Islamic Republic of Afghanistan

Ministry of Agriculture, Irrigation and Livestock

Afghanistan Agricultural Inputs Project

PEST AND PESTICIDE MANAGEMENT PLAN

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ABBREVIATIONS

AAIP	Afghanistan Agricultural Inputs Project
AECID	Spanish Agency for International Development Cooperation
AFD	Agence Française de Développement (French Development Agency)
AI	Artificial Insemination
AIS	Agricultural Innovation System
AKF	Aga Khan Foundation
AKIS	Agricultural Knowledge Information System
ALP	Alternative Livelihood Program
APAARI	Asia-Pacific Association of Agricultural Research Institutes
APP	Agriculture Productivity Program
ARIA	Agricultural Research Institute of Afghanistan
CABI	Center for Agricultural Bioscience International
CADG	Central Asia Development Group
CGIAR	Consultative Group on International Agricultural Research
CIIMYT	International Maize and Wheat Improvement Center
CIP	International Potato Center
CITES	Convention on International Trade on Endangered Species of Fauna and Flora
DFID	Department for International Development of the United Kingdom
EC	European Commission
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FFS	Farmer Field School
GDP	Gross Domestic Product
IARCs	International Agricultural Research Centers
ICARDA	International Center for Agricultural Research in the Dry Areas

ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IDEA-NEW	New Ideas for Agriculture
IFPRI	International Food Policy Research Institute
IVM	Integrated Vector Management
IPM	Integrated Pest Management
IPPM	Integrated pest and Pesticide Management
IRS	Insecticide Residual Spraying
ITN	Insecticides Treated Bed Nets
JICA	Japanese International Cooperation Agency
LDP	Local Development Plan
LLINs	Long Lasting Insecticide Impregnated Nets
MRRD	Ministry of Rural Rehabilitation and Development
NADF	National Agricultural Development Framework
NARS	National Agricultural Research System
NVDCP	National Vector-borne Disease Control Prevention
PALAD	Policy Analysis and Legal Department
PHDP	Perennial Horticulture Development Project
PASA	Participating Agency Services Agreement
PSE	Private Seed Enterprise
PMP	Pest and Pesticide Management Plan
RAMP	Rebuilding Agricultural Markets Program
RARS	Regional Agricultural Research Stations
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
WB	the World Bank
WHO	World Health Organization of the United Nations

EXECUTIVE SUMMARY

The World Bank, through the Afghanistan Agricultural Inputs (AAIP) project, has an objective of strengthening the institutional capacity for safety and reliability of agricultural inputs and sustainable production of certified wheat seed. . This objective will be achieved through four (4) components: Improved seed production and certification; Quality control for fertilizer and agro-chemicals; Improve and expand local input delivery systems; Project management, implementation and coordination. The present project will be implemented nationwide in order to increase the farmer's income and improve the food security situation through revamping of productive infrastructures, service delivery, and availability of quality agricultural inputs.

The AAIP will develop the public infrastructure necessary to strengthen the input delivery system for major crops including wheat, industrial crops, vegetable crops and perennial horticulture crops, through (i) consolidating and extending the existing system of improved seed supply with the formulation of a comprehensive seed policy (including the planting material for perennial crops) and development of requisite institutions and infrastructure; (ii) developing the necessary infrastructure and policies that will serve farmers' needs for appropriate, effective and safe use of fertilizers and other agro-chemicals, and (iii) Piloting improvements in the network of agricultural input delivery systems and improved information for farmers regarding agricultural inputs.

The AAIP will finance improvement of the capacity to produce and supply improved quality seed for wheat that will lower the price of seed and reduce the subsidy burden of the government where farmers are willing to pay the full economic cost of seed. Fertilizers and other agrochemicals are almost entirely imported and often of unreliable quality, and the potential of improved seed for improving crop productivity cannot be fully realized unless the judicious use of agrochemical inputs is achieved. Currently, the Government of Afghanistan (GoA) lacks the legal and regulatory frameworks as well as the infrastructure to exercise and enforce the quality control for fertilizers and other agrochemicals. The lack of a quality control system, insufficient farmers' access to inputs and knowledge regarding their safe transport, storage, handling and use are all areas of attention in the AAIP. The use of phytosanitary and anti-vector control products and the above-mentioned gaps potentially generates negative effects on the cultivated crops as well as to the environment and human health. The challenge will therefore be to combine the development of improved seeds, the service delivery of agricultural inputs, and the requirements of protection as well as environmental and social management.

The Pest and Pesticide Management Plan (PMP) addresses the Improving Agricultural Inputs Delivery System (AAIP) project's concerns relative to the risks associated with the use of agrochemicals in Afghanistan to deal with the control of pests and diseases. In addition, the PPMP addresses the need to comply with the World Bank Safeguard Policies on Pest Management (OP 4.09 and BP4.01 Annex C) consistent with the priorities for agricultural investments and policies under the National Agricultural Development Framework (NADF), implemented by the Ministry of Agriculture, Irrigation and Livestock in collaboration with the Development Partners.

The current PMP will enable actors and stakeholders to monitor and mitigate negative environmental and socioeconomic impacts of the project arising from the use of agrochemicals, by promoting and implementing Integrated Production and Pest Management (IPPM) through the Farmer Field School approach, to enable actors and stakeholders of this project to comply with the World Bank Safeguard Policies on Pest Management and in line with the current IPM Policy approved for implementation on all crops by the MAIL.

The PMP will strengthen the growers and stakeholders involved in this project to identify and manage their own pest and disease problems as well as the agro-ecosystems in the development of agriculture, prevent and reduce personal and environmental health risks associated with pesticide use and protect beneficial organisms and the environment, and in the process increase crop production to enhance food security and reduce poverty in the farming community.

The PMP also addresses the internal and external environmental factors affecting the production of cereals, fruits, legumes and vegetable crops, for domestic production and export with a view to improve the livelihoods of growers to benefit from international trade by complying with phytosanitary export requirements. For example, production of quality and pesticide free crops for domestic consumption and export, quarantine pests, alien invasive species and pesticide residue limits will be addressed (e.g. the story of the pomegranate export to South Korea, where the shipment was returned to Afghanistan because of the pesticide residue problem). Towards this end the PMP will help enforce the Pesticide Law and Regulations in Afghanistan and strengthen the Plant Protection Service to build the capacity of both PPQD of MAIL and growers on IPM, and guide construction of laboratories and procurement of hardware to enable the Pesticide Residue and Quality Control Laboratories to carry out tests and determine pesticide residue levels acceptable for domestic consumption and export of farm produce.

Collaborative linkages between this project and the existing Emergency Horticulture and Livestock Project (HLP), On Farm Water Management Project (OFWMP), the FAO through the Special Program on IPM (FAO-IPM project), and the Perennial Horticulture Development Project (PHDP) for perennial crops IPM management will be established to bring relevant expertise needed to further strengthen IPM in Afghanistan.

The PMP expresses a dire need for the establishment of a Multi-sectoral Steering, Coordination, Monitoring and Evaluation Committee (M&E committee) whose members will come from the PPQD, NEPA, MoPH, ARIA, MRRD, Farmer Organizations, and relevant NGOs. The M&E committee should commission a mid-term and an external evaluation to be conducted by a Consultant to determine the correct implementation of the PMP as well as the mid-term results, with full participation of donor (WB) and project beneficiaries, to measure the effectiveness of the project as well as its performance and to identify lessons learned.

Notwithstanding, raising awareness is a key factor to safeguard the population against harmful effects of pesticides. The Extension Services Directorate of MAIL should be empowered to carry out sensitization campaigns in the form of workshops, training, radio & TV programs, dramas and agriculture festivals, as well as press releases and field visits as on-going activities and part of the task of the extension personnel. The extension agents should have mobility and adequate resources to function effectively, in

order to echo to the target audience the mitigation measures outlined in the PMP to minimize the risks associated with the use of pesticides.

The current IPM Policy approved by the MAIL is a step forward to ensuring compliance to the World Bank Safeguard Policies on Pest Management relative to judicious pesticide use with respect to protecting human health and the Environment. The existing national, regional and international Conventions signed (or to be signed) and ratified by the Government of the Islamic Republic of Afghanistan on pesticide use and management, will compliment compliance. All these instruments require a change of attitude and behavior by growers to shift to IPM.

Recommended Actions:

- The recommended actions elaborated below will strengthen national institutional capacity to implement the IPM Policy of the Ministry of Agriculture, Irrigation and Livestock and build capacity of growers, extension agents/workers and all stakeholders on IPM and IVM and Pesticide Management, during the implementation of the AAIP.
- Organize a national workshop for sharing and dissemination of the PMP with national actors and stakeholders.
- Issuance and enforcement of the Pesticide Legislation of the Islamic Republic of Afghanistan, pesticide registration and control system to be made mandatory.
- Provide essential support to Analysis Laboratories (NEPA, PPQD, ARIA and Quality Control Department, AKF Biological Control Laboratory) to enhance the implementation of AAIP activities, both in Kabul and at the provincial levels.
- Provide essential support to the National Malaria and Vector-borne Disease Control and Prevention Program, to reduce the incidence of insect-borne diseases in Afghanistan. The AAIP will complement the efforts of the GoA towards this end, by supporting monitoring of pest and diseases of agricultural and public health importance, and other preventive approach measures.
- Strengthening the Multi-Sectoral Monitoring and Steering Committee to ensure the effective and timely implementation of their activities is a priority.
- Establish a network of Pesticides Management Database for PPQD, NEPA, and ARIA to enhance access to information and information sharing for effective management of pesticides.
- Develop Integrated Pest and Pesticides Management (IPPM) database for Extension Information System to benefit producers and extension agents/workers.
- Support national sensitization and awareness campaigns on pesticides management and its related aspects, to change attitude and behavior of traders, users and the general public.
- Strengthening national actors (ARIA, PPQD, and NEPA) with transportation facilities to effectively implement activities under AAIP.
- Strengthening institutional and human resource capacity in Pest and Pesticide Management for sustainability after the AAIP, by training some Agricultural staffs to Bachelor Degree and Masters Degree Levels on IPM and Agriculture.
- Institutionalization of the pest and pesticide management curriculum in the Faculties of Agriculture's Plant Protection Departments in the Afghan University system.
- Hire International and National Consultants with Pest and Pesticides Management background to conduct mid-term evaluation of the PMP.

Budget:

A Proposed Budget of 2,288,690 USD will be required to effectively implement the AAIP activities over a Five Year period. The detail budget is shown in Table 15 – Cost of Activities.

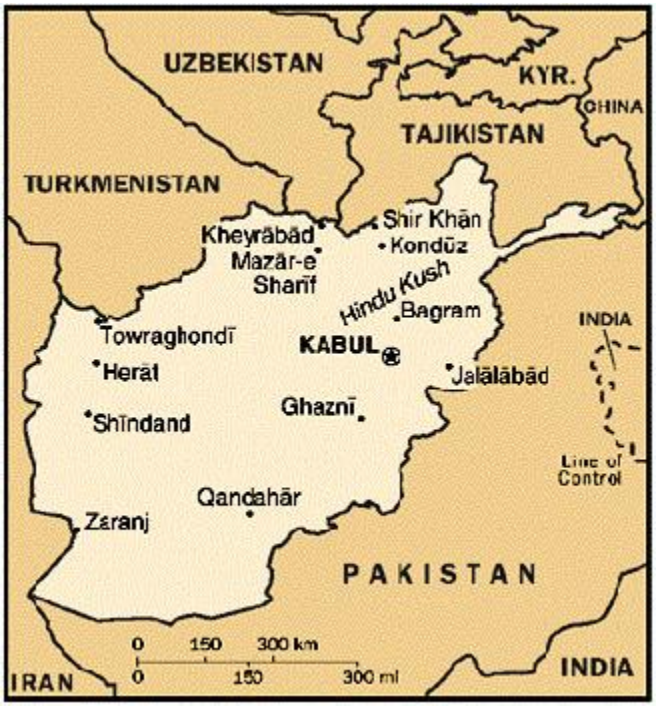
1. INTRODUCTION AND BACKGROUND

1.1 Country setting

Geographic Location

The Islamic Republic of Afghanistan is a landlocked country, situated in both the northern and eastern hemispheres, with a surface area of 653,000 sq. km. The Islamic Republic of Afghanistan lies between 29°35’ and 38°40’ northern latitude and between 60°31’ and 75°00’ eastern longitude on the mountainous and desert areas where the Iranian (GoAnian) Plateau borders with the mountainous systems of Central Asia. Afghanistan is bounded on the north by Turkmenistan, Uzbekistan and Tajikistan, on the northeast by China, on the south and east by Pakistan and on the west by Iran (GoAn).

Fig. 1. Map of Afghanistan



Land elevations generally slope from northeast to southwest, following the general shape of the Hindu Kush massif, from its highest point in the Pamir Mountains near the Chinese border to the lower elevations near the border with Iran. To the North, West, and Southwest there are no mountain barriers to neighboring countries. The northern plains pass almost imperceptibly into the plains of Turkmenistan. In the West and Southwest, the plateaus and deserts merge into those of GoAn. Afghanistan is located on the Eurasian Tectonic Plate. The Wakhan Corridor and the rest of northeastern Afghanistan, including Kabul, are situated in a geologically active area. Over a dozen earthquakes occurred there during the twentieth century.

Demography

The population of Afghanistan is estimated at 31.9 million, but it is not clear whether the 3 million Afghan refugees living in Pakistan and GoAn are included or not. Population growth is 2.6 percent per year (2010 census estimate). According to the 2010 census estimate, the percentage of population in the rural areas is 80 while that in the urban area is 20. The life expectancy for males is 44.8 years while that for females is 45.2 years. The infant mortality rate (per 1,000 live births) is 111 while maternal mortality rate (per 100,000 live births) is 1,400.

Human Development

The primary education completion rate (% age group) is 63.10%, the illiteracy rate (% age 15 and above) 28%, male illiteracy rate (% age 15 and above) 43%, while that of females (% age 15 and above) is 12.6%. Unemployment rate (% of total) is 35% and youth (ages 15-24) unemployment not available. The number in women in rural development (total number) is 42,178.

The Economy

Afghanistan is one of the world's poorest countries. Many years of war and political instability have left the country in ruins, and highly dependent on foreign aid. Nevertheless, Afghanistan's economy has been experiencing strong growth fueled by international development assistance and security-related spending. The main source of income in the country is agriculture. The growth drivers of recent years have been agricultural production which is the occupation of the majority of the population, strong services growth (including construction, transportation etc) and security spending enabled by large aid flows, especially in FY 2009/10.

Afghanistan is a land that is rich in natural resources. There are numerous mineral (coal, copper, chromites, talc, barites, zinc, iron ore, salt, etc.) and precious stone deposits, as well as natural gas and yet untapped petroleum stores. Some of these resources have been exploited to some degree, while others have remained relatively unexploited. Real GDP grew by 8.2 percent in 2010/11, down from 20.4 percent the year before which reflected recovery from the poor harvest in 2008/09. GDP per capita has increased to US$560 in 2010/11 from US$426 in 2008/09 - from a very low base of US$189 in 2002/03. An estimated 36% of the population lives below poverty line, but nearly half of the population lives on less than120 percent of the poverty line, making them highly vulnerable to negative shocks.

Afghanistan's economic outlook in the medium term is highly uncertain, despite GDP growth rate projections in the neighborhood of of 8 percent per annum and moderate levels of inflation. The transition beyond 2014 and the expected decline in overall assistance is likely to result in high funding gaps and uncertain economic outcomes. Longer-term growth prospects will depend on the extent to which mining developments, as well on the performance of the agriculture and services sectors, which are crucial to food security, employment and poverty reduction, and export revenue.

Political and Administrative Structures

Politically, Afghanistan has historically consisted of power struggles, bloody coups and unstable transfers of power. With the exception of a military junta, the country has been governed by every system of government over the past century, including a monarchy, republic, capitalism, theocracy, dictatorship, socialism and a pro-communist state. The country's first constitution was adopted in 1923 by the reformist king, after declaring the country's independence from Britain. In 1933 the country adopted another constitution, only to be replaced by a more democratic one in 1964. The constitution ratified by the 2003 Loya jirga (Grand Assembly) after the fall of the Taliban restructured the government as an Islamic republic consisting of three branches of power (executive, legislative, and judiciary). The Loya Jirga was replaced by the National Assembly after the legislative elections of September 2005.

The Islamic Republic of Afghanistan is divided into 34 Provinces and 398 Districts (or Wolaswalei) and score of sub-districts/sub-divisions and villages. The number of districts, which has fluctuated over the years, is expected to change with further administrative reorganization. Kabul, the capital and largest city of Afghanistan, is located in Kabul Province. According to the 2008 official estimates, the population of Kabul metropolitan area is 3.5 million people- even though the actual figure may well be beyond that estimate. The government has implemented a decentralization policy aimed at devolving responsibility for the administration to the provincial, district, and village council's levels, since its reorganization of 2005.

1.2 Context of the study

There are currently a number of on-going donor-financed projects (including AFD, DFID, EU, USAID, USDA, JICA, and WB) that either are involved in, or depend on efficient delivery of sufficient quantities of high-quality agricultural inputs for their success. However, virtually none of these projects address the fundamental agricultural inputs development challenges despite the fact that most of them are highly dependent on overcoming these challenges for their eventual success.

The framework of the Agricultural Productivity Program (APP) explicitly recognizes the public sector function of MAIL in the regulatory arena to support expansion of the production and productivity of all areas of Afghanistan's agriculture sector. Thus, it is the role of MAIL to ensure, as far as possible, that the seed, fertilizer, other agro-chemicals and mechanical inputs offered are suitable for the dominant cropping systems and that adequate guidance is given to the farmer in the safe and effective use of these inputs. This type of regulatory activity is a public good to be taken up by technically equipped regulatory bodies within MAIL. Therefore, the main focus of the AAIP will be on developing the necessary regulatory systems and appropriate infrastructure for delivery of quality agricultural inputs to Afghan farmers.

MAIL has recognized its role in the institutional strengthening of the seed certification system and raising it to the full capacity required to provide farmers with quality seeds according to their needs and demands. A seed policy has been endorsed by the Government and stakeholders, and is active since August 2005. A major effort to produce quality certified seeds since that time has been through the Variety and Seed Industry Development Project sponsored by the EU and implemented by the Food and Agriculture Organization of the United Nations (FAO). While certified seed production capacity under this project has reached the level of about 18,000 metric tons of wheat seed in 2009, and about 24,000

and 30,000 tons in 2010 and 2011 respectively, institutional strengthening aspects of the seed production system is not the focus of the EU-FAO project.

Neither a regulatory framework nor the infrastructure necessary for quality control of agrochemicals currently exists in Afghanistan. In order to fill this institutional and regulatory vacuum, the AAIP would establish the required regulatory framework and appropriate quality control infrastructure. This would be an important step towards ensuring the quality of agrochemical inputs as well as the products for which they are used. The infrastructure required for quality control for agrochemical inputs would consist of laboratories for fertilizer and other agrochemical inputs whose task it would be to test the quality of imported and domestic products. MAIL would then certify the inputs based on the test results. In combination with improvements in the government's capacity regarding the certification of seeds, this would significantly contribute towards satisfying farmers' demand for an agro-input certification process that they can trust.

However, the use of pesticides or other methods not integrated into the framework of controlling vector insects and/or pests or weeds, depending on their nature or their mode of usage, can cause social, health and environmental damage which can delay the attainment of the project objectives. This use of pesticides, even in limited quantities, requires having a management plan for these potentially dangerous products.

The analysis of the World Bank's safeguard policies in the context of the AAIP's for Environmental and Social Management concluded effectively for the use of this policy. As such, in agreement with the World Bank's OP 4.09 (pest management), the current PMP is prepared to ensure the rational use of pesticides in pest management in the Afghanistan as a whole, and specifically within the context of the AAIP. The aim of this operational policy is to promote the use of biological or environmental control methods and to reduce the dependence on synthetic chemical pesticides and to ensure that the health and environmental risks associated with pesticides are reduced. In most agricultural sector projects financed by the World Bank, pests are controlled through Integrated Management Approaches such as biological control, farming practices as well as the development and use of varieties that are pest resistant or pest tolerant.

1.2.1 Agriculture Sector and its Importance in the country's Reconstruction Efforts

The Government of Afghanistan recognizes that economic growth is a key factor for poverty reduction and that agriculture plays an important role in this process. The agriculture sector, which has been severely affected by years of war and neglect, provides a significant share of the livelihood of much of the country's population. Given the country's dependence on agriculture, the rate of recovery in the sector will largely determine the nation's overall rate of economic recovery and poverty reduction. Improved agricultural productivity and growth are central to reconstruction. At the same time, attention to rural non-farm economic activities is also important. Agriculture dominates the Afghan economy, contributing about 40% of gross domestic product and providing employment and livelihoods for the vast majority of the population. However, 25 years of war and civil conflict and the recent severe prolonged drought have seriously affected Afghanistan's agriculture sector. Developing the agriculture sector is critical for economic growth and for tackling opium poppy cultivation. Record Economic growth in 2009-2010 (22.5%) was largely due to a strong rebound of the agricultural sector after a very poor performance during the previous fiscal year.

Building on the Agriculture Master Plan, through the high development priority given to agriculture and in collaboration with its development partners, the government has defined a number of priorities for agricultural investments and policies under the National Agricultural Development Framework (NADF). In order to increase the food security situation and the farmers' incomes, the government has given the most attention to the strengthening of agricultural production base. The above mentioned is the rationale for which the government of Afghanistan has asked for the Bank's assistance in developing a mechanism for strengthening agricultural input supply systems.

Agro-ecological zones

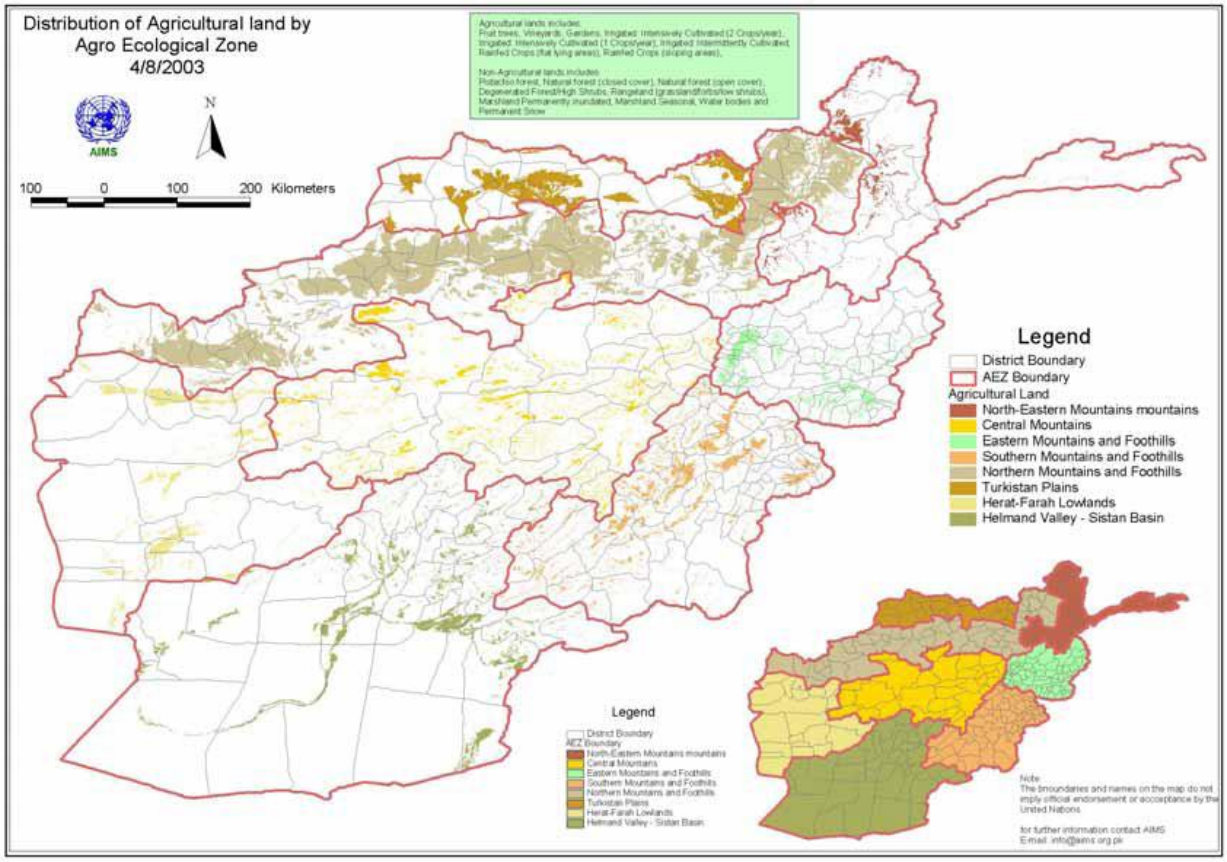
Agro-ecological zones and watersheds are the most significant criteria for zoning if the purpose is surveying agriculture. However, the identification and delimitation of agro-ecological zones in Afghanistan is rather difficult. The country has a very varied geography, with literally thousands of microclimates and micro-watersheds, and frequently conditions change from one valley to the next, within a fairly short distance. The main instrument for analyzing agro-ecological zones is the Afghanistan Land Cover Atlas, prepared by FAO, published in 1999 but based on satellite and ground information dating from 1990-93. As land use has somewhat changed over the intervening years, and normally varies from one year to the next according to rainfall and climatic conditions, even that very significant work has some drawbacks. FAO is now preparing to update the Land Cover Atlas, using recent satellite imagery and ground data, but no such update is available at the moment on a general basis.

The zones indeed have designations that allude to a broad stretch of territory, such as "Northern Mountains and Foothills". However, given the mountainous geography of Afghanistan, agricultural activity does not occupy a contiguous and homogeneous stretch of the country. Agriculture is possible only in specific patches or strips of land in the numerous mountain valleys and the thousands of micro-watersheds created by large numbers of streams coming down from the mountain ranges. More or less contiguous and relatively extensive agricultural areas only exist in some parts of the territory (such as the Turkistan Plains or the Northern Foothills) where flat or gently undulating land prevails, but even there the actual conditions of the terrain and the capricious nature of water supply impose at the best of times only a patchwork of cultivable and uncultivable land- rather than a continuous pattern of cultivation. In this survey some estimates are given about the actual extent of the cultivable land within some of the land cover types, especially within the rain-fed crop land.

It is possible and convenient to establish finer agro-ecological differences within each broad agro-ecological zone. For instance, within the wide belt of rain-fed land in the Northern Mountains and Foothills there are recognizable differences between conditions in the Western or Eastern parts of that belt, not so much in the soils (that are generally homogeneous, mostly of the Loess type) but in rainfall, slope, and elevation. In the massive Highlands that make much of the Central Mountains Agro-ecological Zone there are also internal differences based on altitude, precipitation or watershed. Thus the zones may be considered to break down into a number of specific agricultural areas located in different provinces and districts, belonging to different watersheds and existing at different elevations. These local variants of the zones have their own agricultural specificity, and thus conclusions about one of the broad agro-ecological zones are not meant as an exact description of every local variant, but as an average for a certain type of terrain on which certain kinds of agriculture prevail. The following are the agro-ecological zones as described above: (i) Badakhshan mountains in the North-East; (ii) Central and

Eastern mountains in the Center; (iii) Southern mountains in the South-East; (iv) Northern mountains in the North; (v) Turkistan plains in the Far/Extreme North, (vi) Herat-Farah lowlands in the West; and (vii) Helmand River valley in the South, as described in the figure below. The corresponding climate types to these agro-ecological regions are also described by the FAO in 2003 as (i) Continental desert climate in the Extreme North; (ii) Continental semi-arid to moist Mediterranean with winter frost in the North East Central; (iii) Alpine in the High mountains, centre and NE; (iv) Warm semi-arid Mediterranean climate in the Lower central & South East; (v) Continental semi-arid Mediterranean climate in the North-West; (vi) Sub-tropical desert climate in the South; and (vii) Dry Steppe climate in the Lower Kabul Valley.

Figure 2: Distribution of Agricultural Land by Agro-Ecological Zone



Area Cultivated and Farming Systems

The land area of Afghanistan consists of about 64.5 million hectares in total, of which only 3.3 million ha (5.1 percent) is irrigated and intensively farmed; 4.5 million ha (7 percent) is under rainfed cultivation and 29.2 million ha (45 percent) is rangeland. The remaining 41 percent of the country consists of urban areas, barren land and the rocky regions of the mountains, and is of no use for farming.

There are, basically, two farming systems practiced in the country: the sedentary, mixed crop/livestock system and the nomadic system which takes its name from the livestock owners, called the 'Kuchi'. Most sedentary farmers have some livestock because of the need for traction (for plowing) and transport,

because Afghans like to eat meat and dairy products every day if possible, and because they aspire to own livestock. Therefore, most farms have a mixture of crops and livestock including cattle, sheep, goats, a donkey, some backyard poultry and perhaps a horse and a camel or two. Some farms have a few fruit trees or grape vines, and others may have a vegetable patch.

Crop Production Systems

The main crop is wheat, being also the basic food staple as it accounts for around 70 percent of total cereal consumption and is grown on about 57 percent of the cultivated land. The country is no longer self-sufficient and has to import wheat to fulfill its food demand. The other major crops include barley, which is sometimes mixed with a legume, and maize, which is used as a livestock feed. Fodder crops, such as alfalfa, Persian clover (shaftal) and other clovers used for hay, make up about 10 percent of the cropped area. A range of other crops are also grown, for example chickpea (grams) and millet; cotton is grown in the southwest and potatoes are grown in central Afghanistan. Also important are gardens and orchards (always irrigated) that produce vegetables, fruits and nuts, which contain essential dietary constituents and can also be sold for cash.

A wide range of tree crops are grown, including apricots, mulberries, plums and nuts and other fruits such as grapes, pomegranates and watermelons. On farms with fruit crops draught power is less important, and frequently inter-row cropping with alfalfa and other fodder crops is used to provide feed for livestock. Because it is highly profitable, the cultivation of poppies for raw opium production is fairly widespread, being concentrated mostly in the southwest (particularly in the Helmand Province), although it is also common in several other provinces. The other reason poppy production persists, in spite of eradication efforts, is the need to obtain credit to get farming started, in order to buy livestock and other inputs.

Most of the systems described above are based on irrigation, but there are much larger areas of rainfed agriculture, which mostly produce grain. In the north, farmers have complained that local commanders were plowing the common range areas to grow wheat and that this practice deprived the sedentary farmers of grazing for animals close to the villages. The recent drought may have stopped this practice, to some extent, but not before large tracts of range had been ruined. The importance of grain production using rainfed land should not be under-estimated, since at least a quarter of Afghanistan's needs are provided for by these lands.

The importance of growing grain crops, for livestock in particular, should be emphasized because the crop residues provide vital winter feed. Similarly, the small amount of cottonseed and other oilseed residues which are produced are valuable sources of protein, a commodity which is desperately short in the country.

In most villages, farmers rely heavily on livestock to enable crop production. Afghanistan is one country in which animals and draught animals in particular, often come before people in terms of the priority set for food. This is because the land cannot be plowed and cultivated without animals. Dung is also important as a fertilizer, although this use competes with the domestic use of dung as a fuel for cooking and for warming homesteads.

Ox-power is still the most effective means of plowing the land in a timely fashion in post-war Afghanistan. Tractors would clearly be faster than oxen, but very few are available and, in any case, the villagers complain about the cost of fuel, maintenance and a lack of spare parts.

Livestock Production

Cattle production is an important enterprise in crop/livestock farming systems. Not only are cattle the principal source of traction for plowing and cultivation, they also provide meat and dairy products for farm household consumption. Any surpluses and by-products can be sold for cash, or can be bartered to obtain other goods. Milk production and milk sales have increased, becoming more popular even in the Pashtoon areas, where cultural traditions previously dictated that milk products should only be given away. Cattle are kept using distinct summer and winter systems. In the winter they are generally shut in poorly ventilated stalls and hand-fed. In the summer, and on warmer days in the spring and autumn, the young stock and dry cows are taken to nearby communal grazing areas and are herded by men and boys from the villages. At these times, bulls serve the cows and no payment is generally made to the bull's owner. Artificial insemination (AI) was usually only available to government farms, but has been expanded to private establishment since 2005 by the Dutch Cooperation, FAO, and AKF.

Sheep and goats are herded together and, on the high, cooler summer pastures, are combined into village flocks. Families take turns in herding the animals, although in the case of some big flocks the owners hire herders. In Nuristan and Badakhshan, small ruminants are not permitted back into the villages until after the harvest. In some areas, the flocks of small ruminants accompany the large ruminants but, more often than not, are herded separately. In the winter, small ruminants are managed in a similar way to cattle, except that in good weather they are generally taken to graze whilst the cattle are kept in the homestead.

1.2.2 Agricultural Research and Extension Services

Agriculture Research Institute of Afghanistan (ARIA)

The Agricultural Research Institute of Afghanistan (ARIA), one of the main directorates of the MAIL, has undergone many changes over the past sixty years. In the 1950s and 1960s, the focus was on building public sector research departments and institutes and extension services. This broadened with the National Agricultural Research System (NARS) approach of the 1980s, the Agricultural Knowledge and Information System (AKIS) approach in the 1990s, and the recently designated Agricultural Innovation System (AIS) approach, to the current established ARIA. Prior to 1979, Afghanistan's agriculture research system comprised 24 research stations, over 1,000 staff, 25 percent of which was technical research staff. However, this system is now largely dysfunctional as a result of widespread degradation of infrastructure and human capital that resulted from the more than 25 years of war and civil conflict.

For policymakers, three points are of importance concerning agricultural research in Afghanistan: (i) Agriculture research is a fundamental building block for progress in agricultural production and food security; (ii) Rapid transmission to farmers of advances from research stations and experimental farms depends on the effective functioning of many actors along the "research impact pathway," from researchers and policymakers to farmers and herders; and (iii) The farmer is the key to the whole

system; in the end the decisions of hundreds of thousands of farmers in Afghanistan determine whether the new varieties and technologies are adopted, impacts registered, poverty reduced and livelihoods improved.

The scope of agricultural research covers the biological, human and other sciences relevant to animal, plant and fish resources and production, and also the exploitation of natural resources (soils, water) on which such production is based. Over the last decade, the ARIA research areas focused on improvements in cereals production, grain legumes and oilseeds improvement and development, horticulture production and post-harvest management, cropping systems and resource management, agro-forestry in production systems and agricultural engineering. It also carries out socioeconomic assessment and study, supervise and control seed production in collaboration with the other International Research Institutes.

The NARS profits from various major scientific results, borrowing broadly from innovations made in other countries. Collaborative relations exist with institutions through externally (USAID, USDA, World Bank, FAO, etc.) supported projects; International Agricultural Research Centers (IARCs) of the Consultative Group on International Agricultural Research (CGIAR), including ICARDA, ICRISAT, CIMMYT, etc.; Australian Centre for International Agricultural Research (ACIAR); specialized regional programs such as Asia-Pacific Association of Agricultural Research (APAARI), Regional Agricultural Research Station (RARS), etc.

The Ministry of Agriculture, Irrigation and Livestock (Extension Services)

The Ministry of Agriculture, Irrigation and Livestock (MAIL) previously called the Ministry of Agriculture, Animal Husbandry and Food (MAAHF) has a mandate to promote agricultural development, through helping farmers and managing natural resources such as water, soil and forests; strengthening the agricultural economy through profitable new crops like saffron and better ways to grow traditional crops using new dry-land farming techniques; and building cooperatives, Afghan agribusiness and exports.

Currently MAIL is the main provider of extension and support services to the farming community, and tries to promote the adoption of research technologies to increase production. MAIL has been restructured into a more decentralized setup, which includes the Minister and three Deputy Ministers, aimed to improve interface with other stakeholders for more effective and efficient service delivery. The new structure with ten (10) General Directorates among which the General Directorate for Research and Extension, under the Deputy Technical Minister, comprises of seven technical departments namely: Research, Extension, Horticulture, Home Economy, Vegetables, Flower Growing, and Cereal and Industrial Crop Development, and a Directorate for each of the seven agricultural regions (corresponding to Agro-ecological zones).

The agriculture extension system aims to increase the knowledge and skills of farmers through the dissemination of improved agriculture technologies. It focuses mainly on crop improvement, Human Resource Development and collaborative program with other government departments and Non-Governmental Organizations (NGO). Staffed with more than 3,000 extension workers in the 1970s, the extension services in Afghanistan today is a broken understaffed system, with two extension agents at most per accessible district, and even none in the more remote areas.

Since 2003, USAID and many other donors (DFID, CIDA and EC) have been providing assistance to deliver new technologies and information to farmers and herders through its Rebuilding Agricultural Markets Program (RAMP), the Dairy Industry Revitalization Project implemented by Land O'Lakes, the Participating Agency Services Agreement (PASA) with USDA, and through grants to Central Asia Development Group (CADG). More recently, extension related work is being supported through the Alternative Livelihoods Program (ALP) at the provincial and district level. Although these activities have not directly targeted the capacity strengthening needs of MAIL, they have worked directly with farmers through privately contracted extension advisors, many of whom were previously employed by the MAIL.

1.3 Objective of the PMP in the AAIP

Within the context of the implementation of the AAIP which aims at strengthening the institutional capacity for safety and reliability of agricultural inputs and sustainable production of certified wheat seed, the PMP is designed to minimize the potential negative effects on human health and the environment, which could stem particularly from within the framework of anti-vector control; and to promote integrated pest management.

One of the objectives of the PMP is to address the capacities of the institutional and regulatory framework of Afghanistan to promote and support the effective and rational safety management of pests and pesticides and to incorporate into the project proposals for protection. The present plan is integrated into the framework of the activities and other operational measures already prepared and proposed in existing projects (HLP, OFWM project, FAO-IPM project etc.), thus strengthening the synergies and the complementarities, while avoiding duplications.

2. PRESENTATION OF THE AFGHANISTAN AGRICULTURAL INPUTS PROJECT (AAIP)

2.1 Objectives of AAIP

The Afghanistan Agricultural Inputs Project (AAIP) will strengthen the institutional capacity for safety and reliability of agricultural inputs and sustainable production of certified wheat seed.. It will develop the public infrastructure necessary to strengthen the input delivery system for major crops including wheat, industrial crops, vegetable crops and perennial horticulture crops, through (i) consolidating and extending the existing system of improved seed supply with the formulation of a comprehensive seed policy and development of requisite institutions and infrastructure; (ii) developing the necessary infrastructure and policies that will serve farmers' needs for appropriate, effective and safe use of fertilizers and other agro-chemicals, and (iii) piloting improvements in the network of agricultural input delivery systems and improved information for farmers regarding agricultural inputs.

This public sector development will be done in conjunction with strengthening and incentivizing the private sector involved in agricultural input delivery, and will be supported by the development of a sufficient regulatory regime to protect both the farmer and the consumer.

2.2 General components of the AAIP

The AAIP includes four main components described as follows:

- *Component A*: Improved seed production and certification. This component will focus on building up and raising the capacity of the seed production system in Afghanistan. It will do so primarily by strengthening the public sector role regarding the seed industry in order to support private sector producers and distributors of certified and improved quality seed. Given that wheat is Afghanistan's main staple crop, strengthening the provision of improved wheat seed will be a strong focus of the proposed project. Seed production (breeder seed) and certification capacity in the government will be improved to account for current and future farmers' need for certified seeds. The following weaknesses and constraints of the system will be addressed: (i) The Afghan Research Institute for Agriculture (ARIA) which is responsible for research, variety testing and breeding and production of breeder seed, lacks sufficient qualified personnel, facilities (land, equipment) and funding; (ii) The improved seed enterprises (ISE) whose responsibility is the production of foundation seed, lack sufficient qualified staff, a consistent incentive system, and modern and functional equipment; and (iii) The availability of improved varieties for irrigated areas needs to be expanded and appropriate varieties for rain-fed wheat need to be identified including the production of breeder seed.

  These efforts will be complemented and facilitated by the expansion of the network of private seed enterprises (PSE) under the EC-FAO project that will increase the reach of PSEs from 11 to over 20 provinces and raise the number of companies from 32 to over 50. In addition to wheat seed, the proposed Project may also tackle some of the needs and constraints faced by other crop sub-sectors as far as their seed requirements are concerned.

- *Component B*: Quality control for fertilizer and agro-chemicals. This project component will create the necessary public sector capacity and infrastructure for regulating and enforcing

quality assurance for agrochemicals at the national and sub-national levels. It will do so by introducing a system of quality control and testing to fertilizer and agrochemical industries. Such a system will consist of quality control laboratories for fertilizer and other agrochemical inputs, and a certification process will also be developed. The component will also extend best practices in safe application of agrochemicals to farmers. Capacity will be expanded in the area of laboratory testing of agrochemicals; and MAIL extension workers will receive training in safe application of agrochemicals, including integrated pest management techniques and protection of human health during the application of agrochemicals.

- *Component C*: Piloting of improvements in local input delivery systems and farmers' access to information regarding agricultural inputs. This component will facilitate and encourage private sector involvement in the supply of certified agricultural inputs while preparing input suppliers to provide information on safety and efficacy to farmers. It will will build on existing programs that have set up Ag Depots, farm cooperatives and farm service centers. There have been several successful programs, including USAID funded programs on Ag Depots and Farm Service Centers, and new approaches are being tried under the IDEA-NEW project. This component will build on these existing programs to pilot alternative types of input delivery and increase the amount of training available to dealers to improve the safe usage of agricultural inputs, and to assist in providing productivity-enhancing information to the farmer.Furthermore this component will pilot a number of IT-based systems aimed at improving farmers' information regarding prices, quality and judicious use of agricultural inputs.
- *Component D*: Project management, implementation and coordination. To implement and manage the Project, a Project Management Unit (PMU) will be established within MAIL. The PMU consists of a Project Implementation Unit (PIU) at the national level which is responsible for the planning, implementation and monitoring of the proposed project; and a Technical Assistants/Advisors Team. The PIU will have a Project Director who reports to the Technical Deputy Minister, and to the Director of the Program Implementation & Coordination Unit (PICU) in MAIL.

3. LEGAL FRAMEWORK AND INSTITUTIONAL CAPACITIES

3.1 Legislative and Regulatory Framework of Pesticide Management

3.1.1 International Conventions on the Environment

The legal framework that has a direct and/or indirect relation with pest and pesticide management, calls for several legislative and regulatory texts at the national level as well as international agreements, treaties and conventions ratified by the countries. It is against this context that the Government of The Islamic Republic of Afghanistan (GoA) with a view to harmonize and fulfill its national, regional and international obligations relative to Environmental Management has signed and/or ratified the following conventions:

- United Nations Convention to Combat Desertification (UNCCD) in those Countries Experiencing Serious Drought and/or Desertification
- Vienna Convention for the protection of ozone layers
- The Montreal Protocol on Ozone Depleting Substance
- Basel Convention for Control of Trans-boundary Movements of Hazardous Wastes and Their Disposal (Basel Convention)
- International Treaty on Plant Genetic Resources for Food and Agriculture
- Convention on Biological Diversity (UNCBD)
- United Nations Convention on the Law of the Sea
- Unite Nations Framework Convention on Climate Change (UNFCCC)
- Male Declaration on Control and Prevention of Air Pollution and its Likely Trans-boundary Effects for South Asia
- London Convention on the Prevention of Marine Pollution by Dumping wastes and Other Matter (London Convention)
- Convention on the Protection of World Cultural and Natural Heritage
- Convention on Fishing and Conservation of Living Resources of the High Seas
- Convention on the International Trade in Endangered Species of Wild Flora and Fauna (CITES)

The Islamic Republic of Afghanistan is not party or signatory to the following important international agreements, conventions and treaties:

- Rotterdam Convention on the International Code of Conduct on the Distribution and Use of Pesticides on Prior Informed Consent (PIC)
- Stockholm Convention on Persistent Organic Pollutants (POPs)
- International Plant Protection Convention (IPPC)
- Convention on the Conservation of Migratory Species of Wild Animals
- Kyoto Protocol Convention on Climate Change
- Agenda-21 Global Program of Action for Sustainable Development (Environmentally sound management of toxic chemicals and prevention of illegal international traffic in toxic and dangerous products)
- The Rio Declaration on Environment and Development- which addresses the sustainable use of natural resources and its development

3.1.2 Policies, Legal and Regulatory Texts on Environmental Protection and Management

The post-conflict environmental assessment in Afghanistan in 2003 by the UNEP found the livelihoods of more than 80% of the population that relies directly on the natural resource base of the country are under threat by the alarming degree of environmental degradation caused by a combination of conflict, poverty, population growth and survival tactics. The decline in the country's natural resource based has increased vulnerability to natural disasters and food shortages, thereby further increasing poverty and decreasing opportunities for sustainable livelihoods. Human health is also directly threatened by pollution hotspots and inadequate waste management and sanitation practices.

In 2002, the environmental function within the centralized government system was first housed in the Ministry of Irrigation, Water Resources and Environment (MIWRE – now called Ministry of Energy and Water (MEW)) as the Department of Environment. In 2005, due to increasing environmental problems (urban environment, surface and groundwater, forests and rangelands, soils, air, wildlife and biodiversity, and uncontrolled import and use of agro-chemicals) to be addressed the Department of Environment was separated from MIWRE and was subsequently declared an independent Department of Environment, and given the function and the status of an independent National Environmental Protection Agency (NEPA). The National Environment Protection Agency (NEPA) was established as Afghanistan's environmental policy-making and regulatory institution to regulate, coordinate, monitor and enforce the implementation of Afghanistan's Environmental Laws, adopted in 2005 and its amended version promulgated in 2007.

Currently, there are no legal and regulatory binding instruments relative to chemicals pesticides and pesticides management to enforce the registration, import, distribution and use and application of pesticides in Afghanistan. The new Pesticides Law, which is still under its draft form (Draft Pesticides Law) has been endorsed by the FAO and all the stakeholders, and is being reviewed by the Policy Analysis and Legal Department (PALAD) of MAIL.

The environmental challenge for post-conflict Afghanistan involves rehabilitation of both physical degradation and the associated collapse of national and sub-national governance. To this end the focus of NEPA and the environment sector has focused in the strengthening of environmental management capacity through: (i) national environmental coordination; (ii) public administration reform and human resources skills development; (iii) environmental impact assessment; (iv) environmental legislation, regulations and standards; (v) sub-national environmental affairs and community-based natural resource management; (vi) environmental monitoring, information and analyses, audit and enforcement; (vii) environmental policy development and planning; (viii) environmental communications, outreach and education; and (ix) multilateral agreements and regional cooperation. In addition, there is a dire need for capacity building in the implementation of the three global environmental conventions namely: Climate Change, Desertification and Biodiversity, using the 'bottom-up'' approach and active participation of the communities in decision-making, in accordance with the institutional frame-work and decentralization approach.

- While the National Environmental Protection Agency (NEPA) is the lead government authority, other national institutions also play an important role. These include: the Ministry of Agriculture, Irrigation and Livestock, the Ministry of Water and Energy, the Ministry of Mines, the Ministry of Rural Rehabilitation and Development, the Ministry of Urban Development and

Housing, the Ministry of Public Health, the Ministry of Transport, the Ministry of Education, the Ministry of Foreign Affairs, and the Ministry of Public Works. Other national institutions are also key partners, such as the universities and the Afghanistan Independent Human Rights Commission.

Per the Afghan's Environmental Law of 2007, NEPA has the following functions and responsibilities:

- Maintain environmental integrity and promote the sustainable use of natural resources;
- Promote conservation and rehabilitation of the environment;
- Coordinate environmental affairs at the local, national and international levels;
- Develop and implement national environmental policies and strategies in order to integrate environmental issues and sustainable development approaches into the legal and regulatory frameworks;
- Provide environmental management services in the areas of environmental impact assessment, air and water quality management, waste management, pollution control, and permitting of related activities;
- Establish communication and outreach for environmental information to ensure improved awareness of environmental issues;
- Implement bilateral or multilateral environmental agreements to which Afghanistan is a Party;
- Implement the Convention on the International Trade in Endangered Species of Fauna and Flora (CITES);
- Sign on behalf of the government agreements regarding the protection and rehabilitation of the environment;
- Promote and manage the Islamic Republic of Afghanistan's accession to and ratification of bilateral and multilateral environmental agreements;
- Coordinate the preparation and implementation of a national program for environmental monitoring and effectively utilize the data provided by that program;
- Prepare every two years in relation to urban areas and every five years in relation to rural areas a State of the Environment report for the Islamic Republic of Afghanistan for submission to the President's Office;
- Prepare an interim State of the Environment report on emerging issues relevant to the environment in Afghanistan not less than every two years;
- Within a period of three years of promulgation of this Act, develop a national environmental action plan, which assesses the urgency and importance of actions that should be taken in the short, medium and long-term in order to prevent, eliminate and reduce adverse effects as described in the most recent State of the Environment report, and, in consultation with relevant ministries and institutions, determines a coordinated strategy and schedule for the implementation of those actions;
- Periodically compile and publish reports on significant environmental indicators;
- On an annual basis, compile and publish a report that details the authorizations granted and activities undertaken by the National Environmental Protection Agency;

- Assess the effectiveness of the implementation of the Act and any regulations made under it in improving the sustainability of the use and management of natural resources and conservation and rehabilitation of the environment;
- Develop and implement plans for environmental training, environmental education and environmental awareness-raising in cooperation with relevant ministries and public bodies;
- Actively coordinate and cooperate with ministries, Provincial Councils and District and Village Councils, public bodies and the private sector on all issues related to sustainable use of natural resources and conservation and rehabilitation of the environment;
- Monitor the implementation of the objectives and provisions of this law;
- Fulfill any other functions that may be assigned by the Council of Ministers.

3.2 Institutional Framework for Pesticide Management

Afghanistan has had written regulations on pesticide use since 1989, but these are not enforced and are largely ignored due to lack of resources. “Leaky” Afghan border crossings are a likely source of unregistered, internationally banned, substandard, obsolete pesticides. A pesticide regulation was produced and published in 2000, by the Ministry of Justice of the Islamic Republic of Afghanistan. However, this regulation was never implemented due to insecurity, lack of human capacity, logistics support. The current draft Pesticides Act, when adopted by the Parliament, signed by the President and promulgated, will become a legally binding instrument to be enhanced by both the MAIL the PPQD and the National Environment Protection Agency (NEPA), which will establish the institutional framework required for the management of hazardous chemicals and pesticides.

3.2.1 Institutional Framework

The draft Pesticides Act is to provide for the control and management, manufacture, distribution and use of hazardous chemicals and pesticides, and to make provisions for the matters connected therewith. The Act is divided into 10 Chapters with 41 Articles as follows:

Chapter 1: General Provisions (Article 1 - 3).
Chapter 2: Administration (Article 4 - 10).
Chapter 3: Registration of Pesticides and Chemicals (Article 11 - 19).
Chapter 4: Licenses (Article 20-23).
Chapter 5: Presentation of Chemicals and Pesticides (Article 24 - 29)
Chapter 6: Laboratories (Article 30)
Chapter 7: Inspection (Article 31-32)
Chapter 8: Import (Article 33)
Chapter 9: Offenses and Sanctions (Sections 34-36)
Chapter 10: Miscellaneous (Article 37 - 41)

In accordance with the provisions of the Act, the Minister of Agriculture, Irrigation and Livestock (MAIL) is the responsible for the implementation of this Act, and should ensure, with the assistance of the Pesticide Division of the PPQD of the Ministry all the functions thereof as indicated by this Act. Therefore, the Multi-Sectoral Board Members appointed for the administration of this Act are comprised of:

- The Deputy Minister in the Ministry the MAIL or his delegated representative, who shall act as Chairman;
- The Head of the Plant Protection and Quarantine Directorate (herein Department) under the Ministry, or his delegated representative, as Registrar;
- One member from the Plant Protection Department under the Agricultural Research Services/Research Institute in the Ministry;
- One member representing the General Directorate of Livestock and Animal Health (LAH) in the MAIL,
- Two members representing the Ministry of Public Health (MoPH), one from Disease Control and a second one with a background in toxicology;
- One member from the National Environment Protection Agency (NEPA);
- The Chairman, at the request of any member of the Board, may invite other public authorities from departments related to food safety, health, environment, crop and animal production or protection to its meetings. Invited experts shall not have voting rights Solicitor General and Legal Secretary or his representative;
- Members shall, unless their seats become vacant earlier, hold office for three (3) years and shall be eligible for re-appointment;
- Members shall be selected based on their technical capacity and knowledge of pesticides in relation to their area of work;
- Members must be free from any personal or economic interest related to the pesticides trade or industry, and shall be required to sign a declaration to that effect.

3.2.2 Pesticide Control and Management (Registration and Post Registration Activities)

The registration of pesticides is the responsibility of the Ministry of Agriculture, Irrigation and Livestock (MAIL), with the assistance of the Pesticides Division of PPQD as to maintain the registry of pesticides, receive registration applications, prepare the applications and submit them to the approval of the Board of pesticides.

The post-registration of pesticides is the responsibility of the MAIL through PPQD, in coordination of the Ministry of Public Health (MoPH) and the Pesticides Management Board of the NEPA, in their respective areas. The rationale of post registration activities provide a means of measuring the validity of predictions based on registration data, regarding efficacy, safety and environmental effects of a particular pesticide. Thus, the post-registration activities conducted by the above consortium are elaborated below:

- Monitor and control, the manufacture, import, export, distribution, storage and use of chemicals and pesticides by licensing and any provisions made in the Supplementary Regulations for illegal importation of pesticides.
- Test the quality of pesticide formulations authorized and pesticide residue levels in food, plants, water and soils, and applicators of pesticides.
- Conduct various monitoring activities to monitor impacts of pesticides on plants, food, human and animal health, and the environment.
- Conduct training programs on the safe use and management of pesticides, including transport, storage and disposal, for all stakeholders.

- Raise public awareness on the risks associated with pesticides and safety measures.
- Enforcement of legislation/regulation and provide suitable control measures, to control imports, adverts, labeling and re-packaging of pesticides.
- Information exchange in accordance with FAO Code of Conduct (Article 9), to decision-makers, contracting parties, users, businesses and applicators, importing and exporting countries. This helps ensure compliance to the regulations in force.
- Operate Licensing Schemes for Pesticide Applicators and Companies.
- These activities should be conducted by Pesticide Inspectors of the Field Inspectorate, gathered from collaborating institutions (Customs, MAIL, MoPH, and NEPA), who are posted at various entry posts into the country, supported by a Pesticide Formulation Laboratory to test samples.

3.2.3 Institutional and Human Capacity to Control the Pesticide Trade

- In most countries pesticide regulations exist to control the availability of crop protection chemicals and to protect the interests of users, rural communities, the public at large and the environment. New pesticides being introduced to any country for the first time normally undergo a registration procedure, and for use on specific crops would undergo efficacy trials in the field. Phytosanitary regulations are used to protect domestic consumers against the importation of infected produce and planting material. Similarly, export markets must be confident Afghan agricultural produce destined to be exported is free from infection by pests, diseases and pesticide residues. Annex 6 is a list of policy elements that may or may not impact positively on the implementation of IPM programs. AAIP will coordinate with and complement the action of HLP, PPQD and FAO in fielding consultants to look at the regulation and control of the trade in pesticides and at the phytosanitary legislation to provide Afghanistan with a regulatory framework that will support the implementation of integrated pest management in general and help to protect Afghanistan's environment, farmers, consumers and the public at large.
- As part of the preparation phase of the AAIP, two consultants are planned to be fielded: a pesticide regulation specialist and plant quarantine specialist together who will further actions previously undertaken by the HLP consultants. The purpose of their work will be to assess the current situation and to design relevant implementation strategies for pesticide regulation, pesticides analysis and quarantine laboratories operations for quality control and safe handling of agro-chemical by the end of the project. These interventions will go hand in hand with the implementation at field level of the pest management component, the overall task of which is to reduce dependence on and the use of pesticides and to enable Afghan farmers to export produce free of pests, diseases and pesticide residues. Each consultant will cover his subject to include all stakeholders, particularly investigating farmer's attitudes and needs.
- As of September 2011, the Pesticide Policy Consultant has been in country, and has pushed further on the draft legislation which, at this stage is still not yet at its final form.
- The consultant's initial assessment mission revealed that there is neither quality control of pesticides nor any effective regulation in place. Traders are bringing all kinds of products to Afghanistan. Some of these products are repackaged in-country and falsely marketed as various other products. Farmers buy pesticides mostly based on the recommendation of the vendor. Vendors often have little knowledge of the products they are selling, often selling both

agrochemicals and veterinary medicines and food products from the same shelves. Traders' pesticide stores are also inconsistent with any international code of practice such as the FAO code of conduct on the distribution, handling and use of pesticides. Overall, the pesticide market in Afghanistan is depicted as being unregulated and subject to the whims, fancies and profit margins of the traders and vendors. A market survey of the Agrochemical trade was carried out in 2009 under the HLP project preparation phase. This survey was carried out in the 11 focal districts and main bazaars of the HLP implementation area and has determined the volume, types of products being sold and for what purpose and the types of vendors and distribution networks associated with this trade. The survey took place during three months starting mid-October 2009- and the results were made available in 2010.

- The handling, storage, re-packaging, transport and application of pesticides pose a significant challenge to environmental management and health in Afghanistan. Given the porous nature of Afghanistan's borders it is still possible (as was once common) for chemicals such as Methyl Parathion and Methamidophos, trade in which is subject to the Rotterdam Convention, to be freely imported from neighboring countries. Such products are sold in Afghan bazaars by traders with little technical knowledge of pesticides. Such products are a hazard to those who handle or use them, aggravate pest problems by destroying natural enemies and reducing the value of export products which may be contaminated by them. Pesticide misuse may have consequences that directly impact on farmers and communities causing specific and non-specific health problems and eliminating natural enemies of pests- thus creating further pest problems and often further dependence on the use of pesticides.
- As above-mentioned, a comprehensive pesticides trade and usage survey has been carried-out under the HLP project, and accordingly the needs have been identified, which have formed the basis of planning comprehensive farmers' trainings on the use and handling of pesticides. Moreover, AAIP will not allow procurement and use of any unregistered pesticides before the farmers' trainings are implemented.
- In addition, the medical staffs at the rural clinics are not properly trained to identify and diagnose pesticide poisoning from farmers' complaints on health problems; and with the lack of appropriate infrastructures and equipment, there is no provision for antidotes at the rural clinics, or such dispositions at the national level for reporting the statistics on pesticide poisoning in Afghanistan that could be related to international standards.
- The trade and transport of certain hazardous chemicals is subject to the Rotterdam Convention and its procedure of Prior Informed Consent (PIC) which was introduced on February 24, 2004. The objective of this procedure is to ensure that importing parties are aware of the hazards of certain chemicals before export/import takes place. If a party is exporting a product that is restricted or banned in his own country, it must inform with an export notification to the importing party. Afghanistan is not a signatory of the Rotterdam Convention and in the recent past many compounds on the list of banned or restricted compounds (Annex 1) were commonly available in Afghanistan. There is currently no legal way to prevent the dumping of such banned pesticides on the Afghan market. Afghanistan is not yet a member of the IPPC (International Plant Protection Council), the international body that monitors the regulation and use of pesticides in its member countries.

3.2.4 Proposed Strategy to Strengthen Capacity

In order to protect itself from becoming a dumping ground for banned pesticides, it is necessary for Afghanistan to become a member of the international organizations and signatory to the conventions controlling the distribution and use of pesticides. The drafting of the new and relevant legislation and it promulgation into law (Pesticides Law) will go a long way towards providing a national framework able to support Afghanistan's future international commitments in this regard.

Mindful of the weakness the country presents relative to its vulnerability to fraudulent sales and use of unwanted agrochemicals, the AAIP has taken into consideration the drafting and development of stringent pesticides Act and Regulations which were endorsed the Ministry of Agriculture, Irrigation and Livestock by the end of 2011 and submitted on to the Ministry of Justice. Both the Pesticides Act and Pesticides Regulations submitted to the Ministry of Justice are under the process of approval. In addition and as mentioned above, a market survey of the agrochemical trade was made in the HLP project area in late 2009. The support to the completion and operationalization of the institutional and regulatory framework for quality and safety standards of agrochemicals, and the construction and equipment of the laboratories for agrochemicals and quarantine and their safe use, will include capacity building and supply of hardware. This may require the building and equipping of laboratories and purchase of hardware and training of personnel and a budget within in MAIL to support these activities in a sustainable manner.

The project, based on a comprehensive needs assessment, has been undertaking an action plan to establish a well-equipped and trained manned laboratory along with comprehensive training of distributors, dealers, retailers, handlers and farmers on the distribution, transportation, storage, handling and use of pesticides so that no banned and IPM incompatible pesticides is imported into Afghanistan and no pesticide without formal registration is traded in Afghanistan. Ultimately, however, the long term future of Afghanistan lies with the youth of the country, so the young will be given the necessary training opportunities at the appropriate international standard.

Under the proposed AAIP as well as in HLP, those implementing IPM represent a mix of government and non-government employees. The latter are young people (mainly male) employed as extension workers. They have generally low levels of education and little experience of working with farmers. The former are largely middle aged (many approaching retirement) educated to degree level some 30 years ago and with little access to training or work in their profession during the intervening period. The AAIPwill rely on and supplement the efforts of HLP and FAO-IPM project to offer classroom and field training to extension workers as well as training of trainers to lead farmer through FFS in pest management. During the cropping season monthly field visits by senior national plant protection specialists offers the opportunity for extension workers and trainers (lead farmers) to reinforce and refresh the classroom training received during the winter months.

3.2.5. Constraints on Pesticide Management and Control

The "Leaky" Afghan border crossings are likely sources of unregistered, internationally banned, substandard, outdated/obsolete pesticides, coupled with the problems of insecurity, lack of infrastructure, and above all, the farmers' illiteracy, have the reasons the former pesticide regulation

was neither enforced nor implemented within the Afghan borders. The main constraints on pesticide control and management are elaborated below:

- Lack of functioning policies, legal, institutional and regulatory frameworks for pesticides licensing, import, storage, distribution, and use;
- Lack of functioning infrastructure for the Pesticides Formulation Analysis and Pesticides Residue Laboratories;
- Lack of mobility and resources to conduct monitoring and enforcement activities;
- Lack of resources to conduct training and awareness campaigns for illiterate afghan farmers.

3.2.6 Recommendations

The constraints mentioned above in Section 3.2.5 need to be addressed for effective pesticide management and control, as part of the implementation of the AAIP. In addition, capacity building (institutional and individual) needs to be taken seriously with incentives for sustainable provision of services and rightful use of trained personnel in their field of expertise.

4. PEST AND PESTICIDE MANAGEMENT APPROACHES IN AGRICULTURE AND PUBLIC HEALTH

4.1 Major Pests and Diseases Found in Agriculture in Afghanistan

4.1.1 Purpose

The purpose of the plan is to analyze the pest management situation in relation to increasing farmers' incomes, improve the food security and livelihoods situation as well as public and environmental health concerns through the implementation of the Afghanistan Agricultural Inputs Project (AAIP), and specifically in the use of appropriate inputs and priorities for agricultural investments and policies under the National Agricultural Development Framework.

Afghan farmers have little knowledge about pesticides and particularly the risks associated with their use and have little understanding of the agro-ecology of their crops. They tend to seek diagnostic advice from pesticide vendors and from staff of the Plant Protection and Quarantine Directorate of the MAIL: both sources of information are often misinformed and unreliable. As a result farmers frequently receive incorrect diagnosis and inevitably a prescription for the use of pesticides. Many of the pesticides prescribed are inappropriate, and/or in formulations beyond expiration date, are banned in other countries or may be classified by WHO as extremely hazardous (Ia) and highly hazardous (Ib). Such practices lead to the misuse of pesticides.

4.1.2 Overview of Crops Cultivated in Afghanistan and their Major Pest Problems

The crops cultivated in Afghanistan and their major pests and diseases are documented in number of publications. The details of the major field pests and diseases of major food crops (corn, rice, barley, wheat, vegetables, legumes, fruits, and nuts) and industrial crops (cotton, castor beans, and sugarbeets) are summarized in the table below.

According to MAIL's Plant Protection and Quarantine Department (PPQD) Survey reports, losses due to storage pests such as Rhyzoperha dominica, Trichoderma granarium, Tribolium castaneum, Oryzaephilus surinamensis, and the moths Sitotroga cerealella, Ephestia cautella and Corcyra cephalonica, notwithstanding the damage caused by the Sunn pest (Eurygaster integriceps) on wheat production. Flour Beetle, Cryeadon cerratus (Seed Beetles) and Bean Beetles damage is estimated to top 30% on Rice, Flour, Beans and Oil Seeds in storage, which is very significant. Other associated problems include lack of germination and inappropriateness for human consumption and export. The infestations can be higher at field level. The unfortunate part of the scenario is that damages are irreversible. A season's efforts could go to waste if produce improperly stored. Home stored farm products are the most vulnerable in Afghanistan as the designs of the stores are inadequate for maintaining the quality of grains for long term storage. Beside the storage pests listed above, the major field crop pests and diseases of economic importance found in different agro-ecological regions are summarized in the tables below.

Table 1: Major Pests and Diseases of Cereals, Legumes/Oil Seeds, Root and Tubers

Cereals	Pest	Diseases
Barley	1. Aphids 2. Grasshoppers 3. Armyworms 4. Cutworms	**1. Foliar diseases** brown rust, Yellow rust and Powdery mildew, Barley stripe rust (Hordeivirus), Ear diseases and mycotoxins barley Scald Ergot Sclerotia **2. Stem-based diseases** eyespot, stem rust **3. Virus diseases** barley yellow dwarf virus, soil-borne mosaic viruses **4. Fungal diseases** covered Smut, Loose Smut **5. Bacterial Diseases** blight (Xanthomonas campestris pv. Translucens); powdery mildew, and nematode
Maize	1. Corn worms- cutworms, earworm, wireworms, armyworms 2. Stem borers- European corn borer, chilo spp. 3. Aphids 4. Beetles- Cucumber beetles & Flea beetles, Blister beetles 5. Hoppers- grasshoppers, corn leafhopper 6. Miners- Corn leafminers 7. Maggots- seed corn maggots, 8. Mites- spider mites, 9. Thrips, 10. Jassids 11. white grubs 12. Whiteflies	**1. Viral diseases** Maize streak virus, Aflatoxicosis; maize dwarf mosaic, common rust, corn stunt **2. Bacterial diseases** corn stunt, root rot, fusarium (ear rot and stalk rot), head smut, seed rots and damping-off, charcoal rot, soft rot. **3. Fungal diseases** Smut (Ustilago nuda, Tilletia spp.), Pythium, and common Smut (boil smut).
Millet	1. Hairy Caterpillars 2. Armyworms 3. Blister Beetle, up to 50% damage observed, 4. Grasshoppers	1.Downey mildew 2.Smut 3.Ergot 4. Village Weaver Birds
Rice and Pulse	1. Grasshoppers 2. Stink bugs 3. Aphids 4. Stem borers 5. Midge, 6. Leafhoppers & Planthoppers, 7. Grain sucking insects, and Nematodes 8. Rice leaf roller	1. Paddy blast 2. Leaf spots 3. Sheath blight 4. Bacterial panicle blight 5. Straighthead, rust
Sorghum	1.Earworm and Stem borer 2.Aphids	1. Smut 2. Claviceps sorghi, 3. Tolyposporium ehrenbergii
Wheat	1. Sunn pest (Eurygaster integriceps) 2. Wheat curl mite (WCM) 3. Aphids 4. Wheat blossom Midge) 5. Grasshoppers 6. Armyworms) 7. Cutworms-Noctuidae 8. Wireworms (Coleoptera: Elateridae), 9. Cereal Leaf Beetle, 10. Hessian Fly 11. Wheat Stem Maggots (borers) 12. Wheat Stem Sawfly	**1. Rust diseases** Leaf rust (Puccinia tritici), Stem rust (P. graminis); Stripe Rust (P. striiformis) **2. Leaf Spotting Diseases** Tan spot (Pyrenophora tritici-repentis); Septoria leaf disease complex (Septoria tritici, S. avenae, S. nodorum); Spot blotch (Helminthosporium sativum) **3. Other Fungal Diseases** Powdery mildew (Erysiphe graminis f. sp. Tritici) Fusarium head blight or scab (Gibberella zeae / Fusarium graminearum) **4. Smut Diseases** Loose smut (Ustilago tritici); covered smut and common bunt (Tilletia caries, T. foetida) **5. Root Diseases** Common Root Rot (Cochliobolus sativus/ Bipolaris sativus); Take-All (Gaeumannomyces graminis- tritici)
Legumes /Oil Seeds		
Beans (soy bean, Mung bean, chick-pea, green bean, cowpea)	1. Ootheca mutabilis, 2. Aphids 3. Armyworms, 4. Coleoptera- Coryna spp., Anoplognemis curvipes, Callosobruchus maculates 5. White-flies - Bemissia tabaci	1. Pythium spp. 2. Mosaic Virus, 3. Rhizotonia solani, 4. Fusarium (F. oxysporium, and F. solani), 5. Phuelus vulgaris, and 6. Ascochyta blight
Cotton	1. 1.Aphids (Aphis cracccivora, A. gossypii), 2. 2.Cotton Strainers (Dysdercus spp.), 3. 3.White flies (Bemisia tabaci), 4. 4.Cotton armyworms 5. Cotton bollworm 6. Jassids 7. Trhips 8. 8. Mites	1. Fusarium wilt, 2. Soil-borne fungi (Rhizoctonia solani and Pythium spp.) 3. Root-rot (Rhizoctonia, Phythium, Thielaviopsis spp) 1. 4. Verticillium wilt (Verticillium albo-atrum)
Groundnuts	1. Aphids 2. Millipedes, 3. Ootheca mutabilis, Epicauta spp. 4. Odontotermes spp. 5. Aphanus sordidus, 6. 6. Cryeadon serratus	1. Groundnut Rosette Virus, 2. Aspergillus Niger and A. flavus
Olive	Facilia (producing white stuff around stem)	
Sesame seeds	Armyworms (Defoliators)	Green flowering

Table 2: Major Pest and Diseases of Vegetables

Crops	Pest	Diseases
Cabbage	1. Worms (armyworms, cutworms, fruit worms, etc.), 2. Aphids 3. Grasshopper 4. Whitefly (Bemisia tabaci), 5. Leaf cutworm (Barathra brassicae),	1. Root Knot Nematode (Meloidogyne spp.) 2. Black mildews (Peronospora parasitica) 3. Cabbage black rot (Xanthomonas campestris), 4. blossom end rot, 5. bacterial diseases
Eggplant	1. Red Spider Mites (Tetranychus spp.), 2. Moths (Heliothis armigera) and 3. Whitefly (Bemisia tabaci), 4. Aphids (Aphis gossypii, (Daraba spp.)	1. Fusarium solani, 2. Leveillula taurica, 3. Rhizotonia solani, 4. blossom end rot
Lettuce	Leaf beteles (Nisotra spp.), Grasshopper (Zonocerus variegatu)s, Aphids (green peach aphid, potato aphid, foxglove aphid, lettuce aphid, root aphid), Lettuce armyworm, beet armyworm, Bulb mites, cutworms, Darkling beteles, Field crickets, garden symphylans, Leaf minners, lettuce hoppers, Saltmarsh Caterpillar, silverleaf, Whitefly (Bemisia tabaci), and Springtails.	Alfalfa mosaic, anthracnose, aster yellow, bacterial leaf spot, beet western yellows, beet yellow stunt, big vein, corky mildew, fusarium wilt, chlorosia and lettuce infectious, yellow, lettuce dieback, lettuce mosaic, phoma basal rot, powdery mildew, verticillium wilt, Root Knot Nematode (Meloidogyne spp.)
Onions/garlic	1. Thrips (Thrips tabaco) 2. Sliver stripe Onion maggots 3. Termites	1. Bulb rot (Fusarium oxysporium) 2. The Pink Roots (P. Terrestris), 3. Neckrot, 4. Powdery mildew, 5. Ring rot
Pepper	1. Leaf beetle (Nisotra spp.), 2. Grasshoppers (Zonocerus variegates), 3. Beet armyworm, 4. Flea beetles, 5. Green peach aphid, 6. Leafminer, 7. Thrips, 8. Tomato (potato) 9. Psyllid, 10. Twospotted spider mite, 11. Western yellowstriped armyworm, and 12. 12. Whiteflies (Bemisia tabaci)	1. 1.Alfalfa mosaic virus, 2. 2.Bacterial spot, 3. 3.Cucumovirus, 4. 4.Curly top, 5. Pepper potyvirus & tobamovirus diseases 6. 6.Mosaic diseases, 7. 7.Root and crown rot (phytophthora), 8. 8.Powdery mildew, 9. 9.Tomato spotted wilt virus, 10. 10.Verticillum wilt,
Potato	1. Aphids (Aphis gossypii, A. Oxycarinus spp.), 2. Potato tuberworm (Phthorimaea operculella), 3. Flea beetles, 4. Colorado potato beetles (Leptinotarsa decemlineata), 5. Grasshoppers (Zonocerus variegates), 6. Whiteflies(Bemisia tabacci) 7. Cut worm, 8. Jassid, 9. 8. Stink bug	1. Early & Late blight (Phytophthora infestans), 2. Bacterial ring rot (Clavibacter sepedonicus), 3. Curly top, 4. Bacterial soft rot & blackleg (Erwinia carotovora), 5. Bacterial wilt (Ralstonia solanacearum), 6. 6. Common scab (Streptomyces scabies).
Sweet & Hot Pepper	1. Fruit flies (Ceratitis capitata, Bractocera invadens, C. cozyra and Cryptophlebia leucotreta), 2. Whitefly (Bemisia tabacci), 3. Blister beetles, 4. Cutworm caterpillar (Agrotis ipsolon), 5. Tomato hornworms (Manduca sexta), 6. 6. Pepper weevils (Anthonomus eugenii),	1. Bacterial spot (Xanthomonas vesicatoria), 2. Blossom-end rot, 3. Southern blight (Sclerotium rolfsii), 4. Phytophtora blight (Phytophthora capsici), 5. 5. Bacterial soft rot (Erwinia spp)
Tomato	1. Red spider mites (Tetranychus spp.), 2. Hornworms (Heliothis armigera), 3. Whitefly (Bemisia tabaci), 4. Beet leafhopper, 5. Cutworms (Agrotis spp), 6. Grasshoppers (Zonocerus variegates), 7. Leaf miners (Liriomyza trifolii), 8. Fruit borers (Helicoverpa zea), 9. Flea beetles, 10. Root knot nematode (Meloidogyne spp.),	1. 1.Anthracnose, 2. 2.Ttomato mosaic virus, 3. Fusarium wilt, 4. Pythium spp. 5. Early blight (A. solani, Stemphylium solani), 6. Downy mildew (Phytophthora infestans), 7. Tomato bacterial spot (Xanthomonas vesicatoria. Verticillium Wilt) 8. Tobacco Mosaic Virus, 9. Blossom end rot, 10. Take-all root rot (Gaeumannomyces graminis var. tritici), 11. Powdery mildew (Oidium neolycopersici),
Water melon/ cucumber/ squash/ pumpkin	1. Fruit flies (Ceratitis spp.), 2. Leaf beetle (Nisotra spp.), 3. Grasshoppers (Zonocerus variegatus), 4. Leafminers (Liriomyza trifolii), 5. Darkling beetles, 6. Melon fly (Bactrocera cucurbitae), 7. Cutworms (Agrotis, Amathes, Peridroma, Prodenia spp.), 8. Melon aphids.	1. Powdery mildew (Leveillula taurica), 2. Anthracnose, 3. Fusarium crown and foot rot, 4. Fusarium wilt.

Major Pest and Disease of Fruit Trees

The major pest and diseases of fruit tree crops are summarized in table below.

Table 3: Common insects and plant pathogens of the Afghan Orchards

Fruit Trees	Pest	Diseases
Almond	1. Western tent caterpillar(Malacosoma indica) 2. Aphids, 3. Black veined white butterfly (Aporia crataegi) 4. Brown tail moth (Eurproctis chrysorrhae); 5. Scales Eggar/Lackey Moth (Eriogaster amygdale) 6. Brown Peach aphid (Pterochloroides persicae)	1. Gummosis (Pseudomonas sp) 2. "Shot hole" disease (Stigmina carpophila) 3. Leaf spot (Cercospora circumscissa); 4. Wilt diseases 5. Red Leaf blotch (Polystigma ochraceum) 6. Brown rot and blight

	7. Scale insects 8. Mites 9. Longhorned Beetle (Aeolesthis sarta) 10. Semi lopper (leafroller), 11. Soft scale 12. San Jose Scale 13. Lecanium scale 14. Thrips 15. Oriental Fruit moth 16. Bark beetle 17. 17. June beetle	7. Bacterial wilt, Bacterial Canker, Foamy Canker and Band Canker, Bacterial blast 8. Root and crown rot (Phytophthora spp.) 9. Crown Gall 10. Bark split (Trunk and Branch Canker) 11. Anthracnose 12. Alternaria leaf spot 13. Almond leaf rust 14. Almond Scab, Hull rot 15. Downy mildew, and 16. 16. Bud mosaic
Apples	1. Woolly aphid (Eriosoma lanugerum); 2. San Jose scale; 3. Codling moth (Cydia pomonella); 4. Apple aphids & maggot (Rhagoletis pomonella); 5. European red mite (Tetranychus urticae Koch), 6. Green fruit worms, 7. Tent caterpillars, 8. Apple two spoted spider mites, 9. Apple leaf roller, 10. 10 .Fruit borer, 11. Heliothis spp, 12. Cicada spp, 13. Jassid, 14. Thrips, 15. 15. Nematods	1. Powdery mildew (Podosphaera leucotricha), 2. Fire blight (Erwinia amylovora), 3. Apple scab (Venturia inaequalis), 4. Leaf curling (Taphrina deformans) 5. Root and crown rot (Phytophthora spp,) 6. Crown Gall, 7. Bark split (Trunk and Branch Canker) 8. Bacterial Canker, 9. Foamy Canker and Band Canker 10. Bacterial blast, 11. Anthrocnose , 12. Alternaria leaf spot, 13. Downy mildew, 14. Scab 15. 16. Apple mosaic virus
Apricot	1. Western Tent Caterpillar (Malacosoma indica), 2. Browntail moth (Eurproctis chrysorrhae); 3. Black veined white butterfly (Aporia crataegi); 4. Eggar/Lackey Moth (Eriogaster amygdale); 5. Bark Beetle "Shothole"; 6. Wood boring beetles; 7. Aphids; 8. White Grub (nurseries) (Polyphylla sp); 9. Green fruit worm (Orthosia hibisci) 10. Mites, 11. Hairy caterpillar, 12. Lecanium scale (soft scale) and 13. Hard scale	1. Bacterial canker Gummosis (Pseudomonas syringae); 2. "Shot hole" disease 3. Stigmina blight (Stigmina carpophila AKA; Wilsonomyces carpophilus); 4. Verticilum wilt (Verticillium dahliae); 5. Brown rot blossom and 6. Twig blight, 7. Ripe fruit rot.
Citrus	1. Aphids, 2. Leaf worm and Leaf miner 3. lemon butterfly 4. Citrupsylla 5. cotton cushion scale 6. citrus white fly	1. Canker 2. Downy Mildew 3. Citrus dieback 4. Tristeza virus
Grapes	1. Berry Moth (Endopiza viteana); 2. Cicada; 3. Leafroller (Archips subsidiaria); 4. Mealybug (Pseudococcus sp.) 5. Scale insects; 6. Fruit flies (Ceratitis capitata, Bractocera invadens); 7. Termites; and 8. Mites	1. Gummosis and Citrus canker; 2. Powdery mildew (Uncinula nector); 3. Downy Mildew (Plasmopora viticola); 4. Anthracnose (Elsinae ampelina); 5. Crown Gall 6. Fruit Rots 7. White rot of vine (Coniella diplodiella)
Peach	1. Aphids, 2. Borers, 3. Mites, 4. Peach midge, 5. Soft scale,	1. Leaf curl (Taphrina deformans), 2. Fire blight (Erwinia amylovora), 3. Anthracnose, 4. Powdery mildew, 5. Downy mildew, 6. Brown rot, 7. Shothole,
Pear	1. Mealybug, 2. Aphids, 3. Sucking pest, 4. Pear maggots,	Powdery mildew
Plums	1. Aphids, 2. Leaf rollers, 3. cutworms, 4. twig borer and 5. peach tree borer.	1. Silver leaf, 2. Bacterial canker, 3. Blossom blast and brown rot, 4. Bacterial spot and 5. Plum leaf scab, Plum pox virus, dwarf virus, Necrotic ringspot virus
Pomegranate	1. White Grub (nurseries) (Polyphylla sp); 2. Fruit borer "carop moth" (Ectomyelois ceratoniae); 3. Aphids	Leaf Spot (Alternaria sp)

The above-mentioned pests and diseases are not limited to one region or province, though more virulent and damaging in some provinces than in others, depending on the specificity of the agro-ecological region or the province. They have been reported affecting cultivated plant species in all agro-

ecological zones, and their damaging effects are dependent on the weather conditions and the importance of the outbreaks. However, these pest and diseases listed could not be verified in the field because of the timing of the report (season) and the time constraint for the document to be readied.

Non Parasitic Disorders

Plant growth and productivity are as well disturbed by abiotic factors, and the most important are summarized in table below.

- Deficiencies of major and minor elements: phosphorous deficiency-interveinal yellowing for magnesium, young leaves chlorosis for iron, in some cases deficiencies results from actions by other elements or inadequate acidity. Corrections are by adding the required major and secondary elements. Adequate manuring can help prevent deficiencies.
- Phytotoxicity –is linked to excessive quantities of chemical pesticides and fertilizers. Symptoms of leaf and stem burns usually occurs.
- Soil acidity-some species are more tolerant to acidity than others (e.g. potatoes).
- Salinity –causes crops to wilt because water and nutrient uptake is reduced with increasing salt concentration.
- Water supply – should be optimized to avoid both insufficiency and excess causing wilting and root asphyxia or rotting.
- Wind, Sun and Heat- cause damage to plants. Tomato and Sweet Pepper fruits can be burnt (e.g. Blossom end rot of tomato).
- Drought- soil moisture restricts plant growth, both in terms of the total quantity of tissue produced and the time that the plant tissue is produced.
- Birds, animals and rodents- can cause damage to plant.

4.1.3 Pest Management Approaches in Agriculture

A survey of insects and diseases will be carried out on wheat and on other major crops (grains, vegetables, and perennials) in all the provinces where the AAIP will be implemented. The correct taxonomic determination of most of these is relevant as well as the economic status of most of them. The quarantine network and quality control for agrochemicals focusing on pesticides legislation in relation to import, distribution, use and application of pesticides to minimize risks for human, wildlife, and environment will be designed.

In general, small producers use various methods and techniques in combination, including integrated pest management (IPM) to control and manage the pest and diseases of field crops. These control methods include:

- *Traditional or cultural control methods*: burning of old crop debris to control stem borer pupae and soil insects, early planting and timely weeding to control weeds and other pest, hand picking and burning blister beetles adults, uprooting weeds before flowering, using repellants and noise devices to scare away village weaver birds.
- *Agronomic methods:* crop rotation, fallowing, good seed and stock selection, seed treatment, recommended spacing and optimum plant population densities, application of recommended fertilizer dosage rates and manures, use of resistant (genetically selected hybrids) varieties, early harvesting, crop sanitation, burning of old and affected plants, tethering and timely harvesting.

- *Physical and mechanical control methods*: regular monitoring of pest populations, hand picking, digging of trenches and burying to control hairy caterpillars and armyworms, and use of baits for millipedes. Plowing to expose grasshopper's egg-pods and pupae of other insect pests.
- *Chemical methods*: Use of chemical pesticides to control major pests and diseases, and weeds attacking crops are the most popularly used methods, especially during outbreaks of invasive species like desert locusts and fruit crop defoliators.
- *Spraying and Fumigation* using pesticides and Phostoxin Tablets to control storage pests.
- *Use of Neem Powder and Plastic Containers* to protect stored grains and seeds from infestation of storage pests.
- *IPM methods*: a combination of more than one control methods to manage the pests and diseases.
- Research and development of alternative control methods.

On the other hand, larger commercial crop growers use mostly conventional control methods that involve intensive use of pesticides to protect their crop against pest and disease outbreaks to achieve instant results, notwithstanding the damage caused on the beneficial insects as well as on the environment.

4.1.4 Pest Management Strategy Proposed under the AAIP

The strategy will consist of (i) proper identification of insects and diseases; (ii) identification and control of pests (insects, mites, nematodes and diseases) of economic significance; (iii) development of pest "calendars"; (iv) set up of an early warning system to determine possible pest and disease outbreaks; (v) determination of control methods based on local knowledge and the experience of other regions and countries; (vi) non-chemical control and mechanical methods applied where possible; (vii) specification of allowed pesticides (as classified by WHO); (viii) specification of required application equipment and protective gear; etc.

To reduce to a minimum environmental damage, the control strategy using pesticides is based on dormant sprays targeting major economic pests and mechanical control and spot sprays of pest outbreaks during the growing season. Otherwise, cultural, mechanical, agronomic and biological methods should/will be mostly recommended on the following crops:

a. Cereals

i. Wheat

Wheat is the staple crop and national food - mainly winter-sown but spring wheat is grown in the coldest zones. The main pest problem in wheat in Afghanistan is Sunn pest (Eurygaster integriceps), which feeds on the plant by injecting chemicals that cause the grain's gluten to break down. If as little as 2 or 3% of the grain in crop has been affected, the grain is unusable for baking. Chemical control of Sunn pest in the past has been achieved by using specific quantities of recommended pesticides (Fenitrothion, Trichlorfon, Fenthion, Methyl-parathion, Malathion and Diazinon), though this has also created resistance and caused the destruction of the Sunn pest's natural enemies, causing its constant resurgence. Long term management of this pest is provided using integrated pest management (IPM) that calls upon comprehensive biological control and behavioral knowledge of the Sunn pest, its natural

enemies, the farming practices, host plant resistance and the entomopathogenic fungi (Beauveria bassiana), as well as the conventional use of pesticides, if needed, to combat infestations/outbreaks and reduce damage on the crop. By using this approach, in combination with improved and resistant wheat seed varieties (genetic control), developed and/as recommended by scientists from ICARDA/CABI, one expects to more effectively control infestations and decrease dependence on expensive and environmentally harmful chemicals that also lead to resistance in the insect population.

Currently, there is not a pest management strategy to control the Sunn pest on a national or global scale in Afghanistan. However, there are a number of methods that farmers can utilize to help limit the economic damage caused by these insect populations. These consist of:

- Monitor and assess pest populations not to reach economic thresholds, since Sunn pest populations vary from year to year in response to climatic conditions. Pest populations should be monitored annually to determine if it is necessary to spray for the insect. Keeping records of population levels is beneficial.
- Plant early-maturing wheat varieties and harvest early; damage is less if wheat is harvested before Sunn pest reach adulthood. Growing early-maturing varieties and establishing a regional uniform planting date minimizes damage. Early harvesting methods must be developed in relation to local production methods and weather conditions.
- Maintain shelter belts around wheat fields. The use of natural enemies, especially egg parasitoids, that play an important role in suppressing and reducing Sunn pest populations and the entomopathogenic fungi Beauveria bassiana which very efficient in destroying Sunn pest pupae, should be encouraged. Cereal crops should not be grown on marginal lands in the foothills. These areas should remain as uncultivated habitats where flowers and grow undisturbed, providing shelter and alternative food sources, which improve survival of these beneficial insects.
- Use chemical insecticides only if needed.

Diseases are a major cause of yield loss in wheat besides insect pests. Environmental conditions including elevation and rainfall in the wheat growing agro-ecologies are the major influence on the prevalence and incidence of specific wheat diseases. Tan spot, Cephalosporium stripe, Fusarium head blight, take-all (take-all fungus), and others are residue-borne diseases of wheat in no-till and reduced tillage system and can be managed through (i) crop rotation, (ii) resistant, locally adapted cultivars, (iii) planting date, (iv) stand establishment , (v) weed control, (vi) fungicides, and (vii) crop residue management.

For the root diseases, the root, crown, and foot rots are common fungal diseases that affect overall plant health and lower yields. Common root rot and Fusarium foot rot are fungal diseases common in dryland wheat such of Afghanistan with continuous copping systems. Cultural management with adapted cultivars as well as seed treatment fungicides provides an early window of protection against common root rot and seedling blights caused by Fusarium spp.

Foliar diseases such as leaf rust, stripe rust, powdery mildew, tan spot, stem rust and glume blotch are primary foliar fungal diseases which result in serious economic losses in wheat. Monitoring rust epidemics in and scouting fields for powdery mildew and leaf spot will give an indication of the potential

damage these diseases may cause in wheat production. A number of fungicides are currently registered to control wheat foliar diseases and Fusarium head blight as well as stem rust.

Management of powdery mildew of wheat, caused by the fungus Blumeria graminis f. sp. Tritici, is achieved through growing of mildew-resistant cultivars and a well timed fungicide application to protect the flag leaf after assessment of the incidence and severity from tiller elongation through flowering.

Diseases affecting the head, wheat grain and seed quality such as black point, ergot, common bunt, loose smut, and scab, reduce wheat yield, quality, or both. Fungal diseases affecting grain and seed quality in wheat such as loose smut and common bunt of wheat can be managed by planting resistant cultivars, and fungicide-treated seed can help to effectively control and manage both of these common fungal diseases.

ii. Barley/Corn

Barley and corn are used as stock-feed, rarely for humans. Besides aphids and grasshoppers, others insects pests are never of great importance in barley production. In contrast, barley diseases can affect the growth and survival of both tillers and spikelets which can affect initial plant count. Therefore early disease management is vital, as initial plant count is important for a successful yield and economic profits. Certifying seed is one way to reduce pests and diseases. Fungicides are often the best way to limit barley crop diseases. However resistance can occur when a disease becomes insensitive to a particular fungicide. Prevention of barley diseases can be achieved through the practice of good hygiene (disposal of crop debris), avoid large areas of any one variety of crop, only use fungicides when treatment is necessary and at a minimum amounts, and regularly monitor crops for diseases and resistance.

The control of corn diseases is achieved mostly through the use of fungicide seed treatment of resistant hybrids during planting. It is recommended to plant when soil conditions are warmer and drier, and use the proper planting depth. Corn disease is primarily a problem in seed production fields with certain highly susceptible inbreds. Select hybrids with resistance (tolerance based on risk), using a two year crop rotation scheme with nongrass crops, and cleanly plow under infected residue. Foliar fungicides may be useful in seed production fields.

Many insects may attack growing corn, but economic damage may not occur every year. In years of heavy infestations, any one of several insects may cause a loss in yield. To prevent loss, knowledge of the insects and the most practical controls is required. When yield potential is low or other factors are involved (e.g. price) insecticide use may be impractical. In such cases, harvesting the crop as silage or fodder may be the best means of salvage. Several aphids transmit a plant virus which causes a disease known as maize dwarf mosaic. Insecticide control of the aphid is not an effective method of controlling the disease because the disease is transmitted prior to aphid death. The most effective means of virus management is the use of disease-tolerant varieties.

Early planting when the soil is warm reduces damage from most insects (aphids, seed maggots, cutworms, wireworms, white grubs) and early stalk destruction is a very good practice to reduce overwintering borers. For corn borers, stubble should be turned up and left through the winter. Plowing or turning corn stubble in early spring will greatly reduce overwintering of corn borer larvae. Because

proper timing of insecticide application against borers is difficult, early planting and stalk destruction just after harvest are the best management of corn borers. If an insecticide is used before the young borer enters the stalk and ear, a substantial level of control can be expected.

iii. Rice and pulses

The approach, known as integrated pest management (IPM), in the simplest terms is referred to as "a broad ecological attack combining several tactics including biological, chemical, and cultural control methods and insect resistant rice varieties, for the economic control and management of pest populations". Cultural methods to control insects involve crop production practices that have a dual purpose of crop production and insect suppression. Primary cultural control practices are those done specifically to control insects such as draining a field to control the aquatic caseworm larva or planting a trap crop for stem borers. Secondary practices are those that are specifically done for crop husbandry, such as land preparation and weeding, which also happen to minimize pest buildup. Due to pesticides cost, toxicity to man and the environment, the secondary pest problems caused such as the resurgence of the brown planthopper, and because of the development of insecticide resistant populations, the recent trend in rice IPM has been toward the integration of insect resistant varieties with the conservation of natural control agents. Biological control through the action of indigenous predators, parasitoids and insect pathogens forms the cornerstone for modern IPM programs on rice. Research studies have shown that indigenous natural enemies have a strong impact on rice pest populations and their conservation is an essential part of rice IPM programs. Many species of predators, parasitoids and pathogens have been shown to attack rice insect pests.

b. Vegetables

i. Potatoes

Farmers face several potential disease problems in potato production: Late blight is the most serious potato disease worldwide as well as in Afghanistan. It is caused by a water mold, Phytophthora infestans, which destroys leaves, stems and tubers and reduces the plant production to near zero. Bacterial wilt (Ralstonia solanacearum) is the other pathogen that affects the aerial part of the plant and leads to severe losses in potato fields in tropical, subtropical as well as in temperate regions. This pathogen is also present in Afghanistan and causes severe damage in potato farms. Also, the Potato blackleg (Erwinia carotovora) is a bacterial infection that affects and causes tubers to rot in the ground as well as in storage.
The main pest of potato production is the Colorado potato beetle (Leptinotarsa decemlineata), a serious pest with strong resistance to insecticides. It is present in Afghanistan and causes tremendous damage during the cropping season. The potato tuber moth, most commonly known as Phthorimaea operculella, is the most damaging pest of planted and stored potatoes in warm, dry areas such as the one in Afghanistan.

Combating pests and diseases in potato production with intensive use of insecticides and fungicides often does more harm than good. Luckily, an array of alternatives is available, including IPM. Increasing potato production while protecting producers, consumers and the environment requires a holistic crop protection approach encompassing a range of strategies - encouraging natural pest predators, breeding

varieties with pest/disease resistance, planting certified seed potatoes, growing tubers in rotation with other crops, and organic composting to improve soil quality.

There is no effective chemical control against the bacterial wilt disease. But planting healthy seed in clean soil, using tolerant varieties in rotation with non-susceptible crops, and other sanitation and cultivation practices can lead to significant reduction of the disease. Incidence of potato tuber moth can also be reduced by preventing soil cracking that allows moths to reach the tubers. Both the International Potato Center (CIP) and FAO advocate Integrated Pest Management (IPM) as the preferred pest control strategy during production. IPM aims at maintaining pest populations (Colorado beetle) at acceptable levels and keeping pesticides and other interventions to levels that are economically justified and safe for human health and the environment.

ii. Cucurbits (Water melon/ cucumber/ squash/ pumpkin)

The main problem in cucurbits in Afghanistan is related to the Melon fly (Bactrocera cucurbitae). This is one of the most important pests with which vegetable growers have to contend throughout most of southeastern Asia, from Nepal, Bangladesh, most of India, Pakistan to Afghanistan. The melon fly, sometimes called the melon fruit fly, is considered the most destructive pest of melons and related crops, and can greatly curtail the production of melons, cucumbers, and tomatoes. The extensive damage caused by this fly indicates that this species could rapidly become a very serious pest of cucurbits and possibly of some fruit crops also. Pumpkin and squash are heavily attacked even before fruit setting, with eggs laid into unopened male and female flowers, and larvae successfully developing in the taproots, stems and leaf stalks.

Successful IPM has always followed an ecological approach. The decline of chemical control (the use of organophosphates) came about because it could not successfully handle the problems of resistance, resurgence and secondary pest outbreaks, along with environmental and health hazards. The most successful alternative of these was IPM. This approach encouraged the development of non-chemical methods that promote the growing of a healthy crop and at the same time protecting natural enemies, thus ensuring a low population of pest species. A participatory approach towards IPM demands that farmers need to be educated in ecology to better appreciate the advances in an ecological pest management approach. The management of this pest consists of a combination of bait spraying to attract and kill adults and male annihilation through mass trapping of males, and the use of sterile male insect technique. Biological control of this fly which consists of larval parsitoid Psyttalia fletcheri and the egg parasitoid Fopius arisanus which are fruit fly parasitoids is also one of the technical components in the management of this pest. Cultivation of trap crops (such as castor oil plant) in the vicinity is encouraged as well as crop hygiene (sanitation of the field) and a 3-4 year crop rotation.

c. Horticulture

i. Grapes

The main problem in grapes is Powdery Mildew (Uncinula necator). A dormant spray of Lime Sulphur is made against Powdery mildew, which also reduces mealybug populations. New growth is protected against Powdery mildew with applications of sulphur dust or wettable sulphur beginning 2 weeks after bud burst and then to protect new growth at approximately 15-day intervals. A minimum of three

applications are made. Spot sprays of copper fungicide in April are used to control Anthracnose. Mechanical control of insect pests (Cicadas for example) will be encouraged and methods developed accordingly, as well as for mites (spider mites).

ii. Pomegranate

The main problem in pomegranate is the fruit borer: the larva of the Carob moth (Ectomyelois ceratoniae) which is believed to enter the young pomegranate via the calyx at flowering. This moth has been identified in pomegranates in Afghanistan, but the biology of the moth in the pomegranate is poorly understood. Orchard sanitation (pruning of overgrowth shoots, dead overwintering ranches, etc.) is used to reduce the number of infected fruit in the orchard and the population of the moth. Mechanical control can also be employed – a plug of mud placed in the calyx of the very young fruit or bagging of the young fruit acts as a physical barrier and prevents the larvae entering. The use of pheromones for mating disruption is being tested by the IDEA-NEW project (funded by USAID) and is being supported by HLP in focus districts in the Northern provinces.

iii. Almonds/ Apricots

In Afghanistan, there is a high incidence of bacterial canker and gummosis in both almond and apricot trees. This is a chronic infection which can kill the tree and which is believed to be associated with the combination of cultivation of intercrops in the orchards and overuse of water particularly where flood irrigation methods are used. Copper has some impact in slowing the development of the disease. A dormant spray of Copper (Bordeaux Mixture) is applied to the tree and Bordeaux paste/paint is applied directly to lesions and pruning cuts. The copper spray also offers some protection against shothole disease.

A dormant spray of winter oil/horticulture oil is used to reduce populations of insects overwintering as sedentary stages or eggs, in particular aphids, scales and mites.

Mechanical control is used to remove nests of tent caterpillars (defoliating Lepidoptera larvae) which can be burnt either in situ or after being pruned out of the tree. Mechanical control will be used to control local pest outbreaks during the crop season. Spot sprays of pesticides will be used to control local pest outbreaks, but only as a last resort.

4.2 Pests in Public Health

4.2.1 Overview of Vector-Borne Diseases of Public Health Importance

Vector-borne diseases (Malaria, Leishmaniasis, Lymphatic filariasis, Onchorcerciasis, Trypanosomiasis and a number of ArbovGoAl infections—Rift Valley fever, Dengue fever, Yellow fever, West Nile fever, Crimean–Congo hemorrhagic fever and Japanese encephalitis) are a major public health problem in the Eastern Mediterranean Region as defined by WHO. There is potential for these diseases to spread both geographically and seasonally due to ecological and climatic changes, human activities such as development projects, civil strife, and urbanization and population movement.

According to the Vector Control Department of the Ministry of Public Health, the major vector-borne diseases in Afghanistan are as follows:

- Mosquitoes caused diseases such as: Malaria, Dengue fever and Yellow fever
- River Blindness caused by black flies
- Sand Flies causes Leishmaniasis, but infections are under-reported
- Bed bugs, Fleas, Lice, Ticks, Mites and House flies.

Malaria is a significant public health concern in Afghanistan. Currently, approximately 60% of the population, or more than 14 million people, live in a malaria-endemic area. Afghanistan's diverse landscape and terrain contributes to the heterogeneous malaria prevalence across the country. With military conflicts and instability that have lasted more than three decades, the once successful malaria vertical control program was long abandoned, and the public health infrastructure in Afghanistan has all but disappeared. Malaria outbreaks have recently re-emerged in rice growing Kunduz province between 2001-2005 as a result of returning refugees from neighboring countries, intensified rice cultivation close to populated towns, and lack of any vector control measures.

Much of Afghanistan is arid or semi-arid, and agriculture depends heavily on irrigation. The most prevalent malaria vector species are Anopheles stephensi, Anopheles culicifacies, Anopheles pulcherrimus and Anopheles superpictus. These species breed in river pools, river edges, and irrigated rice fields. Melting snow in the spring and rainfall in the summer provide additional larval habitats and enhance malaria transmission. The main transmission season is from June to November, while transmission in other months is negligible. According to WHO and MoPH, Vivax malaria has been the most dominant infection in Afghanistan. Evidence from the 1990s showed that Plasmodium falciparum infection had increased. In the eastern region of the country, for example, P. falciparum infections previously accounted for only 1% of the total malaria infections, and in 1996 this increased to 20%. However, the incidence of P. falciparum malaria then decreased significantly between 2002 and 2008. In 2007-2009, P. falciparum cases contributed to less than 5% of the malaria burden. At present, P. falciparum cases have declined to the extent that the National Malaria and Leishmaniasis Control Program (NMLCP) could not find even 50 cases per year at the sentinel site for drug efficacy study.

Because of the diversity in landscape and terrain of Afghanistan, malaria prevalence is heterogeneous - it is believed to be endemic in areas lower altitudes (2,000 meters of elevation) and highly prevalent in river valleys, where rice growing is common. However, in October of 2000 an epidemic of P. falciparum malaria was reported in the previously malaria-free remote valleys of Bamyan with relatively high altitude (2,250-2,400 m). The increase in population movements has led to increased potential for malaria transmission, particularly during the short summer season, rendering high altitude areas susceptible for infection.

The goal of the WHO Eastern Mediterranean Regional Office (EMRO) regional malaria program is to reduce the malaria burden to a level at which it is no longer a major cause of morbidity and mortality and a barrier to social and economic development. Specifically, the program aims to reduce malaria morbidity by 60% and malaria mortality by 90% by the year 2013. The continuing military conflicts in Afghanistan, however, may limit the access to malaria treatment and prevention. Hence it will be challenging to reach as well as to maintain such goals.

4.2.2 Pest Management Approaches in Vector-Borne Diseases Control Prevention

Although not a traditional practice, insecticide-treated bed nets (ITN) have been gradually accepted through extensive public awareness campaigns and mobile, subsidized sales. In order to attain universal coverage in high-risk population, free distribution of long-lasting insecticide-impregnated nets (LLINs) have been adopted in 2008. For some provinces, more than 75% of the residents own bed nets as shown in the November 2008 malaria indicators survey. As insecticide residual spraying (IRS) is difficult to implement in the current situation, broadening the ITN use is a viable approach for reducing malaria infections. The continued, consistent and proper use of ITNs, however, still requires sustained awareness campaigns. Since other infectious diseases have also taken tolls in the population, malaria is grouped with other health and disease programs into a basic package of health services (BPHS). Other approaches to vector control include:

- Indoor residual spraying (IRS) using (DDT) insecticide to control mosquito larvae at the mosquitoes breeding sites, using WHO Training Manuals on IRS. Post-treatment applications require monitoring of (i) mosquito population densities (ii) identification of species mortality (iii) monitoring the incidence of malaria before and after treatment, and (iv) conducting vector susceptibility test to assess efficacy of treatments.
- Larviciding and Adulticiding, using larvicides to control and reduce mosquito populations.
- Environmental Management- promoting environmental sanitation in the communities.
- Biological control: using natural predators (e.g. Bats which feed on mosquitoes).
- Surveillance and control, using pesticides to regularly spray ditches around major cities to reduce the populations and thereby, reduce the malaria incidence.
- Mobilizing adequate resources for the National Vector-borne Disease Control and Prevention (NVDCP) program, especially Malaria Control.
- Promoting Integrated Vector Management, using combinations of methods to reduce the vector populations and morbidity and mortality rates.
- Research and develop new effective intervention control methods.
- Use quarantine for people infected with diseases such as Bird Flu, Mad Cow diseases to prevent introduction and spread of diseases.

4.2.3 Constraints of the Vector-borne Disease Control and Prevention (NVDCP) Program

The activities of the NVDCP are constrained by limited financial and human resources, mobility, spraying equipment, cholinesterase test kit, pesticides and protective gears, to cover the entire country.

4.2.4. Recommendations

- Expand the coverage and use of Long Lasting Insecticide Treated Nets (LLITNs), and conduct more awareness campaigns.
- Provide support for mobility to enhance surveillance and control operations.
- Support for the training-of-trainers of village-based malaria control applicators.
- Provision of cholinesterase test kits for local applicators

4.3 Integrated Pest Management Experiences

4.3.1 Policies on Plant Protection and IPM

The government of Afghanistan has not, as yet, adopted IPM as a national policy, as the country's preferred method of tackling crop protection issues. On the contrary, the application of pesticides by MAIL staff is still used as a means, justified by political expediency, to show to the public at large that the government is doing something for the farmers and the agricultural sector. A typical example of this is the response of MAIL when pressure is put on it by complaints from provincial governors that insufficient is being done to control, on behalf of farmers, pests such as Colorado Potato Beetle and potato blight in potatoes, Baluchistan Melon Fly in the cucurbits family, Moroccan and Italian (Desert) Locusts, Sunn pest and rust diseases in wheat, and worms (cutworms, armyworms, earworms) on corn and other vegetables. In the absence of an alternative long-term strategy involving farmers, MAIL sees itself obliged to implement reactive centrally controlled spray programs using the staff of the plant protection department.

4.3.2 The country's Capacity to Implement IPM

The government institution concerned with plant protection matters is the Plant Protection and Quarantine Directorate (PPQD) of the Ministry of Agriculture, Irrigation and Livestock (MAIL). The HQ and diagnostic laboratories of PPQD are in the ministry compound in Kabul and PPQD is represented in the provinces by Provincial Directorates of Agriculture, each with one or two pest management officers. The current national Head of PPQD is an experienced extension professional (former head of the Extension Directorate) who worked for the ministry before the conflict - but with no plant protection experience. Nevertheless, he is using his long-lasting experience in the Ministry to bring the PPQD to the standard acceptable to the international community.

The general level of capacity in the country to implement IPM, if described in terms of access to information, skills and understanding of the concepts of IPM, is low. Support for the PPQD though pro-active projects which tackle pest problems would remove the need for reactive emergency interventions currently being implemented. In addition, the building of human capacity within the Ministry would assist moving away from the prescribing of pesticides towards more sustainable approaches to pest management (such as IPM).

Since 2002 various FAO emergency projects have been implemented for the control of locusts and Sunn pest. Through these and other funding sources e.g. RAMP (Rehabilitation of Agricultural Marketing Program), laboratories at the Kabul HQ of PPQD have been rehabilitated and re-equipped at a modest level. However, the technicians need training and mentoring to be at the appropriate professional standard to be able to offer accurate diagnostic and technical services to farmers. The AAIP will be helping in providing in equipping the laboratories with hardware and in providing opportunities for high level capacity building for personnel at the post graduate level.

At the provincial level offices and stores in some northern provinces have been rehabilitated, but there are no laboratory facilities. Some in-country training was provided through the FAO emergency projects and some staff benefited from participation in project activities, but these have been confined to the north. A workshop for all provincial heads of plant protection held in Kabul in December 2005 revealed a wide range of technical ability, but many do not have expertise in the sector. Many provincial appointments were made by local authorities during the conflict period and the status of these is uncertain. Because of the lack of capacity and a common strategic vision for plant protection to be

pursued nationwide, the PPQD in September 2011, again brought together in Kabul for a two day workshop all the stakeholders (including FAO, JICA, HLP, PHPD, AECID, Root of Peace, IDEA-NEW, AKF, and Provincial Directorates of plant protection) involved in plant protection - to share their different experiences and design a five year national strategic plan for the PPQD. Nevertheless, the application of the recommendations outlined by the participants is still uncertain because the country is still in dire need of capacity building efforts (institutional, human, and infrastructure) and the political will for the recommendations to be translated into concrete actions.

The recent undertakings by FAO's IPM project and HLP in implementing the FFS in the wheat and fruit producing zones are the first attempts to carry out IPM programs in the country, and should be given more emphasis. Pilot farmers may become trainers of trainers and this undertaking may have the snow ball effect that will carry the message, leading to easy adoption of the IPM, reducing thus the heavy application of pesticides during the cropping season.

In addition, the Pesticides Act and the Pesticides Regulations have envisaged the promotion of the IPM practices as well as introduction and marketing of IPM compatible pesticides including bio-pesticides. The AAIP has thus incorporated programs for capacity development towards implementation of those articles of the Pesticides Act and Pesticides Regulations in the proposed work plan.

5. PESTICIDE MANAGEMENT METHODS AND USAGE

Pesticide management refers to the regulatory control, proper handling, supply, transport, storage, use and disposal of pesticide-related waste, to minimize adverse environmental effects and human health.

5.1 Pesticide Use in the Islamic Republic of Afghanistan

The Government of Afghanistan does not have its own list of registered pesticide products with specific permitted usages and instead refers to the United Nations' Food and Agricultural Organization's (FAO) list of acceptable products, which is limited and not adapted specifically for Afghanistan's agriculture and human health systems. The Ministry of Agriculture, Irrigation and Livestock (MAIL) is not the major importer and user of pesticides used in Afghanistan, except in the framework of the major outbreaks of desert locusts, that often occurs in the northern part of the country. Most pesticides found in Afghanistan are imported, sold and distributed by the private sector with networks scattered of over the country. Pesticides that are often banned for use in other countries or internationally, are obsolete or mislabeled, have expired or are even dangerous and classified by WHO as extremely hazardous or highly hazardous (Ia and Ib), are all found in the Afghan pesticide market.

5.1.1 Pesticides used in Agriculture

Cereals, horticulture and vegetable crops, as well as legumes are attacked by a wide variety of pests and diseases which cause economic damage and crop losses. Despite the availability of other pest control methods, producers in Afghanistan heavily depend on chemical pesticides to control pests whenever outbreaks occur.

The types of pesticides used in cereals and vegetable production are variable and are mostly purchased from local dealers in Kabul or local pesticides stores in different provincial cities and districts without proper labels, outdated and/or banned for sales in others countries. They are typically used without proper protective gears/clothing, thereby poisoning farmers, manipulators, non targets species (beneficial insects, wildlife) and negatively affecting the already polluted environment. Some producers are using other alternatives for protecting their vegetable crops. Phytotoxicity (not observed during this study) is often prevalent but not reported as such, because of uncontrolled usage and application of heavy dosage rates of pesticides while trying to control pests and diseases.

For the control of migratory and invasive pests (desert locusts, caterpillars), pesticides are mainly used as the main effective control method. Fruit producers use different pesticides in large quantities because of the need to spray more than one time during the crop cycle. Producers purchase pesticides from pesticide dealers in their respective regions, and use them inappropriately without protective gear/clothes, and inappropriate dosages. Heavy dependence on pesticides as the most reliable option for pest and disease control and their improper use undermines national economic growth through producers' non-compliance with trade barriers on pesticides residue standards on export crops (Afghanistan has not yet signed the membership of WTO or the IPPC), as well as in domestic markets for local production. MAIL is currently promoting the implementation of the New Integrated Pest Management Policy adopted in 2008. To date, this policy is being implemented in some provinces of the Central and Northern regions through the FAO's IPM project and the World Bank supported Horticulture and Livestock Project (HLP).

5.1.2 Pesticides used in Public Health

Afghanistan has identified a number of challenges in pesticide management, including: (i) weak legislation and regulation of public health pesticides; (ii) inadequate mechanisms and capacity for procurement and quality control of pesticides; (iii) challenges in implementation of integrated vector management (IVM) and application of pesticides; (iv) inadequate capacity for pesticide resistance prevention and management; (v) general lack of capacity for monitoring pesticide exposure and poisoning; (vi) alarmingly low capacity for disposal of pesticides and pesticide-related waste; and (vii) low capacity of managers of vector control programs for integrated vector management and sound management of pesticides.

5.1.3 Pesticide Use Pattern

There are no quick and easy answers to concerns about pesticide use. When pesticides are properly used according to the label, risks are minimized. Pesticides vary greatly in their level of toxicity, so during training on integrated pest management as an ecological approach to pest control, one should stress the importance of using a product that is effective, but as nontoxic as possible to non-target organisms.

A reduction in pesticide use can only be achieved with a greater understanding of plant selection, placement and care. Farmers can do a great deal to reduce and, in many cases, eliminate the use of pesticides. There may be a cultural, mechanical, physical, biological and/or chemical approach that effectively controls the problem with minimal impact on humans and the environment, and integrated pest management considers all those approaches. Whatever the situation, it is always important to first identify the problem, monitor its severity and spread, and know at what time or stage control is necessary.

As indicated above, the current pesticide use pattern in Afghanistan indicates that pesticides are not used in the context of IPM. There is a great need for change in behavior and attitudes towards producers' dependence on pesticides. The IPM/FFS concept that is taking place in fruits production through the HLP project should be adopted and extended to cereals (especially wheat) and vegetable production to change producers' attitudes and behavior. The process of change is gradual and needs time to achieve it with success. The undertakings by FAO in implementing the FFS in the wheat producing zones should be given more emphasis since the pilot farmers/extension agents would become trainers of trainers and the snow ball effect will spread the message, leading to easy adoption of the IPM, thus reducing the heavy application of pesticides during the cropping season. The AAIP will encourage farmers to use cultural methods to conserve populations of natural enemies and to use mechanical control methods prior to the use of spot sprays.

5.1.4 Types and Quantities of Pesticides to be financed by the Project

The implementation of the AAIP may require some pesticides for the control of the major wheat and other cereal pests of economic importance as well as in the major crops considered under the project. The selection of pesticides will be done considering the hazards and risks associated with pesticides, the criteria of OP 4.09, the target pests to be controlled, availability of less hazardous products suitable for the target pests, the IPM strategy adopted for the AAIP and the promotion of organic and bio-pesticides. This will form the basis for a suitable list of candidate pesticides to be procured. The AAIP will

encourage farmers to use cultural methods to conserve populations of natural enemies and to use mechanical control methods prior to the use of spot sprays as the last resort in hot spots.

The project will reduce these risks by only using pesticides as a last resort and to demonstrate and recommend pesticides that are classified as being less damaging to the environment and to train extension workers and farmers in their safe use and storage.

The use of highly persistent and highly toxic chemicals must be avoided to the maximum extent possible and the choice of pesticides used in subprojects must be based on factors as per the World Bank Guidelines on Pesticide Handling and Application. The Guidelines state that these criteria should be assessed based on: (i) biodegradability; (ii) toxicity to mammals and fish; (iii) occupational health and safety risks; and (iv) costs.

Table 4: Types of pesticides in the World Bank-Financed project- Example of the Pesticides required, selected and purchased annually by HLP in 2009, 2010, and 2011 for procurement to enhance the implementation of IPM activities.

YEAR	Product		Active Ingredient	formulation	Toxicity WHO Class	Quantity Ordered liter or Kg	Unit price USD	Total USD	Status
	Type (Insecticide/ Fungicide, etc.)	Name							
2008	Fungicide	Sulphur Powder			U				Distributed & Used
	Fungicide	Lime Sulphur	Calcium Polysulfide		U	4537 Kg			Distributed & Used
	Miticide	Tobacco			U	200 Kg			Distributed & Used
	Insecticide	Confider	Imidacloprid	SC	III				Distributed & Used
	Miticide	Neuron			II	980 L			Distributed & Used
	Fungicide	Copera-vit Blue	Copper OxyChloride		III	3165 Kg			Distributed & Used
	Insecticide	Malathion			II				Distributed & Used
	Insecticide	Super Top	Lambda Cylothrin		III	676.5 L			Distributed & Used
	Insecticide	Dinadol			II	13 L			Distributed & Used
2009	NO PESTICIDES WERE PURCHASED IN 2009								
2010	Insecticide	Winter oil	Refined petroleum		U	3250 L	4.3	13,830	Distributed & used
	Fungicide	Copper sulphate	Inorganic Chemical		II	5,700 Kg	4.7	26,681	Distributed & used
	Fungicide	Calcium oxide	Inorganic Chemical		U	9,325 Kg	0.6	5,936	Distributed & used
	Fungicide	Sulphur dust	Inorganic Chemical		U	7,250 Kg	1.2	8,484	Distributed & used
	Insecticide & acaricide	Abamectin	microbial		U	161.5 L	33	5,319	Distributed & used
	Fungicide	Cupravit Blue	Copper Oxychloride 50WP		U	2,600 Kg	8.5	22,128	Distributed & used
	Fungicide	Captan	Dicarboximide		U	110Kg	17	1,872	Distributed & used
	Fungicide	Sulphur wettable	Inorganic Chemical		U	2,275 Kg	5.3	12,101	Distributed & used
	Insecticide	Diflubenzuron	Benzoyl urea		U	90 Kg	31.9	2,872	Distributed & used
	Insecticide/ botanical	Neem Oil			U	2,350 L	6.5	15,000	Purchased & in stock
	Insecticide	Madex	>3*1013 codling moth granuloviruses	SC	U	30 bottles	112	3,360	Purchased & in stock
	Pheromone	Isomate C-Plus	Pheromone mixture of acetate esters		U	10 packet	266	2,660	Purchased & in stock
	Fungicide	Rubigon	Methanol, Naphthalene, Fenarimol		III	1000 L	45	65,957	Used & Distributed
	Insecticide	D-C Tron Plus	23C – Supreme Oil		U	1600 L	10	19,149	Purchase & in Process
	Insecticide	Vertimec	Abamectin	EC	III	300 L	23.5 per 250 ml	28,085	In Process

2011	Insecticide	Emamectin Benzoate	Emamectin Benzoate	SC	III	1000 L	11	10,638	In Process
	Botanical	Mustard Oil	Organic oil		U	1000 kg	4	4,255	Purchased & stock
	Detergent / antiseptic	Baking soda	Inorganic detergent		U	2000 kg	2	2,979	Purchased & stock
	Insecticide	Insecticidal soup	Detergent+ water		U				Homemade & used
	insecticide	China Clay	Unknown		U				granted, used & in stock
	Fungicide	Urea treatment	NH3		U				Purchased and stock
	Pesticide	Bordeaux Mixture	Lime+ Copper Hydroxide		U				Purchased & in stock
	Protector	Fruit bags	Paper		U				Used & Distributed

Note: 1-WHO Class U = Unlikely to present any hazards
2- Pesticide purchased in 2008, recommended by FAO – Afghanistan office.

The amount of spraying equipment and protective gears required by HLP in 2009 is quantified and summarized in the table below.

Table 5: Equipment and Protective Gears required for pesticide applications, procured by the HLP and distributed to the lead Farmers in 2010

Items	Type	Description	Quantity	Total cost (Afg)	Total cost (USD)
Sprayer	Knapsack	5 liter knapsack	680	2,100,000	42,000
	Motorized	5 liter motorized	700		
Protective gears/ safety clothing	Goggles	Disposable dust mask	1,380	4,140,000	82,800
	Mask with chemical filters	Chemically resistant face mask			
	Gloves	PVC gloves			
	Coveralls clothes	Cotton coveralls			
	Face shield	Plastic or glass			
	hard hat	Cotton or hard hat			
	Boots	PVC boots (small and large sizes)			
Other equipment	Plastic tub	PVC	1,300	690,000	13,800
	Bucket	PVC			
	Measuring cup (2 sizes)	Glass			
	Measuring syringe	PVC + Metal			
TOTAL				6,930,000	138,600

5.2 Pesticide Management Methods

The pesticide management methods recommended for adoption by the PPQD, with reference to the pesticides that may be purchased during the implementation of the AAIP, are in conformity with the Environment Law of 2007, and the Pesticides Act (in draft form) to be issued, are summarized in the Table below.

Table 6: Guidelines for Pesticides Management (for Extension workers and Farmers)

Management Practices	Recommended Actions
Procurement/ purchase	Complying with registration process of MAIL (Pesticide Board) and the Pesticides Law (in draft form) to be enforced. The WHO and FAO guidelines for pesticides and vector control should be adhered to. The Procurement Guidelines of the World Bank and The Islamic Republic of Afghanistan Public Procurement Authority should be adhered to.
Testing the Quality of the Product	Testing the Product Quality is essential for the quality and efficacy of the treatments to be conducted. Future Pesticides Analysis Laboratory
Labeling	Ensure that the Pesticides are properly packaged and labeled according to WHO Standards, and written in English and in Dari/Pashto languages and should indicate the content, safety instruction warning and action to be taken in case of accident. The pesticide should remain in its original container and with its label
Storage and Transportation	Appropriate precautionary measures should be taken and protective gear worn for protection. Compliance with the relevant National Legislation is a must. Pesticides should be stored properly under lock and key, the store must be well ventilated and located away from residences. The store must have fire extinguisher and detergents.
Use	The operator must follow the instructions written on the label. Protective gears must be wore and follow recommended guidelines
Disposal	All the empty containers of pesticides must be gathered and stored at PPQD's specific location awaiting for suitable recommendation from NEPA for proper disposal
Monitoring Applicators Pesticide Exposure Levels	Monitoring of exposure levels of pesticide applicators is recommended before the season, and regularly during the season, to determine the levels of exposure to applicators to ensure their health and safety.
Training of all actors involved in the implementation of pesticide application programs	Training of all actors and collaborators in Pesticide Management (traders, handlers, applicators).

5.3 Pesticide Use and Risks Associated with their use by Farmers

The use of all pesticides poses a risk to public health. The AAIP will reduce this risk by promoting those pesticides that are considered less hazardous. Developing countries' farmers as well as the Afghan farmers' general habit is not to use protective clothing. To the limited extent that the AAIP will engage in farm level training, it will supply protective clothing to lead farmers, to include hats, goggles, gloves, overalls, Wellington boots and masks, and will encourage input supply shops to stock the same. The project will undertake limited training of lead farmers that will include how to care for and check safety equipment distributed by the project. The AAIP will not make available any products to farmers other than lead farmers, but will be working with specific qualified agencies in the regions where the project is implemented to ensure recommended materials and information are available to all farmers.

5.3.1 Negative Impacts of Uncontrolled use of Pesticides

When a pesticide applicator system/body is exposed to a pesticide, the manifestation of the pesticide toxicity occurs. Toxic products produce effects on the body from the moment they are absorbed, mainly on the skin, the digestive system and on the lungs; toxic products effect on the body are caused by concentration in targeted organs. Foreseeable risks are related to the following steps: product storage; handling; transportation; dosage during treatments particularly contamination of field agents (applicators) who could be exposed to pesticide effects if instructions related to product utilization standards are not sufficiently applied; use of grazing areas right after treatment, if the populations are not sufficiently informed and associated to preventive control, may cause massive death of livestock. Major risks in the areas where traditional pesticides should be used are the following:

Table 7: Major risks in the areas of traditional use of pesticides

Environment	**Nature of impact**
Soil	• Modification of the microbial flora • Pesticide residue contents in soil cause pollution
Surface water	• Pollutions • altered pH
Well water Water-tables	• Pollutions: • Altered pH
Air	• Air pollution
Biodiversity	• Pest chemo-resistance ○ Fauna poisoning ○ Poisoning and mortality ○ Manpower reduction and/or biomass • Extinction/Proliferation of species or group of species • Breakdown of the food chain • Loss of biodiversity
Human health	• Intoxication : Alteration : • of the embryonic development • of population growth • of reproduction • Poisoning • Death • Drop in cholinesterase level

The intrinsic dangers for each pesticide can be based on five toxicity measures representing various risk factors:

- Acute oral toxicity for the rat; general poisoning risk for human;
- Acute skin toxicity for the rat: occupational hazard for pesticide operators (professional applicators, farmers, formulating plants workers);

- Acute toxicity for fish: risk for fish and fishing;
- Oral toxicity for the bird; risk for birds;
- Acute toxicity through contact for the bee: risk for bees, pollination of crops and honey production.

5.3.2 The Population at Risk

Risks occur during:

- Pesticides application (for land applicators, pilots, drivers and machine manipulators);
- Transportation (contamination of containers, tank bursting or spillage);
- Monitoring during treatment activities or prospection.

Risks affect:

- Field agents:
  These are people (researchers, supervisors, field workers) involved in treatment activities and who are more exposed - however it is important to point out that all other agents can be in danger.
- *Populations:*
  During treatment activities after treatment, empty pesticide containers are used in domestic settings in fetching water, storing foodstuff, etc.

5.3.3 Adverse Effects on the Environment.

The use of pesticides entails a certain number of disadvantages and adverse effects among which are environmental pollution and risks of intoxication - often justifying the need of abandoning the method and resorting to other natural protection measures. Pesticides pollute water and air, destroy the fauna and dangerously modify the function of the ecosystem.

Adverse effects exist on the soil (destruction of soil macro and micro-fauna and flora), in the air and on waters in terms of: (i) mortality on non-targeted species fulfilling important ecological functions: bees and other pollination agents, natural enemies of certain pests (parasites, predators, pathogens) ; (ii) pollution during space treatment of parks and natural reserves, fishing and livestock production zones with the contamination of fauna and flora; (iii) water pollution either directly or through surface water : (iv) resistance among insect populations.

5.3.4 Impact on Health and Causes

The Phytosanitary products intended for pest prevention and control, as well diseases in agricultural production have proven to be harmful to humans and their environment. Warehouses for phyto-pharmaceuticals often are located on inappropriate geographical space units (in the middle of built-up areas); built without respecting conventional norms (without holding tanks, without septic tank and fire hydrant); ill-ventilated; not well lit up, etc.

Moreover, individual protection measures and recommended dosage are not respected. Phyto-pharmaceuticals in rural areas (especially in cotton, horticulture and animal production zones) can cause burns and/or human poisoning (nausea, vomiting, dizziness, coma, death).

5.3.5 Risks Associated with Handling of Packaged Products

In general, the public health risk will be assessed (as low and/or high) regarding the handling of the selected packaged chemicals and pesticides providing the normal precautions are taken in their handling and storage. Training of extension workers will be undertaken regarding disposal of pesticide containers and other packaging. Very often, there is a tendency for unaware farmers to discard plastic containers (bottles) where they use them, without taking any safety precautions that will protect the environment and the public at large. The objective of the training during the farmer field school sessions will be to inform farmers about the risks that discarding of pesticide containers poses to the environment and the public at large, in order to change their habits.

5.3.6 Actions to Reduce the Risks Associated with Specific Products

Dust pesticides need to be kept in dry stores and should be applied with a dusting machine in the cool of the day and under weather conditions when there is no wind and the crop is dry; their application in the heat of the day in the middle of the summer will lead to burning of the crop. Hand throwing of dust pesticide risks burning of skin and should be avoided. Protective clothing, gloves and masks should be worn to avoid skin contact since pesticides burn if in contact with the skin, and to avoid inhalation of pesticide fumes.

5.3.7 Pesticides-related Accidents

Large quantities of obsolete pesticides stocks constitute major risks to human and animal health, and the environment. Storage conditions of this toxic and hazardous waste are most often precarious.

5.3.8 Summary of Impacts and Risks of Pesticides Management Methods

The impacts and risks associated with pesticide management methods are elaborated in table 8 below:

Table 8: The impacts and risks associated with pesticide management methods

Steps	**Influencing factor**	**Risks**		
		Public health	**Environment**	**Personnel**
Transportation	- Lack of training -Inadequacy of transport and -emergency preparedness planning	Health hazard if mixed with foodstuff or water and other beverages	Accidental discharge, water-table pollution through leaching	- Product inhalation : vapor, dust, risk of skin contact - Skin and eye contact
Storage	-Lack of means -Deficit in pesticide management training -Inadequacy of facilities	-Accidental contamination -Inconvenience of populations living in the vicinity	-Soil contamination -Toxic to soil micro-organisms -discharge in nearby streams, and rivers -contamination of ground by leaching	-Skin contact through accidental spillage caused by the narrowness of the premises -Skin and eye contact
Handling Manipulation	-Deficit in training and sensitization -Inappropriate clothing of pesticide handlers -Lack of right equipment and tools	-Contamination of water sources through washing of containers -Accidental leaks	-Soil contamination through accidental spillage or intentional discharge, water-table pollution	-Vapor Inhalation, skin contact through splashing during preparation or product transfer -Skin and eye contact
Packaging disposal	-Deficit in training, education and sensitization -Non availability of disposal facilities	-Product ingestion by re-using containers -Inhalation -Skin contact	Contaminated containers may release toxic residues and fume in the atmosphere	-Skin contact and respGoAtory tract -Skin and eye contact
Washing of containers	-Deficit in training, education and sensitization	-Skin contact, contamination of wells, stream and rivers	-Acute intoxication of fish and other crustacean, pollution of wells, ponds, water-tables	-Skin contact -Skin and eye contact -Ingestion of contaminated water and foodstuff

5.4 Selection of Alternatives to the Chosen Pesticides

The substitution of selected hazardous products with less hazardous ones is clearly an important consideration in the AAIP. Impediments to the sustainability of this strategy are the availability of bio-pesticides and "botanicals" in Afghanistan, the sustainability of their supply and the generally high cost of these products. This should not however, prevent substitution trials taking place or alternative control strategies being designed and experimented with.

5.5 Proposed strategy to strengthen capacity

In order to protect itself from becoming a dumping ground for banned pesticides, it is necessary for Afghanistan to become a member of the international organizations and signatory to the conventions controlling the distribution and use of pesticides. The drafting of new and relevant legislation by consultants previously fielded by HLP and now by the AAIP will go a long way to providing a national framework able to support Afghanistan's future international commitments in this regard. The work to produce new Pesticide Legislation has been completed and the draft of the new Pesticide Act as well as its rules and regulations have been submitted to the Ministry of Justice.

5.6 Assessment of Knowledge and Practices in Pesticide Management

The circumstance of pesticide use and the competence required to handle pesticides are largely due to lack of awareness on pesticides risks and hazards caused to human health and the environment, complacency, misuse and abuses, lack of knowledge on pests and disease management, lack of knowledge on product dosage rates, training on the spraying methods and techniques, proper use of application equipment and calibration techniques, use of protective gears, knowledge on risks associated with pesticide use and safe precautions, protection of non target species and the impact of pesticides to human health and the environment.

During control of migratory pests- (grasshoppers and desert locust) using pesticides, training courses should be conducted for spraying teams and topics covered include: safety in the transportation, handling and spraying application methods and techniques of pesticides, storage, distribution disposal, cleaning of application equipment and empty containers. Applicators should be supplied with complete sets of protective gears, with towels and soap.

For control of general pests the case is different, some producers buy their own protective gears which is very expensive and they cannot afford it. Those who cannot afford it improvised in some way, or spray without protection, as a result they are exposed and contaminated, despite the fact that extension workers regularly conduct training on safe use of pesticides to minimize the risks associated with pesticide use.

6. ASSESSMENT OF THE IMPLEMENTATION OF EXISTING PMP in hlp

6.1 Assessment of the Implementation of Existing Plans/Programs

A PMP was prepared for the Horticulture and Livestock Project (HLP) in September, 2009 on Horticultural Crops, funded by the World Bank. This Project has been implementing the Pest and Pesticide Management Plan since 2010. The Plant Protection and Quarantine Department (PPQD) is the national legal institution recommended to implement the PMP and achieve its objectives. The Project Implementation Unit (PIU) of the HLP is responsible for coordinating the PMP and has recruited a Project Pest Management Specialist to ensure the effective implementation of this component, with local/national counterparts fielded in different project regional PIUs. To this end, the recruited Specialist is working hand in hand with the Directorate of PPQD of MAIL, the Ministry of Public Health, and NEPA, for the safe implementation of the HLP's PMP.

The activities of the PMP/ HLP are as follows:

- Activity 1: Study Tours in two to three selected countries in the sub-region where farmer participatory IPM programs have been successfully implemented
- Activity 2: Strengthening national capacity in promoting the adoption of IPM practices
- Activity 3: Training farmers (horticulture, vegetable and legume crops, and other industrial crop growers) in pesticides management
- Activity 4: Fund for Inputs Credit for Horticulture Growing Schemes
- Activity 5: Pest Management Plan Consultants

The total cost of the component activities of the PMP for the duration of the HLP Project is estimated at US$ 4,084,000.

It is envisaged that the AAIP's Pesticides Management Plan will complement the HLP's PMP, and cover improved wheat seed production and distribution, as well as seeds for other eligible crops, while strengthening Afghanistan's institutional, legal and regulatory frameworks for agro-chemicals and fertilizers registration, import, marketing, distribution, use and handling.

6.2 Conclusion and Recommendations

The PMP Action Plan has not yet been fully realized during this first phase of the Emergency Horticulture and Livestock Project implementation. It has only been confined to the provinces and districts where the project is being implemented. It would be advisable that under the second phase of HLP and the present AAIP, that the major activities on horticulture be recommended for their expansion in other provinces and districts where the HLP has not been currently carrying out its activities, i.e., at the national level.

7. ACTION PLAN FOR PEST AND PESTICIDES MANAGEMENT

The PMP is designed to build on, and to some extent strengthen existing national capacities for the promotion of IPM and IVM, for the duration of the AAIP, and ensure compliance with the World Bank Safeguard Policies on Pest Management OP4.09.

7.1 At the MAIL (AAIP)/PPQD Level

- Support to the enforcement of newly drafted and issued Pesticide and Quarantine Acts and their respective rules and regulations
- Support to the establishment of national pesticide data banks
- Monitoring system of pesticides use and poisoning
- Monitoring/Evaluation (periodic; mid-term and final evaluation) of PMP

7.2 Priority Issues Identified at the Country Level

- Strengthening National Capacity in Promoting the adoption of IPM practices
- Training of plant protection (IPM), quality control (including pesticides residues analysis specialists) and quarantine officers at post-graduate levels
- Limited training of farmers (cereals, horticulture, legume and vegetable producers) in pests and pesticides management
- Institutionalization of the pest and pesticide management curriculum in the Faculties of Agriculture's Plant Protection Departments in the Afghan University system
- Equipment of provincial diagnosis laboratories and training of laboratory technicians
- Strengthening national legal and regulatory frameworks and institutional capacities
- Participatory Research and Development of IPM by major stakeholders
- Coordination and inter-sectoral cooperation
- Monitoring and evaluation – environmental and sanitary impact control

7.3 Strategic Actions and Measures under the AAIP

The appropriate measures to mitigate these risks are through implementation of the following:

- Workshop for sharing and dissemination of the PMP with national actors and stakeholders
- Enforce pesticide legislation to accommodate current international legislations
- Integrated Vector Management: surveillance of disease vector populations in the country
- Provide essential support to Analysis Laboratories (NEPA, PPQD, Quality Control Department, ARIA and Water Quality Department) to enhance the implementation of AAIP activities;
- Provide essential support to the National Malaria and Vector-borne Disease Control Program;
- Support monitoring of pest and diseases of agricultural and public health importance
- Support to the National Multi-Sectoral Monitoring, Coordination and Steering Committee to enhance the timely implementation of its activities
- Develop and establish a Pesticides Management Database for NEPA, PPQD, and ARIA
- Develop an Integrated Pest Management (IPM) database in Extension Information System for producers and extension agents
- Support for sensitization awareness campaign (through TV, radio, newspapers, kiosk, mobile phone, etc.) on pesticides management and its related aspects
- Strengthening ARIA, PPQD and FQCAID, with vehicles to implement activities under the AAIP
- Institutional strengthening of the human resource capacity in pest and pesticide management.

The PMP will enable the AAIP to monitor pests and disease vectors and mitigate negative environmental and social impacts associated with pest/vector control in Afghanistan agriculture and promote agro-ecosystem management. The plan provides Afghanistan decision makers and AAIP beneficiaries with clearer guidelines on integrated pest management (IPM) approaches and options to reduce wheat and other crop losses with minimal personal and environmental health risks. The specific objectives of the PMP are to:

- Promote participatory approaches in IPM for farmers to learn, test, select and implement "best-bet" IPM options to reduce losses due to arthropod pests, diseases and weeds.
- Promote biodiversity monitoring to serve as early warning systems on pest status, alien invasive species, beneficial species, and migratory pests.
- Establish linkages to develop a national IPM policy to promote IPM and compliance with international conventions and guidelines on pesticide use in the Afghan agriculture.
- Monitor and evaluate the benefits of IPM including its impact on food security, the environment and health.

7.3.1 Activities and Results

Under the current set-up, the Government of Afghanistan under the Plant Protection and Quarantine Directorate, the Food Quality Control and Agriculture Inputs Directorate and Directorate of Agriculture, Irrigation and Livestock (DAIL) has manpower in the provincial and district levels but they do not have adequate facilities to monitor and analyze the samples. Under AAIP, programs have been incorporated to strengthen the capacity of the government's monitoring and inspection system through improvement of mobility, sample collection, sample analysis and legal implementation.

Table 9 below outlines the matrix of activities, expected results, milestones and performance indicators of the PMP.

Table 9: Component activities and expected results of the PMP

Narrative summary	Expected results	Milestones	Performance indicators	Assumptions/risks
1. Record stakeholders' overviews on crop and livestock pests. 2. Conduct field diagnosis to specify pests that undermine the Afghan agriculture. 3. Identify farmers' coping mechanisms and researchers' recommended IPM options against the pests. 4. Develop and explain historical profile of pesticide use and other pest control practices in the Afghan agro-ecological regions. 5. Specify partnership opportunities at local, national and international levels to assist in the implementation of the PMP	Result 1: Members of Provinces and districts and other relevant stakeholder groups develop common understanding of key pest problems and agree upon corrective actions.	• Pest problems diagnosed and related IPM opportunities identified • Potential constraints farmers may face in the use of the technologies specified • Pest lists including quarantine pests and alien invasive species developed • Potential for improving existing pest control practices assessed • Pest monitoring schemes for early warning on alien invasive species and migratory pests organized and functional • Action plan for location-specific IPM activities developed	• Type and nature of participatory methods for problem analysis • Documented information on the status of pests and natural enemies of pest and pollinators in Afghan agriculture. • Inventory of alien invasive species and quarantine pests • Types and availability of natural enemies for use in biological control of named pest • Types and availability of microbial pesticides and botanical pesticides to replace chemical pesticides List of principal actors and of partners	Social, economic, political and security situation remain stable

Table 9 (Cont'd): Component activities and expected results of the PMP

Narrative summary	Expected results	Milestones	Performance indicators	Assumptions/risks
1. Develop participatory learning modules (PLM) in line with farmers identified training needs 2. Conduct short to medium term training of farmer support groups on skills relevant to the PLMs 3. Organize international study visits/tours on specialized IPM skills of relevance to the PLMs 4. Develop/disseminate IPM decision-support information resources for field agents, farmers, policy makers, and the general public 5. Train pest management practitioners at postgraduate level and provide incentives for sustainable application of PMP knowledge by professionals	Result 2: Human resource capacity for IPM delivery and implementation developed. In partnership with PPQD HLP and FAO, the AAIP will help to promote IPM for supporting Afghanistan's sustainable improved wheat and other major crops seed production.	• At least 3 sets of study visits/tours organized for at most 12 technical support staff per study visit/tour • At least 70% of information materials developed is disseminated and used by extension agents and farmers.	• Type and number of PLMs developed • Type of IPM skills covered in study visits/tours by agriculture staff • Number & type of IPM information materials developed/disseminated • Incremental benefits due to pest control • Type and number of user-friendly taxonomic keys for pest and natural enemy recognition by farmers	AAIP beneficiaries and their service providers comply with international conventions guiding pesticide handling and use and maximum residue limits (MRLs) in trade Critical mass of staff trained remain within the province, district and village communities

Table 9 (Cont'd): Component activities and expected results of the PMP

Narrative summary	Expected results	Milestones	Performance indicators	Assumptions/risks
1. Develop/update a national IPM policy including legislation to govern the manufacture, importation, distribution and use of pesticides 2. Establish a national IPM advisory and oversight committee to guide national, provincial, district and local compliance with World Bank safeguard Policies, OP 4.09 and BP 4.01 and other international conventions concerning pesticide handling and use 3. Sensitize the population on IPM issues and activities through formal and informal educational channels and public awareness campaigns	Result 3: Awareness regarding benefits of replacing harmful pesticide regimes by environmentally friendly alternatives raise *In partnership with the:* 1. CABI-IPM for sustainable access to microbial pesticides. 2. FAO National Crop Protection Office, HLP's IPM department & PPQD's IPM unit for assistance to develop a national IPM policy document and establish a national IPM advisory and oversight committee (multi-stakeholder composition). 3. Agricultural Research Institute of Afghanistan's Taxonomy unit and ICARDA biodiversity center for identification services and IPM program.	• At least one microbial pesticide registered and widely used in place of chemical pesticides • Surveillance system to enforce the Pesticide Law to protect Afghan agriculture from banned/harmful pesticide regimes is fully operational • Existing pesticide regulations are fully enforced • A multi-stakeholder National IPM advisory and oversight committee established to guide compliance with international conventions and guidelines on pesticide handling and use, and promote the IPM development • Radio, TV, pamphlets, kiosks and other public campaigns on impact of pesticides in agriculture, environment and health conducted through radio and TV spots, dramas, mass field days, rural market days, information workshops, and focus groups discussions	• Level of reduction in chemical pesticide use; type and number of pesticides replaced by botanical or microbial pesticides • Level of compliance with World Bank safeguard policies by Afghan farmers and pesticide dealers/service providers • Effectiveness of the IPM advisory and oversight committee • Number of pest surveillance groups and pesticide law enforcement mechanisms • Effectiveness of public awareness campaigns	Government of Afghanistan and development partners remain committed to international conventions and guidelines on safe pesticide handling and use Critical mass of staff trained remain within the PPQD, the private sector and willing to serve the Afghan farmer communities

7.4 Strategy of Intervention and Pesticide Management Action Plan

The assessment objective for the implementation of AAIP's PMP is to enable identify several deficiencies and identifiable causes at several levels of the IPM implementations schemes in Afghanistan, namely: (i) lack or even absence of sharing and dissemination of PMP; (ii) lack of synergies with other programs or current or future pesticide management activities in the country; (iii) absence of clear specific expectations or responsibilities of each category of actors; (iv) absence of differentiation and coordination between the research phase and the extension phase. Thus, to reverse these negative trends, this PMP will be registered in a logical rupture in moving towards the following areas of intervention (at the strategic and technical levels):

7.4.1 Strategic Guidelines of the PMP

The strategic guidelines will strengthen the synergies with the programs, activities and on-going initiatives on pest and pesticide management, and clarifying the expectations and responsibilities of different actors concerned, and ensuring their effective participation in all the programs.

The activities of Research and Extension Phases elaborated below on pest and pesticides management, in which an 'A-la carte Menu' is prepared, to enhance the effective participation of all actors and stakeholders, in the implementation of activities. Their responsibilities are also defined with output indicators.

Table 10: 'A la-carte Menu' to enhance Actors and Stakeholder Participation

Key Activities	Actors Concerned	Responsibility	Output indicator
Planning workshop for Annual Work Plan (research & extension)	MAIL, NGOs, Farmer Organizations, NEPA, Ministry of Public Health, Private Sector	To participate in the development of the plan	Annual Work Plan developed.
National workshop for sharing PMP	All actors and stakeholders	PIU and PPQD	Actors agree to implement PMP
Training of Extension Agents and pesticide applicators	The Plant Protection and Quarantine Department and NEPA	The Plant Protection and Quarantine Department will conduct the training and NEPA will coordinate the training	All stakeholders involved in the ARIA research programs are trained.
Procurement of Inputs	AAIP, Private Sector, PPQD	Provision of Agricultural inputs for research. PPQD to enhance procurement	Timely availability of inputs enhanced
Pesticides management (research & extension)	Specialized Analyst Laboratories (PPQD, NEPA, Ministry of Public Health, Ministry of Rural Rehabilitation and Development) and ARIA	PPQD to conduct pesticide formulation test and NEPA to monitor storage and disposal. Quality Control Department-to conduct pesticide residue analysis. Ministry of Rural Rehabilitation and Development -will monitor water quality, and ARIA to conduct soil and mycotoxin analysis	Specialized Analysis Reports will be submitted to Multi-stakeholder IPM advisory and oversight committee
Monitor Exposure Level of pesticide applicators (research	Ministry of Public Health (MoPH)	MoPH– monitors the health (cholesterol & cholinesterase levels)	Reports of level of exposure available and safety of

&extension)		of pesticides applicators before and regularly during the season	applicators enhanced.
Internal and external monitoring of trials (research & extension)	ARIA, QCD, NEPA, PPQD and MoPH	ARIA- will conduct internal monitoring research developmental stages. NEPA, PPQD and MoPH will conduct external monitoring of research developmental stages	Reports available from all actors
Monitoring and evaluation of Research Phases	Farmer Organizations, NGOs, Private Sector, MAIL and Ministry of Finance, and WB	Conduct national monitoring and evaluation mission	Monitoring & evaluation reports submitted.
Training on IPM /FFS	ARIA, PPQD, NEPA, AAIP	Conduct IPM & IVM	Reports submitted

7.4.2 Technical Guidelines of the PMP

Following a review of the research program activities in testing pest control products or techniques and agricultural technologies other than pest control, and whose dissemination can lead to pesticide use for the research and extension phases, and considering the two concerns raised on pesticide management, it is concluded that even though there was increased pesticide use, the research phase activities were at their minimum because of the security situation and lack of resources, while pesticides at the extension/dissemination phase were used indiscriminately. In this context, the technical guidelines to be considered are elaborated below:

Institutional Measures

- Establish a National Multi-Sectoral Coordination, Steering and Monitoring Committee involving relevant institutions and stakeholders (e.g., Board of Pesticides Management);
- Conduct a National Workshop to share the Pest and Pesticides Management Plan (PMP);
- Conduct national planning workshop for development of Annual Work Plan and Budget
- Conduct mid-term and external evaluations;
- Strengthening National Laboratories (ARIA, PPQD, NEPA, Quality Control Department, AKF-biological control/Plant Biotechnology laboratory and MoPH) with essential needs to perform services for the AAIP as well as for the interest of the Afghan people;
- Support for mobility for ARIA, PPQD, NEPA and MoPH, to enhance the implementation program Activities.

Legislative and Regulatory Measures

- Support the enforcement of the Pesticide Act and its harmonization at the Regional level;
- Expedite the enactment of the draft Pesticides Act and issue a Plant Health Legislation for harmonization as required;
- Set up a Phytosanitary Measures Control contact point according to International Plant Protection Convention, so to facilitate trade of plant materials, while protecting; Afghanistan from the introduction and spread of pest & diseases of cultivated & wild plants

- Support technical and organizational capacity of custom focal points at the border crossings.

Technical Measures

- Established and harmonize Pesticide Management Database;
- Support research and development of biological control, alternative control methods and demonstrations on the use of bio-pesticides;
- Training on Pesticide Management for actors and stakeholders involved in the implementation of participatory research and extension phase programs;
- Conduct tests to determine exposure levels of pesticide applicators;
- Conduct sensitization and awareness campaigns on pesticide use and management in all the research intervention areas;
- Support for pest and disease monitoring (early warning system) and control for crop and storage pests;
- Strengthened Institutional Human Resource Capacity in Pest and Pesticide Management
- Support for surveillance of vector borne diseases and control and long lasting insecticide treated bed nets;
- Capacity building of farmers and extension agents/workers on IPM and IVM using the FFS approach.

7.5 Monitoring and Evaluation Plan

The Monitoring Plan is subject to AAIP planned activities. Monitoring is supported by data collection and analysis in order to check whether the implementation of activities is being carried out as expected and to move to immediate adaptation, if necessary. This involves a short-term evaluation activity to help take real-time action. The frequency of the monitoring will depend on the type of information available. However, monitoring will continue throughout the implementation of the action plan.

An independent Monitoring and Evaluation (M&E) unit within the AAIP will be responsible for overseeing the impacts of implementation, including its impact on cross cutting issues such as gender participation, counter narcotics and the environment. One of the M&E specialists under the AAIP will also be assigned as Safeguards Focal Officer and will be responsible for overseeing the implementation of the Environmental and Social Management Framework.

Comprehensive monitoring will be carried out in every Province by AAIP Coordination Units. It will be organized through periodical field visits. A complete Monitoring Plan will be developed and made available to actors involved in the implementation and who are interested in the monitoring.

- Establish a Multi-sectoral Steering, Coordination, Monitoring and Evaluation Committee. Members will be gathered from the Plant Protection and Quarantine Department, Livestock Department, NEPA, MoPH, ARIA & Extension Department, Ministry of Rural Rehabilitation and Development, Farmer Organizations, Pesticide Traders' Organizations, and relevant NGOs.

The Committee will be responsible for the coordination of the comprehensive monitoring of the PMP activities. The Committee's mission will include: organizing a workshop for the preparation of a response strategy and operational action plan, defining the charter of responsibilities for the action plan, and

implementation of the action plan, approving field intervention sites, coordinating the comprehensive monitoring of the activities.

- Community monitoring: will be conducted by ARIA during the Research Phase. During the Extension Phase it will be conducted by Plant Protection and Quarantine Department (PPQD) and Extension Department, Ministry of Public Health (malaria and vector control) and NEPA. The PPQD will conduct internal environmental monitoring of the operation sites. The NEPA will conduct external environmental monitoring of the operation sites. Ministry of Public Health will be responsible for the external public health monitoring in operation sites.
- Mid-Term Evaluation: the mid-term evaluation will be conducted by a Consultant in order to determine the correct development of the PMP as well as the mid-term results. Donor (WB) and beneficiaries will fully participate in this evaluation.
- External evaluation: to measure the effectiveness of the project as well as its performance and to identify lessons learned. This evaluation will be integrated into that of the AAIP at large.

7.5.1 Activities to be Monitored

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

- IPM capacity building in membership of seed and other input users.
- 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 wheat and other commodities growers?
- What are the major benefits that members of FFSs derive by adopting IPM?
  - Economic benefits (i) Increase in crop production due to adoption of IPM practices; (ii) Increase in farm revenue resulting from adoption of IPM practices, compared with farmer's conventional practices.
  - Social benefits – improvement in the health status of farmers.
  - Knowledge benefits-improvement in the level of knowhow of before and after.
- Numbers of IPM Networks/FFS operational and types of activities undertaken.
- Extent to which pesticides are used for wheat and other crop production.
- Efficiency of pesticide use and handling.
- Level of reduction of pesticide purchase and use by the producer organizations for crop production.
- Influence of the results of IPM participatory research on implementation of IPM on wheat and other crop production.
- Number of controls on imported plant material at custom check points
- Overall assessment of (i) activities that are going well, (ii) activities that need improvements, and (iii) remedial actions required.

7.5.2 Monitoring Indicators

At the level of every province, indicators to be followed during the implementation of both research and agricultural extension activities by Research Scientists, Plant Protection and Quarantine Department, Environmental Agencies and Ministry of public Health for provinces are as follows:

- **Monitoring during the planning and execution phase of agricultural research activities:** during the planning and execution of agricultural research activities, regulatory provisions as well as environmental and social requirements contained in the outline shall be integrated and complied with.
- **Monitoring during the extension phase of research projects:** during the extension phase of research projects, monitoring will concern essential components described as follows: state of water resources, water quality; soil chemical fertility; soil degradation and soil physical property; soil behavior and utilization; animal and plant life development within the biodiversity; ecology and protection of the natural environment; pollution; nuisance and safety during operations; claims and conflicts monitoring. Monitoring will also be concerned with claims and conflicts.

Strategic indicators to be followed by AAIP

Strategic indicators to be followed by AAIP are as follows:

- Holding of national PMP sharing and dissemination workshops;
- Articulation and synergy level of the PMP with national strategy implemented;
- Environmental processes, stages and criteria during activities;
- Enforcement of the national regulations on pesticide management;
- Number of actors trained/sensitized on good practices for pesticide management;
- "Research-Agriculture-Environment" databases harmonized;
- Efficiency of national environmental monitoring and reporting.

Indicators to be followed by national Agricultural Research Service

At the level of every target agro-ecological zone, the following indicators are proposed to be followed:

Health and Environment

- Toxicity level of the products used
- Available quantity of protection equipments
- Level of knowledge about good management practices (pesticides, empty packages, etc.)
- Level of impacts on domestic animals, aquatic organisms and fauna
- Toxicity level of decomposed substances
- Water resources contamination level.
- Status of emergency preparedness
- Compliance with regulatory requirements

Storage/pesticide and empty packages management conditions

- % of available and adequate storage facilities
- Level of risks associated with transportation and storage

- Level of mastery of spraying and impregnation methods
- Number of equipments for disposing of functional packages, quantity of packages disposed of.

Staff training - Information/public awareness

- Number of training sessions organized
- Number of officers trained as per category
- Number of farmers adopting integrated control, good practices for pesticide management;
- % of people reached through awareness campaigns
- Level of user knowledge about the products and the risks involved
- Traders/distributors' knowledge level about products sold.

Indicators to be followed by other public institutions

During the implementation phase of PMP activities, monitoring will focus on main environmental components (water, soil, vegetation and fauna, living environment, health, etc.) and will be carried out by public structures responsible for the management of these components (MRRD, MoPH, ARIA, NEPA, etc.). Table 12 below provides the outline and specific indicators to be monitored.

PMP monitoring responsibilities

The community monitoring will be carried out by Research Institutions during the experimentation phase. During the extension phase, the community monitoring will be carried out by the Plant Protection and Quarantine Department of MAIL and the Ministry of Public Health. The frequency of using alternative pest control methods will be evaluated as well. Special attention will be given to the monitoring and evaluation of the following points: checking non-target groups in order to determine whether the campaign against pests and harmful insects does not pose any danger to other living organisms not targeted by this campaign; entomological surveys to control the vector population and the effectiveness of treatment programs; operators' health monitoring; and the choice of pesticides based on their environmental risks.

- Plant Protection and Quarantine Department (PPQD) will be responsible for the internal environmental monitoring of the PMP in AAIP operation sites;
- National Environmental Protection Agency (NEPA) will be responsible for the external environmental monitoring of the PMP in AAIP operation sites;
- Ministry of Public Health will be responsible for the external health monitoring in AAIP operation sites.

Table 12: Institutions responsible for country monitoring of pest and pesticides in Afghanistan

N°	Institutions responsible for the monitoring
1	Plant Protection & Quarantine Department of the Ministry of Agriculture, Irrigation & Livestock
2	National Environment Protection Agency (Multi-sectoral Pesticide Management Board)
3	Ministry of Public Health: National Vector-borne Disease Control Prevention Program
4	Agricultural Research Institute of Afghanistan

7.5.3 Evaluation

Two evaluations will be carried out: a mid-term evaluation and an external evaluation in the course of the month that follows the end of the implementation in order to maintain the objectives of the action plan. The mid-term evaluation will be carried out by a consultant. It will assess the correct development of the management plan as well as mid-term results. Financial partners, beneficiaries of the project and other partners involved will fully participate in this evaluation. The external evaluation will involve measuring the effectiveness of the project as well as its performance and to identify lessons learnt. This evaluation will be integrated into that of the AAIP at-large.

Summary of the Monitoring Plan

Table 13: Environmental and Social Focal Points in the AAIP and the PPQD/NEPA are responsible for coordinating the monitoring of the implementation of this monitoring plan.

Components	Monitoring elements	Indicators and elements to be collected	Frequency	Institution responsible for internal monitoring	Institution responsible for external monitoring
Water	Level of pollution/contamination of surface waters and underground resources (sinks)	• Physico-chemical and bacteriological parameters of water bodies (pesticide residues, etc.)	Once per year	• Plant Protection • Research Institutions • Research Institutions	• Hydraulic • Water laboratories (MRRD) • Environmental Services
Soil	Pollution level of pesticide storage sites	• Typology and emission quantity (solid and liquid)	Once per year	• Plant Protection • Agricultural Services • Research Institutions	• Environmental Services
Vegetation and fauna	Development of fauna and microfauna; condition of flora and animal and plant biodiversity	• Presence of toxic residues in plants and crops • Destruction level of non target organisms (animals, aquatic fauna, and vegetation)	Once per year	• Plant Protection • Agricultural Services • Research Institutions	• Forest Services
Human environment	Hygiene and health Pollution and nuisances Protection and safety during operations	• Types and quality of pesticides used • Number of accidents/intoxication cases • Waste management (pesticide residues and empty packages) • Compliance with the carrying of protective equipments • Compliance with storage and pesticide use measures • Level of the monitoring carried out by Plant Protection Officers	Once per year	• Plant Protection • Agricultural Services • Research Institutions	• FOs • Local communities • Environmental Services • Health Services

7.6 Training of Actors Involved in Pest and Pesticide Management

To ensure the effective integration of environmental concerns into the implementation of AAIP, we suggest to implement a capacity building program (training and awareness raising) for all actors, which will focus on the following main issues: making the pest management strategy operational; promoting the emergence of an expertise and pest management professionals; raising the responsibility level of employees in pesticide management; protecting the health of and ensuring the safety of populations and health workers.

The training will be targeted and adapted to beneficiary groups: NEPA agents; Research Scientists, Plant Protection and Quarantine Officers, Agricultural Extension Officers, Public Health workers, Farmer Organizations and other NGOs active in pest and vector control. Generally, the best trainers are found among the staff of ministries responsible for Health, Environment and Agriculture. The training will mainly focus on pesticide management workers, health and environmental workers to enable them to acquire the necessary knowledge about the content and prevention methods, to evaluate their working environment and improve it by reducing risk factors; to adopt precautionary measures that might reduce intoxication risks, to promote the use of protective equipments; and to correctly apply the procedures to be followed in case of accident or intoxication. The training will also focus on village-level facilitators and other local people active in pest and vector control.

The training modules will concern the risks associated with pesticide handling, sound management methods (collection, disposal, storage, transportation, and treatment), adequate behavior and good environmental practices, facilities and equipment maintenance, protective measures and measures to be adopted in case of intoxication, etc. Special emphasis will be laid on the requirements for a secure storage in order to avoid a mix up with other products of common domestic use, as well as on the reuse of empty packages. It is recommended to train trainers by leading them to come out with a guidebook on good pesticide management practices rather than giving them a passive training. A list of training modules is given below:

Training modules

- Information on risks as well as health and safety advice
- Rules governing the storage and the conservation of pesticides by farmers
- Basic knowledge about risk handling and management procedures
- Carrying of protective and safety equipment
- Risks associated with pesticide transportation
- Handling, loading and offloading procedures
- Vehicle equipment
- Protective equipment
- Outline of treatment and operation procedures
- Health and safety in connection with the operations
- Emergency and relief procedures
- Technical procedures
- Maintenance of equipment
- Emission control
- Process and residue monitoring
- Biological monitoring of pesticide exposure

7.7 Awareness Campaigns on Pesticides Management

Raising awareness is a key factor in the safeguard of the population against harmful effects of pesticides. Sensitization campaigns in the form of workshops, training, radio & TV programs, dramas and agriculture festivals, as well as press releases and field visits are on-going activities as part of the task of the enforcement personnel. But the Field Inspectors of the NEPA and PPQD, and IPM Extension Agents should have mobility and resource constraints to function effectively. The AAIP should enhance the both NEPA and PPQD with mobility and resources, to enable both entities to implement the mitigation measures outlined above to minimize the risks associated with pesticides.

The most impending dangers in farming come from uncontrolled use of pesticides usually meant for plant protection. But these products are often ill-advisedly used. Hence, there is the need for creating awareness on good use of pesticides and chemical fertilizers. Also, the awareness has to target in the first place the users of chemical fertilizers, notably farmers and traders who speculate about the risks involved in using some chemical preservatives dangerous to health. The awareness should seek to disseminate modern conservation methods, traditional granary systems that are very effective as well as biological and natural pest control methods.

At the level of importers, dealers and other traders, it is essential to introduce a requirement that the products must be sold with detailed and simple handbooks providing information on the best handling and use, including the risks involved. In the same way, users must be cautioned about the quality of the products and the methods used for their conditioning. In addition, the pesticide labeling in Afghanistan should be standardized, containing all the specifications required and written in both Dari/Pashto and in English.

At the public level, the media should regularly organize extension/awareness programs. The risk of intoxication by chemical products poses a serious problem for public health. There is the need to distinguish on the one hand: (i) health problems caused by food, i.e. by the consumption of foodstuffs (especially vegetables, fruits and cereals) infected by dangerous chemical products; (ii) health problems associated with the consumption of spoilt food (according to the expiry date) that have undergone chemical decomposition or contain chemical sweeteners; (iii) health problems associated with the use of expired phytosanitary products whose chemical constituents are corrupt or disintegrated due to failure to observe conservation rules or the non-observance of the normal duration; and (iv) health problems associated with overdosing.

Overall, very little progress has been made in terms of information and public awareness on environmental and health risks of misuse of pesticides in Afghanistan. Specific actions by public services and the willingness to put in place regulations through legal texts remain marginal. It is essential to develop long-term strategies and effective approaches to inform and sensitize all stakeholders (street traders, wholesalers, agricultural users, rural populations, etc.).

Information and awareness programs for the general public in general, and decisions makers in particular, are essential for reducing the risks of infection and intoxication by pesticides, and in the end, for true behavioral change. These programs will be multifaceted and will rely on supports from several

sources. Public media can play a relatively important role in creating awareness among the general public and users. The Ministry of Agriculture, Irrigation and Livestock, NGOs and farmer associations/movements, territorial communities as well as community health structures will be involved in the public awareness.

7.8 Coordination and Monitoring of the PMP

Involvement of all actors in the coordination and the monitoring

The implementation of pest and pesticide management strategies is the concern of many actors and requires the participation of a wide range of national and international organizations. Agricultural development activities can result in the creation of adequate breeding sites for vectors, and eventually the increase in the impacts of vector-borne diseases. Furthermore, a safe and appropriate use of pesticides, including quality control and resistance management, requires cross-sectoral collaboration.

Several actors are involved in the implementation of planned actions, either individually or through partnerships. Pest and pesticide management requires full and close cooperation among the Ministries of Agriculture, Irrigation and Livestock, Public Health and other sectors such as the National Environmental Protection Agency, territorial communities as well as research institutions and laboratories, the private sector involved and environmental NGOs, etc. to develop harmonized approaches dealing with development in a sound environment. It is essential to establish communication and a close collaboration among institutions responsible for public health, environment and agriculture to ensure necessary support for a smooth implementation of policies and strategies.

Multi-sectoral steering, coordination, monitoring and consultation structure

For a better vector control and pesticide management coordination, a multi-sectoral steering, coordination, monitoring and consultation structure needs to be put in place to guide the process. Under the AAIP, MAIL as the principal public entity responsible for agriculture (Plant Protection and Quarantine Department) may carry out the secretariat work of this structure. Other Ministries (Ministry of Public Health, Ministry of Mine and Water Resources, National Environment Protection Agency, etc.) and Research Institutions may come out with additional measures.

The missions of the Steering Committee may include: (i) organizing a workshop for the preparation of a concerted response strategy; (ii) approving the composition of the groups to be involved in field activities; (iii) agreeing on the people or institutions that will carry out the interventions as part of the IPM and the IVM; (iv) identifying the sites where the evaluation will be carried out; (v) preparing an operational action plan; (vi) defining the charter of responsibilities for the implementation of the action plan; (vii) coordinating the monitoring of the implementation. This committee will be responsible for the coordination of the comprehensive monitoring of the execution of activities.

7.9 Institutional Arrangements for the Implementation and Monitoring of the PMP

At the provincial level, the coordination of the monitoring of the PMP will be carried out by the provincial Directorate of PPQD in collaboration with the AAIP, HLP, and FAO. At the national level, the coordination of the PMP will be carried out by MAIL/PPQD in collaboration with the AAIP's Coordination Unit. Therefore:

- ***AAIP***, especially personnel attached to the Plant Protection services, will coordinate the monitoring of the PMP;
- ***Plant Protection and Quarantine Department*** will carry out the internal monitoring of the PMP work package on "environment and health", and to that effect, regularly report to the AAIP's Coordination Unit;
- ***Ministry of Agriculture, Irrigation & Livestock, Directorate of Agriculture (Extension Services)*** will participate in the monitoring of the implementation of the PMP and in building the capacity of their field officers in all provinces;
- ***MoPH through National Malaria and Vector-borne Disease Control Program*** will carry out the external monitoring of the implementation of the PMP work package on "health" , and to that effect, regularly report to AAIP Coordination Unit;

Note:

Agricultural and phytosanitary risks, which fall under the Ministry of Agriculture, Irrigation and Livestock, are associated with the use of veterinary inputs (especially pesticides- Livestock Services) and products to stimulate and promote production in this sector; health risks, notably the lawful use of pharmaceutical products and various drugs used for medical purpose or for self-medication fall under the Ministry of Public Health. (Note: the use of veterinary inputs falls under the Directorate of Livestock in MAIL, and Pesticides and Phytosanitary Risks is under Plant Protection and Quarantine Department in MAIL).

- ***The National Environmental Protection Agency*** will carry out the external monitoring of the implementation of the PMP work package on "environment";
- ***Research and analysis institutions and laboratories*** will help carry out the analysis of environmental components (analysis of pesticide residues in waters, soils, plants, crops (PPQD, NEPA, MRRD or ARIA), fishes, foodstuffs, etc.) in order to determine the various parameters of pollution, contamination and toxicity associated with pesticide use, as well as for monitoring virus spread and control of import/export of planting material through the AKF Plant Biotechnology laboratory;
- ***Farmer Organizations:*** they will have in place and promote the enforcement of environmental procedures and good practices in terms of ecological and safe use and management of pesticides;
- ***Local communities:*** they will participate in public awareness and social mobilization activities. They will also participate in the supervision and the external monitoring of the implementation of recommended measures as part of the PMP;
- ***NGOs and the Civil Society:*** NGOs, CBOs and other environmental organizations of the civil society can also participate in informing, educating and sensitizing farmers and the general public on environmental and social aspects associated with the implementation the PMP as well as the monitoring of the implementation and environmental surveillance.

Table 14: Summary of the institutional machinery and the responsibility charter

N°	Countries	Institutions/actors	Responsibilities
Regional level			
1	AAIP	PPQD	• Regional/provincial level coordination of the implementation of the PMP
National level			
2	Afghanistan	AAIP Coordination Unit	• National level coordination of the implementation of the PMP (proposed membership: MAIL, MoPH, ARIA, NEPA, PPQD, Extension Department, MRRD)
		MAIL/PPQD	• Monitor the implementation of the PMP and build capacity
		Plant Protection and Quarantine Department/ MoPH	• Conduct internal monitoring of PMP work package on Environment and Health
		Afghanistan Agricultural Research Institute/ PPQD/ NEPA	• Will conduct analysis of environmental components with other Analysis Laboratories
		National Environment Protection Agency. MoPH/National Malaria and Vector Control Program	• Conduct external monitoring of the PMP Environment package • Conduct external monitoring of the PMP Health Package •

7.10 Implementation of the Pest and Pesticide Management Plan

This will consists essentially of the development of specific operational plans to address the pest and pesticide problems currently identified in Afghanistan, and will be carried out as a component of the AAIP itself. During this implementation phase, arrangements will be made to prepare and make a plan to operationalize the PMP as required by the World Bank operational policy (OP) 4.09, while providing sound technical advice and guidance to the AAIP regarding pest and disease management strategies, including appropriate practices for Afghanistan. The operational plan will develop a methodology and administrative structure for the implementation of IPM approach as well as for environmental management in the AAIP/MAIL in cooperation with PPQD, HLP, PHDP, OFWM and FAO-IPM projects. Among other measures, the plan will suggest measure to improve the institutional and information flow arrangements for enhancing the effectiveness of environmental management in MAIL/ AAIP (including staffing, training and other capacity building, and information management), while suggesting lessons learned from other national and international experiences that could be mainstreamed into the AAIP to enhance environmental management.

7.11 Work Plan and Cost of Activities Proposed During the PMP Implementation

The cost of items below concerns those activities that are likely to be sponsored under AAIP. Annual work plan will be developed in consultation with the provinces in line with their respective local development plans (LDP). Approximately US$ 1,104,570 will be required to effectively implement the PMP over a five year period (Table 15).

Table 15: Cost of Activities in Developing and Implementing a Pest Management Plan (this budget is indicative and should be adapted to align with the real situation and adequate and appropriate costs)

Area /Line item	Year 1	Year 2	Year 3	Year 4	Year 5	Total
1. Technical Assistance (International)						
Pathology Diagnosis Consultant	63,000	63,000	63,000	63,000	0	252,000
Pest Diagnosis Consultants	63,000	63,000	63,000	63,000	0	252,000
Sub-total I	126,000	126,000	126,000	126,000	0	504,000
3. Capacity Building						
Master Degree & BS Training	120,000	120,000	120,000	120,000	0	480,000
IPM orientation workshop	27,300	14,000	0	0	0	41,300
Training of Trainers (extension agents)	262,500	0	0	0	0	262,500
Farmer groups training (FFS)	89,550	89,550	89,550	0	0	268,650
Study visits/tours	36,000	36,000	36,000	0	0	108,000
Sub-total III	535,350	259,550	245,550	120,000	0	1,160,450
4. Advisory Services						
IPM problem diagnosis	25,000	27,000	27,000	25,000	23,400	127,400
Field guides/IPM materials	20,000	25,000	25,000	20,000	20,000	110,000
Public awareness/ Sensitization campaigns	10,000	20,000	15,000	5,000	5,000	55,000
Pest/vector surveillance	7,500	7,500	7,500	6,000	3,340	31,840
Sub-total IV	62,500	79,500	74,500	56,000	51,740	324,240
5. Environmental Management						
Equipment; bed nets; chemicals, biopesticides, Botanicals (neem, pyrethrin, etc.)	10,000	25,000	15,000	10,000	5,000	65,000

Support to IPM research and development	20,000	45,000	35,000	15,000	5,000	120,000
Support to PPQD at Regional PIU levels	15,000	15,000	15,000	15,000	10,000	70,000
Environmental Audit	0	7,500	15,000	15,000	7,500	45,000
Sub-total V	45,000	92,500	80,000	55,000	27,500	300,000
Grand total	768,850	557,550	526,050	357,000	79,240	2,288,690

Notes on the Budget

International Technical Assistance

1. Pathology Diagnosis Consultant: to be hired for 3 months each year for 4 years to oversee the plant disease diagnosis by local officers during the growing season at 700 USD per day for 90 days (700 USD/day x 90 days = 63,000 USD), for a total amount of 252,000 USD.

2. Plant Pest Diagnosis Consultant: to be hired for 3 months each year for 4 years to oversee the plant pest diagnosis by local officers during the growing season at 700 USD per day for 90 days (700 USD/day x 90 days = 63,000 USD/year), for a total amount of 252,000 USD.

Capacity Building

3. Provide Fellowship (120,000 USD per year for 4 years) for Master level and beyond trainings of professional experts in the PPQD on identified disciplines that required such expertise (Pesticide Analysis, Quality Control, Quarantine, Pest and Disease diagnosis, etc.) for the implementation of the PMP activities in a sustainable manner.

4. IPM orientation workshops: 7 regional-based 1-day workshops for groups of 57 attendees per workshop at 5,900 USD per workshop for a total of 41,300 USD.

5. Training of Trainers: one training of trainers' course in each of the 7 agro-ecological regions of Afghanistan with 10-11 trainees per province at 37,500 USD per course lasting 3 weeks for 50 participants per course (i.e. 350 trained farmer trainers/extension agents at $750 per participant) for a total of 262,500 USD.

6. Farmer group training and pest management information ant new technologies: 15 USD per extension agent/farmer trainer per for three days for each training session; 5 field based training sessions per season for each province; with 398 districts (= field training sites) and 20 farmers representatives per district. Training cost per province per season = $15 x 3 days x 5 sessions = 135 USD. Number of districts = 398, total training cost for all districts = 135 USD x 398 districts = 89,550 USD per season/year. Total

farmer trained per season = 7,960 (and these will train other farmers through participatory extension activities (Total amount of 268,650 USD).

7. Study visits/tours: 3 set of 7 days visit per participant (12 participants per visits) at 3,000 USD per participant to include travel, accommodation, per diem and bench fees; at hosting institution; Cost of visits = 3 x 12 x 3,000 USD = 108,000 USD.

Advisory Services

8. IPM problem diagnosis and monitoring of population levels: 2 day informal interviews and field assessment per district (398 district clusters in total) for four persons at 40 USD per person per day (160 USD x 2 days = 360 USD per district cluster; Total cost therefore 360 USD x 398 = 127,360 USD).

9. Field guides: Cost of preparing and producing 9,000 copies of a field guide at 10 USD per unit (90,000 USD) and other training materials (20,000 USD) for a total cost of 110,000 USD.

10. Public awareness and sensitization campaigns: cost of TV and radio jingles, posters, dramas, and sensitization workshops.

11. Pest/vector surveillance: 1 day field assessment and sample collection per district cluster (398 clusters of 20 farmers each) for two persons at 40 USD per person per day (80 USD x 1 days = 80 USD per district cluster; Total cost therefore 80 USD x 398 = 31,840 USD).

Environmental Management

12. Equipment, bed nets, chemicals and botanicals: Purchase and distribution of materials.

13. Support to IPM research and development: Provide support to ARIA with necessary resources required per agro-ecological region for IPM related participatory research works. Biodiversity identification services of endemic natural enemies, use of botanicals, trials on bio-insecticides and entomopathogenic fungi Beauveria bassiana, Metharizium, and Bacillus thurigiensis (Bt), as well as different attractants (pheromones, trap crops) or other mechanical control methods on prevailing insect pests and diseases of wheat and other major crops.

14. Support to PPQD at provincial levels for extension works and supervision of trained famers in different districts. Two-day visits per district for 2 technical staff, two times per growing season: 40 USD per day, 2 days per visit and 2 visits per season in 398 districts (80 USD x 2 x 2 x 398 districts = 63,680 USD) and 6,000 USD additional.

15. Environmental Audits: Empower NEPA and other experts to evaluate laboratory structures and their operation during the project implementation phase.

ANNEX I

List of Pesticides and Other Chemicals Banned or Severely Restricted in Use but that are Found Being sold in the Afghan's Market

It is Illegal in The Islamic Republic of Afghanistan to Import, Manufacture, Formulate, Offer, Hold on Stock, Sell, Use or Advertise the following Banned Chemicals, though not enforced:

Pesticide/ Chemical Compound Banned	
1. 2,4,5-T (2,4,5 Trichlorophenoxyacetic acid)	26. PARATHION-METHYL (Toxic Oragno-Phophorus Pesticide present in "Spiridin"
2. ALDRIN	27. HCH
3. ALDICARB	28. HEPTACHLOR
4. BENOMYL+CARBOFURAN+THIRAM Formulation	29. HEZACHLOROBENZENE
5. BENZENE HEXACHLORIDE	30. LINDANE (Present in Thiodal form Senegal)
6. BINAPACRYL	31. MALEIC HYDRAZIDE
7. CALCIUM CYANIDE	32. MENAZONE
8. CAPTAFOL (80% Powder)	33. MERCURY COMPOUNDS
9. CABOFURON (50% SP)	34. METHAMIDOPHOS FORM
10 CHLOROBENILATE	35. METHOMYL 12.5% L
11. CHLOROBROMOPROPANE	36. METHOMYL 24% L
12. CHLORODANE	37. METHYL BROMIDE
13. CHLORODIMEFORM	38. METHYL PARATHION
14. COPPER ACETOARSENITE	39. MONOCROTOPHOS and its Formulations
15. DDT (Persistent Organo-Phosphate, found in Cock Brand Coil from PRC)	40. NICOTIN SULFATE
16. DIELDRIN	41. NITROFEN
17. DINOSEB	42. PARAQUAT DIMETHYL SULFATE
18. DINOSERBY SALTS (DNOC and its salts)	43. PARATHION
19. ENDRIN	44. PENTACHLORO-NITROBENZENE
20. ETHYL MERCURY CHLORIDE	45. PENTACHLOROPHENOL
21. ETHYL PARATHION	46. PHENYL MERCURY ACETATE
	47. PHOSPHAMIDON

22.	EHTYLENE DIBORMIDE (EDB)	48.	SODIUM METHANE ARSENATE
23.	ETHYLENE DICHLORIDE	49.	TAA (Trichloro Acetic Acid)
24.	ETHYLENE OXIDE	50.	TETRADIFON
25.	FLUOROACETAMIDE	51.	TOXAPHENE

Source: Plant Protection and Quarantine Department of the Ministry of Agriculture, Irrigation and Livestock, Islamic Republic of Afghanistan

ANNEX II

Complete List of Pesticides Found being sold and used in Afghanistan with and/or without the Government's Consent.

Trade Name	Class	Status	Manufacturer	Active Ingredient	Area of Use
2,4.D	III	C	Rhône Poulenc	2,4-dichlorophenoxyacetic acid	Herbicide broad leaf weeds
6-Fenoxy supper	None	R	Qingdao Jiner Agrochemicals	Fenoxaprop-p- ethyl	Herbicide
Abamore	None	R	Shenyang jinlaiwang Chemical	Dimethylavermectin alamixture + dimethyl 2.5-di (1-methylpropyl) - 2.5 (methylethyl) avermectine	Insecticide
Abomore	None	R	Shenyang jinlaiwang Chemical	Abamectin	Insecticide
Acis	II	C	Aventis	Deltmethrin	Insecticide
Acarus	None	C		Fenpyroximate	Acaricide
Afra	None	C	Calliope	Cypermethrin	Insecticide
Agreezor	None	C		6+12+6 Fe+Zn+TE	Supplementary
Agrifol EC	III	C		Dicofol	Insecticide
Aluminium Phosphides	None	R		Aluminium Phosphides	Rodenticide
Ametrin	None	C		Cayno (3 phnoxy phenyl) (methyl 3-(2-2,- dichloroethenyl)- 2,2-dimethyl=	Insecticide
Amitraz	None	R		Amitraz	Insecticide
Antracal wp	None	R		Propine other ingrediets	Fungicide
Arisban	II	R	Dow AgroScience	Chlorpyrifos	Insecticide
Arisbon	II	C	Dow AgroScience	Chlorpyrifos	Insecticide
Atlantis	None	C		Mesosulfuron-mythel	Herbicide
Azylon	None	C		Phosalone	Insecticide
Best	None	C			Supplementary
Bioestrene Fe	None	C		Fe	Supplementary
Biomax	II	C	Dow AgroScience	Chlorpyrifos	Insecticide

Bordeaux Mixture	None	C		Tobacco and soap	Insecticide
Bordeaux paste	II	C		Copper sulphate and lime	Bactericide
Boxer EC	II	R	Zeneca	Lambda-cyhalothrin	Insecticide
Buthchi	None	R		Buthachlor	Herbicide
Chlorofet- EC	None	C		Chlorofet	Insecticide
Chlorpyrifos	II	C	Dow AgroScience	Chlorpyrifos	Insecticide
Ciran	None	R		Zn, I, B, Cu, Mg, Mn, P, N, Cl	Supplementary
Citruban	II	C	Dow AgroScience	Chlorpyrifos	Insecticide
Confidor SL	II	C		Imidacloprid	Insecticide
Copper oxychloride	II	C		Copper oxychloride, inertingrediets	Fungicide
copravit	None	C		Copper	Fungicide
Copravet Blue 50%	None	C		Copper oxychloride	Fungicide
Crops plus	None	C		Increase crops growth	Fungicide
Crown SL	II	C		Imidacloprid 200 mg/L	Insecticide
Cyclodan EC	None	C		Endosulfan + Emulsifier-Stabilizer Solvent	Insecticide
Cypermethoate	None	C			Insecticide
Cypermethrin1 WP	None	C	Calliope	Cypermethrin	Insecticide
Cupervit Blue	None	C		Dipteryx Malathion	Insecticide
Daemavite EC	None	C		Immolation	Insecticide
Damon	None	R		Bromopropylate	Acaricide
Danadim EC	II	C	Cyanamid	Dimethoate	Insecticide
Danitol EC	II	R		Fenpropthrin	Insecticide
Dasa-1	None	C		Growth hormones for grapes	Supplementary
Deltamethrin	II	R	Aventis	Deltamethrin	Insecticide
Deltamethrin	II	R	Aventis	Deltamethrin Emulsifier	Insecticide
Denadol EC	II	C	Cyanamid	Dimethoate + and immolathion	Insecticide
Denadoul	III	C	Calliope	Malathion	Insecticide
Dena Super	None	C		S-12 bis (Ethoxycarbony) ethyl10.0 Dimethyl Phosphorodithioate	Insecticide
Diazinon	II	R	Marubeni	Diazinon	Insecticide to control stem borers of cereals sugarcane, millipedes, locusts and grasshoppers
Dicofol	III	C		Dicofol	Acaricide

Diflubenzuron	U	R		N-[[(4- chlorophenyl) amio] carboyl] -2,6- difluorbenzamide	Insecticide
Dimethoate	II	C	Cyanamid	Dimethoate	Insecticide
Dimethoate	II	C	Cyanamid	Dimethoate	Insecticide
Dimilin	II	A	Uniroyal Chemical	Diflubenzuron (60g/l)	Insecticide against locusts
Dipterex	II	R		Trichlorophon	Insecticide
Dragon	III	C	Calliope	Glyphosate	Herbicide
Eagle EC	None	R	Calliope	cypermethrin	Insecticide
Endoria	II	R	Changzhou Biochemical Co.	Endosulfan	Insecticide
Endosulfan	II	R	Changzhou Biochemical Co.	Endosulfan	Insecticide
Ethion	None	C		Ethion	Insecticide
Fenoxysuper	None	R		Extractable Acid	Insecticide
Fenvalerate	II	C	China AgroChem	Atropine sulphate	Insecticide
Fenvalerate	II	C	China AgroChem	Fenvalerate	Insecticide
Fifanoun	None	C	Nanjing Chemicals	Malathion	Insecticide
Flea & Tick wp	II	C	Zeneca	Lambda-Cyhalothrin	Insecticide
Foliol winter oil	None	C		Mineral oil	Preventive
Gima	None	R		Neo Pynamin + Solvent + LPG (Propan butan)	
Green crop	None	C		N,K,B,Zn,Mg,Cu	Supplementary
Green Crop	None	C		N,K,Zn, Mg,Cu	Supplementary
Haloxyfop	None	R		Haloxyfop-R methyl Exter	Herbicide
Hawk	None	R		Ioxynil Octanoate	Herbicide
Hef oil	None	R		Sulphonation	Fungicide
Helal Pearl	II	R		Imedaclopride	Insecticide
Herbikill	I and II	C	Vapco	Paraquat	Herbicide
Icon 1	III	C	Zeneca	Perethroid lambda-Cyhalothrin	Insecticide
Ifra	None	C	Calliope	Cypermethrin	Insecticide
Illograss	III	C		Diclofop Methyl	Herbicide
Imidacloprid	II	C		Imidacloprid	Insecticide
Imidacloprid WP	II	R		Imidacloprid + Methylena bis – naphthalines + Sodium Sulphonate + Sodium Lauryl Sulphate + Light Calcium Carbonate	Insecticide
Imidacloprid 2	II	C		Imidacloprid + Other ingredients	Insecticide
Killer EC	None	R		Diethyl mercaptosuccinate	Insecticide

Kissan SL	Ib	C		methamidophos [O,S-dimethyl phosphoramidothiate]	Insecticide
Kumulus -DF	None	C		Active ingredients + others	Fungicide
Karate	II	C	Zeneca	Lembda-Cyhalothrin	Insecticide
Lannat SP	None	C		Thioacetimidate-	Insecticide
Lazer EC	Non	C		Cypermthrin + Dimethoate + other ingredients	Insecticide
Lobello	II	R	Aventis	Deltamethrine	Insecticide
Lorsban EC	II	C	Dow AgroScience	Chlorpyrifos	Insecticide
Mactomeil EC	None	C	Calliope	Cypermethrin 100, Immolation	Insecticide
Malathion	None	C		Malathion	Insecticide
Mancozeb	U	C		Mancozeb + Other Ingredients	Fungicide
Mantax- forte	U	C		Mancozeb + copper + xychloride and sulfate + Iron sulfate	Fungicide
Manthane	U	C		Mancozeb	Fungicide
Matador	II	R	Zeneca	Fenpropathrin	Insecticide
Matox	none	C		Tetramethrin	Insecticide
Mr-Clean	None			Parathyroid	Insecticide
Naboud	II		Calliope	Cypermethrin 1	Insecticide
Oxadiazon	U	C		5- tert-butyl 1-4dicloro-5)	Herbicide
Padan SP	None	R		Cartap Hydrochloride	Insecticide
Padide	II	C	Senchim AG	Cypermethrin kind of crawling	Insecticide
Paraxon	I and II	R	Zeneca	Paraquat	Herbicide
Paraxon SL	None	C		1,1dimethyl 4,4 bipyridilium and dichloride	Herbicide
Partner w/p	III	C		Isoproturon	Herbicide
Parto	II	C	Calliope	Cypermethrin-	Insecticide
Parumi	None	C		Permethrin-	Insecticide
Patak	None	C	Senchim AG	Tetramethrin + Cypermethrin, Perfum + Solvents and propellants	Insecticide
Patron	II	C	Calliope	Cypermethrin	Insecticide
Peykar	None	C	Senchim AG	D-allethrine Tetramethrine + Cypermethrine + Pipronlle butoxide Solvent + Propellant	Insecticide
Power Lorsban	II	C	Dow AgroScience	Chlorpyrifos	Insecticide
Project	None	C		Propargite	Acaricide
Pujing EC	None	C		Fenozaprop-p-ethyl	Herbicide
Puma Super	None	C		Puma	Herbicide
Puma super EW	None	C		Fenozaprop-p-ethyl + other ingredients	herbicide

Pyridate	None	C		Pyridate	Herbicide
Radical	None	C		EPTC	Herbicide
Rat Kill	Ib	C		Zinc phosphide	Rodenticide
Rest	II	C		Propiconazole	Fungicide
Roundup	III	C		Glyphosate 490 gm and inert material	Herbicide
Sahara	None	C			Rodenticide
Senitox EC	II	C	Cyanamid	Dimethoate	
Sevan wp	None	C			Insecticide
Seven Top	None	C			Insecticide
Spain ghar	None	C		All micronutrients	Supplementary
Spot	None	C			
Stream	None	C		Tridemorph	Fungicide
Sulfur	None	C		Sulfur	Fungicide
Sunicidin	None	C		Cyano-3phenoxy-benzl-2(4chlorophenyl)-3methyl-butyrate+optanal	
Supercide	None	C		Methidathion	Insecticide
Superdin	None	C	Calliope	Malathion + immolathion	Insecticide
Super dithion	None	C		Superdithion + Amosulphide	Insecticide
Super Don EC	None	C		Superdon	
Super grower	None	C		N,P,Mg,S,Boron,Co,Ma,Iron	Supplementary
Super Lorsban	II	C	Dow AgroScience	Chloropyrifos	Insecticide
Super Malathion	None	C	Calliope	Malathion	Insecticide
Super sure	None	C	Calliope	Malathion + immolation	Insecticide
Super Tonic	None	C		Co. + Ma. + N	Supplementary
Super top	None	C		C23H19CIF3NO3	Insecticide
Super top	None	R		Parathyroid	Insecticide
Super work U46 Combi Fluid	None	R		Extractable acid , 2,4 Dunethumin salt	Insecticide
Systan	Ib	R		Oxydemeton-methy	Insecticide
Taromar	None	C	Senchim AG	Cypermethrin PBD, Perfume	Insecticide
Thiodan EC	II	C	Senchim AG	Endosulfan	Insecticide
Timer EC	None	C	Qingdao Jiner AgroChem	Emamectin benzoate	Insecticide
Tophas	None	C	Calliope	Malathion	Insecticide
Topgun	None	R		Clodinafop Propargyl	Herbicide
Trichlorfon SP	II	R	Dow AgroScience	Trichlorfon	Insecticide
Trymethoate 40%EC	None	C	Cyanamid	Immolation	Insecticide

Unigol	None	C		K,P,N,I,EDTAchelate,Z,Boron,Mg,Co,Mo	Supplementary
Vacomil-Plus 50	None	C		Copper Oxycholoride	Fungicide
Vetavax thiram wp	None	R		Thiram , Emulsifier	Fungicide
Wettasul- w/w	None	C		Sulphur	Fungicide
Zed	None	C	Calliope	Cypermethrine	Insecticide
Zineb wp	U	C		Active Ingredients + Zinc ethylenebis (dithiocarbamate) (polymeric) + Others	Fungicide
Zinc Phosphidew/w	Ib	R		Zinc Phosphide	Rodenticide
Zubin	II	C	Sumitomo	Fenvalerate	Insecticide
Zubin EC	None	C	Sumitomo	Cyano(3-phenoxyphenyl) + methyl-4-chloro-a	Insecticide

(Source: Plant Protection and Quarantine Department; HLP's Agro-chemical survey 2009, and ASAP-PERSUAP).

The table above shows the inventory of pesticides that have been retrieved from survey of all the stakeholders. Furthermore, the database has been divided into different categories on various classification bases i.e. on pesticide type bases, systemic/contact etc, also classified according to world standards based on their active ingredients as A= environmentally friendly; C= acceptable; R=dangerous; RR= very dangerous; and B= Baned. Unfortunately, among all the pesticides in the inventory only the "Dimilin" insecticide falls under the environmental friendly (A) category.

ANNEX III

Good Management Practices Guide and Pesticides Management Measures:

Required measures for the reduction of pesticides-related risks

Safe use of pesticides

Pesticides are toxic for pests and also for humans. However, if sufficient precautions are taken, they should not constitute a threat either for the human population or for non-targeted animal species. Most of them can have harmful effects if swallowed or in case of prolonged contact with the skin. When a pesticide is sprayed in the form of fine particles, there is a risk of absorbing them with the air we breathe. There is also a risk of water, food and soil contamination. Specific precautions should therefore be taken during the transportation, storage and handling of pesticides. The spraying equipment should be regularly cleaned and well maintained to avoid leakages. The individuals using pesticides should learn how to use them safely.

Pesticides registration

Reinforce the registration process of insecticides by ensuring:

- Streamlining, between the national pesticides registration system and other products used in Public Health;
- Adoption of World Health Organization (WHO) specifications applicable to pesticides for national registration process purposes;
- Reinforcement of the pilot regulatory body;
- Collection and publication of data relating to imported and manufactured products;
- Periodical review of registration.

It is also recommended, when planning to buy pesticides to control vectors, to consult the guiding principles issued by WHO. For the acquisition of insecticides intended for public health use, the following guidelines are recommended:

- Develop national guidelines applicable to the purchase of products intended for vector control and ensure that all the agencies buying them strictly comply with those guidelines;
- Use synthetic Pyrethroids: Deltamethrin SC, Permethrin EC, Vectron, Icon, Cyfluthrin, as recommended by the national policy;
- Refer to the guiding principles issued by WHO or FAO on calls for tenders, to FAO recommendations regarding labelling and to WHO recommendations regarding products (for indoor spraying);
- Include in calls for tenders, the details regarding technical support, maintenance, training and products recycling that will be part of the after-sale service committing manufacturers; apply the back-to-sender principle;
- Control the quality and quantity of each lot of insecticides and impregnated supports before receiving the orders;
- Ensure that the products are clearly labelled in English and in local language (Dari/Pashto) and in the strict respect of national requirements;

- Specify which type of package will guarantee efficiency, preservation duration as well as the human and environmental security of handling packaged products while strictly complying with national requirements;
- Ensure that donated pesticides intended for public health, comply with the requirements of the registration process in The Islamic Republic of Afghanistan and can be used before their expiry date;
- Establish a consultation, before receiving a donation, between the ministries, agencies concerned and the donors for a sound use of the product;
- Request users to wear protective gears (clothes and equipment) recommended in order to reduce their exposure to insecticides to the strict minimum;
- Obtain from the manufacturer a physic-chemical analysis report and the product acceptability certification;
- Request the manufacturer to submit an analysis report of the product and of its formulation along with guidelines to follow in case of intoxication;
- Request the buying agency to perform a physic-chemical analysis of the product before shipment arrival.

Precautions

Labeling

Pesticides should be packaged and labelled according to WHO standards. The label should be written in English and in Dari/Pashto language; it should indicate the content, the safety instruction (warning) and any action to be taken in case of accidental ingestion or contamination. The product should always remain in its original container. Take all appropriate precautionary measures and wear protective gears/clothes in accordance with recommendations.

Storage and transportation

Pesticides should be stored in a place that can be locked up and is not accessible to unauthorized individuals or children. The pesticides, should, in no event, be stored in a place where they could be mistaken for food/medicine or beverage. They should be kept dry and out of the sun. They should not be transported in a vehicle that also carries food products.

In order to ensure safety during storage and transportation, the public or private agency in charge of managing purchased insecticides and insecticide-impregnated supports, should comply with the current regulations as well as the conservation conditions recommended by the manufacturer regarding:

- Preservation of the original label;
- Prevention of accidental pouring or overflowing;
- Use of appropriate containers;
- Appropriate marking of stored products;
- Specifications regarding the local population;
- Products separation;
- Protection against humidity and contamination by other products;

- Restricted access to storage facilities;
- Locked storage facilities to guarantee product integrity and safety.

Pesticides warehouses should be located far from human residences or animal shelters, water supplies, wells and channels. They should be located on an elevated surface and secured with fences with restricted access for authorized individuals only.

Pesticides should not be stored in places where they could be exposed to sunlight, to water or to humidity, which could harm their stability. Warehouses should be secured and well ventilated.

Pesticides should not be transported in the same vehicle with agricultural products, food products, clothes, toys or cosmetics as these products could become dangerous in case of contamination.

Pesticides containers should be loaded in vehicles in order to avoid damages during transportation, so that their labels will not tear off and they would slip off and fall on a road with an uneven surface. Vehicles transporting pesticides should bear a warning sign placed conspicuously and indicating the nature of the cargo.

Distribution

Distribution should be based on the following guidelines:

- Packaging (original or new packaging) should ensure safety during the distribution and avoid the unauthorized sale or distribution of products intended for vector control;
- The distributor should be informed and made aware of the dangerous nature of the cargo;
- The distributor should complete delivery within the agreed deadlines;
- The distribution system of insecticides and impregnated supports should enable to reduce the risks associated with the numerous handlings and transportations;
- In the event the purchasing department is not able to ensure the transportation of the products and materials, it should be stipulated in the call for tenders that the supplier is expected to transport the insecticides and impregnated supports up to the warehouse;
- For all pesticides and spraying equipment the distributors should have an exploitation permit in accordance with the current regulation in force in the Islamic Republic of Afghanistan.

Disposal of pesticide stocks

After the operations, the remaining stocks of pesticides can be disposed off without risk by dumping them in a hole dug specifically or in a pit latrine. A pesticide should not be disposed off by throwing it in a place where there is a risk of contaminating drinking water or for bathing or where it can reach a pond or a river. Some insecticides, such as pyrethroids, are very toxic for fish. Dig a hole to at least 100 meters from any stream, well or habitat. If in hilly areas, the whole must be dug below. Pour all waters used for hand washing after the treatment away from streams and rivers. Bury all containers, boxes, bottles, etc. that have contained pesticides. Reseal the hole as quickly as possible. Packaging or cardboard, paper or plastic containers— the latter cleaned — can be burnt, if allowed, far away from homes and drinking water sources, avoiding the re-use of containers after cleaning.

Pyrethroid suspensions can be discharged on a dry soil where they are quickly absorb and then will go through a decomposition process making them harmless for the environment.

If there is an amount of insecticide solution left, it can be used to destroy ants and cockroaches. Simply pour a little bit of solution on infested areas (under the kitchen sink, in corners) or to rub a sponge soaked with water on it. To temporarily prevent insect proliferation, a certain amount of solution can be poured inside and around latrines or on other breeding places. Pyrethroid suspensions for mosquito nets treatment and other fabrics can be used days after their preparation. It can also be used to treat mats and rope mattresses to prevent mosquito to bite from the bottom. Mattresses can also be treated against bugs.

Cleaning of empty pesticide packaging and containers

Re-using empty pesticide containers is risky and it is not recommended to do so. However, it is estimated that some pesticide containers are very useful to be simply thrown away after use. Can we therefore clean and re-use such containers? This depends both on the material and the content. In principle, the label should indicate the possibilities for re-using containers and how to clean them.

Containers having contained pesticides classified as hazardous or extremely dangerous should not be re-used. Under certain conditions, containers of pesticides classified as dangerous or that do not present any risk under normal use, can be re-used unless they are not used as food or drink containers or as food containers for animal food. Containers made of materials such as polyethylene that preferentially absorb pesticides, must not be re-used if they have contained pesticides whose active ingredient has been classified as moderately or extremely dangerous regardless of the formulation. Once a recipient is empty, it should be rinsed, then filled completely with water and allowed to stand for 24 hours. Then it should be emptied and this process should be done over again.

General Hygiene

Do not eat, drink or smoke when handling insecticides. Food should be placed in tightly closed containers. Measurement, dilution and transfer of insecticides should be done with the adequate material. Do not shake or take liquid with unprotected hands. If the nozzle is blocked, press the pump valve or unblock the opening with a flexible rod. After each fill, wash hands and face with water and soap. Eat and drink only after washing hands and face. Take a shower or a bath at the end of the day.

Individual protection

- Adapted coveralls covering hands and legs
- Dust, gas and respirator masks, based on the type of treatment and product used
- Gloves
- Goggles
- Hoods (facial shield)

Protection of the population

- Minimize the exposure of local populations and livestock
- Cover wells and other reservoirs
- Sensitize populations on risks

Protective clothing

Treatments inside homes

Operators should wear coveralls or a long sleeves shirt over a pair of pants, a flapped hat, a turban or any other type of headgear as well as boots or big shoes. Sandals are not suitable. Nose and mouth should be protected using a simple method, for example a disposable paper mask, a disposable surgical or washable mask or a clean cotton cloth. Once the fabric is wet, it should be changed. Clothing must be in cotton for easy washing and drying. It must cover the body and contain no opening. In hot and humid climates, it can be uncomfortable to wear additional protective clothing; therefore one will be forced to spray pesticides during hours when it is not very hot.

Preparation of suspensions

People responsible for bagging insecticides and preparing suspensions, particularly for the treatment of mosquito bed net units must take special precautions. In addition to the above-mentioned protective clothing, they must wear gloves, an apron and eye protection, for example a facial shield or glasses. Facial shields protect the entire face and keep less warm. Nose and mouth should be covered as indicated for treatment in homes. They should ensure that they do not touch any part of their body with gloves during pesticide handling.

Treatment of nets

To treat mosquito nets, clothes, grills or with tsetse traps with insecticides, it is necessary to wear long rubber gloves. In some cases, additional protection is required, for example against vapors, dusts or insecticide dusting that could be dangerous. These additional protective accessories should be mentioned on the product label and may consist of aprons, boots, facial masks, coveralls and hats.

Maintenance

Protective clothing should always be impeccably maintained and should be checked periodically to verify tearing, wearing that could lead to skin contamination. Protective clothing and equipment should be washed daily with water and soap. Particular attention should be paid to gloves and they must be replaced once they are torn or show signs of wear. After usage, they should be rinsed in water before removing them. At the end of each working day, they will need to be washed inside and outside.

Safety measures

During spraying

Spurt form the sprayer must not be directed towards any part of the body. A leaking sprayer must be repaired and skin must be washed if it is accidentally contaminated. The household pets must stay outside during the whole spraying activity. Avoid treating a room where there is a person — a sick person for example — who cannot be taken outside. Before starting spraying activities, kitchen utensils should be taken out and all utensils as well as dishes containing drinks and food. They can be gathered in the centre of the room and covered with plastic film. Hammocks and paintings should not be treated. The bottom part of furniture and the side against the wall should be treated while ensuring that surfaces are effectively treated. Sweep or wash the floor after spraying. Occupants should avoid contact with walls. Clothing and equipment should be washed every day. Avoid spraying organophosphate or carbamate for more than 5 to 6 hours daily and wash hands after each filling. If Fenitrothion is used or old stocks of Malathion are used, operators should control the level of cholinesterase in their blood every week.

Monitoring exposure to organophosphate

There are country kits available on the market to control cholinesterase activity in the blood. If this activity is low, it can be concluded that there is excessive exposure to organophosphate insecticide. These dosages should be done every week with people handling such products. Any person whose cholinesterase activity is very low should be stopped from working until it returns to normal.

Fabric spraying

When handling insecticide concentrates or preparing suspensions, gloves should be worn. Attention should be paid particularly to spraying in the eyes. A big bowl not too high should be used and the room should be well ventilated to avoid inhaling smokes.

Measures to minimize transportation, storage, handling and usage risks

Step	Determining factor	Risks			Mitigating measures
		Public health	Environment	Personnel	
Transport	Lack of training		Accidental discharge, water-table pollution through leaching	Product inhalation : vapor, dust, risk of skin contact	- training—in-depth sensitization of pesticide management personnel on all aspects of the pesticide chain as well as on emergency responses - provide the personnel with protective equipment and encourage them to wear it - Provide the personnel with adequate storage facilities, refurbish existing sites - proceed to awareness-raising among the public on pesticide use and their containers - training for a safe disposal of empty containers - ban transfer to high volume containers - reduce the quantity of pesticides used through
Storage	Lack of means Deficit in pesticide management training	Accidental contamination Inconvenience of populations living in the vicinity	Soil contamination	Skin contact through Contact with the skin through accidental spillage caused by the narrowness of the premises	
Handling and manipulation	Deficit in training and sensitization	Contamination of water sources through washing of containers	Soil contamination through accidental spillage or intentional discharge, water-table pollution	Vapor Inhalation, skin contact through splashing during preparation or product transfer	
Disposal of packaging	Deficit in training and sensitization	Product ingestion by re-using containers		Skin contact and respiratory tract	

Washing of containers	Deficit in training and sensitization	Skin contact, contamination of wells and nearby streams	Acute poisoning of fish and other Crustacea, pollution of wells, ponds, water-tables	Skin contact	use of efficient alternatives

Poisoning symptoms and appropriate care to victims

Poisoning symptoms	Appropriate care
Eye contamination (pain or irritation)	Rinse well with tap water If the condition worsens, consult a physician
Skin irritation (tingling and burning sensation)	Wash affected part with water, never with oil Apply a soothing cream on it If symptoms persist, consult a physician
Tiredness, headaches or dizziness	Rest Do not start over until after complete rest If symptoms persist, consult a physician
Lungs contamination	Stay in the shadow Place under medical observation

Treatment methods of empty containers

Treatment of empty containers is focused on two fundamental activities: decontamination and the actual disposal with its primary packaging.

Decontamination

- It comprises three steps and concerns all pesticides containers:
- ensure maximum product emptying and drainage for 30 seconds (the content is emptied into a mixing container, in glass for the final dosage (for spraying) ;
- rinse the container at least three times with a volume of water not less than 10% of the container total volume;
- pour-rinsed water in a sprayer, in a pit (spraying).

A decontaminated container does not however, qualify for storage of food or animal feed or for water or domestic consumption.

Disposal

Unless intended for recycling, the first disposal activity consists in making them unusable for other purposes: « packaging». Holes should be made with a sharp tool and the container should be flattened when it is metal cans and drums; glass bottles should be broken in a bag to avoid splinters; plastics are shredded and ground. Capsules and screws are removed beforehand.

Combustible containers are disposed off through monitored burning (paper and plastic packaging [PVC containers must not be burnt], carton) or deposited in a landfill accepting toxic waste of this nature (tear into pieces plastic jugs, glass containers and metal cans); ashes resulting from burning in the air are buried. However, the sticker on the container can bear a notice not recommending burning. Indeed, burning for example of some phenoxyacetic acid-based herbicidal containers can lead to the release of fumes toxic for human and surrounding flora.

Precautions: combustion must neither take place under conditions where wind is likely to send toxic smoke towards houses, livestock, and granary in the vicinity, nor towards those carrying the operation.

Non-combustible high volume recipients 50 to 200 liters can follow the chain as follows:

- return to supplier,
- sale/recovery to/by a company specialized in the sale of drums and used barrels with adherent material toxicity neutralization technologies that can proceed to recovery,
- evacuation towards a monitored landfill whose owner is informed of drums content and is warned about the potential release of toxic fumes if combustion is applied,
- evacuation towards a private site, fenced, guarded, while respecting environmental standards and used specifically for pesticides.

Non-combustible low volume recipients up to20 liters are either:

- conveyed towards public landfill, or
- buried on private site after removal of capsules or covers, perforation of containers, breaking of glass containers. The pit with a depth of 1 to 1.5 m used for burial purposes will be filled up to 50 cm of the soil surface and then covered with soil. The site will be away from homes and water bodies (wells, ponds, rivers), should not be cultivated and will not be in a flooding area; ground-water level should be at least at 3 m from the soil surface, the soil must be waterproof (clay-like or light sandy). The site will be fenced and identified.

ANNEX IV

Basic Principles of Integrated Control of Pests and Diseases

PRINCIPLES	**IMPLEMENTATION**	**RESULTS**
PRINCIPLE 1 Obtain and plant quality planting material	Choose seeds, cuttings, tubers or residues from very productive, healthy varieties and resistant to pests/diseases. To obtain certified seeds, contact national registered seeds growers or the national research centers for seed multiplication. Farmers could plant material taken from healthy plants from the previous campaign. Do not stock planting material for more than one season. Carry out summary germination tests.	The use of quality planting material will provide a healthy and productive and consequently a quality harvest. Certified seed varieties are often resistant to several pests and diseases. Remember the popular saying that good seeds make good harvests.
PRINCIPLE 2 Choose fertile soils and areas adapted to planting	Select soils with good natural drainage, suitable for cultivation. Some farming (low-land rice or irrigated rice for example) prefer submerged soils. Always perform cultivation in weed-free farms.	Crops need a maximum soil/land and water management to develop and compete effectively with weeds.
PRINCIPLE 3 Adopt good practices in nursery	Establish nurseries on disease-free soils to promote growth of seedlings. Cover the sol with mulch of Neem leaves or dry grass or straws.	After replanting in farm, rigorous seedlings will produce sturdy plants.
PRINCIPLE 4 Adopt devices and adequate planting devices	Plant in line, with an appropriate spacing for the crop species to avoid an excessive density. Intercropping is generally practiced in rows, alternated rows or strips.	A very high density prevents crop development and by creating a humid environment, encourages the emergence of diseases. Planting in line help save seeds and carry out easily agricultural activities such as (weeding) in weed control. Intercropping reduces pressure from insects and guarantees yields.
PRINCIPLE 5 Planting crops at the right time to	Schedule planting to avoid periods of pest and disease prevalence in farms. Coordinate plantation dates at the regional/provincial level to prevent pest from moving/migrating between crops and to maintain a seasonal rest period.	The crop defies strong incidence of pests and diseases during their development and growth. Pest development cycle is interrupted. Pest populations do not have the necessary time to reproduce

synchronize their growth period with a low incidence of pests and diseases		massively.
PRINCIPLE 6 Practice crop rotation	Plant successively crop that do not have common pests (cereals and root and tuber crops rotation with vegetables and legumes for example). Plant blanket crops during fallow (for example velvet bean and other legumes).	Crop rotation prevents the proliferation of diseases and soil-borne pest (nematodes or pathogens for example), as well as diapausing or overwintering insect pest survival. Blanket crops enrich soils and suffocate weeds.
PRINCIPLE 7 Adopt good soil conservation practices	Cover the ground with mulch, improve soil with compost or organic fertilizer and if needed, correct the nutrient balance with mineral fertilizers to enrich less fertile soils. Split fertilizer inputs, particularly nitrogen to better meet crop needs.	Poor soils are enriched at little cost to stimulate the growth and development of healthy crops and to obtain high yields, if fertilizer is used in a cost-effective manner.
PRINCIPLE 8 Adopt adequate and proper water management practices	Plant in soils with good natural drainage (except for rice). If necessary, build drainage channels to eliminate excess water; prepare water harvesting channel or pod (in millet or sorghum, for example) for sufficient water reserve. In irrigated condition, irrigate plants regularly depending on their need.	Crop development and growth are not compromised by lack of water; in addition crops do not suffer from water logging.
PRINCIPLE 9 Regular weeding	Place crops in weed-free farms. To prevent the production of seeds with weeds, hoe within three weeks after planting and hand-hoe superficially until the crop is covered. Pull out first weed seedlings before flowering and bolting.	This measure helps to save labor cost and avoid harming crop roots. Competition between crops and weeds is eliminated; the latter fail to produce seeds. Parasitic weeds cannot settle in farms.
PRINCIPLE 10 Regular farm inspections	Inspect farms every week to monitor crop growth and development, follow the development of auxiliaries and quickly detect the emergence of hot spot pests, diseases and weeds; carryout an agro-ecosystem analysis and decide on crop activities to be carried out.	Regular inspection of farms enables farmers detect problems and implement necessary integrated control measures to avoid extension of damage and, consequently, considerable yield losses.

PRINCIPLE 11 Keep farms perfectly clean	Always keep farms clean. Remove all residues (plants from previous year and plant residues for example); most residues are used as forage for livestock. Pull out and destroy crops with disease symptoms at early vegetative cycle. After harvest, remove crop residues (mow them and use them as livestock forage or bury them as soil amendment)	These results prevent pests and disease proliferation and their movement from plant to plant. Pest and diseases cannot spread to the whole farm.
PRINCIPLE 12 Combat pests and diseases effectively	Adopt a strategy on the prevention and growth of auxiliaries. Avoid control methods (excessive use of pesticides) that are harmful to human or crops as well as those causing environmental degradation; give preference to mechanical or natural methods (neem tree seeds/leaves extract, soapy solution for example). If the use of chemical pesticide becomes compulsory, (for example in case of outbreaks of Sunn pest or migratory crickets/grasshoppers or forest insect invasions, apply appropriate product in recommended areas, in accordance with required techniques in compliance with precautionary measures.	Pest and diseases problems under control contribute to a high and sustainable production with low-cost inputs. Natural products are cheaper and less harmful to human and the environment.
PRINCIPLE 13 Encourage growth of natural enemies (auxiliaries)	Adopt practices that create enabling environmental conditions for insect natural enemies' growth and reproduction (minimal use of synthetic pesticide, use of plant producing pesticides such as neem tree extract, and mulching to stimulate the reproduction of natural enemies such as predatory ants, spiders, beetles, flower flies and ladybird beetles).	Pest populations are efficiently and naturally controlled by a significant population of natural enemies. Natural pest control is neither harmful to human nor to the environment.
PRINCIPLE 14 Minimize chemical pesticide applications	Avoid the systematic and regular applications of pesticides. If really needed, use only selective pesticides. Give preference to plant products. Do not use phyto-pharmaceutical products as soon as pests or early symptoms appear. Always analyze the agro-system (AESA) before any treatment. In the event of pest overgrowth and considerable damage, use natural products (neem tree seeds/leaves extract soapy solution or pyrethrin).	The parsimonious use of selective chemical pesticides allows auxiliary populations (predatory ants, spiders, mantis and ladybirds, for example) to grow at the expense of pests. It is a natural method for controlling pest.
PRINCIPLE 15	Harvest crops upon maturity; be prudent to avoid harming, tearing, breaking or causing damage to harvested produce. Avoid harvesting or storing fruits	Farmers obtain better prices for clean and pest-free produce. Pest-free produce is easily conserved as it does

Adopt good practices of harvest	and vegetables in the sun.	not constitute an entry point for pests and pathogens. Freshly harvested produce and preserved at low temperature are conserved for a long time.
PRINCIPLE 16 Adopt appropriate and quality storage facilities.	Warehouses should be always clean, dry and well ventilated. Store only whole produce. Keep harvests in tight containers to protect them from pests of granaries. In general, damage caused by pests become significantly worse after three months of storage; therefore, distribute harvests in several batches according to their self-life. Process only batches intended for long-term preservation (with appropriate products like neem tree oil, pyrethrin or recommended pesticides for store products).	The quality of products in stocks is maintained during warehousing. Store products are not too much exposed to pest and pathogen contamination. Stored grains remain dry. Recommended pesticides for stock treatment are used economically.

ANNEX V

Examples of Available Tools in the IPM Toolbox

(Source 'Pest Management Guidebook' http://web.worldbank.org)

There is a wide variety of techniques that can be applied under IPM approaches. Applicability of individual techniques depends on various factors, including: the crop, the cropping system, the pest problems, the climate, the agro-ecological conditions, etc. Generally, IPM involves a combination of techniques. Some examples of such techniques:

Cultural practices that can help prevent build up of pests:

• Crop rotation

• Inter-cropping

• Field sanitation and seed bed sanitation

• Use of pest-resistant crop varieties

• Managing sowing, planting or harvesting dates

• Water/irrigation management,

• Soil and nutrient management

• Practices to enhance the buildup of naturally existing predator and parasite populations

• Weed management within and in the field borders or other hand-weeding

• Cover crops and grass species

• Use of traps or trap crops in borders or strips within the field

• Flowering plants along the borders

• Trap crops for insect pest, also used as reservoir for beneficial predators and parasites

• Planting and harvesting dates for pre-and post harvest loss preventions

Mechanical control practices

• Hand-picking of pests and sweeping

• Soil tillage to destroy insects and expose them to birds and other predators

• Complete decomposition of organic mattered in a field before planting

• Longer fallow periods between crops or more frequent grass rotations

• Vacuuming and destroying insect pests

• Floating row covers and plastic tunnels reduce access to many pest species

• Use of reflecting mulch in early aphid infestations

• Sticky trap barriers and attractants as monitoring devices

• Water pressure sprays

• Use of Diatomaceous or clay sprays against soft body insect pests

• Insecticidal Soaps

Biological inputs

• Biological control through release of predators, parasites, or pathogens (B. thurigiensis, B. bassiana, etc.)

• Biological control through fish, ducks, geese, goats, etc.

• Release of sterile male insects

• Bio-pesticides

• Biological preparations (e.g. Neem extract, rotenone, etc.)

Chemical inputs

• Chemicals that disrupt insect behavior (e.g.: pheromones, repellents, etc.)

• Growth-regulators

• Conventional pesticides

ANNEX VI

The "DO" and "DO NOT DO" of IPM policy

(source 'Pest Management Guidebook' http://web.worldbank.org)

DO NOT DO – Examples of elements that may contribute to a policy environment that encourages reliance on pesticides

• Pesticide use is directly or indirectly subsidized

• Inadequate pesticide legislation or weak enforcement of legislation to control import, distribution, handling and use of pesticides

• Requesting/accepting donor support in the form of pesticide donations, (i) without adequate assessment of actual requirements, (ii) without paying adequate attention to non-chemical alternatives, (iii) without appropriate pricing of these pesticides to avoid unnecessary use induced by availability at below-cost prices

• Government agricultural programs and associated budget allocations emphasize input supply more than farmer training in IPM

• Absence of IPM extension, as a result of which farmers have little or no access to information about alternative approaches that reduce reliance on chemical control

• Extension schemes/programs/messages are oriented towards chemical control

• Agricultural advisory services for extension staff and/or farmers have a financial interest in selling pesticides (e.g.: extension advice is provided by private sector entities that sell pesticides; extension staff receives commissions on pesticide sales)

DO - Examples of policy elements that reduce biases towards chemical control

• Social and environmental costs internalized in prices through polluter pay tax

• Enforcement of pesticide legislation

• Enforcement of food safety legislation regarding pesticide residues (quality control)

• Enforcement of environmental protection legislation

• Emphasis on development of agro-ecosystem management skills and knowledge

• Establishment of formal policies on IPM covering inter-agency coordination and common agendas' incentive systems, regulatory and information systems for sustainable agriculture, generation and dissemination of appropriate approaches and technologies

• Encouraging research on the economics and the environmental and health impact of different plant protection approaches and make this information available

• Development of an effective regulatory framework to enhance food safety and to reduce risks related to the distribution, handling and use of pesticides

• Orienting agricultural research in general to be more demand driven and with greater beneficiary participation.

ANNEX VII

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ANNEX VIII

Persons Meet During this Mission

1. H.E. Mr. Abdul Ghani Ghuriani; Deputy Minister Technical Affairs, Ministry of Agriculture, Irrigation and Livestock, Kabul, Islamic Republic of Afghanistan.
2. Mr. Assad Zamir; Director General, General Directorate of Programs, Ministry of Agriculture, Irrigation and Livestock, Kabul, Islamic Republic of Afghanistan.
3. Mr. Mir. Amanulldin Haidari; Director of the Plant Protection and Quarantine Department, Ministry of Agriculture, Irrigation and Livestock, Kabul, Islamic Republic of Afghanistan.
4. Eng. Abdul Satar Sarhal; Director of Customs Central Laboratory, Custom General Directorate,Ministry of Finance, Kabul, Islamic Republic of Afghanistan.
5. Eng. Qasem (Obaidi); Director of Agriculture Research Institute of Afghanistan (ARIA), Ministry of Agriculture, Irrigation and Livestock, Kabul, Islamic Republic of Afghanistan.
6. Eng. Ghulam Mohammad Malikyar; Deputy Director General/ Technical, National Environmental Protection Agency (NEPA), Kabul, Islamic Republic of Afghanistan.
7. Mr. Hukum Khan Habibi; Director General of Extension & Agriculture Development, Ministry of Agriculture, Irrigation and Livestock, Kabul, Islamic Republic of Afghanistan.
8. Mr. Mozammil Shinwari; Director General of International Trade, Ministry of Commerce and Industries, Kabul, Islamic Republic of Afghanistan.
9. Mr. Ghulam Hazrat Halimi; Project Director for the Horticulture Cooperatives Development Project (HCDP), General Directorate of Programs, Ministry of Agriculture, Irrigation and Livestock, Kabul, Islamic Republic of Afghanistan.
10. Mr. Habib Khan; Project Director, On-Farm Water Management Project (OFWMP), Ministry of Agriculture, Irrigation and Livestock, Kabul, Islamic Republic of Afghanistan.
11. Mr. Fazal Hamid; National IMP Specialist, Head of Integrated Pest Management Program, Horticulture and Livestock Project (HLP), Ministry of Agriculture, Irrigation and Livestock, Kabul, Islamic Republic of Afghanistan.
12. Prof. Alem Alemi; Deputy Team Leader, Rural Business Support Program for Afghanistan, Ministry of Agriculture, Irrigation and Livestock, Kabul, Islamic Republic of Afghanistan.
13. Mr. Zemarsi Ahmad Zada; Expert Cereal Improvement, Agriculture Research Institute of Afghanistan, Ministry of Agriculture, Irrigation and Livestock, Kabul, Islamic Republic of Afghanistan.
14. Mr. Mohammad Ibrahim Rahmani; Environmental Coordinator, Horticulture and Livestock Project (HLP), Ministry of Agriculture, Irrigation and Livestock, Kabul, Islamic Republic of Afghanistan.
15. Ms. Kristin Harms; Horticulture Specialist, Horticulture and Livestock Project (HLP), Ministry of Agriculture, Irrigation and Livestock, Kabul, Islamic Republic of Afghanistan.
16. Mr. Mohammad Ishaq Sahibzada; Safeguard Specialist, On-Farm Water Management Project, Ministry of Agriculture, Irrigation and Livestock, Kabul, Islamic Republic of Afghanistan.
17. Mr. Zia Ahmad Abdulrahimzai; Parliament and Provincial Affair Advisor to the Minister, Ministry of Agriculture, Irrigation and Livestock, Kabul, Islamic Republic of Afghanistan.
18. Mr.Abdullah; Plant Protection Director, Kandahar Province, Ministry of Agriculture, Irrigation and Livestock, Kandahar, Islamic Republic of Afghanistan.

19. Ms. Mariella Sandini; Project Horticulturist of the PHDP for Provision of Technical Assistance to the Ministry of Agriculture, Irrigation and Livestock, Kabul, Islamic Republic of Afghanistan .
20. Dr. Shyam Singh Yadav; International Advisor for Capacity Building in Agriculture, Ministry of Agriculture, Irrigation and Livestock, Kabul, Islamic Republic of Afghanistan.
21. Mr. Abdul Kabir Farzam; Director of Agriculture, Irrigation and Livestock, Parwan Province, Islamic Republic of Afghanistan.
22. Mr. Hashmatullah Enayat; Director of Agriculture, Irrigation and Livestock, Kabul Province, Badam Bagh- Kabul, Islamic Republic of Afghanistan.
23. Mr.Mirjan Hemut; Head of the IPM Unit, Plant Protection and Quarantine Department, Ministry of Agriculture, Irrigation and Livestock, Kabul, Islamic Republic of Afghanistan.
24. Mr. Noor Ahmad (malakhail); Team Leader of the On Farm Water Management Project, Ministry of Agriculture, Irrigation and Livestock, Mazar-e-Sharif Regional Office, Islamic Republic of Afghanistan.
25. Pr. Zahir Abibi; Head of the Entomology and Plant Protection Department, Herat University, Herat, Islamic Republic of Afghanistan
26. Mr. Kateb Shams; Director of Agriculture, Irrigation and Livestock, Balkh Province, Mazar-e-Sharif, Islamic Republic of Afghanistan
27. Mr. Aria Ahmad Zia, Regional Seed Coordinating Officer, GCP/AFG/045/EC Seed Project, OIC/FAO North Region, FAO Balkh Agriculture Office, Mazar-e-Sharif, Islamic Republic of Afghanistan.
28. Mr. Basir Ahmad Tabib; Head of the Plant Protection and Quarantine Department of Herat Province, Ministry of Agriculture, Irrigation and Livestock, Herat, Islamic Republic of Afghanistan
29. Er. Abdul Rahman Manan; Advisor and Deputy Head of ICARDA-Afghanistan Program, Kabul, Islamic Republic of Afghanistan
30. Pr. Ghulam Rasul Faizi, Department of Plant Protection, Faculty of Agriculture, Kabul University, Kabul, Islamic Republic of Afghanistan