010, Lao PDR became a signatory to the Rotterdam Convention on the Prior Informed Consent (PIC) Procedure for Certain Hazardous Chemicals and their Disposal. A Designated National Authority (DNA) has been nominated for agro-pesticides (MAF, Director of Regulatory Division), while the Acting Director General of the NAST serves as contact point for industrial chemicals. Whereas the Lao PDR, as FAO member country, underwrites the Code of Conduct on the Distribution and Use of Pesticides, it appears that implementation of the Code remains rather weak. This is particularly a concern in the proliferating contract farming and land concession schemes implemented by the private sector with no or limited supervision provided by national and local government authorities. Civil society organizations, tasked with flagging problems in implementation of the Code, remain largely absent in the Lao PDR.

Lao PDR signed the Stockholm Convention in 2002 and ratified in June 2006. The Water Resource and Environment Agency (WREA) serves as contact/focal point for the Stockholm Convention. Persistent Organic Pollutants pesticides are no longer used in the country. Other than Agent Orange residues dating back to the American War, there remain no obsolete stockpiles and thus POPs are not considered a major problem in Lao PDR.

Lao PDR is party to the Convention on Biodiversity and member of the World Organization for Animal Health (OIE), the FAO Codex Alimentarius Commission, and the Asia and Pacific Plant Protection Commission (APPPC) of which the Secretariat is hosted by FAO-RAP in Bangkok.

1.2.3 Prior and ongoing Pesticide Risk Reduction efforts

Obviously, the best way to reduce pesticide risk is to eliminate all indiscriminate use of pesticides and to ensure farmer access to effective alternatives, such as Integrated Pest Management. To this end, FAO supports the government to implement a national IPM programme. Alternatives to pesticides are also being developed. FAO also supports the testing by IPM farmers of novel vegetable varieties developed for production in the hot lowlands by the private sector (e.g. EastWest). The Plant Protection Centre (PPC) of DOA, with technical and financial assistance from the Cuban Government, Oxfam-Belgium and FAO-IPM, developed biological control options as alternatives to chemical pesticides. For example, *Bacillus thuringiensis* formulations were produced and were being tested by Lao farmers for control of Diamond Back Moth on crucifer crops. The fungal entomopathogen *Beauvaria* was produced and promoted for the control of rice bug (*Leptocorisa sp*.) and Coffee Berry Borer. During the last five years, botanical pesticides have also been tested for population management of some vegetable pests. *Trichoderma harzianum*, produced at the PPC, was also used by the famers for controlling soil-born diseases. Also with FAO-IPM assistance, the National IPM Program worked on classical biological control programmes, such as the introduction of the larval parasitoid *Asecodes hispinarum* from Vietnam for control of coconut hispine beetles. Unfortunately, due to lack of private sector presence and investments in Lao PDR, commercial availability of –and farmer access to- such eco-friendly plant protection products is still limited.

As described above, the National IPM Programme, with FAO support, has done pioneering work with regards to IPM education of farmers in the Lao PDR. The Farmers Field School method is employed in such training with a proven track record of success with regards to elimination of unnecessary use of pesticides. The FFS training approach has enthused local farmers having had the opportunity to participate in such schools. Local governments have welcomed the support and endorsed the farmer education programme. FFS follow up activities (such as participatory action research (PAR) initiatives) have further allowed farmers to reduce on-farm use of pesticides with improved yields and profits. There is growing realization that the FFS curriculum can -and should be- strengthened as to deal with important pesticide risk reduction content. Prior (2007-10) FAO assisted pilot work on community education for pesticide risk reduction is described in detail in section 1.1.3 above.

1.2.4 Current opportunities, challenges and priorities

Current *opportunities* for the extension of the pesticide risk reduction project in Lao PDR include a growing realization among policy makers that urgent efforts are needed as to curb the increased use of agro-chemicals in Lao agriculture. This is important for both domestic food safety as well as to facilitate better access of Lao export produce to foreign markets. Reduction of risk associated with pesticide distribution and use can be achieved through stricter regulation and enforcement thereof as well as promotion of IPM and related farmer training efforts.

Current *challenges* with regards to successful design and implementation of pesticide risk reduction training efforts include the lack of human resources, including IPM trainers, at all government levels as well as the absence of a well-functioning and demand-driven agricultural extension system.

Project *priorities*: Although IPM training activities have been instrumental in the empowerment of farmers with regards to informed decision making for more sustainable and profitable crop production and protection, a priority for the pesticide risk reduction project is to strengthen the FFS with a fortified Pesticide Risk Reduction curriculum. In order to design such a curriculum it is essential to understand patterns of pesticide use and routes of exposure in local communities. It will be essential to involve communities in the design of action plans and targeted training interventions aimed at pesticide risk reduction in the local community. Special attention will have to be paid to pesticide handling in contract and concession farming schemes. The design and implementation of awareness raising activities on the substantial health and environmental risks associated with handling of pesticides among farmers, farm workers and the general public has also been identified as a priority.

2 Project design for pesticide risk reduction programme during July 2010-June 2013

2.1 Objectives and logical frame work

The objective of the FAO Regional Pesticide Risk Reduction Project for the "IPM Component" is to strengthen capacity to innovate and scale up Integrated Pest Management (IPM) and pesticide risk reduction training in four GMS member countries, including Lao PDR.

The objective for project implementation of the IPM Component in Lao PDR is aligned with the regional objective with a focus on strengthening capacity to innovate and scale up IPM and PRR training in selected provinces in Lao PDR. Expected outputs, a tentative list of activities with indicators, sources of verification and assumptions for a 3 year project extension period (July 2010 – June 2013) are included in the Logical Framework in *Appendix 2* .

2.2 Priorities and Implementation Strategy

In addition to priorities listed under section 1.2.4 above, the pesticide risk reduction programme will be implemented primarily in four provinces with existing IPM and PRR trainer networks, namely Vientiane Capital, Vientiane, Sayabouly and Xiengkhouang provinces. Increasing concerns with regards to over-reliance on toxic pesticides including herbicides in other provinces (Luang Prabang, Louang Namtha) rationalize the geographical expansion of training work. However, in light of limited funds available for the extension phase, IPM/PRR training work will have to be focused in the existing 4 provinces. As outlined in the tentative workplans in *Annex 3* using its indicative training budget as indicated in *Annex 4*, the existing network of IPM trainers, including farmer trainers, in these provinces will be utilized to develop pilot models for community education and mobilization for pesticide risk reduction, and formulation and implementation of Pesticide Risk Reduction Community Action Plans. Pilot models will be established in rural communities engaged in fresh fruit and vegetable production prone to indiscriminately high use of pesticides. Pilot models will also be set up in a combination with production schemes, both for individual smallholder farmers producing for local fresh markets as well as those organized in contract farming schemes. Pilot activities for the pesticide risk reduction project will be focused on quality farmer education and on strengthening training content in line with the government policy, particularly on clean agriculture production. New training modules on pesticide risk reduction, including on Good Agricultural Practices and food safety, will be integrated into the FFS curriculum. Additional training materials will also have to be developed in order to assist IPM-PRR and PRR trainers in the fortification of the FFS and PRR farmer training activities. Efforts to conduct the pilot training activities in collaboration with other related projects will be continued. Community education and awareness raising activity will be implemented in collaboration with its project NGO partners, NALD and SEADA, respectively. Pilot modules of IPM FFS with integration of fortified modules on PRR and GAP and focused activities on raising consumer awareness on food safety and pesticide risk reduction linking farmers to markets will continue to be supported by the project & its partner, PADP. Public awareness raising on the effect of pesticides on health and environment, using a variety of different media on top of FFS interventions, has also been identified as a priority, especially among the larger farming communities through TV, newspapers, posters, leaflets and radio broadcast.

2.3 Monitoring and Evaluation and Impact assessment

The development and documentation of impact assessment case studies will also be prioritized during the Phase I extension period up to June 2013. Baseline surveys will have to be conducted before conducting training activities so that the information can be used for impact assessment work. Local external institutions and organizations may be contracted to participate in such IA work.

Monitoring and evaluation schemes for training quality control will also be strengthened. Field activities implemented in the areas prone to high pesticide abuse will be regularly monitored and evaluated by National Expert, FAO Staff and counterparts. Technical backstopping support will be provided to Provincial/District/Farmer Trainers. Occasionally, where/when needed, External

Consultants will be recruited to provide technical backstopping. The process of critical self evaluation of training activities, normally done at the end of FFS and PRR trainings by IPM and/or PRR trainers themselves and recorded in FFS diaries/PRR training report and reviewed by experienced supervisors, will have to be strengthened. Guidelines and formats for effective self evaluation for trainers will be developed. Evaluation and Planning Workshops for review and planning of field activities will be held on six-monthly basis.

2.4 Local Partnerships

The establishment of new -and strengthening of existing- partnerships with a wider set of institutions has also been identified as a priority for the extension phase of this project. This would include the development of new –and strengthening of existing- links to research and extension institutions, DoA's Regulatory Division, Plant Protection Center (PPC), Clean Agriculture Development Center (CADC), Department of Food & Drug, Department of Environment, Agriculture College, PSADP/Oxfam-Belgium, PROFIL, NALD, SAEDA, Smallholder Development Project, and Water Resource and Environment Agency (WREA).

2.5 Coordination and Management

The National IPM Programme is implemented by the Plant Protection Center (PPC), Salakham, Vientiane Capital under the guidance of the Department of Agriculture (DOA). The programme management at the National level consists of two government staff including Acting National IPM Programme Coordinator/Deputy Director of PPC and PPC IPM staff and two PPC interns. The two PPC interns are supported by the FAO IPM project under LOA contract with PPC. At the provincial level, the training team is comprised of a Provincial IPM Training Coordinator (PITC), District Trainers (DT) and Farmer Trainers (FT).

The National Team will be responsible for (1) Planning for farmer field training activities; (2) Developing curriculum for farmer training in FFSs and developing and updating training materials including field guides and curricula; (3) Organizing Training of Trainers (TOT) and refresher courses; (4) Organizing coordination meetings and workshops; (5) Providing technical backstopping to provincial and district trainers in implementing programme activities at provincial and district levels; (6) Conducting M&E and participating in impact assessment work (e.g. baseline surveys) as relevant and required; and (7) Reporting the progress of the implementation of the programme activities to DOA, MAF.

The project will work in coordination with parties concerned for implementation of the programme activities and disseminate information at local, national and regional levels for programme support. The project will also facilitate the cooperation among the parties concerned for improving the local IPM network.

As to ensure that a quality programme will be implemented as planned and given a limited government coordination and implementation capacity at central level, the need has been identified for a strong, experienced and capable FAO National Expert and administrative support team to work full-time with GOL on this project. The FAO IPM office staff members in Salakham are fully empowered to implement the project and will serve as focal points for coordination with GOL on implementation and administrative management of project activities in Lao PDR. Project staff based at the FAO Regional Project Management Unit at FAO-RAP in Bangkok will provide programme development and technical backstopping support.

2.6. Indicative Training Budget

Below is an *indicative* budget for training activities as outlined in the workplan.

#	Activities	2010 (USD)	2011 (USD)	2012 (USD)	2013 (USD)	**Total (USD)**
1.	-Curriculum development workshop for TOT, refresher and FFS		200			**200**
2.	-Develop training materials		3,000	3,000	1,000	**7,000**
3.	-Undertake participatory action research	1,000	2,000	2,000	2,000	**7,000**
4.	-Conduct one training of trainers (TOT) IPM & PRR courses on target high pesticide use crops in some selected provinces		35,000			**35,000**
5.	-Conduct IPM-PRR & PRR FT refresher courses (2 each)		8000	8000		**16,000**
6.	-Conduct fortified IPM-FFS		9,000	7,000	1,000	**17,000**
7.	-Conduct PRR FT		14,000	13,000	13,000	**40,000**
8.	-Support post FFS activities (e.g. bio control, marketing, etc.)		2,000	2,000	2,000	**6,000**
9.	-Field follow-ups/M&E of field training activities on IPM-PRR & PRR FT	500	4,000	4,000	4,000	**12,500**
10.	-Follow-up of community action plan		3,000	3,000	3,000	**9,000**
11.	-Project evaluation		200	200	200	**600**
12.	-Impact assessment case study		-			**-**
13.	-Popularise the impact of IPM-PPR and PPR training through TV, newspapers and radio broadcast				5000	**5,000**
	Total	**1,500**	**80,400**	**42,200**	**31,200**	**155,300**

Appendix 1

Crops	***Season***	***Major pests***	***Major diseases***	***Average # pesticide applications/ cropping season***
Rice	Dry	-Stemborers *(Chilo polychrysus; Scirpophaga incertulas)* -Brown Plant Hopper *(Nilaparvata lugens)* -Stink bug *(Leptocorisa acuta)*	-Blast *(Pyricularia oryza)* -Sheath blight *(Rhizoctonia solani kuhn)* -Bakanae (*Fusarium moniliforme)*	0-2
	Wet	-Gall midge *(Orseolia oryzae)* -Rice bug *(Leptocorisa oratorius)* -Rodent (for upland rice)	-Rice blast *(Pyricularia oryzae)* -Sheath rot *(Sarocladium oryzae)* - Bacterial leaf blight *(Xanthomonas oryzae)* -Bakanae (*Fusarium moniliforme)*	0-1
Maize	Dry and Wet	-Grasshopper*;* -Stem borer *(Ostrinia furnacalis)*		0-1
Coffee	All year round	-Coffee berry borer *(Hypothenemus hampei)*	-Coffee rust *(Hemilia vastratic)*	0
Coconut	All year round	-Coconut hispine beetle *(Brontispa longissima)*		0
Crucifers (cabbage, Chinese kale, cauliflower, mustard)	Dry	-Cabbage web worm *(Hellula undalis)* -Diamond back moth *(Plutella xylostella)* -Flea beetle *(Phyllotreta sp.)* -Army worm *(Spodoptera litura)* -Black cut worm *(Agrotis ipsilon)* -Aphid *(Brevicoryne brassicae)*		6-9
	Wet	-Cabbage web worm *(Hellula undulalis)* -Aphid *(Brevicoryne brassicae)*	-Alternaria leaf spot *(Alternaria brassica)* -Soft rot *(Erwinia carotovora)* -Black rot *(Xanthomonas campestris)* -Complex of soil-borne pathogens causing damping-off	
Legumes (yard-long bean, ….)	Dry & Wet	-Fruit worm *(Helicoverpa armigera);* -Black aphid *(Aphis craccivora Koch);* -Bean fly *(Melanagromyza spp.)* -Pod borer *(Maruca vitrata)*	-Angular leaf spot (*Cercospora sp.)* -Anthracnose *(Colletrotrichum sp.)* -Bean rust *(Uromyces sp.)*	6-9

Crops	Season	Major pests	Major diseases	Average # pesticide applications/ cropping season
Cucumber and melon	Dry	-Pumkin beetle *(Aulacophora foveicollis)* -Thrip *(Thrips tabaci)* -Red spider mites *(Tetranycus sp.)* -Aphid *(Aphis gossipii)* =Fruit fly *(Bactrocera cucurbitae)*	-Mosaic virus (CMV) -Downy mildew *(Pseudoperonospora cubensis)* -Gummy stem blight *(Didymella byonae)*	6-10
	Wet	-Aphid *(Aphis gossipii)* - Fruit fly *(Bactrocera cucurbitae)*	-Complex of soil-borne pathogens causing damping-off -Downy mildew *(Pseudoperonospora cubensis)* -Gummy stem blight *(Didymella byonae)*	
Tomato	Dry	-Army worm *(Spodoptera litura)* -Tomato fruit worm *(Helicoverpa armigera)* -Thrips *(Thrips palmi)* -Whitefly *(Bemisia tabaci)*	-Tomato Yellow Leaf Curl Virus (TYLCV)	9-12
	Wet	-Tomato fruit worm *(Helicoverpa armigera)* -Thrips *(Thrips palmi)* -Whitefly *(Bemisia tabaci)*	-Tomato Yellow Leaf Curl Virus (TYLCV) -Black leaf mold (*Pseudocercopspora fuligena)* -Bacteria wilt *(Ralstonia solanacearum)* -Complex of soil-borne pathogens causing damping-off	
Eggplant	Both seasons	-Fruit and shoot borer *(Leucinodes orbonalis)* -Red spider mites *(*	-Damping-off pathogens; -Powdery mildew *(Odium sp.)*	5-7
Onions	Both seasons	-Army worm *(Spodoptera exigua)*	-Alternaria leaf spot *(Alternaria sp.)* -Anthracnose *(Collectoricum sp.)* -Fusarium basal rot *(Fusarium sp.)*	6-9

Source: FAO IPM Programme, Vientiane, Lao PDR

Appendix 2: Logical Framework Analysis

	Immediate Objective **Strengthened capacity to innovate and scale up Integrated Pest Management (IPM) and pesticide risk reduction training in Lao PDR in collaboration with its project partners**				
	Outputs	**(Indicative) Activities**	**Indicators**	**Sources of Verification**	**Assumptions**
1	Functional networks of programme partners established as to ensure planning and implementation of more relevant and effective training programmes, with a focus on pesticide risk reduction	• Establish new –and strengthen existing- functional linkages with private enterprises, government and non government organizations • Hold regular meetings among project partners (e.g. Coordination and Planning meetings, etc.) • Update country strategy paper for extended Phase I project period (2010-13) to prioritize PRR curriculum development and training interventions	• Functional and expanded partnerships established for PRR project implementation • Regular communication, planning meetings/networking among project partners • Availability and use of baseline survey reports and country strategy paper for planning of project interventions.	Meeting notes/reports published	Governments, CSO partners and private sector commit to joint sharing of experiences and programme planning.
2	Fortified FFS, TOT and Refresher Training curricula and training materials developed with focus on pesticide risk reduction, including IPM for new invasive pest/diseases, crops and climate change adaptation	• Conduct national and local Curriculum Development workshops for Pesticide Risk Reduction • Continue to fortify curriculum with regards to pesticide risk reduction training • Undertake action research activities involving agricultural universities and private sectors in developing IPM for new crops subject to heavy pesticide abuse • Action research & curriculum development focusing on development of local risk mitigation/adaptation strategies to prepare communities for prevention and management of newly emerging pest/disease problems related to climate change. • Training material development (e.g. session guides and handouts)	• Fortified pesticide risk reduction curricula is available and widely used by facilitators and farmers in some selected provinces in Lao PDR • Diversity and quality of training materials available and utilized	Country progress report including list of training materials developed Training materials	As climate warming will bring about marked changes in agricultural pest distribution patterns, the Lao governments is committed and willing to create an enabling environment to allow the project to assist rural communities to adapt and manage these new problems with minimal use of pesticides.
3	Capacity of national and private sector programmes, project partners to train farmers in IPM and pesticide risk reduction strengthened and increased by at least 30 trainers	• Conduct one IPM Training of Trainers course making use of revised and new modules for pesticide risk reduction • Conduct 2 Refresher Courses integrating new modules on IPM and pesticide risk reduction, including risk mitigation/adaptation strategies for dealing with new pest/disease resulting from climate change.	• Some 30 additional IPM trainers involved in implementation of farmer education activities in some selected provinces of Lao PDR	Training reports	Governments will make available staff for participation in training and will allow their staff to implement farmer training thereafter.

4	At least 2,800 additional farmers participated in FFS and Pesticide Risk Reduction Farmer Training in some selected provinces of Lao PDR and at least 50% of trained farmers involved in community learning activities and implementation of community action plans for pesticide risk reduction.	• Conduct 15 IPM Farmer Field Schools • Conduct 80 short Pesticide Risk Reduction Farmer Training courses • Community mobilization and formulation of 110 community action plans for pesticide risk reduction • Facilitate post-FFS community Learning activities (biocontrol testing, disease management, marketing, etc)	• Level of use of alternative pest management among farmers trained • Community actions plans formulated and actions taken for pesticide risk reduction	Case studies and Surveys showing: - a reduction of Class I by at least 40% among FFS trained farmers. - IPM\FFS trained farmers at least halved pesticide use. - at least 90% of trained farmers increase use of alternative pest management approaches, including soft products) Documentation on Community Action Plans for Pesticide Risk Reduction	
5	Staff trained for internal monitoring and evaluation system for training quality control.	• Consolidate and implement participatory monitoring and evaluation system for IPM-FFS/Pesticide Risk Reduction training programmes • Conduct national training and workshops on monitoring and evaluation system • Regular follow up by IPM trainers on implementation of Community Action Plans for pesticide risk reduction	• Information on activity implementation is continuously available and used for strengthening quality of field training	Study material produced and reports documenting Community Pesticide Risk Reduction Action Plans.	
6	National and local government providing policy and funding support for IPM and Pesticide Risk Reduction training	• Implement pilot activities to demonstrate beneficial role of IPM-FFS in government programmes on safe vegetables and GAP • Develop model Pesticide Risk Reduction communities for up scaling by Lao government • Design, conduct and document impact assessment study among IPM-FFS graduates, with particular focus on pesticide risk reduction. • Popularize the impacts of IPM-FFS and pesticide risk reduction training through TV, newspaper and radio broadcasts	• News/video clips developed on IPM/PRR and disseminated • Impact Assessment reports available and utilized to strengthen training interventions • Government policies and action plans reflect support for pesticide risk reduction and recognize the positive impact of IPM-FFS programmes	National and local government/community plans and policies Impact assessment studies Newspaper, press releases and promotion materials (video/tv/radio clips)	

Annex 3: Tentative workplans (Lao PDR)

#	Activities	2010							2011												2012												2013					
		J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J
1.	-Curriculum development workshop for TOT, refresher and FFS								X																													
2.	-Develop training materials	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X																		
3.	-Undertake participatory action research			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X								X	X	X	X	X							
4.	-Conduct one training of trainers (TOT) IPM & PRR courses on target high pesticide use crops in some selected provinces									X	X	X	X																									
5.	-Conduct IPM-PRR refresher courses															X	X												X	X								
6.	-Conduct fortified IPM-FFS									X	X	X	X						X	X	X	X								X	X	X	X					
7.	-Conduct PRR FT										X	X	X										X	X	X										X	X	X	
8.	-Support post FFS activities (e.g. bio control, marketing, etc.)													X	X	X										X	X	X									X
9.	-Field follow-ups/M&E of field training activities on IPM-PRR & PRR FT						X	X		X	X	X	X						X	X	X	X	X	X	X				X	X	X	X	X		X	X	X	
10.	-Follow-up of community action plan														X	X	X										X	X	X						X	X	X	
11.	-Project evaluation								X												X												X					
12.	Impact assessment case study												X	X																								
13.	Popularise the impact of IPM-PPR and PPR training through TV, newspapers and radio broadcast																																				X