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AFGHANISTAN ACCELERATING SUSTAINABLE AGRICULTURE PROGRAM (ASAP)

PESTICIDE EVALUATION REPORT AND SAFER USE ACTION PLAN (PERSUAP)

June 22, 2008

Pending USAID approval

AFGHANISTAN ACCELERATING SUSTAINABLE AGRICULTURE PROGRAM (ASAP)

PESTICIDE EVALUATION REPORT AND SAFER USE ACTION PLAN (PERSUAP)

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The author's views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

Acronyms

ABSC	Agribusiness Brokerage Service Center
AI	Active Ingredient
ADI	Average Daily Intake
ANE	Asia and Near East Bureau of USAID
ASAP	Accelerating Sustainable Agriculture Program
BEO	Bureau Environmental Officer
BRC	British Retail Consortium
CBD	Convention on Biological Diversity
CFR	Code of Federal Regulations
CIA	Central Intelligence Agency
COP	Chief of Party
CTO	Cognizant Technical Officer
DCA	Dutch Committee for Afghanistan
EA	Environmental Assessment
EC	European Community
EC_{50}	Effective Concentration to kill 50 percent of a population
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EPAs	Economic Partnership Agreements
EU	European Union
EUREPGAP	European Good Agricultural Practices (also known as EUROGAP)
EXTOXNET	Oregon State University Ecotoxicology Network Pesticides Website
FAO	Food and Agriculture Organization (part of UN)
FLO	Fairtrade Labeling Organization
GAP	Good Agriculture Practice
GDP	Gross Domestic Product
GUP	General Use Pesticide
Ha	Hectare
HACCP	Hazard Analysis Critical Control Point
HLP	Emergency Horticulture and Livestock Project (World Bank Project)
HT	Highly Toxic
IEE	Initial Environmental Examination
IFDC	International Fertilizer Development Center
IFOAM	International Federation of Organic Agriculture Movements
IGR	Insect Growth Regulator
IOAS	International Organic Accreditation Service
IPM	Integrated Pest Management
ISO	International Standards Organization
LC_{50}	Lethal concentration to kill 50 percent of a population
Km	Kilometer
Kg	Kilogram
LD_{50}	Lethal dose to kill 50 percent of a population
LOP	Life of Program
MAIL	Ministry of Agriculture, Irrigation, and Livestock
M&E	Monitoring and Evaluation
MEO	Mission Environmental Officer
MoPH	Ministry of Public Health
MRL	Minimum Residue Level
MSDS	Material Safety Data Sheet
MT	Moderately Toxic
NAIS	National Agriculture Information System
NAT	Not Acutely Toxic
NEPA	National Environmental Policy Act (USA)
NEPA	National Environmental Protection Agency (Afghan)
NGO	Nongovernmental Organization
OP	Organophosphate (a class of pesticides)

OPIC	Overseas Private Investment Corporation
PAN	Pesticide Action Network
PER	Pesticide Evaluation Report
PERSUAP	Pesticide Evaluation Report and Safer Use Action Plan
pH	log of hydrogen concentration, measure of acidity
PIC	Prior Informed Consent (a treaty, relates to pesticides)
POPs	Persistent Organic Pollutants (a treaty, relates to toxic pesticides)
PNT	Practically Non-Toxic
PPE	Personal Protection Equipment
PPQD	Plant Protection and Quarantine Department
PVO	Private Volunteer Organization
R&D toxin	Reproductive and Developmental Toxin
Reg 216	Regulation 216 (USAID Environmental Procedures)
REI	Re-Entry Interval (safety period after pesticide spraying)
RUP	Restricted Use Pesticide
S	Solution (a pesticide formulation)
SOW	Scope of Work
SPS	Sanitary and Phytosanitary
ST	Slightly Toxic
SUAP	Safer Use Action Plan
U	Unlikely to be toxic
UC	University of California
UN	United Nations
UNEP	United Nations Environment Program
UNFAO	United Nations Food and Agriculture Organization
UNWHO	United Nations World Health Organization
USAID	United States Agency for International Development
USEPA	U.S. Environmental Protection Agency (also known as EPA)
VFU	Veterinary Field Unit
VHT	Very Highly Toxic
WHO	World Health Organization
WTO	World Trade Organization
WWW	World Wide Web

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Executive Summary

This study has been performed to ensure ASAP's compliance with 22 Code of Federal Regulations (CFR) 216, as prescribed in the Initial Environmental Examination (IEE). Upon approval by the USAID Asia and Near East Bureau Environmental Officer, activities relating to the procurement or use of pesticides can commence.

This Pesticide Evaluation Report and Safer Use Action Plan (PERSUAP) recognizes 23 crops or crop groupings that are likely to be supported by ASAP: grapes, almonds, apricots, apples, melons/cucurbits/squash/pumpkins, carrots, spinach, tomatoes, potatoes, strawberries, eggplant, pepper, turnips, radishes, onions/garlic, okra, corn, lettuce, kale, asparagus, collards, canola, and cumin, and the common production constraints and pests of these crops.

This study evaluates 144 pesticide active ingredients (AIs): 61 in insecticides/miticides, 4 in fumigants, 3 in rodenticides, 2 in molluscicides, 52 in fungicides, and 22 in herbicides. Each AI was evaluated for the following factors: active ingredient class, EPA registration status (including Restricted Use Products status), with criteria for restrictions, acute human toxicity by EPA and WHO systems, chronic human health issues, groundwater contamination potential, and ecotoxicity to fish, honeybees, birds, amphibians, earthworms, mollusks, crustaceans, aquatic insects and plankton.

ASAP has already done a lot of work to promote safe storage, handling and use of pesticides for staff, farmers, rural farm stores, and others, including, but not limited to, promoting Integrated Pest Management (IPM) tools and techniques.

Using a systems approach, we analyzed the entire pesticide system in Afghanistan for risk, to determine a risk profile within which to evaluate ASAP activities. The report also assesses the effects of the following risk reduction systems: International Trade and Markets, Standards and Certification Systems like Good Agriculture Practices (GAPs), Codes of Conduct, Sanitary and Phytosanitary (SPS) Barriers, and World Trade Organization (WTO) membership.

This PERSUAP recommends a "negative determination" for all ASAP agricultural production activities, with the following recommendations to be followed as "Conditions" for the negative determination.

Recommendations

ASAP staff will incorporate these recommendations in action plans with appropriate resources and deadlines, with COP support and sign-off upon completion.

Immediately:

- Eliminate from ASAP lists any pesticides containing active ingredients that are either not registered for same or similar use by the U.S. EPA and those deemed very highly toxic (Class I) with increased risk to project implementers and beneficiaries;
- For active ingredients of high toxicity (Class II) and RUP pesticides, discontinue use until all program implementers and beneficiaries have received sufficient (to set or change behavior in favor of best safe use practices) training with proper use of personal protective equipment (PPE) and integrated pest management (IPM);
- For pesticide active ingredients with relatively lower toxicity (Class III and IV), continue to train program implementers and beneficiaries in safe pesticide understanding and use (to set or change behavior in favor of best safe use practices) and IPM training and use PPE;
- ASAP should continue to assist the farm stores sector with best practices training;
- ASAP should continue to source pesticides from well-managed stores that do not sell illegal or products containing very highly toxic active ingredients;
- ASAP should obtain Material Safety Data Sheets (MSDSs) from pesticide importers/distributors for pesticides that will be used extensively on program crops;
- ASAP should produce quick reference guides (and if possible crop phenology) for all of the anticipated major or primary pests/production constraints by crop, GAPs and IPM measures that can be used to strengthen and protect the crop, pesticides to be used on the program for each anticipated pest, with use rates, safety measures, environmental concerns, restricted entry intervals (REI) and minimum residue levels (MRLs) for export and local consumption;
- ASAP should continue to provide safe pesticide use training for staff and beneficiaries;
- ASAP should ensure that protective clothing (gloves, mask, goggles, boots) are issued to farmers whose fields are used as a demonstration plots and people who mix or apply pesticides.

Ongoing:

- ASAP project staff economists should perform economic analyses comparing pesticides to determine the most effective choice — with low health and environmental impact potential — affordable for the crop grown;
- ASAP should choose and use pesticides with low human and environmental risk profiles (see decision matrix in Table 1, MSDSs, and Labels), as practical;
- ASAP should use more biological and naturally-derived pesticides, as practical;
- During training and field visits by ASAP staff, ASAP should emphasize and enhance understanding of the IPM philosophy, tools, and techniques, with pesticides used only as a last resort;
- ASAP should continue to produce safe use training materials and posters;
- ASAP should rotate pesticides to reduce the build-up of resistance;
- ASAP should monitor for pest resistance by noting the reduction in efficacy of pesticide products;
- ASAP should use pesticides with low ground water contamination potential where water tables are high or easy to reach;
- Continue to work with the new MAIL as they implement environmental compliance.

By the end of the 2008 cropping season, ASAP should:

- ASAP should regularly (at least annually), update any changes to the list of pesticides proposed for use and communicate these changes to USAID with a note that an amendment to this PERSUAP will be necessary;
- ASAP implementers and beneficiaries should understand and follow basic first aid for pesticide overexposure;
- Investigate and promote the use of biological and natural pesticides and additional IPM measures to reduce use of synthetic pesticides;
- Include sections on environmental impact mitigation, with subsections on Afghan and EPA regulation compliance, GAPs/IPM measures tried/used, biodiversity and conservation, inputs and PPE use and issues, training/capacity building in IPM and safe use, and monitoring/audits of IPM and safe use issues outstanding (discuss issues in the PER section on monitoring) in the Year 2 Annual Report to USAID and Year 3 Work Plan.

By the end of the 2009 cropping season, ASAP should:

- Regularly (at least annually) update any changes to the list of pesticides proposed for use and communicate these changes to USAID with a note that an amendment to this PERSUAP will be necessary
- Include sections on environmental impact mitigation, with subsections on compliance with Afghan and EPA regulations, GAPs/IPM measures tried/used, biodiversity and conservation, inputs and PPE use and issues, training/capacity building in IPM and safe use, and monitoring/audits of IPM and safe use issues outstanding (discuss issues in the PER section on monitoring) near LOP end in the Year 3 Annual Report to USAID.

Justification

The death of five Pakistani Ministry of Health workers in 1976 during USAID anti-malaria spray campaigns, along with about 2,800 sub-lethal poisonings, led USAID to develop regulations that dictate risk mitigation and reduction to protect human health and safety while protecting the environment. These poisonings could have been avoided or greatly reduced with risk awareness and risk reduction training and the use of personal protective equipment (PPE). The environmental regulations that USAID codified (adapted from the US National Environmental Policy Act — NEPA) to mitigate such risks are written under Title 22 of the Code of Federal Regulations (CFR) for Foreign Assistance.

This study was performed to comply with the requirements of 22 Code of Federal Regulations (CFR) 216, as prescribed in the program's Initial Environmental Examination (IEE) and to seek the approval of the Asia and Near East (ANE)/Bureau Environmental Officer (BEO) before implementing activities relating to the procurement or use of pesticides.

US Government Regulation 216 Compliance

Part 216 (also called Regulation 216) of 22 CFR finds that certain environmental compliance procedures and a process must be followed on overseas projects to:

- Create modern state-of-the-art development;
- Achieve optimal economic results with every dollar invested;
- Avoid harming people in both our partner countries and the United States;
- Avert unintended negative economic growth;
- Reinforce practical civil society and democracy through transparency and public participation;
- Reduce diplomatic incidents;
- Engender public trust and confidence in USAID; and
- Comply with the law.

Regulation 216 subjects all USAID activities to analysis and evaluation via (at minimum) an Initial Environmental Examination (IEE), and (at maximum) an Environmental Assessment (EA).

Because of the extra risks presented by pesticides, a large part of Regulation 216 (part 216.3) is devoted to pesticide use and safety. Part 216.3 requires that 12 pesticide factors be analyzed and recommendations be written to mitigate risk, with training and monitoring. USAID adopted the philosophy and practice of Integrated Pest Management (IPM) as official policy in the early 1990s. IPM is strongly promoted and required in Regulation 216.3, and, since the early 2000s, it is now being included as an integral part of the Good Agriculture Practices (GAPs) increasingly being adopted as the best management practices in USAID agricultural projects.

In the late 1990s, USAID Africa Bureau developed a tool called the "Pesticide Evaluation Report and Safer Use Action Plan" (PERSUAP) to analyze the pesticide system from import through use to disposal in any given country or territory. This "systems approach" creates a pesticide risk profile and determines relative risk factors based upon this profile. The PERSUAP examines a pesticide system in a country and is submitted as an amendment to the project IEE (usually the umbrella IEE that is put into place when a project commences).

The PERSUAP focuses on the particular circumstances of the ASAP program, the pesticide system within which it operates, the risk management choices available, and how ASAP would implement a risk management plan in the field. Further details about what to include in a PERSUAP are given below.

Pesticide Risk Management

When the U.S. Environmental Protection Agency (USEPA) registers pesticide products for use in the United States, it specifies the manner in which the product can be "safely" used (that is, with an

acceptably small risk), including the safety equipment needed when applying the pesticide, how to apply it, the allowed uses, storage, transport, and disposal. It is important to note the context in which EPA makes these registration decisions. In the United States, an extensive system of capabilities and resources exists that helps give the USEPA confidence these specifications will be followed and the product will be used appropriately and safely. These include a 97 percent literacy rate (most of the population can read labels), close control by the USEPA over the contents of pesticide labels, training requirements and programs for pesticide products that require applicator certification — such as restricted use pesticides (RUPs) and fumigants (some of which are USEPA acute toxicity class I or II pesticides), worker protection requirements, occupational safety regulations, and relatively effective federal, state, and local enforcement mechanisms.

In countries like Afghanistan, a local-level analysis and evaluation such as a PERSUAP is needed for pesticide use because farmers and other field workers in these countries are unlikely to have the training (or literacy) to understand the risks of using pesticides or implement means to reduce these risks. They may not be able to read or understand pesticide labels, even if they are present. As in 1976, dangerous formulations of pesticides containing very toxic byproducts or adulterated products with unknown or low-quality components may enter the country and be used by unsuspecting program staff or recipients.

In allowing the use of certain pesticides in its overseas programs, USAID cannot rely on the same societal capabilities and resources that the USEPA does to assure appropriate use of the product in the United States. Preparing a PERSUAP gives the ASAP program manager the opportunity to consider practical actions to *reduce the risks* of using pesticide products, taking into consideration the context in which the products will be used, the particular elements of the program, and the capacities of the various partners and stakeholders involved.

Components of a PERSUAP

A PERSUAP basically consists of two parts, a Pesticide Evaluation Report and a Safer Use Action Plan. The Pesticide Evaluation Report (PER) uses the information collected on the pesticide system in Afghanistan to inform stakeholders and partners of the levels and types of risk likely to be found and sets the stage for the specific pesticide analysis. It then analyzes integrated pest and pesticide management options in Afghanistan, vetting them through Regulation 216's special section (216.3) on Pesticide Procedures with 12 informational elements.

The Safer Use Action Plan (SUAP) puts the conclusions reached in the PER into recommendations for plans of action, assigning responsibility to appropriate parties connected with the pesticide program. This PERSUAP supporting an initial environmental evaluation (IEE) for agricultural production activities for local consumption and regional export markets is being submitted, specifically to address uses of pesticides, as listed below.

The Scope of Work for this PERSUAP is attached as Attachment 1.

Country Background

Afghanistan is a landlocked country north and west of Pakistan, east of Iran, and slightly smaller than Texas. It is also bordered by China, Tajikistan, Turkmenistan, and Uzbekistan. Water resources there are very limited.

Natural resources include natural gas, petroleum, coal, copper, chromite, talc, barites, sulfur, lead, zinc, iron ore, salt, precious and semiprecious stones. Slightly more than 12 percent of the surface area is arable, with permanent crops on 0.22 of it. Environmental issues include limited natural fresh water resources, inadequate supplies of potable water, soil degradation, overgrazing, deforestation (much of the remaining forests are being cut down for fuel and building materials), desertification, and air and water pollution.

Currently, agriculture accounts for 60 of Afghanistan's GDP and 80 percent of its labor force, with industry and services making up 20 percent and 10 percent of GDP and labor, respectively. Agricultural products include opium, wheat, fruits, nuts, wool, mutton, sheepskins, and lambskins. Agriculture is the country's main source of income, and in good years, Afghanistan produces enough food and food products to provide for the people and a surplus for export. The major food crops produced are corn, rice, barley, wheat, vegetables, fruits, and nuts. The major industrial crops are cotton, tobacco, madder, castor beans, and sugar beets. Sheep farming is also extremely valuable. The major sheep product exports are wool and highly prized Karakul skins.

Afghanistan exports opium, fruits and nuts, hand-woven carpets, wool, cotton, hides and pelts, and precious and semi-precious gems. In the 1960s, it was the world leader in raisin production. Major export partners are Pakistan, India, the United States, and Germany. Import partners are Pakistan, the United States, India, Germany, Turkmenistan, Kenya, South Korea, and Russia.

According to the CIA, "Afghanistan's economic outlook has improved significantly since the fall of the Taliban regime in 2001 because of the infusion of over $2 billion in international assistance, recovery of the agricultural sector, and the reestablishment of market institutions. Agriculture boomed in 2003 with the end of a four-year drought, but drought conditions returned for the southern half of the country in 2004. Despite the progress of the past few years, Afghanistan remains extremely poor, landlocked, and highly dependent on foreign aid, farming, and trade with neighboring countries. It will probably take the remainder of the decade and continuing donor aid and attention to raise Afghanistan's living standards up from its current status among the lowest in the world. Expanding poppy cultivation and a growing opium trade may account for one-third of GDP and looms as one of Kabul's most serious policy challenges."

Agriculture

According to http://dosfan.lib.uic.edu/ERC/bgnotes/sa/afghanistan9407.htmlAgriculture , "The Afghan economy continues to be overwhelmingly agricultural, despite the fact that only 15% of its total land area is arable and less than 6% currently is cultivated. Agricultural production is constrained by an almost total dependence on erratic winter snows and spring rains for water; irrigation is primitive. Until very recently, relatively little use has been made of machines, chemical fertilizer, or pesticides.

Grain production is Afghanistan's traditional agricultural mainstay. Overall agricultural production declined an average of 3.5% per year between 1978 and 1990. This can be attributed to sustained fighting, instability in rural areas, prolonged drought, and deteriorated infrastructure. Soviet efforts to disrupt production in resistance-dominated areas also contributed to this decline. Furthermore, Soviet efforts to centralize the economy through state ownership and control and consolidation of farmland into large collective farms contributed to lower production.

The war against the Soviet Union and the ensuing civil war also led to migration to the cities and refugee flight to Pakistan and Iran, further disrupting normal agricultural production. Recent studies indicate that agricultural production and livestock numbers are less than one-half of what they were in 1978. It is estimated that Afghanistan's food production levels are about 15% lower than what is necessary to feed the population.

Shortages are exacerbated by the country's already limited transportation network, which has deteriorated due to damage and neglect resulting from war and the absence of an effective central government.

Opium is increasingly becoming a source of cash for many Afghans, especially since the breakdown in central authority after the Soviet withdrawal. Opium is easy to cultivate and transport and offers a quick source of income for returning refugees and other impoverished Afghans. Afghanistan is the second-largest producer of raw opium in the world, after Burma.

In 1993, despite efforts by the U.S. and others to encourage alternative crops, poppy and opium production increased 8 percent and 7 percent, respectively, from a year earlier. Much of Afghanistan's opium production is shipped to laboratories in Pakistan and refined into heroin which is either consumed by a growing South Asian addict population or exported, primarily to Europe and North America."

Many agricultural development projects work to replace opium poppy with other high-value crops.

Description of Relevant ASAP Activities

The United States Agency for International Development's Mission to Afghanistan (USAID/Afghanistan) has selected Chemonics International to implement ASAP. The purpose of this 40-month program (12/2006 – 3/2010) "is to accelerate broad-based, market-led agriculture development capable of responding and adapting to market forces in ways that provide new economic opportunities for rural Afghans." ASAP will, in concert with other project efforts, emphasize relevant technology generation and transfer, with an increased focus on marketing of high-value commodities, competitiveness, sustainability, and natural resource management. Together, these initiatives will foster competitive private-sector agriculture.

ASAP works in both the livestock and horticulture subsectors. The horticulture activities occur as part of three distinct initiatives:

- The existing demonstration farm at Badam Bagh, located on government land on the outskirts of Kabul;
- The proposed Mazar Foods Corporation, a large-scale commercial farming operation expected to be funded by both USAID and the Overseas Private Investment Corporation (OPIC); and
- Technical assistance to selected farm stores and producers in ASAP's 19 target provinces, related to procurement and use of pesticides, fungicides, and other plant disease control agents.

Revised ASAP Program Structure

Several key changes were made to ASAP's organizational structure in early 2008 to better support the implementation of the program's new buyer-led approach, which are described below. This organizational structure may see additional changes as ASAP continues to evolve.

Agribusiness Deal and Technical Assistance Units

The Agribusiness Deal and Technical Assistance Units represent a fundamental shift toward the new ASAP buyer-led approach. These units are charged with the overall direction and management of the field-based agribusiness brokerage services centers (ABSCs) that ASAP will establish and the provision of technical assistance to address constraints along the value chain of various agricultural products. Central direction and technical monitoring of the ABSCs is essential, and these two units will perform that function. When the Agribusiness Deal Unit identifies business opportunities (through the ABSCs or directly by the unit staff), the Agribusiness Technical Assistance Unit will facilitate technical assistance to address key constraints that prevent the client from producing, processing, selling, or buying the right product at the right time. The Agribusiness Deal Unit is also charged with identifying and securing the commitment of buyers and investors, especially foreign buyers. The Agribusiness Technical Assistance Unit will be responsible for the management of the Badam Bagh AgFarm and AgFairs.

The Agribusiness Deal Unit is managed by Andres Judeh and supported by Assistant Director Ben Friedman and local support staff tasked with training and monitoring the ABSC subcontracts. The Agribusiness Technical Assistance Unit is managed by Tom Brown and supported by two local agribusiness specialists responsible for coordinating and supervising technical assistance to the ABSC clients. Technical assistance may be sourced through short-term consultants, purchase orders, or subcontracts. Tom Brown also supervises AgFarm Manager Peter O'Farrell, who is responsible for managing the AgFarm and organizing AgFairs. Haroon Zareef, the AgFarm associate, works under Mr. O'Farrell's guidance.

Planning and Network Development Unit

The Planning and Network Development Unit will house the veterinary field unit (VFU), AgDepot, NAIS/AgNet, and Livestock Product Development programs. This unit will maintain a close link to the MAIL through the NAIS/AgNet program. The overall goal of the Planning and Network Development Unit is to develop and nurture VFU and AgDepot networks to ensure that important goods and services are delivered to rural households by sustainable businesses. These networks will expand sales of agricultural and livestock products by collaborating with the Agribusiness Brokerage Services Centers. At this time, the Livestock Product Development program is focusing on the cashmere value chain. However, as new opportunities are identified in close coordination with the Agribusiness Deal Unit, this program will expand its reach and scope.

While the cashmere value chain activities naturally fit under the Agribusiness Deal and Technical Assistance units, ASAP has placed this key program under the Planning and Network Development Unit because of the close link between the cashmere activities and the VFU program. The VFUs will provide extension services to herders to train to harvest and store the cashmere and will serve as collection points for the harvested cashmere by purchasing the product from the herders and selling it to buyers for a profit. Herders will increase their income from the sale of cashmere to the VFUs, and the VFUs will, in turn, expand their income-generating activities. It is also important to note that the VFU program will continue to be implemented by the Dutch Committee for Afghanistan (DCA) through its subcontract with ASAP. Raymond Briscoe is a DCA employee, but is a full-time staff member of the ASAP program. ASAP will also assume full management of the AgDepot program as IFDC is transitioned off of the program. Ehsanullah Ehsan, a full-time ASAP employee, will serve as the AgDepot Manager going forward and will supervise a team of five local AgDepot managers.

Performance Monitoring and Communications Unit

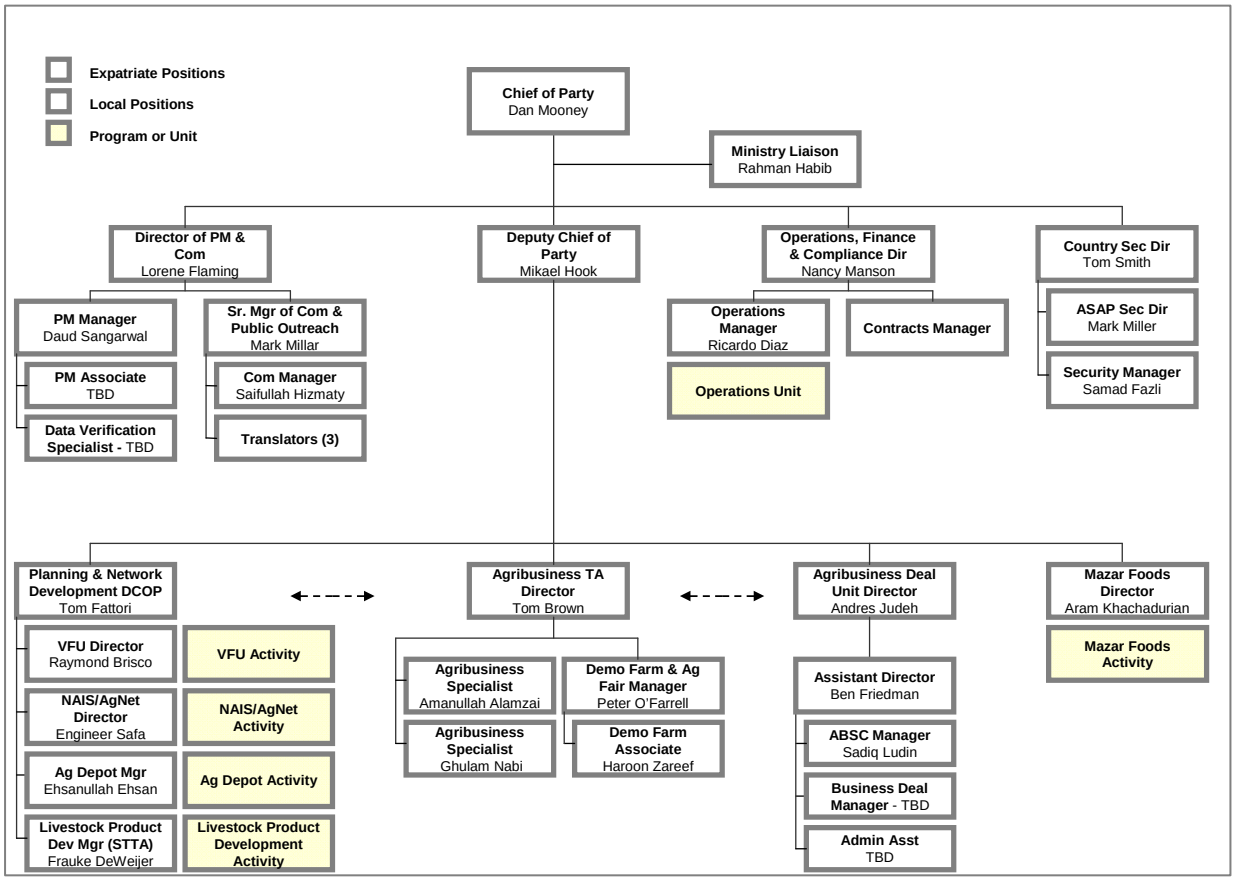
Under the new ASAP, the Performance Monitoring and Communications teams have been combined to better support the program objectives. The Performance Monitoring and Communications team will work closely with the technical teams and units to track increases in sales and jobs and independently verify ABSC results. By linking performance monitoring with communications, ASAP is better positioned to create accurate and timely communications reports and products, especially success stories to attract new clients. {erformance Monitoring and Communications Director Lorene Flaming will supervise this unit, supported by Senior Manager of Communications and Public Outreach Mark Millar and a team of local performance monitoring and communications staff.

The Communications team will continue to oversee standard communications activities, such as the preparation of project reports and success stories, but will also work closely with the Agribusiness Deal Unit and MAIL. The Communications team will work with the Agribusiness Deal Unit to market and promote Afghan agricultural products nationally and internationally and will provide ongoing assistance to MAIL outreach and public relations activities. The Performance Monitoring and Communications Unit will support the Mazar Foods project by tracking and reporting results and communicating successes for USAID-funded activities.

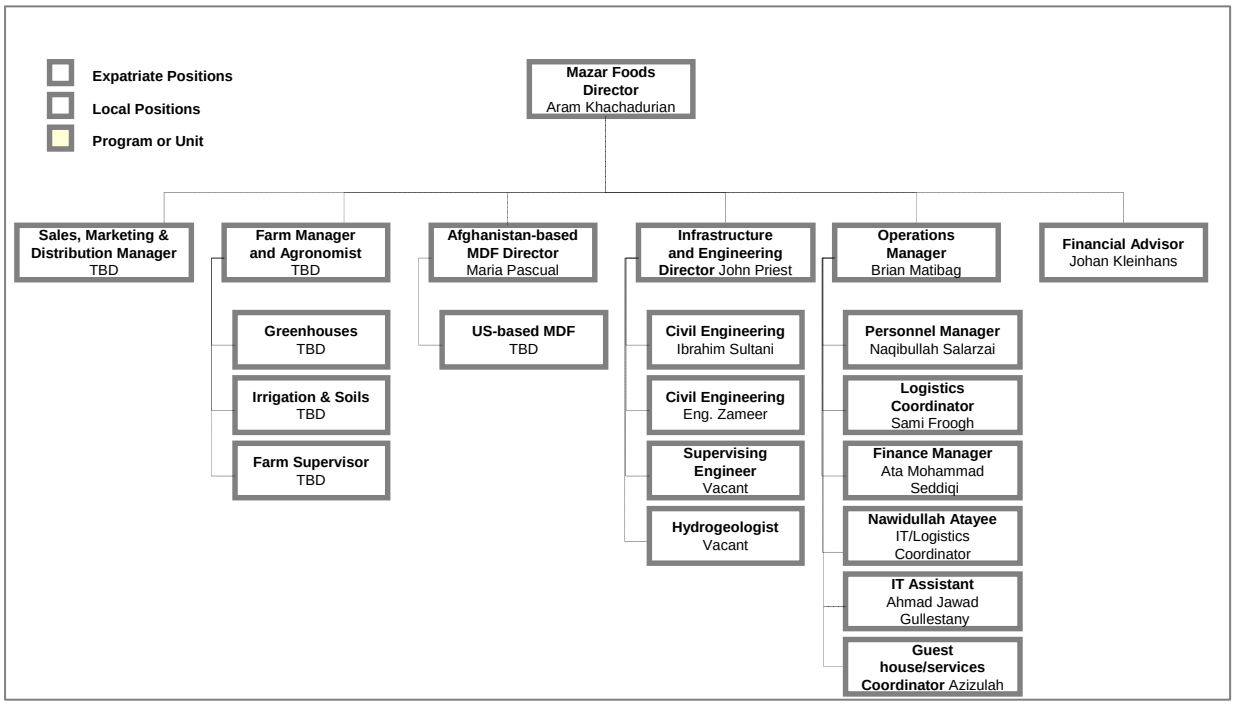
Mazar Foods Project

The Mazar Foods project is a new activity started under the ASAP contract in the fall of 2007 to create a commercially viable farming operation in Balkh Province based on production and processing of fruits, vegetables, and nuts that would be sold domestically for import substitution and in other contexts that will not hurt local producers and exported to neighboring countries. While the Mazar Foods project is a component of the larger ASAP, it is treated as a separate activity and has its own organizational structure. The Mazar Foods project team consists of ASAP long-term and short-term consultants who will provide technical assistance to the project, supported by core ASAP employees who will bill part of their time to the Mazar Foods program and long-term local professional and support staff.

ASAP Organizational Structure



Mazar Foods Project Organizational Structure



ASAP Crops and Pests

The following is a list of crops and associated pests, as communicated by ASAP staff.

Grapes: Downy mildew *(Podosphaera leucotricha)*, powdery mildew *(Uncinula necator)*, armillaria root rot, bot canker, botrytis bunch rot, eutypa dieback, black vine weevil *(Otiorhynchus sulcatus)*, ants *(Linepithema humile)*, webspinning spider mites *(Tetranychus pacificus)*, vine mealybug, leafhopper (cicada), amaranthus, barnyard grass, hare barley, foxtail barley, Southern brass buttons, Bermuda grass, and nut sedge.

Almonds: Aphids, European red mite, fruit tree leaf roller, Oriental fruit moth, peach twig borer, ten-lined June beetle, San Jose scale, tree borers, almond leaf scorch, bacterial, brown rot blossom blight, shot hole, phytophthora root and crown rot, anthracnose, Bermuda grass, Italian ryegrass, barnyard grass, hare barley, foxtail barley, Southern brass buttons, and nut sedge.

Apricot: Shot hole disease *(Wilsonomyces carpophilus)*, bacterial canker *(Pseudomonas syringae)*, verticillium wilt *(Verticillium dahliae)*, brown rot blossom and twig blight, ripe fruit rot, aphids, branch and twig borer, green fruit worm *(Orthosia hibisci)*, shot hole borer, European red mite, peach twig borer, mealy plum aphid, Bermuda grass, nut sedge, Italian ryegrass, barnyard grass, hare barley, foxtail barley, Southern brass buttons, and oxidation in dried fruit.

Apples: Powdery mildew, fire blight, apple scab, woolly apple aphid *(Eriosoma lanigerum)*, San Jose scale, codling moth, apple maggot, European red mite, green fruit worms, green apple aphid, Bermuda grass, nut sedge, Italian ryegrass, barnyard grass, hare barley, foxtail barley, Southern brass buttons, and oxidation in dried fruit.

Melons/cucurbits/squash/pumpkin: Anthracnose, fusarium crown and foot rot, fusarium wilt (watermelon), powdery mildew, darkling beetles, melon fly, cutworms, grasshoppers, melon aphid, amaranthus, wild carrot, Bermuda grass, and nut sedge.

Carrots: Powdery mildew, bacterial soft rot, crown and root aphids, honeysuckle aphid, whiteflies, amaranthus, wild carrot, and Bermuda grass.

Spinach: Anthracnose, bacterial leaf spot, damping-off and root rot, caterpillars, green peach aphid, spinach crown mite, wireworms, amaranthus, wild carrot, Bermuda grass, and nut sedge.

Tomato: Alternaria stem canker, anthracnose, damping-off, early blight, fusarium wilt, beet leafhopper, cutworms, wild carrot, Bermuda grass, and nut sedge.

Potato: Bacterial ring rot, cucumber mosaic, curly top, bacterial soft rot and blackleg, aphids, nematodes, cutworms, potato tuberworm, and flea beetles.

Strawberries: Angular leaf spot, anthracnose, botrytis fruit rot, leather rot, hytophthora crown rot, powdery mildew, rhizopus fruit rot, verticillium wilt, aphids, beet armyworm, cutworms, cyclamen mite, slugs, spider mite, vinegar fly, whiteflies.

Pepper: Alfalfa mosaic virus, bacterial spot, cucumovirus mosaic, curly top, pepper potyvirus mosaic diseases, pepper tobamovirus diseases, phytophthora root and crown rot, powdery mildew, tomato spotted wilt virus, verticillium wilt, beet armyworm, flea beetles, green peach aphid, leafminer, thrips, tomato fruitworm, tomato (potato) psyllid, twospotted spider mite, western yellowstriped armyworm, and whiteflies.

Onion/garlic: Bacterial soft rot, basal rot, blue mold rot, botrytis leafspot, downy mildew, garlic mosaic, purple blotch and stemphylium leaf blight, rust, white rot, bulb mites, thrips, dodder, annual bluegrass, nut sedge, and yellow sweetclover.

Corn: Bacterial soft rot, charcoal rot, common rust, common smut (boil smut), corn stunt, exserohilum root rot, fusarium ear rot, fusarium stalk rot, head smut, maize dwarf mosaic, pythium stalk rot, seed rots and damping-off, aphids, armyworms, corn earworm, corn leafhopper, corn leafminer, cucumber beetles, cutworms, flea beetles, grasshoppers, seedcorn maggot, spider mites, thrips, and wireworms.

Lettuce: Alfalfa mosaic, anthracnose, aster yellows, bacterial leaf spot, beet western yellows, beet yellow stunt, big vein, corky rot, downy mildew, fusarium wilt, chlorosis and lettuce infectious, yellows, lettuce dieback, lettuce drop, lettuce mosaic, phoma basal rot, powdery mildew, verticillium wilt, lettuce armyworm, beet armyworm, bulb mites, corn earworm and tobacco budworm, cutworms, darkling beetles, field cricket, foxglove aphid, garden symphylans, green peach and potato aphids, leafminers, lettuce Aphid, lettuce root aphid, lettuce loopers, saltmarsh caterpillar, silverleaf, whitefly, and springtails.

Asparagus: Asparagus virus I and II, crown and spear rot, fusarium wilt, purple spot, rust, armyworms, asparagus geetles, cutworms, European asparagus aphid, garden symphylan, thrips.

Others (eggplant, turnip, radish, okra, kale, collards, canola, and cumin): to be determined.

Afghanistan Pesticides Active Ingredients

The following is a list of active ingredients contained in lists of products found in the Afghanistan urban and rural farm stores, as forwarded by an ASAP consultant.

These active ingredients are analyzed in Table 1 and in the PER for active ingredient class, EPA registration status including restricted use products status with criteria for restrictions, acute human toxicity by EPA and WHO systems, chronic human health issues, groundwater contamination potential, and ecotoxicity to fish, honeybees, birds, amphibians, earthworms, mollusks, crustaceans, aquatic insects and plankton.

Insecticides/Miticides (61): Abamectin (ivermectin), acephate, acetamiprid, alpha cypermethrin, aluminum phosphide, azidirachtin (neem oil), azinphos methyl, Bacillus thuringiensis-BT, beta cypermethrin, bifenthrin, bifenzate, buprofezin, carbaryl, carbosulfan, chlorpyrifos (ethyl), clofentezine (mites), clothianidin, cryolite, cyfluthrin (beta), cypermethrin (alpha), cyromazine, deltamethrin, diazinon, dicofol (mites), diflubenzuron, dimethoate, disulfoton, emamectin benzoate, endosulfan, esfenvalerate, fenpropathrin, fenvalerate, flufenoxuron, imidacloprid, indoxacarb, insecticidal soap, kaolin clay, lambda cyhalothrin, malathion, methamidophos, methyl bromide, methoxyfenozide, mineral oil, methomyl, monocrotophos, oxydemeton-methyl, permethrin, phosmet, propargite, pymetrozine, pyrethrum (mix of pyrethrins), pyriproxyfen, pyridaben (mites), rotenone, spinosad, spiromesifen, thiacloprid, thiamethoxam, thiodicarb, trichlorfon, and zeta cypermethrin.

Fumigants (4): Aluminum phosphide, metam sodium, methyl bromide, and zinc phosphide.

Rodenticides (3): Brodifacoum, flocoumarfen, and zinc phosphide.

Molluscsicides (2): Metaldehyde and iron phosphate.

Fungicides (52): Azoxystrobin, Bacillus subtilis, benomyl (benlate), Bordeaux mixture, boscalid (nicobifen), captan, carbendazim, chlorothalonil, copper hydroxide, copper oxychloride, copper sulfate, cymoxanil, cyprodinil, dicloran; 1, 3 dichloropropene; dimethomorph, difenoconazole, dithianone, famoxadone, fenamidone, fenarimol, febuconazole, fenhexamid, fenoxaprop-p-ethyl, fludioxonil, folpet, fosetyl aluminum, iprodione, kresoxim-methyl, mancozeb, maneb, mefenoxam, metalaxyl, metam (potassium), metam sodium, methyl bromide, metiram, myclobutanil, pendimethaline, phosphorous acid, potassium bicarbonate, propiconazole, propineb, pyraclostrobin, sodium tetrathiocarbonate, sulfur, tebuconazole, thiofanate methyl, thiram (TMTD), triflumizole, trifloxystrobin, and zineb.

Herbicides (22): 2 4 D, glyphosate, bromoxynil, clethodim, clodinafop-propargyl, cloquintocet-mexyl, cycloate, DCPA (dacthal), diclofop-methyl, dichlorprop-p, fenoxaprop-p-ethyl, glyphosate, halosulfuron-methyl, isoproturon, MCPA, mecoprop-p, metazachlor, oxadiazon, paraquat, phenmedipham, and sethoxydim trifluralin.

Afghan Pesticide System Risk Profile Indicators

Afghanistan pesticide issues that contribute to a high-risk profile for users, their families, and their environment are discussed here.

Small Scale of Operations

Farm sizes in most of Afghanistan vary from less than 2 hectares to a (rare) maximum of 60 hectares (for example export cash crops), with most farms in the 2 to 5 hectare range, which is the maximum manageable size for an average farm family. Contrasted with farms in the United States, which have an average of greater than 1,000 square hectares each, Afghanistan farms are relatively small, and thus the scale of all operations is also small. Most Afghan farmers can be referred to as smallholders.

The issue is this: Small farmers and the systems that support them often cannot afford all of the inputs that larger farmers in highly developed countries take for granted, like education, information, training/certification, wide selections of pesticide product options (including more selective and “safer” ones, affordable PPE, backup extension systems, enforced regulations, developed value chains and markets, more efficient and “safer” pesticide application equipment, purchased pollinators, parasites and predators, degree-day computer models for decision-making, etc.). Thus, many of the more high-tech and expensive inputs available and approaches taken in highly developed countries may not be economically feasible or sustainable on small-scale operations like those found in Afghanistan, due to the scale. Both supply and demand are limited. The costs for imported fertilizers and pesticides — derived from petrochemicals — will increase with the price of oil.

Registration/Enforcement

The Government of Afghanistan apparently does not have its own list of registered pesticide products with specific permitted uses and instead defers 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. Further, 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, and pirated pesticides.

Newness of Afghan Inputs Sector

Several Web sites note that before 2001, Afghanistan farmers had hardly any access to agricultural inputs, including machinery, seed, fertilizers, and pesticides. For most intents and purposes, there were no functioning and integrated agriculture research and agriculture extension systems. This can have two potential consequences: Farmers’ lack of exposure to the safe use of inputs because they have not had experience with them could potentially lead to higher risk, but since risky behavior patterns (which generally take years to set into place) of pesticide use have not been set, the government, donors, NGOs, and projects have the opportunity to introduce safe use best practices to farmers’ thinking and actions from the start.

Unregistered (Illegal) Products

Conversations with ASAP project implementers indicate that illegal products, including both nonregistered products and internationally banned (or tightly controlled) products, do enter Afghanistan. Products containing chemicals on the international persistent organic pollutants (POP) banned list — like DDT, dieldrin, HCH, heptachlor and lindane, encountered widely in developing countries — are likely to be found in retail shops in smaller towns and border towns, because they move easily across land borders. Chemicals contained on the usually tightly controlled prior informed consent (PIC) list are also likely to be encountered in Afghanistan.

Substandard Quality Products

Afghanistan is proximate to three countries best known for the production of substandard quality pesticides. A pesticide's quality can be reduced by not containing the active ingredient stated on the label, not containing the amount of active ingredient listed on the label, and, more dangerously, containing any number of chemical reaction byproducts produced along with the active ingredient. Byproducts are often much more acutely toxic than the active ingredient. Smaller companies without the means for removing these impurities include them with the active ingredient. Most developing countries lack the analytical means for detecting not only active ingredients but also the presence and amounts of these often highly toxic byproducts.

Pirated Registered Trademarks

Most international pesticide manufacturers and distributors are so concerned with pirating of their products' trade names and trademarks that they have begun putting special, hard-to-reproduce holograms on their products to distinguish genuine products from pirated versions. Afghan farmers need to be made aware of this issue and the risks that go with it.

Local Pesticide Production, Packaging, and Repackaging

One of the highest risks to pesticide sellers as well as farmers and farm families come from pesticide repackaging at the store, where the seller pours and weighs the amount requested into small, unlabeled bottles, often empty water, soda, or juice bottles, cans, and plastic baggies for sale to farmers who have funds for only a single treatment. Both sellers and farmers come into contact with concentrated active ingredient — one of the most toxic points of use.

Many of the large international pesticide manufacturers and distributors are now formulating (and in some cases, producing) pesticides and packaging them in the country of ultimate use into single-use sachets that are appropriate to local conditions (small scale), so that farmers do not need to store entire liter bottles of the products at home. This solves several problems: It eliminates the need for pesticide retailers to pour small quantities of pesticides from one-liter bottles into small, unlabeled bottles, cans, and plastic baggies, which, in turn, eliminates the need to store pesticide bottles at home, where children might mistake the pesticide for a drink or food. It also eliminates the problem of empty pesticide bottles being used for storing and drinking water from them, since no bottles are involved. Some companies now work with Crop Life International to recycle used containers, and some even are considering offering a rebate for returned empty sachets.

Single-use sachets designed for specific-capacity backpack sprayers eliminate the need for farmers to calculate and measure the amount of pesticide to use, which, for many farmers (and most people in general) is a difficult task. Some distributors are also beginning to import small single-use sachets, and this practice should be encouraged. Training can emphasize the benefits of purchasing pesticides in single-use sachets for small-scale farms.

Pesticide Labeling Quality, Deterioration, Wrong Language

Since the agriculture inputs sector in Afghanistan is so young, label quality and deterioration of labels are unlikely to be issues of concern in the near term, except, perhaps, in the informal sector. Often, however, labels are written in the language of the exporting country, not the importing one. For literate Afghani farmers, they would require information in the local languages. For illiterate farmers, label information is only useful if someone can decipher it for them.

If labels are not interpreted clearly, unfortunate farmers will be unable to respond properly should a poisoning occur, or should they require information about environmental concerns. Training can emphasize giving oral instructions for the most commonly used or problematic pesticides.

Knowledgeable Pesticide Shopkeepers

In many developing countries, farm input shops are run by clerks who may not understand pesticide use and risks. Risk increases as knowledge decreases. All pesticide shopkeepers or farm shop owners working with ASAP have been trained through the project and are sufficiently knowledgeable. Crop Life International and IFDC have teamed up in many developing countries to provide safe use training and certification for shopkeepers.

Ongoing or future refresher training by ASAP can emphasize that that toxic products should not be sold to untrained or inexperienced farmers without the means to protect themselves, that farmers should be advised about label contents, risk reduction, and especially the safety pictograms and the types of safety equipment that should be used.

Product Adulteration

In many developing countries, it is common for pesticide salespeople to dilute the active product with water or talc so that they can sell more of it. This may lead to increased resistance of pests to the pesticide and may lead farmers to complain that the products are not working properly. This is likely to be a concern especially in the informal pesticide sales sector and in outlying areas away from major cities.

Pesticides Stored with Fertilizers and Other Products

Many pesticide shops, especially in rural areas of developing countries, store fertilizers next to pesticides. This practice is not recommended, due to fire and explosion hazard. Training can reinforce this safety message for any shopkeepers encountered during operations and during shopkeeper training. In many countries, the law requires that pesticides for horticulture and veterinary needs be sold in separate shops. In some poorer countries, however, they are sold side-by-side, and even in the same space as animal feed, or next to food stores, with no wall in between. ASAP training has recommended against these practices for its partners and farm stores.

On-Farm Storage Issues

Most farmers in developing countries store their pesticides in their homes, because they consider them to be valuable resources that they need to protect and keep an eye on. In general, farmers do not lock the pesticides up to keep them out of reach of children, which is recommended practice. For the unusually small scale of most Afghan farms, it may be a stretch for most farmers to find this practicable and affordable. Nonetheless, ASAP implementers can assist with this need, as resources become available.

Farmers' Lack of Awareness of Risks from Highly Toxic Products

Farmers in developing countries may or may not be aware of the acute health risks from pesticides, and even fewer are aware of chronic risks. Afghan farmers will require training that accomplishes both. High risk is introduced with very toxic products like aluminum phosphide, endosulfan, disulfoton, methamidophos, monocrotophos, methyl bromide, azinphos methyl, metam sodium, metam potassium, zinc phosphide, and others, which should not be used by farmers who do not fully understand the high risk to them and their families of acute poisoning. But they are permitted and used in Afghanistan. Awareness of chronic risks will also need to be enforced.

Lack of Proper Identification of Pests and Beneficial Organisms

Due to the lack of training and proper extension services in Afghanistan until just recently, farmers are unlikely to be able to identify pests correctly, especially crop diseases. Very few farmers in most countries can correctly identify beneficial insect pathogens, spiders, predators, and parasites. ASAP implementers can help train and retrain farmers on proper identification of pests, the damage they cause, the diseases that kill the pests, and how to recognize beneficial insects and spiders.

Lack of Use of Selective Pesticides

Few of the pesticides available for use on vegetables are highly selective. This is one issue that results from scale. There may not be sufficiently lucrative markets for selective specialty products in Afghanistan, and farmers may not be able to afford them for the small hectarages they till.

Under/Over Dosing

ASAP project staff members note that incorrect dosage (especially overdosing) is a serious issue among the farmers they serve. Training courses can teach proper calibration and pesticide measurement, but calculations are often too difficult for farmers to remember. Improper dosing can hasten the development of insecticide resistance among pests. Training can be used to reinforce proper pesticide doses to use for each pest.

Pesticide Resistance

Extensive resistance of pests to pesticides in Afghanistan is unlikely due to the paucity of pesticide use until very recently. It could quickly develop, however, if farmers over- and under-dose and use non-selective pesticides. For pests like aphids, leafhoppers, and disease spores, which can migrate easily on upper atmosphere air masses from surrounding countries, resistance is likely already present at some level.

At some point, Afghan farmers may begin to note that some products no longer work well to control pests in their field and will likely begin to blame pesticide manufacturers for a weaker product. This could be due to the development of insecticide resistance, and it could be the result of improper dosing. Farmers should be trained to monitor for the development of insecticide resistance, and ASAP project implementers should be on the lookout for it during their field visits.

Interference with Natural Pest Control

Overreliance on insecticides in Afghanistan could wipe out populations of beneficial insects and spiders that currently serve as natural pest controls, unless managed properly. Integrated Pest Management (IPM) training can teach farmers to recognize beneficial insects in the field and consider them as an augmentive means of control to reduce total amounts of pesticides used.

Human Poisonings and Health Risks

In Pakistan, it was the death of five Pakistani Ministry of Health officials in 1997 that led to USAID's environmental regulations. As the use of the acutely toxic pesticides listed above under "Farmers' Lack of Awareness..." ensues in Afghanistan, the risk of farmer or farm family poisonings will increase. In the past few years, the inappropriate use of endosulfan on vegetables in West Africa has caused deaths of farm family members due primarily to residues.

Each of the chemicals used by farmers in Afghanistan is evaluated by acute toxicity for this PERSUAP study. Several are too toxic for illiterate, untrained, and unprotected Afghan farmers to use.

Animal and Livestock Deaths

Occasionally, livestock and domestic animals become poisoned by accidental exposure to pesticides. Exposure to organophosphates and rodenticides are the primary cause of poisonings in domestic animals and livestock. No accidental animal or livestock deaths have been reported from Afghanistan, although it is a potential problem that requires attention during training.

Residues in Food

There are risks to people eating fruits and vegetables contaminated with pesticide residues. This is especially true with cotton pesticides, which are very often diverted for use on food crops. In fact, in

2000, some 60 percent of the approximately 77 people in Benin poisoned to death by endosulfan ate food crops that had been treated with it. It is likely that limited analytical testing capabilities exist in Afghanistan to test food samples for pesticide residues. If food (for example, raisins) will be exported to Europe, samples will require testing. The EU posts minimum residue levels (MRLs) for acceptable levels of pesticide residues on imported foods, and these will need to be met.

Personal Protection Equipment (PPE) Not Used

Afghan farmers are likely not to use PPE to reduce pesticide exposure risks for the following reasons:

1. No safety equipment is available for purchase.
2. Safety equipment is not affordable.
3. PPE is too hot to wear in the field (in spite of the fact that it is recommended that many pesticides should be applied very early in the morning when it is cool).
4. Many farmers will not use PPE even if it is available, due to a masculine sense of invincibility.

International best practices for safe use of pesticides require that appropriate PPE be used. Most pesticide companies list or put pictograms on each pesticide label showing PPE that is required for use of that certain product. Standards and certification systems for trade in agricultural commodities also require the use of appropriate PPE. Training should emphasize these facts and decipher pictograms. Groupings of farmers (via communes, cooperatives, and associations) can purchase PPE for use or rental by members, thus reducing the per-farm cost of ownership.

Obsolete and Expired Pesticides

In Afghanistan, expired pesticides might be encountered in any large aerial or ground spray campaigns against migratory or medical pests like locusts, mosquitoes, or Leishmaniasis-transmitting sand flies. These should not be diverted to the horticulture sector, as often happens in developing countries: Instead, they should be properly disposed of. Both the World Bank and the FAO have programs for disposal of obsolete pesticides. ASAP can train farmers to look at the label for the expiration date or date of manufacture — most pesticides remain active and useable if stored properly for two years past the date of manufacture.

Conclusion

All of these issues with pesticides in Afghanistan can increase the risk for errors to occur and thus, the risks that farm family members may be acutely or slowly poisoned and their environment polluted and damaged. Thus the pesticide risk profile for Afghanistan is higher than might be encountered in some more developed countries. Extra care will be needed to emphasize and implement mitigation measures that work.

Impact of International Trade and Markets, Certification Schemes, Codes of Conduct, SPS Barriers, and WTO Membership

Market-driven trade is considered in this section, because it is having a growing influence worldwide on the adoption of best practices in agriculture production, including protection of environmental resources and human health.

International Trade in General Agricultural/Horticultural Products by the Country, with Specific Emphasis on Program-Targeted Commodities

At this stage, the ASAP program consultant states in a questionnaire that “Some of the products, apple, apricot, almond, and grape, are being exported mostly to the neighboring countries, Pakistan and India, although there is no certification scheme or standards.” Thus, ASAP is focused on local market opportunities and import substitutions and is not immediately looking far and wide at export markets for Afghani produce.

Regional or International Trade in Program Commodities

According to http://dosfan.lib.uic.edu/ERC/bgnotes/sa/afghanistan9407.htmlAgriculture, “Trade accounts for a small portion of the Afghan economy, and there are no reliable statistics relating to trade flows. Since the Soviet withdrawal and the collapse of the Soviet Union, other limited trade relationships appear to be emerging with Iran, Pakistan, and the West. Afghanistan trades little with the United States; its 1992 trade is estimated at $6 million. Afghanistan does not enjoy U.S. most-favored-nation trading status, which was revoked in 1986.

Afghanistan is endowed with a wealth of natural resources, including extensive deposits of coal, salt, chromium, iron ore, gold, fluorite, talc, copper, and lapis lazuli. Unfortunately, the country's remote and rugged terrain and inadequate transportation network have usually made mining these resources unprofitable.

The most important resource has been natural gas, first tapped in 1967. At their peak during the 1980s, natural gas sales accounted for $300 million a year in export revenues (56% of the total). Ninety percent of these exports went to the Soviet Union to pay for imports and debts. However, during the withdrawal of Soviet troops in 1989, Afghanistan's natural gas fields were capped to prevent sabotage by the Mujahidin. Restoration of gas production has been hampered by internal strife and the disruption of traditional trading relationships following the collapse of the Soviet Union.”

Codes of Conduct, Treaties, and International Conventions that Apply to Target Commodities, Crop Protection Products and Systems with Rates of Implementation Success, Where they Do Apply

According to the Food and Agriculture Organization, over the past 20 years, there has been growing public awareness of environmental and social issues in agricultural production and trade. Several food safety crises and animal disease epidemics have intensified concerns over intensive agricultural practices. Consumers have become more knowledgeable about labor conditions and about the problems faced by small farmers due to low commodity prices.

There are an increasing number of industry-wide and company codes of conduct, some of which reach far down the commodity chain to producers. In addition, consumers' concerns have given rise to several certification and/or labeling initiatives, some led by NGOs and others led by the business sector. Social and environmental certification and labeling are market-oriented mechanisms that use market incentives to encourage management improvements above the minimum level required by law to implement laws that are otherwise difficult to enforce or to suggest a framework where formal laws may not exist. They often refer to international treaties and conventions, sometimes translating them into verifiable standards for direct implementation by producers and/or traders. With this approach, voluntary certification programs complement (inter)governmental regulatory frameworks and labor unions, but do not — and cannot — replace them.

Relevant Conventions and Codes of Conduct on Pesticides and Pesticide Use:

- The International Code of Conduct on the Distribution and Use of Pesticides, the Revised Version of which was adopted by the United Nations FAO Council in November 2002.

- The Rotterdam Convention on the Prior Informed Consent (PIC) Procedure for Certain Hazardous Chemicals and Pesticides in International Trade. Under this procedure, the secretariat provides all participating countries with detailed information on the risks the chemicals pose, allowing them to decide whether to accept future imports. If any country chooses to ban or restrict substances on the PIC list, which presently contains 31 chemicals, exporting countries are advised and must immediately inform their exporters, industry and customs departments.

- The Stockholm Convention is a global treaty to protect human health and the environment from persistent organic pollutants (POPs): chemicals that remain intact in the environment for long periods, become widely distributed geographically, accumulate in the fatty tissue of living organisms, and are toxic to humans and wildlife. In implementing the Convention, governments will take measures to eliminate or reduce the release of POPs into the environment.

Status of Pesticide Regulations in the European Union

According to http://www.pesticideinfo.org/Docs/ref_regulatoryEU.html, "The European Community (EC) has established a harmonized legal framework for the regulation of pesticides in all member countries of the EC. The Commission of the European Communities, in collaboration with member countries of the EC, is responsible for the registration of pesticide active ingredients (also referred to as active substances) for use in all EC member countries. Individual member countries, called Member States, are responsible for the registration in their country of specific pesticide products (active ingredient percentage by weight plus inert ingredients) containing active ingredients authorized for use by the Commission. This dual authority of the EC and its member states is granted by the Council of the European Community under Council Directive 91/414/EEC, adopted on July 15, 1991 and effective July 25, 1993 (1). Standards and regulations for the classifications, labeling, and packaging of pesticides are set by Council Directive 67/548/EEC of June 27, 1967 (2)."

Afghanistan is not a member of the EU, nor is it an EC member state. However, information on pesticides toxicity and use restrictions of products from the EU can be found through this mechanism.

EU Registration Status of Proposed Pesticides' Active Ingredients (There are currently 834 existing EU-registered pesticide active ingredients), Including ADIs (Average Daily Intakes) and MRLs (Minimum Residue Levels)

These and new active substances, along with minimum residue levels (MRL) and average daily intakes (ADI), can be located at the following two Web sites:

http://europa.eu.int/comm/food/plant/protection/evaluation/index_en.htm;
http://europa.eu.int/comm/food/plant/protection/evaluation/existactive/list1-28_en.pdf)

All of the pesticides *accepted* for the ASAP project are registered by the EU. Since no products from this project will likely be exported, minimum residue levels for export will not be considered.

Standards and Certification Systems that Reduce Risk

Export Market Standards and Auditing and Certification (EurepGAP, ISO 14001, Organic, EU minimum residue levels, etc.) Schemes Applicable to Program Crops and Pesticides

National Standards and Codes. There are as yet no Afghani national standards or codes of conduct or practice that address social or environmental standards or certification in tropical agriculture or horticulture. Afghanistan is, however, beginning to consider pesticide registration and regulation issues.

Economic Partnership Agreements (EPAs). EPAs aim to establish new WTO-compatible trading arrangements that progressively remove barriers of trade between the EU and certain groups or blocs of developing countries (like the Africa, Caribbean, and Pacific Group), which would build on the regional integration initiatives and promote sustainable development and poverty eradication in group states.

Apparently, there are no fresh produce trade associations in Afghanistan with which to form an EPA.

Organic Production. Organic production is a holistic management of the agro-ecosystem, emphasizing biological processes, soil health, and minimizing the use of nonrenewable resources. This includes maintenance of soil fertility through the use and recycling of organic materials. Normally, the use of synthetic fertilizers and pesticides is prohibited. The International Federation of Organic Agriculture Movements (IFOAM) has formulated IFOAM Basic Standards, on which organic certifiers can base their standard, with a view to international harmonization. The International Organic Accreditation Service (IOAS) accredits certification bodies that have organic certification programs that comply with the IFOAM standards. The last revision of the IFOAM Basic Standards strengthened the standards for ecosystem management. There are ongoing discussions on whether the standards should also include criteria for labor conditions and other social issues, to which currently only a very general reference is made.

With the growing market for organic products, many countries have developed national organic regulations to protect producers and consumers against misleading organic claims. The FAO/WHO Codex Alimentarius Commission has formulated guidelines for labeling of organically produced food, with a view to harmonizing national regulations.

Afghanistan has yet to develop national organic regulations, either for use in-country or for export.

Fair Trade Initiatives. The fair trade initiatives try to provide better market access and better trading conditions to small farmers. This includes a price premium for producers to be invested in social and environmental improvements. For larger production units, an additional aim is to improve conditions for workers. The Fairtrade Labeling Organizations (FLO) International is an umbrella organization of 17 national fair trade labeling initiatives, but producers and traders are also represented on the board. FLO has developed production criteria, both socially and environmentally oriented, differentiated for smallholder production and plantations. In addition, it has developed standards for trade, with which traders licensed by FLO have to comply. Complementary to the generic standards, there are product specific standards. Currently, FLO standards exist for coffee, tea, cocoa, cane sugar, honey, fresh fruit, fruit juices, bananas, and rice. Standards for wine and cut flowers are being developed. From January 2003, the certification unit will be a legally independent certification body.

Afghanistan does not yet deal internationally in any of the FLO International crops.

Export Certification Authorities/Auditors/Companies Present in the Country or Region

Phytosanitary Ceritification. A phytosanitary certificate is a document issued by a ministry (or department) of agriculture, or comparable government body, that verifies the quality of a produce shipment, that many countries require for the import of unprocessed plant products. Currently, no

phytosanitary regulations are in place in Afghanistan, and therefore, no mechanism exists to guarantee the quality of produce for export.

There are a select number of global organizations that verify national phytosanitary certification systems. In 1963, FAO and the WHO created the Codex Alimentarius Commission to develop international standards and guidelines for food traded on the global market. The commission aims to protect the health of consumers, ensure fair trade practices in the food trade, and promote coordination of all food standards work undertaken by international governmental and nongovernmental organizations.

The Codex Alimentarius system presents a unique opportunity for all countries to join the international community in formulating and harmonizing food standards and ensuring their global implementation. It also allows them a role in the development of codes governing hygienic processing practices and recommendations relating to compliance with those standards.

It is possible to export produce from Afghanistan to international markets without a national phytosanitary certification system in place. Clearly, some international markets present less strict barriers to trade with regard to phytosanitary regulations than others. For example, at this time, Afghanistan has no difficulty exporting produce across the border into Pakistan. Although some countries do not require such certification for importing produce, implementation of such a system would greatly expand the number of international markets to which Afghanistan can export agriculture products.

Seed Certification. There are also international efforts, mostly led by FAO, to develop a system of seed certification so that only high-quality seed is sold to and planted by farmers instead of potentially diseased seed, as can occur with farmers saving seed from season to season.

Produce Certifying Companies. According to http://europa.eu.int/comm/agriculture/ofis_public/pdf/r8_0000_en.pdf, the following companies operate with or in Afghanistan, among other countries:

BCS Ã–ko-GarantieGmbH
Control System Peter Grosch
Germany

BIOLATINA S.A.C.
Peru

ECOCERT S.A.S.
France

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Switzerland and Liechtenstein

Skal International
Netherlands

ASAP Pesticide Evaluation Report

This part of the PERSUAP report addresses pesticide choices, environmental and human health issues and recommendations according to 12 Regulation 216.3 "Pesticide Procedures."

Pesticide Procedures Element A: USEPA Registration Status of the Proposed Pesticides

USAID Implementing partners working overseas are effectively limited to using pesticide active ingredients registered in the United States by the EPA for the same *or similar* uses. Emphasis is placed on *similar use* because some of the pests found overseas are not present in the United States, and therefore, pesticides may not be registered for the exact same use, but are often registered for similar pests and pest situations.

"EPA Registration Status" possibilities of formulated products include never registered, active registration, and cancelled registration.

Pesticides, by necessity, are poisons, but the acute toxicity and hazards (risks) of different compounds vary greatly. Acute toxicity refers to the inherent intoxicating ability of a pesticide product, whereas hazard refers to the risk or danger of poisoning when the pesticide is used or applied. Pesticide hazard depends not only on toxicity but also on the chance (or risk) of exposure to toxic amounts of the pesticide. Both of these are influenced by formulation and concentration.

Pesticide Product Concentration and Formulation. Pesticides are registered in the United States as formulated products (active ingredient — the toxin in a certain concentration, usually much less than 100 percent — plus additives like carriers, emulsifiers, stabilizers, enhancers, adhesives, and other ingredients, formulated as either an emulsifiable concentrate, granule, wettable powder, or other formulation) and also (rarely) as the technical active ingredients (AI, close to 100 percent, without most of the above additives).

EPA classification shows the actual toxicity of the formulated market products — which take formulation types and concentrations into account — and which are usually less (and rarely more) toxic than the active ingredients alone and, in turn, are more representative of actual risks encountered in the field. By contrast, the WHO acute toxicity classification system is based on the active ingredient only (see Attachment 2 for a comparison of EPA and WHO acute toxicity classification systems).

Local Government Pesticide Regulations and Registration. Pesticide products must also be registered by the government of the country in which activities are planned. The Government of Afghanistan apparently does not have its own list of registered pesticide products with specific permitted uses and instead defers to FAO's list of acceptable products, which is limited and not adapted specifically for Afghanistan's agriculture and human health systems. Afghanistan has had regulations on pesticide use since 1989, but these are largely ignored, due to lack of resources.

Analysis

The Government of Afghanistan, in 1989, wrote pesticide regulations for import, testing, sale, transport, use and disposal (Attachment 3). For the registration of pesticide products and uses for each product, however, the Afghani government defers to and accepts FAO's list of acceptable pesticides as its own, in place of producing its own list.

As discussed above in the country analysis, risks with pesticide importation, sale, and use come from several sources:

- Lack of resources to enforce the Afghan pesticide regulations;

- Importation of unregistered, substandard, and occasionally pirated trademark products from some (not all) companies in China, India, and Pakistan in what can be called the informal or illegal sector;
- Local pesticide production, packaging, and repackaging.
- Use of ASAP project beneficiaries of very highly acutely toxic pesticides.
- Importation and use of unacceptably toxic products by both the informal and formal sectors;
- Use by ASAP project beneficiaries of USEPA-designated Restricted Use Products (RUPs), many of which (especially synthetic pyrethroids) are highly damaging to aquatic environments and aquatic biodiversity (given that water is highly limited in Afghanistan, this issue becomes even more critical to mitigate correctly).

Issue: Products Containing Active Ingredients Not USEPA-Registered

Products containing the following active ingredients — identified in rural and urban farm stores and with major distributors in Afghanistan — should not be used by ASAP or its beneficiaries, as they are either cancelled for use in the United States or have not yet been evaluated for risk by USEPA.

Insecticides

carbosulfan
flufenoxuron
monocrotophos—cancelled

Fungicide

benomyl (benlate)—cancelled

Herbicides

cloquintocet-mexyl
isoproturon
metazachlor

Mitigation

ASAP and its beneficiaries do not use products containing these active ingredients. Special note: Bordeaux mixture, per se, is not registered by EPA, but its active ingredients are registered.

Issue: Very High Acute Toxicity

Several of the pesticides found with distributors and in rural farm stores in Afghanistan, and included in the Afghan ASAP Program Pesticides Decision Matrix (Table 1, with WHO and EPA acute toxicities of only Ia or Ib and I, respectively) contain active ingredients that are *too toxic for farmers to use*, as follows:

aluminum phosphide
azinphos methyl
endosulfan
disulfoton
metam potassium
metam sodium
methamidophos
methyl bromide
monocrotophos
zinc phosphide

Mitigation

Do not use products containing these active ingredients on ASAP beneficiary farms.

Many other pesticide products containing less acutely toxic active ingredients may be found in Afghanistan, and these should be used in place of products containing the above active ingredients (see UC Davis IPM site for these pesticide recommendations). For soil sterilization, solar sterilization can be accomplished with black plastic, labor, and the hot Afghan sun. Fumigation of stored products, for example with aluminum or zinc phosphide or metam sodium requires, in every developed country, highly trained and certified workers — the average farmer should not attempt this.

Issue: High Acute Toxicity

All pesticide products that have at least acute WHO and EPA toxicity ratings of II (see Table 1) for at least some products containing the stated active ingredient are considered to be too toxic for use without training and proper use of PPE.

Mitigation

Products containing active ingredients with Class II acute toxicity ratings should be used only by farmers that have received sufficient (to set or change behavior in favor of best safe use practices) training and use PPE.

A Special Issue: Restricted Use Pesticides (RUPs)

USEPA has developed a system for dealing with pesticides with inordinate risks to human health and/or environment for various uses. In the United States, farmers who wish to purchase and use restricted use pesticides (RUPs) must receive (and pay for) specialized training and certification to increase awareness of the risks and ways that can be used to mitigate these risks. These *Certified Applicators*, or those under their direct supervision, must follow the pesticide label instructions and only use the product for purposes covered under their certification. In the United States, some states may require that certain active ingredients not listed on the Federal list be classified as “restricted” in their states due to local conditions, generally related to environmental concerns.

Regulation 216, under section 216.3b, Pesticide Procedures, part 1, Project Assistance, subpart (i) recognizes restricted use pesticides as follows (italics inserted):

> When a project includes assistance for procurement or use, or both, of pesticides registered for the same or similar uses by USEPA *without restriction*, the Initial Environmental Examination for the project shall include a separate section evaluating the economic, social and environmental risks and benefits of the planned pesticide use to determine whether the use may result in significant environmental impact.

The interpretation of “without restriction” is that approved pesticides will not be RUPs, regardless of RUP criteria or basis (the reason they are designated as RUPs). It is important to note that USEPA may designate pesticides as RUPs due to either: 1. Inordinate risk (hazard) to users; or 2. Inordinate risk to the environment; or 3. Sometimes both. Regulation 216 considers this distinction and deals with it in subparts (ii) and (iii) as follows (italics inserted):

> (ii) When a project includes assistance for the procurement or use, or both, of any pesticide registered for the same or similar uses in the United States but the *proposed use is restricted by the USEPA on the basis of user hazard*, the procedures set forth in §216.3(b)(1)(i) above will be followed. In addition, the Initial Environmental Examination will include an *evaluation of the user hazards associated with the proposed USEPA restricted uses* to ensure that the implementation plan which is contained in the Project Paper incorporates *provisions for making the recipient government aware of these risks and providing, if necessary, such technical assistance as may be required to mitigate these risks*. If the proposed pesticide use is also *restricted on a basis other than user hazard* [for example for risk to environment], the

> procedures in §216.3(b) (l) (iii) [below] shall be followed in lieu of the procedures in this section.

Thus, if user hazard is evaluated, if the recipient government is made aware of these risks, and if required technical assistance can mitigate these risks, it appears that a RUP may be used. However, in Afghanistan, the last "if" will be very difficult to achieve for many reasons. This does not, however, preclude ASAP from trying to mitigate risks from RUPs, in addition to making recipient governments aware of such risks.

Regulation 216 goes on to consider RUPs in subpart (iii) as follows (italics inserted):

> (iii) If the project includes assistance for the procurement or use, or both of:
>
> (a) Any pesticide other than one registered for the same or similar uses by USEPA *without restriction or for restricted use on the basis of user hazard*; [as opposed to environmental hazard] or
>
> (b) Any pesticide for which a notice of rebuttable presumption against reregistration, notice of intent to cancel, or notice of intent to suspend has been issued by USEPA,
>
> The Threshold Decision will provide for the preparation of an Environmental Assessment or Environmental Impact Statement, as appropriate (§216.6(a)). The EA or EIS shall include, but not be limited to, an analysis of the factors identified in §216.3(b) (l) (i) above.

No further distinction is made in Regulation 216 for RUPs designated as such on the basis of risk to the environment. This PERSUAP shows, below, the basis for each RUP discovered in the formal (registered pesticides) sector.

Several of the active ingredients in pesticides being imported to Afghanistan are listed as RUPs by the USEPA, as listed below (and found in Table 1). RUP criteria for these active ingredients in specific formulations and uses may be found in Attachment 4.

Restricted Use Pesticide (RUP) Active Ingredients in Products being Imported to Afghanistan

Insecticides: alpha cypermethrin, aluminum phosphide, azinphos methyl, beta-cyfluthrin, bifenthrin, chlorpyrifos (ethyl), cyfluthrin (beta), cypermethrin (alpha), deltamethrin, diazinon, diflubenzuron, endosulfan, esfenvalerate, fenpropathrin, fenvalerate, lambda cyhalothrin, methamidophos, methyl bromide, methomyl, monocrotophos, oxydemeton-methyl, permethrin, pyrethrum (mix of pyrethrins), and zeta cypermethrin.

Fumigants: aluminum phosphide, metam sodium, methyl bromide, and zinc phosphide.

Molluscicide: metaldehyde.

Fungicides: 1, 3 dichloropropene; metam sodium, and methyl bromide.

Herbicide: diclofop-methyl and paraquat.

According to EPA, all synthetic pyrethroids (see Table 1) are classified as RUPs for agricultural use because of toxicity to aquatic organisms and systems, but they may not be classified as RUP for nonagricultural use (in fact several pyrethroids are "safe enough" for household use).

Mitigation of RUP Risks in the United States, as enforced by USEPA

As noted above, farmers in the United States who wish to purchase and use RUPs must receive (and pay for) specialized training and certification to increase awareness of the risks and ways that can be used to mitigate these risks. These *Certified Applicators*, or those under their direct supervision, must

follow the pesticide label instructions and use the product only for purposes covered under their certification. Farmers in the United States who farm relatively large hectarage use a lot of pesticides and have access to highly developed markets can afford this training. Thus, scale is an issue that lends itself to the RUP program.

Mitigation of RUP Risks in Afghanistan

Training/Repeated Message Enforcement. For RUPs that pose a risk to the environment and natural resources and those that pose a risk to human health, training is the best method for enforcing the message that certain targeted pesticides need to be used with care near (especially) aquatic environments.

Radio Infomercials. Short radio "infomercials" may also be used in highly sensitive areas with high aquatic and biodiversity resources and intensive vegetable, tree nut, or fruit-growing regions to enforce and reinforce this safety message with certain highly used RUP products.

Paid/Free Applicator Certification. Afghanistan does not (yet) have pesticide applicator certification systems set up, so this measure would not likely work well until it does. Scale is the major reason. Afghan farming systems are very small in scale compared with American farming systems, and farmers have neither the resources or motivation to encourage such a certification system.

Issue: General Use Pesticides (GUPs)

All pesticides not included above present acute and chronic human health and environmental risks (see decision matrix in Table 1), and it is important to recall that "dose alone determines the poison," so a high dose of a relatively not highly toxic pesticide may increase risks to human health and environmental resources.

Mitigation of These Risks:

- ASAP should continue to assist the farm stores sector with best practices training; and
- ASAP should continue to source pesticides from well managed stores that do not sell illegal or products containing very highly toxic active ingredients.

Additional Recommendations for Mitigation

- *Immediately, ASAP beneficiary farmers should use the accepted (allowable) pesticide products in the short term. Users will require (before the next spraying season-June to September 2008) training and refresher training in pesticide safe use and IPM — if this has not yet occurred — emphasizing which products are recommended, which should not be used, and why.*

Training will introduce beneficiary farmers to pesticides not permitted for use, those the project recommends, and those that might be used with significant training and certification, IPM philosophy, tools and tactics, and safe pesticide use practices including use of basic PPE.

- *Immediately, ASAP should obtain material safety data sheets (MSDSs) from pesticide importers/distributors for pesticide products that will be used extensively on project crops.*

Copies of MSDSs on-hand will provide project field managers with a source of exact information on risks and risk mitigations for each product and what measures to take in case of an accidental spill, fire, or poisoning. MSDS information can also be used during training.

- *Immediately, by crop — and, if possible, crop phenology — produce quick reference guides for all of the anticipated major or primary pests/production constraints, GAPs, and IPM measures that can be used to strengthen and protect the crop, pesticides to be used on the project for each anticipated pest, with use rates, safety measures, environmental concerns,*

restricted entry interval (REI) and minimum residue levels (MRLs) for export and local consumption.

A quick reference guide of GAP, IPM, and pesticide choices will be useful for field project staff, extension agents and literate farmers to refer to in the field as they make decisions.

- *Regularly (at least annually) update any changes to the list of pesticides proposed for use and communicate these changes to USAID with a note that an amendment to this PERSUAP will be necessary.*

ASAP Project Managers will need to report changes to less toxic products on the list of pesticides recommended to USAID as this PERSUAP is amended.

Pesticide Procedures Element B: Basis for Selection of Pesticides

This generally refers to the environmental and economic rationale for choosing a particular pesticide. In general, best practices dictate that the least toxic pesticide that is effective be selected.

The bases for selection of each pesticide are most often the following: availability, effectiveness (efficacy), and price. A reputable manufacturer/importer/distributor, human safety, and environmental safety are other factors that will influence the choice of pesticides for ASAP.

Analysis

ASAP implementing partners have indicated that the three most important bases for pesticide selection in Afghanistan are price, efficacy, and availability.

Issue

Afghan farmers do not consider factors such as reducing risks to human health by using products that contain active ingredients with low acute human toxicity and few to no chronic health risks, reducing risks to scarce and valuable water resources on the surface and underground, reducing risks to biodiversity and environmental resources like honeybee pollinators necessary for crop seed set, fish, birds, wildlife, beneficial field insect predators and parasites, and aquatic organisms, or the importance of using products from a reputable pesticide manufacturer.

Recommendations for Mitigation

- *Training to include additional pesticide selection factors discussion*

ASAP training, using material in this PERSUAP, MSDSs, and pesticide labels, and material found on pest management Web sites (like the UC Davis IPM site), can emphasize the importance of these additional pesticide selection factors.

- ● *ASAP project staff economists should perform economic analyses comparing pesticides to determine the most effective choice — with low health and environmental impact potential —that is affordable for the crop grown;*

- *ASAP should choose and use pesticides with as low human and environmental risk profiles (see decision matrix in Table 1, MSDSs, and Labels) as is practical; and*

- *ASAP should use more biological and naturally-derived pesticides, as practical.*

Pyrethrum, a mix of natural chemicals called pyrethroids, can be extracted from chrysanthemum flowers and provides good general pest control. Extracts from Neem trees are effective insecticides that are commercially available. Spore extracts from the bacterium *Bacillus thuringiensis* are effective against worm or caterpillar larvae of moth and butterfly pests. Insecticidal soaps and oils are effective

against relatively sedentary pests like scales, mealybugs, aphids, and mites. A list of botanical products studied and registered by EPA may be found in Attachment 5.

Pesticide Procedures Element C: Extent to Which the Proposed Pesticide Use Is, or Could Be, Part of an IPM Program

USAID policy promotes the development and use of integrated approaches to pest management (IPM) whenever possible. This section discusses the extent to which the proposed pesticide use is incorporated into an overall IPM strategy, and if not, how it can be.

First Objective for IPM: Growing a Healthy Crop

Good crop management can strongly affect IPM, and good agronomic or cultural practices, or best management practices for agriculture (currently called GAPs), are the most basic and, often, the most important prerequisites for an effective IPM program. Growing a healthy crop optimizes both its yield potential and capacity to prevent, tolerate, or compensate for pest damage.

Increasingly, IPM tools and techniques are becoming a subset of GAPs. The use of GAPs ensure the production of strong, vigorous plants (that can resist or tolerate pest damage), whereas IPM focuses on decreasing risks from certain pest and other constraints to production.

GAPs emphasize maintaining proper plant health, and thus *prevention* of problems, through use of:

- Quality hybrid pest- and constraint-resistant seed, plant density, and thinning;
- Proper land preparation and tillage such as sowing in raised-bed plantings;
- Soil fertility testing, monitoring and management;
- Water testing and management to avoid salinity and soil-borne diseases;
- Nutrient management through use of combinations of biological and mineral fertilizers;
- Organic matter management through use of manures, composting, and mulching; and
- Proper pesticide choice, storage, use and disposal.

IPM is a philosophy and practice of considering and using any and all possible pest management techniques and tools including:

- Cultural methods that promote pest avoidance and a healthy plant that can better tolerate or resist pests. These methods include, but are not limited to, use of resistant varieties, early/late plantings/harvestings, crop rotation, pruning, destruction of crop residues and pest refuge plants near fields, and GAP practices;
- Pest scouting, monitoring, and identification for precision decision-making;
- Natural pest control by encouraging and protecting local and introduced parasitoids, predators, and pest diseases by, among others, planting predator-attracting plants/flowers;
- Mechanical weed or insect pest control using manual and machine practices;
- Chemical practices such as use of *judicious, knowledgeable, and safe application* of synthetic and “natural” (derived from nature, extracted from plants, microbes, and other organisms) pesticides.

IPM can also include use of natural chemical methods (by using attractants, repellents, sterilants, and growth inhibitors), genetic methods (propagation and release of sterile or genetically incompatible pests), and regulatory means (plant and animal quarantines, suppression and eradication programs) to the extent possible while permitting the safe integration of pesticides with farmers’ traditional cropping and pest management systems.

The strongest selling points for IPM beyond the health and environmental benefits are as follows:

- IPM is more effective then synthetic pesticides *in the long run;*

- IPM is less damaging to essential soil health and nutrient cycling;
- IPM generally requires less capital (but more labor) investment; and
- IPM can be used preventatively to eliminate or minimize the need for “responsive” controls (that is, applying pesticides after a pest outbreak occurs and much damage already has been done).

A general IPM planning and design protocol developed by FAO scientists and extensionists may be found in Attachment 6.

General GAP/IPM Tools and Techniques that May Be Tried in Afghanistan

- Soil nutrient, texture and pH testing;
- Plant leaf analyses;
- Pest-resistant/tolerant seed;
- Seed treatment with pesticides;
- Raised-bed planting technique;
- Soil sterilization using black plastic and sunlight;
- Follow seeding rate and thinning recommendations for certain vegetables;
- Soil moisture measurements and management via drip irrigation;
- Use of organic mulch;
- Use of plastic mulch;
- Use of organic fertilizers/soil structure amendments (manure, compost);
- Use of purchased mineral fertilizers;
- Combinations of organic and mineral fertilizers;
- Crop rotation with and use of green manure crops;
- Crop rotations among different families of vegetables;
- Early/late plantings/harvestings to avoid pests;
- Use of trap crops to trap and destroy pests;
- Weekly field scouting to assess pest levels/damage;
- Ability of farmers to identify pests correctly;
- Ability of farmers to identify predators, parasites, and pest diseases correctly;
- Pruning and sanitation of diseased plants;
- Do things to encourage predator/parasite build-up;
- Planting parasite-attracting plants on field margins;
- Mechanical weed control by hand hoe;
- Use of herbicides for weed control;
- Exclude insect pests by using vegetable tunnels and microtunnels;
- Mechanical insect control by hand-picking larvae, pupae, or adults;
- Use of insecticides for insect control;
- Use of fungicides for control of fungus;
- Spot treatment of pest hotspots with insecticides, miticides, or fungicides;
- Use of pheromone traps to monitor moth levels;
- Use of pheromone inundation to confuse moth mating;
- Crop stalks and residue destruction at end of season; and
- Apply local plant extracts (neem, pyrethroid, other) to kill pests.

Analysis

Of these possible GAP and IPM techniques, reviews of project work plans, one annual report and questionnaires filled by ASAP staff members (see Attachment 7) show that ASAP is already using or planning to use the following:

- Soil nutrient, texture, and pH testing;
- Pest resistant/tolerant seed;
- Seed treatment with pesticides;

- Raised-bed planting technique;
- Soil moisture measurements and management via drip irrigation;
- Plastic mulch;
- Organic fertilizers/soil structure amendments (manure);
- Purchased mineral fertilizers;
- Combinations of organic and mineral fertilizers;
- Crop rotation with and use of green manure crops;
- Crop rotations among different families of vegetables;
- Early/late plantings/harvestings to avoid pests;
- Use of trap crops to trap and destroy pests;
- Pruning and sanitation of diseased plants;
- Mechanical weed control by hand hoe;
- Use of herbicides for weed control;
- Exclude insect pests by using vegetable tunnels and micro-tunnels;
- Mechanical insect control by hand-picking melon fly pupae and pomegranate borer;
- Insecticides for insect control;
- Fungicides for control of fungus;
- Spot treatment of pest hotspots with insecticides, miticides, or fungicides; and
- Crop stalks and residue destruction at end of season.

In addition, some NGOs have used pheromone traps to monitor moth levels and pheromone inundation to confuse moth mating of apple moth pests.

ASAP Mitigation Recommendations

- ASAP should investigate the use of additional GAP and IPM techniques from the above list and from the UC Davis IPM website for additional project crop-pest combinations;

- During training and field visits, ASAP should enhance understanding of and emphasis on Integrated Pest Management (IPM) philosophy, tools and techniques, with pesticide use as a last resort; and

- ASAP should write GAP/IPM plans and/or technical sheets for each crop to be protected, by pests, as practical.

Pesticide Procedures Element D: Proposed Method or Methods of Application, Including the Availability of Application and Safety Equipment

This section examines how the pesticides are to be applied and the measures to be taken (training, use of PPE) to ensure safe use.

Analysis

Most project pesticides will be applied by backpack sprayers. For sufficiently high tree crops, it may be necessary to use motorized backpack sprayers to reach the tops and fruit, as regular backpack sprayers may not reach high enough. Most Afghan farmers do not use PPE, though some project farmers do use goggles and gloves (see questionnaire answers in Attachment 7). ASAP has begun to address safety issues through its training programs on safe use best practices.

Issue

Many farmers in Afghanistan (and most developing countries) do not use PPE for the following reasons:

1. No safety equipment is available for purchase;
2. Safety equipment is not affordable;

3. PPE is too hot to wear in the field (in spite of the fact that it is recommended that many pesticides should be applied very early in the morning when it is cool);
4. Many farmers will not use PPE even if it is available, due to a masculine sense of invincibility.

International best practices for safe use of pesticides require that appropriate PPE be used. Most pesticide companies, on each pesticide label, either list or put pictograms showing the PPE required for use of that certain product. Standards and certification systems for trade in agricultural commodities also require the use of appropriate PPE. Training should emphasize these facts and decipher the pictograms. Groupings of farmers (via communes, cooperatives and associations) can purchase PPE for use or rental by members, thus reducing the per-farm cost of ownership. Some general mitigation measures to ensure safe pesticide use are contained in Attachment 8.

ASAP Mitigation Recommendations

- *ASAP can ensure that protective clothing (gloves, boots, mask, goggles) is issued to farmers whose fields are used as a demonstration plots. People who mix and apply pesticides should wear protective clothing during operations.*

Protective clothing and safety equipment needs to continue to be provided for all pesticide handlers, mixers, users, applicators, and others present while application occurs. Examples of safety equipment to be used for each type of pesticide may be found in Attachment 9.

- *Continued training in safe handling and use.*

Program staff who will use of oversee the use of pesticides require training in safe handling and use of insecticides. ASAP has begun to provide this type of training, which requires refreshing and emphasis on issues contained in this PERSUAP.

- *Continued production of safe use training materials and posters.*

One way to remind applicators of safety issues is through producing and using high-quality training materials and safe use posters in the local language.

- *Children must be kept away from the field while spraying is occurring and kept out after spraying has occurred.*

Pesticide Procedures Element E: Any Acute and Long-Term Toxicological Hazards, Either Human or Environmental, Associated with the Proposed Use, and Measures Available to Minimize Such Hazards

This section of the PERSUAP examines the acute and chronic toxicological data associated with the proposed pesticides. In addition to hazards (risk), this section also discusses measures designed to mitigate any identified toxicological hazards, such as training of applicators, use of protective clothing, and proper storage.

Analyses

ASAP staff members were asked: Have there been any pesticide human poisonings related to the crops you work on in your region? They responded (see Attachment 7): “Not seen, but there is no poisoning reporting in the health care system.”

A pesticide decision matrix containing information on acute and chronic human and environmental toxicological risks for each pesticide active ingredient is provided in Table 1. There are several ways to mitigate exposure to humans. Some of the best examples are outlined below.

Issue

Acute and long-term toxicological hazards — both human and environmental — associated with the ASAP project's proposed uses and measures available to minimize such hazards will remain a challenge.

Mitigation of Human Toxicological Exposures

Most pesticide poisonings result from careless handling practices or from a lack of knowledge regarding the safer handling of pesticides. The time spent learning how to use safer procedures is an investment in the health and safety of oneself, one's family, and others. Pesticides can enter the body through the skin, mouth, nose, and eyes. A checklist is given below to help avoid these various routes of overexposure to pesticides.

To avoid dermal (skin) exposure:

- *Check the label for special instructions or warnings regarding dermal exposure;*
- *Use recommended protective clothing and other equipment as listed on the label; and*
- *Do not re-enter the area until deposit has dried or re-entry interval is past.*

To avoid oral (mouth) exposure:

- *Check the label for special instructions or warnings regarding oral exposure;*
- *Never eat, drink, or smoke, chew tobacco while working with any pesticide;*
- *Wash thoroughly with soap and water before eating, drinking, smoking, or chewing tobacco;*
- *Do not touch lips to contaminated objects (such as nozzles);*
- *Do not wipe mouth with contaminated hands or clothing;*
- *Do not expose food, beverages, drinking vessels, or cigarettes to pesticides; and*
- *Wear a face shield when handling concentrated pesticides.*

To avoid respiratory (lungs) exposure

- *Read the label to find out if respiratory protection is required;*
- *If respiratory protection is required, use only an approved respiratory device; and*
- *Stay upwind during application.*

To avoid eye exposure:

- *Read the label to find out if eye protection is required;*
- *If eye protection is required, use goggles to protect eyes or a face shield to protect eyes and face; and*
- *Keep pesticide container below eye level when pouring.*

In addition to these common-sense measures, one can ensure protection against exposure to pesticides by wearing the type of clothing required for different classifications of pesticides (the classification of each pesticide by USEPA toxicity class I, II, III, or IV, and signal word DANGER, WARNING, CAUTION). The toxicity class for each ASAP pesticide is provided in Table 1. Good protection may be achieved by following the protective clothing and equipment guide on the product label (usually via pictograms), the MSDS, and Attachment 9.

The EPA system for determining toxicity of pesticides (as well as the WHO system) is included as Attachment 2 to this PERSUAP.

ASAP Mitigation Recommendations

- *Follow basic first aid for pesticide overexposure.*

Get medical advice quickly if you or any of your fellow workers have unusual or unexplained symptoms during work or later the same day. Do not let yourself or anyone else get dangerously sick before calling a physician or going to a hospital. It is better to be too cautious than too late.

First aid is the initial effort to help a victim while medical help is on the way. If you are alone with the victim, make sure the victim is breathing and is not being further exposed to the poison before calling for emergency help. Apply artificial respiration if the victim is not breathing.

Read the first aid instructions on the pesticide label, if possible, and follow them. Do not expose yourself to poisoning while you are trying to help. Take the pesticide container (or the label) to the physician. Do not carry the pesticide container in the passenger space of a car or truck.

Additional basic first aid procedures for pesticide poisoning are presented in Attachment 10.

- *Continue to provide training in proper use of protective equipment and safe use of pesticides.*

All project farmers who handle, supervise, or spray pesticides will require safe use training, if they have not already received it.

- *Continue to develop or adapt posters on use of safety equipment.*

For many projects using pesticides, posters exist to remind users of safety concerns and equipment. Such posters, in local languages, should be ordered and posted where pesticide workers can see and review them. This can be done as part of a training program.

- *Avoid damage to environment through training to avoid non-target ecosystems.*

IPM and safe use training should include components or training modules on how to mitigate exposure of non-target organisms to pesticides.

Pesticide Procedures Element F: Effectiveness of the Requested Pesticide for the Proposed Use

This section of the PERSUAP requires information similar to that provided in item B, but more specific to the actual conditions of application, and considers the potential for the development of pest resistance to the proposed insecticide.

Analysis

As noted in the country pesticide systems analysis above, extensive resistance of pests to pesticides in Afghanistan is unlikely due to the paucity of pesticide use until very recently. Resistance could quickly develop, however, if farmers over- and under-dose and use non-selective pesticides. For pests like aphids, leafhoppers, and disease spores, which can migrate easily on upper atmosphere air masses from surrounding countries, resistance is likely already present at some level.

At some point, Afghan farmers may begin to note that some products no longer work well to control pests in their field and will likely begin to blame pesticide manufacturers for a weaker product. This could be the result of the development of insecticide resistance, but it could also be the result of improper dosing. Farmers should be trained to check for the development of insecticide resistance, and ASAP project implementers should be on the lookout for it during their field visits.

All of the pesticides chosen for the project were selected based upon effectiveness as one of the primary criteria, from international and local farmer experience. ASAP project staff members note (see

Attachment 7) that under- and over-dosing are the primary concerns with lack of effectiveness, not necessarily development of resistance. Pesticide suggestions for various constraints have been and continue to be reviewed by ASAP staff on the UC Davis IPM Web site.

Issue

With increased usage, and especially improper usage, of pesticides, resistance will undoubtedly develop at some point.

ASAP Mitigation Recommendations

- *Rotate pesticides to reduce the build-up of resistance.*
- *Monitor resistance by noting reduction in efficacy of each pesticide product.*

Project staff and farmers can monitor the kill rate of the pesticides for any reduction in efficacy and communicate with neighboring farmers and extension agents to determine when pesticide rotation is called for.

Pesticide Procedures Element G: Compatibility of the Proposed Pesticide Use with Target and Non-Target Ecosystems

This section examines the potential effect of the pesticide on organisms other than the target pest (for example, the effect on bee colonies in the spray area). Non-target species of concern also include birds, fish, aquatic organisms, and beneficial insects. The potential for negative impact on non-target species should be assessed, and appropriate steps should be identified to mitigate adverse impacts.

Biodiversity, Conservation, and protected or endangered species

Afghanistan has 41 national parks, reserves, and wilderness areas, according to information found on biodiversity and protected areas for countries at earthtrends: http://earthtrends.wri.org/pdf_library/country_profiles/bio_cou_004.pdf.

Altogether, 119 (13 threatened) mammalian species are recorded in Afghanistan, of which the Caspian tiger (*Panthera tigris virgata*), cheetah (*Acionony x jubatus venaticus*), musk deer (*Moschus*), snow leopard (*Panthera uncia*), sand fox (*Vulpes ruppelli*), Blandford's fox (*Vulpes cana*), and three species of ungulates: the goitered gazelle (*Gazella subgutturosa*), markhor (*Capra falconeri*), and Bactrian deer (*Cervus elaphus bactrianus*) are on the endangered species list.

The only comprehensive account of the birds of Afghanistan is that produced by ornithologist Paludan in 1959, consisting of records of 389 species, of which 231 were thought to breed. According to FAO in 1981, other more recent publications bring the total number to about 460. Eleven of these are thought to be endangered presently.

Issue: Pesticide Non-Target Impacts

The effect of each pesticide on non-target ecosystems will depend on how long it stays in the environment, or rather its rate of breakdown, or half-life. Half-life is defined as the time (in days, weeks, or years) required for half of the pesticide present to break down after application into degradation products. The rate of pesticide breakdown depends on various factors, including temperature, soil pH, soil microbe content, and whether or not the pesticide is exposed to light, water, and oxygen.

Many pesticide breakdown products are themselves toxic, and each may also have a significant half-life. Since pesticides break down in soil, light, and water, there are half-lives for exposure to each of these factors. In the soil, types and numbers of microbes present, water, oxygen, temperature, pH, and soil type (sand, clay, loam) all affect the rate of breakdown. Most pesticides also break down, or

photo-degrade, with exposure to light. Lastly, pesticides can be broken down, or hydrolyzed, with exposure to water.

Table 1 addresses the potential impact potential of each pesticide active ingredient on aquatic organisms, fish, birds, bees, beneficial insects, and ground water contamination. Please refer to this table to see the impacts and suggestions for mitigating these impacts.

Since pests and pesticide use will likely be low on the project pilot sites, there should be little impact on non-target organisms. Since water and groundwater are a limited resource in some parts of Afghanistan, however, all attempts must be made to reduce contamination.

ASAP Mitigation Recommendations

- *Avoid using pesticides in or near the national parks and where endangered species are known to exist.*

- *Investigate the use of botanical and biological controls, wherever practical.*

The eco-geography (islands of green crop in a sea of sand, moountains and desert) and cropping methods in Afghanistan are very amenable to the use of biological controls. The program should investigate their use.

- *Apply pesticides early in the morning before bees forage.*

- *Apply pesticides at least 35 meters from drinking water sources and open water.*

Pesticide Procedures Element H: Conditions Under Which the Pesticide Is to Be Used, Including Climate, Flora, Fauna, Geography, Hydrology, and Soils

In general, in addition to Element G above, this requirement attempts to protect endangered species, forests, and parks from the dangers of pesticide misuse and protect soil and water resources from contamination.

Pesticide Adsorption and Leaching Potentials

Each pesticide has physical characteristics, such as solubility in water, ability to bind to soil particles and be held (adsorbed) by soil so they do not enter the soil water layers and the ground water table, and their natural breakdown rate in nature. This data can be found for the pesticides proposed for use on the ASAP project by checking each pesticide on the PAN website: http://www.pesticideinfo.org. The water solubility, soil adsorption, and natural breakdown rates, if available, are included at the bottom of the Web page for each parent chemical.

In general, pesticides with water solubility of greater than 3 mg/liter have the *potential* to contaminate groundwater; and pesticides with an adsorption coefficient of less than 1,900 have the *potential* to contaminate groundwater. Pesticides with an aerobic soil half-life greater than 690 days or an anaerobic soil half-life greater than 9 days have the potential to contaminate groundwater. Moreover, pesticides with a hydrolysis half-life greater than 14 days also have the potential to contaminate groundwater.

The detailed environmental, hydrological, and soil conditions at the project pilot sites are likely included in the official Project Papers for ASAP. Look at these documents to find details. Further, the potential for surface and ground water contamination for each pesticide is addressed in Table 1 for each proposed pesticide. Look to this table to determine contamination potential and use with care.

Issue: Groundwater Contamination Issues and Discussion

With the exception of herbicides, most of the proposed pesticides are not potential ground water contaminants. Moreover, the arid conditions under which the pesticides will be used indicate that they

will be rapidly evaporated upon application. In the highlands, the distance to ground water tables is likely great, and many of the soils contain a highly impermeable calcium layer. There is much closer proximity to surface water via rivers and canals in the Afghanistani Marshlands in the South of the country. Do not apply pesticides near or in water.

ASAP Mitigation Recommendations

- *Use pesticides with low ground water contamination potential where water tables are high or easy to reach.*

As one of the criteria for selection of pesticides, determine the potential for risk of surface and ground water contamination at each site, (see Table 1) and choose pesticides that have low contamination potential.

- *Investigate and promote the use of biological pesticides to replace synthetic pesticides and additional IPM measures to reduce use of synthetic pesticides.*

Lists of botanical and biological pesticides are included in Attachment 5 at the end of this report. Investigate their usefulness and availability in Afghanistan.

Pesticide Procedures Element I: Availability of Other Pesticides or Non-Chemical Control Methods.

This section identifies other options for control of pests and their relative advantages and disadvantages.

Analysis

ASAP staff note (Attachment 7) that some farmers apply a mixture of tobacco with soap and/or burn weeds. In general, conventional pesticides are cheaper and easier to use, and thus preferred. Non-chemical methods (IPM tools and technologies) are listed under Element C above.

Natural and Biological Pesticides

Several of the pesticide active ingredients come from natural or biological sources and are identified as being useful on project sites:

- Earth elements like cryolite and kaolin clay;
- Inorganic elements and compounds like forms of copper and sulfur, iron phosphate, calcium hydroxide, phosphorous acid, sodium bicarbonate, and sodium tetrathiocarbonate;
- Compounds derived from plants like neem oil (azadirachtin), pyrethrin, and emamectin benzoate;
- Microbes like *Bacillus thuringiensis* and *Bacillus subtilis;*
- Microbial-derived products like Spinosad and Abamectin (Ivermectin);
- Mineral and other oils; and
- Fatty acids in insecticidal soaps.

There are international and local companies specializing in many, if not most, of the pests encountered in Afghanistan that can provide support on biological controls, should the project so choose.

Biological Control Agents

Biological controls are available commercially from two large international companies, Koppert of Holland and Biobest of Belgium. The Dutch company Koppert provides many biological controls against spider mites, beetles, leaf miners, mealy bugs, thrips, aphids, whiteflies, and moth and

butterfly larvae. Koppert also provides the Koppert Side Effects List, a list of the side effects of pesticides on biological organisms. Its Web site is: http://www.koppert.com.

Biobest of Belgium provides many of the same or similar biological controls as Koppert, and includes a control against leaf hoppers. Its Website is: http://www.biobest.be.

ASAP Mitigation Recommendations

- *Research and try biological and natural pest controls.*

This PERSUAP provides all the resources to do this. The Web sites given provide direct links to companies producing biological controls, and Attachment 5 to this PERSUAP provides botanically extracted products. Compare these with synthetic pesticides for economic purposes and effectiveness.

Pesticide Procedures Element J: Host Country's Ability to Regulate or Control the Distribution, Storage, Use, and Disposal of the Requested Pesticide

This section examines the host country's existing infrastructure and human resources for managing the use of the proposed pesticides. If the host country's ability to regulate pesticides is inadequate, the proposed action could result in greater harm to the environment.

Analysis

The country of Afghanistan is at an historic crossroads, with a new MAIL having been formed in the past few years, and assistance from USAID to lead environmental management in the region. As it evolves, implementation and compliance will improve during the length of the ASAP project. The project can take advantage of, and contribute to, this progress with the use of progressive pest control tactics and safe use of pesticides. Attachment 11 at the end of this document provides pesticide disposal options.

Attachment 3 contains a 1998 copy of Afghan pesticide regulations that was updated and translated in 2000. According to interviews with the MAIL, the regulations have never been implemented well, due to lack of resources and insecurity. According to ASAP (Attachment 7), "The department of plant protection has the authority to stop and hand over any company responsible for not applying the pesticide law to police, and anyone from the pesticides sell or use according to the regulations, but they have never been applied due to the conflict."

Issues

The Government of Afghanistan apparently does not have its own list of registered pesticide products with specific permitted uses, and instead defers to FAO's list of acceptable products, which is limited and not adapted specifically for Afghanistan's agriculture and human health systems. Afghanistan has had written pesticide regulations since 1989 on pesticide use, but they 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, and pirated pesticides.

Conversations with ASAP project implementers indicate that illegal products do enter Afghanistan. These may include unregistered products as well as internationally banned (or tightly controlled) products. Products containing chemicals on the international Persistent Organic Pollutants (POPs) banned list — like DDT, dieldrin, HCH, heptachlor, and lindane — encountered widely in developing countries — are likely to be found in retail shops in smaller towns and border towns, as they move easily across land borders. Chemicals contained on the usually tightly controlled Prior Informed Consent (PIC) list are also likely to be encountered in Afghanistan.

Afghanistan is located near three countries most known for the production of substandard quality pesticides. Pesticide quality can be reduced by not containing the active ingredient stated on the label, not containing the amount of active ingredient listed on the label, and, more dangerously,

containing any number of chemical reaction byproducts produced along with the active ingredient. Byproducts are often much more acutely toxic than the active ingredient. Smaller companies without the means for removing these impurities include them with the active ingredient. Most developing countries lack the analytical means for detecting not only active ingredients but also the presence and amounts of these often highly toxic byproducts.

ASAP Mitigation Recommendations

- *Continue to work with the new MAIL as it implements environmental compliance.*

ASAP staff can continue to work closely with the MAIL to stay abreast of developments in the regulation and registration of pesticides.

Pesticide Procedures Element K: Provision for Training of Users and Applicators

USAID recognizes that safety training is an essential component in programs involving the use of pesticides. The need for thorough training is particularly acute in developing countries, where the level of education of applicators may typically be lower than in developed countries.

Analysis

Training in IPM and safe use are of paramount importance for Afghanis using pesticides. According to questionnaire results (Attachment 7), several NGOs have provided GAP, IPM, and safe pesticide use training. The ASAP project is in the process of doing so through its training programs.

Issue

Additional and refresher training are superb means for affecting the behavior of distributors, rural farm shop owners and farmers now, as they begin to expand their agricultural opportunities, before risky behaviors become set.

ASAP Mitigation Recommendations

- *Continue to implement pesticide safe use training for staff and farmers.*

Training can occur via a train-the-trainer format, in which supervisors are trained for 2 to 3 days, followed by training for actual applicator and laborer staff for the following 2 to 3 days.

Pesticide Procedures Element L: Provision Made for Monitoring the Use and Effectiveness of Each Pesticide.

Evaluating the risks and benefits of pesticide use should be an ongoing, dynamic process.

Analysis

Reviews of all project documents to date indicate that monitoring is an integral part of the project. ASAP project staff will monitor pesticide efficacy and effects to the environment on an ongoing basis and switch to alternative pesticides as the need arises. Program site managers will monitor for efficacy against pests and impact on beneficial organisms.

Issues

Several issues could receive more attention in annual work plans and annual reports. These include a section on environmental impact mitigation, with subsections (and issues) on:

- Afghan and EPA regulation compliance (documents and enforcement status, risk, pollution, mitigation);
- GAPs/IPM measures tried/used (lists of measures used — in fact the project had a long list of IPM tactics being used that never made it into the annual work plans and reports);
- Biodiversity and conservation (soil, water, energy, protected habitats, biodiversity, and protected species);
- Inputs and PPE use and issues (types, amounts and issues with products, sprayers, MRLs, REIs, MSDSs);
- Training/capacity building in IPM and safe use (hands-on, demos, sessions, meetings, extension, flyers, brochures, pamphlets, posters, crop technical GAP information sheets, and radio and TV outreach/safety message enforcement); and
- Monitoring/audits (unsafe use practices with interventions, proper weekly field pest monitoring and identification of pests by farmers, positive and negative health and environmental impacts, pesticide residues in food, development of pest resistance to pesticides, and uptake of best practices).

ASAP Mitigation Recommendations

- *Simple monitoring plans can be drawn up by site managers.*

Site managers will be responsible for drawing up simple monitoring plans to collect data on reduction in efficacy and any other known environmental impacts leading to a change to a new or different pesticide. This will be reported to USAID, as a small section, along other reporting requirements.

- *When reporting, adhere to comments above under issue.*

ASAP Safe Use Action Plan Recommendations

Refer to the PER sections while planning the following actions. ASAP staff will work to put these actions into action plans with appropriate resources and deadlines, and with COP support and sign-off upon completion.

Immediately:

- Eliminate from ASAP lists any pesticides containing active ingredients that are either not registered for same or similar use by EPA or deemed very highly toxic (Class I) with increased risk to project implementers and beneficiaries;
- For high toxicity (Class II) and RUP pesticide active ingredients, discontinue use until all program implementers and beneficiaries have received sufficient training (to set or change behavior in favor of best safe use practices) in the proper use of PPE and IPM;
- For relatively lower toxicity (Class III and IV) pesticide active ingredients, continue to train program implementers and beneficiaries in safe pesticide understanding and use (to set or change behavior in favor of best safe use practices) and IPM training and use PPE;
- ASAP should continue to assist the farm stores sector with best practices training;
- ASAP should continue to source pesticides from well-managed stores that do not sell illegal products or those containing very highly toxic active ingredients;
- ASAP should obtain Material Safety Data Sheets (MSDSs) from pesticide importers/distributors for pesticide products that will be used extensively on project crops;
- ASAP should produce, by crop (and, if possible, crop phenology), quick reference guides for all of the anticipated major or primary pests/production constraints, GAPs and IPM measures that can be used to strengthen and protect the crop, pesticides to be used on the project for each anticipated pest, with use rates, safety measures, environmental concerns, restricted entry interval (REI), and minimum residue levels (MRLs) for export and local consumption;
- ASAP should continue to provide safe pesticide use training for staff and beneficiaries; and
- ASAP should ensure that protective clothing (gloves, mask, goggles, boots) is issued to farmers whose fields are used as demonstration plots and people who mix and apply pesticides.

Ongoing:

- ASAP project staff economists should perform economic analyses comparing pesticides to determine the most effective choice — with low health and environmental impact potential — affordable for the crop grown;
- ASAP should choose and use pesticides with low human and environmental risk profiles (see decision matrix in Table 1, MSDSs, and Labels), wherever practical;
- ASAP should use more biological and naturally-derived pesticides, wherever practical;
- During training and field visits by ASAP staff, enhance understanding of and emphasis on Integrated Pest Management (IPM) philosophy, tools, and techniques, with pesticide use as a last resort;
- ASAP should continue to produce safe use training materials and posters;
- Rotate pesticides to reduce the build-up of resistance;
- Monitor for pest resistance by noting reduction in efficacy of pesticide products;
- Use pesticides with low ground water contamination potential where water tables are high or easy to reach; and

- Continue to work with the new MAIL as it implements environmental compliance.

By the end of the 2008 cropping season:

- Regularly and at minimum, annually update any changes to the list of pesticides proposed for use and communicate these changes to USAID with a note that an amendment to this PERSUAP will be necessary;
- ASAP implementers and beneficiaries should understand and follow basic first aid for pesticide overexposure;
- Investigate and promote the use of biological and natural pesticides and additional IPM measures to reduce use of synthetic pesticides; and
- In the Year 2 Annual Report to AID and Year 3 Work Plan, include a section on Environmental Impact Mitigation, with subsections on Afghan and EPA regulation compliance, GAPs/IPM measures tried/used, biodiversity and conservation, inputs and PPE use and issues, training/capacity building in IPM and safe use, monitoring/audits of IPM and safe use issues outstanding (discuss issues in the PER section on monitoring).

By the end of the 2009 cropping season:

- Regularly (at least annually) update any changes to the list of pesticides proposed for use and communicate these changes to USAID with a note that an amendment to this PERSUAP will be necessary; and
- In the Year 3 Annual Report to AID, include a section on environmental impact mitigation, with subsections on Afghan and EPA regulation compliance, GAPs/IPM measures tried/used, biodiversity and conservation, inputs and PPE use and issues, training/capacity building in IPM and safe use, monitoring/audits of IPM and safe use issues outstanding (discuss issues in the PER section on monitoring) near the end of the program.

ASAP GAPs, IPM Techniques, and Pesticide Safe Use Training Program

The training program is a compilation of the best practices recommendations listed above. It uses a train-the-trainer methodology for achieving staff and farmer behavior-modification goals.

Phase 1: Immediately, using ASAP-produced safe use training materials and posters, train *program staff and beneficiary leader farmers* on the following topics:

- The reasons for elimination from ASAP lists (contained herein) of any pesticides containing active ingredients that are either not registered for same or similar use by EPA or deemed very highly toxic (Class I) with increased risk to project implementers and beneficiaries;
- Good Agriculture Practices (GAPs) and Integrated Pest Management (IPM) philosophy and specific tools and techniques (contained herein and searched by ASAP staff on the UC Davis IPM Web site) that can be used for ASAP crops;
- The proper interpretation and use of MSDS information, pesticide label warnings/PPE recommendations, and proper use of PPE;
- The requirements for safe use of high toxicity (Class II) and RUP pesticide active ingredients, which will be discontinued until all program implementers and beneficiaries have received sufficient (to set or change behavior in favor of best safe use practices) training with proper use of PPE and IPM (above);
- Understanding and safe use (to set or change behavior in favor of best safe use practices) of pesticide products containing relatively lower toxicity (Class III and IV) active ingredients, including the use of biological and natural pesticides;
- The importance of sourcing pesticides from well-managed stores that do not sell illegal products or those containing very highly toxic active ingredients;
- Understanding and applying information contained in ASAP-produced quick reference guides for all of the anticipated major or primary pests/production constraints, GAPs and IPM measures that can be used to strengthen and protect the crop, pesticides to be used on the project for each anticipated pest, with use rates, safety measures, environmental concerns, restricted entry interval (REI), and minimum residue levels (MRLs) for export and local consumption;
- The importance of monitoring for pest resistance by noting reduction in efficacy of pesticide products, and rotation among pesticide classes (see Table 1) to reduce the build-up of resistance;
- The importance of using pesticides with low ground water contamination potential (see Table 1, column 8) where water tables are high or easy to reach; and
- Basic first aid procedures (found on the product Label, MSDS, and Attachment 10) for pesticide overexposure for the most commonly-used pesticides.

Phase 2: Immediately following Phase 1, use program staff and leader farmers to train *beneficiary farmers* on the following topics:

- The reasons for elimination from ASAP lists (contained herein) any pesticides containing active ingredients that are either not registered for same or similar use by EPA or deemed very highly toxic (Class I) with increased risk to project implementers and beneficiaries;
- Good Agriculture Practices (GAPs) and Integrated Pest Management (IPM) philosophy and specific tools and techniques (contained herein and searched by ASAP staff on the UC Davis IPM Web site) that can be used for ASAP crops;
- The proper interpretation and use of MSDS information, pesticide label warnings/PPE recommendations, and proper use of PPE;

- The requirements for safe use of high toxicity (Class II) and RUP pesticide active ingredients, which will be discontinued until all program implementers and beneficiaries have received sufficient (to set or change behavior in favor of best safe use practices) training with proper use of PPE, and IPM (above);
- Understanding and safe use (to set or change behavior in favor of best safe use practices) of pesticide products containing relatively lower toxicity (Class III and IV) active ingredients;
- The importance of sourcing pesticides from well-managed stores that do not sell illegal products or those containing very highly toxic active ingredients;
- Understanding and applying information contained in ASAP-produced quick reference guides for all of the anticipated major or primary pests/production constraints, GAPs and IPM measures that can be used to strengthen and protect the crop, pesticides to be used on the project for each anticipated pest, with use rates, safety measures, environmental concerns, restricted entry interval (REI), and minimum residue levels (MRLs) for export and local consumption;
- The importance of monitoring for pest resistance by noting reduction in efficacy of pesticide products, and rotation among pesticide classes (see Table 1) to reduce the build-up of resistance;
- The importance of using pesticides with low ground water contamination potential (see Table 1, column 8) where water tables are high or easy to reach; and
- Basic first aid procedures (found on the product Label, MSDS, and Attachment 10) for pesticide overexposure for the most commonly used pesticides.

Phase 3: Perform annual refresher training for program staff, leader farmers and beneficiary farmers on all of the above topic areas.

Table 1: The following pesticide Web sites were used for locating and cross-referencing specific toxicology information for each active ingredient in Table 1, below:

http://www.pesticideinfo.org (PAN most complete pesticides database, linked to EPA)
http://extoxnet.orst.edu/pips/ghindex.html (Extoxnet Oregon State database with ecotox)
http://cfpub.epa.gov/oppref/rereg/status.cfm?show=rereg (EPA Registration Eligibility Decisions)
http://www.epa.gov/pesticides/biopesticides/ai/all_ais.htm (EPA regulated biopesticides)
http://www.epa.gov/opppmsd1/RestProd/rupjun02.htm (EPA restricted use pesticides)
http://www.epa.gov/pesticides/health/tox_categories.htm (EPA Toxicity Classifications)
http://www.epa.gov/opppmsd1/PPISdata/index.html (EPA pesticide product information)
http://www.chemfinder.camsoft.com (chemical database & internet search, free & fee)
http://www.hclrss.demon.co.uk/index.html (compendium of pesticide common names)
http://www.agf.gov.bc.ca/pesticides/f_2.htm (all types of application equipment)
http://www.ohioline.osu.edu/hyg-fact/2000/2161.html (pesticide toxicity to honeybees)
http://www.greenbook.net/Search/AdvancedSearch (pesticide Material Safety Data Sheets)
http://wihort.uwex.edu/turf/Earthworms.htm (pesticide toxicity to earthworms)
http://www.ipm.ucdavis.edu/index.html (IPM and pesticide recommendations)
http://edis.ifas.ufl.edu/pdffiles/PI/PI07300.pdf (Restricted Use Pesticides)
http://sitem.herts.ac.uk/aeru/footprint/en/index.htm (all pesticide data)

Table 1: Afghan ASAP Program Pesticides Decision Matrix

Afghan ASAP Program Pesticides Decision Matrix

Insecticides/Miticides

Active Ingredient	Class	EPA Reg	RUPs	Human Health Issues: Acute tox		Chronic tox Issues	G-water	Eco-tox								
				WHO	EPA			fish	bees	birds	amphib	worm	molusk	crust	aqu ins	planktn
abamectin (ivermectin)	microbial	yes	no	none	II, III	R&D toxin	no data	ST	HT	PNT				HT	VHT	VHT
Acephate	OP	yes		III	III	cancer-possible	potential	MT	HT	MT	ST	ST		ST		
	acephate banned/restricted/canceled in 1 countries															
Acetamiprid	chloro-nicotinyl	yes	no	none	III	none	no data	NAT	MT					NAT		
alpha cypermethrin	pyrethroid	yes	yes	none	II & III	Cancer-possible	no data	HT	HT	PNT			MT	VHT	VHT	VHT
aluminum phosphide	inorganic	yes	yes	none	**I**	none	no data	HT	HT	HT				MT		
azidirachtin (neem oil)	botanical	yes	no	none	III	none	no data	ST	NAT	NAT	MT				MT	
azinphos methyl	OP	yes	yes	Ib	**I**	none	potential	HT	HT	MT	MT	HT	MT	VHT	VHT	MT
	azinphos-methyl banned/restricted/canceled in 3 countries															
Bacillus thuringiensis-BT	microbial	yes	no	none	III	none	no data		PNT	NAT	NAT		ST	ST		
beta cypermethrin	pyrethroid	yes	yes	none	II & III	Cancer-possible	no data									
Bifenthrin	pyrethroid	yes	yes	II	II & III	cancer-possible endocrine suspect R&D toxin	no data	VHT	HT	MT				HT		
Bifenzate	hydrazine carboxylate	yes	no	none	III	none	no data	HT	MT	MT		MT				
Buprofezin	IGR	yes	no	U	III	cancer possible	no data	MT	ST	MT	NAT	MT				
Carbaryl	carbamate	yes	no	II	III	cancer-probable Endocrin-suspect	potential	MT	HT	PNT	MT	VHT	ST	HT	HT	MT
Carbosulfan	carbamate	no	no	II	II	none	no data	HT	HT							
	carbosulfan use cancelled by EU as of December 31, 2007 due to several concerns															
chlorpyrifos (ethyl)	OP	yes	yes	II	II & III	endocrine suspect	no data	HT	HT	HT	MT	PNT	MT	VHT	HT	MT
clofentezine (mites)	tetrazine	yes	no	U	III	Cancer-possible endocrine disrupt	no data	ST	PNT	ST						ST

KEY: for Class, OP = Organophosphate; IGR = Insect Growth Regulator; EPA Reg = Registered by Environmental Protection Agency (EPA)

RUP = Restricted Use Pesticide; Acute tox = Acute toxicity by World Health Organization (WHO) & EPA classification methods, from I (highly toxic) to IV (nontoxic) U = Unlikely to be toxic; Chronic tox = chronic human health toxicity issues; G-water = Groundwater contamination; R&D toxin = reproductive and developmental toxin

Ecotox = Environmental toxicity classification: NAT = Not Acutely Toxic; PNT = Practically Non-Toxic; ST = Slightly Toxic; MT = Moderately Toxic;

HT = Highly Toxic; VHT = Very Highly Toxic; crust = crustaceans; aqu ins = aquatic insects

Insecticides/Miticides (continued)

Active Ingredient	Class	EPA Reg	RUPs	Human Health Issues: Acute tox		Chronic tox Issues	G-water	Eco-tox								
				WHO	EPA			fish	bees	birds	amphib	worm	molusk	crust	aqu ins	planktn
Clothianidin	Guanidine	yes	no	none	III	none	no data	ST	HT	ST				ST		
Cryolite	Inorganic	yes	no	U	III	none	no data	NAT					NAT	ST		
cyfluthrin (beta)	Pyrethroid	yes	yes	II	II & III	Endocrin-suspect	no data	VHT	HT	PNT			ST		VHT	VHT
cypermethrin (alpha)	Pyrethroid	yes	yes	none	II & III	Cancer-possible	no data	HT	HT	PNT			MT	VHT	VHT	VHT
Cyromazine	Triazine	yes	no	U	III	none	known	MT	ST	MT		MT		MT	NAT	
Deltamethrin	Pyrethroid	yes	yes	II	II & III	none	no data	HT	MT		VHT		NAT		VHT	VHT
Diazinon	OP	yes	yes	II	III	R&D toxin	potential	MT	HT	VHT	MT	MT	MT	HT	HT	HT
dicofol (mites)	Organochlorine	yes	no	III	III	Cancer-possible	no data	HT	NAT	ST		MT	MT	HT	MT	MT
Diflubenzuron	benzoyl urea	yes	yes	U	III	endocrine suspect none	no data	NAT	NAT	PNT	NAT		NAT	NAT	ST	MT
Dimethoate	OP	yes	no	II	II	Cancer-possible	potential	ST	VHT	VHT	HT	MT	VHT	HT	VHT	MT
Disulfoton	OP	yes	no	Ia	I & II	none	potential	MT	MT	HT		MT		HT		
	disulfoton banned/restricted/cancelled in 4 countries															
emamectin benzoate	Botanical	yes	yes	none	I & III	none	no data	HT	MT				HT	HT	HT	
Endosulfan	Organochlorine	yes	yes	II	I & II	Endocrin-suspect	no data	VHT	MT	MT	MT	MT	MT	HT	HT	MT
	endosulfan banned/restricted/cancelled in 8 countries, proposed for PIC list															
Esfenvalerate	Pyrethroid	yes	yes	II	II, III	endocrine suspect	no data	VHT	HT	ST	VHT		ST	HT		
Fenpropathrin	Pyrethroid	yes	yes	II	II & III	endocrine suspect	no data	VHT			VHT				VHT	VHT
Fenvalerate	Pyrethroid	yes	yes	II	III	Endocrin-suspect	no data	VHT	HT	ST	HT	VHT	HT	HT	HT	VHT
Flufenoxuron	benzoyl urea	no		U	III	none	no data	HT	ST	MT		MT		HT		
Imidacloprid	chloro-nicotinyl	yes	no	II	II & III	none	potential	NAT		MT					VHT	
Indoxacarb	Oxadiazine	yes	no	none	III	none	no data	HT		PNT		PNT		HT		
insecticidal soap	fatty acids	yes	no	none	II & III	none	no data	MT								
kaolin clay	Inorganic	yes	no	none	III	none	no data									

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Insecticides/Miticides (continued)

Active Ingredient	Class	EPA Reg	RUPs	Human Health Issues: Acute tox		Chronic tox Issues	G-water	Eco-tox								
				WHO	EPA			fish	bees	birds	amphib	worm	molusk	crust	aqu ins	planktn
lambda cyhalothrin	pyrethroid	yes	yes	II	II & III	endocrine suspect	no data	VHT	HT	PNT		VHT	VHT	VHT	VHT	
Malathion	OP	yes	no	III	II & III	Cancer-possible endocrine suspect	potential	MT	HT	MT	HT	ST	VHT	MT	VHT	HT
Methamidophos	OP	yes	yes	Ib	I	none	potential	ST			ST			VHT		MT
	methamidophos banned/restricted/canceled in 13 countries; PIC chemical															
methyl bromide	halogenated organic	yes	yes	none	I	R&D toxin	no data	MT	PNT		MT	MT	MT	MT	MT	MT
Methoxyfenozide	diacylhydrazine	yes	no	U	III	none	potential	MT	MT	ST		ST			HT	MT
mineral oil	petroleum	yes	no	none	III	none	no data	NAT								
Methomyl	carbamate	yes	yes	Ib	I, III	Endocrin-suspect	potential	MT	HT	HT	ST	HT	ST	HT	VHT	HT
Monocrotophos	OP	no	yes	Ib	I	none	no data	ST	HT	HT		MT	MT	MT		HT
	monocrotophos banned/restricted or canceled in 18 countries; not legal for import to 46 countries; PIC chemical															
oxydemeton-methyl	OP	yes	yes	Ib	I & II	R&D toxin	potential	ST	HT	HT		MT		MT	HT	HT
Permethrin	pyrethroid	yes	yes	II	III	cancer-possible endocrine suspect	no data	VHT	VHT	PNT	ST	ST	ST	VHT	MT	MT
Phosmet	OP	yes	no	II	I, II, III	Cancer-possible	potential	MT	VHT	MT		NAT	ST	HT	MT	HT
Propargite	unclassified	yes	no	none	I	cancer-probable R&D toxin	no data	HT	PNT		HT			NAT		HT
Pymetrozine	triazine	yes	no	III	III	cancer-probable	potential	MT	ST	MT		MT		MT		
pyrethrum (mix of pyrethrins)	botanical pyrethroid	yes	yes	II	III	Cancer-possible	no data	HT	HT	ST		MT		HT		
Pyriproxyfen	IGR (Juvenile Hormone mimic)	yes	no	U	II & III	none	no data	MT	MT	MT		MT		MT		VHT
pyridaben (mites)	unclassified	yes	no	II	II & III	none	no data	VHT								VHT
Rotenone	botanical	yes	no	II	III	none	no data	HT	HT	HT	HT		MT	MT	MT	MT

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Insecticides/Miticides (continued)

Active Ingredient	Class	EPA Reg	RUPs	Human Health Issues: Acute tox		Chronic tox Issues	G-water	Eco-tox								
				WHO	EPA			fish	bees	birds	amphib	worm	molusk	crust	aqu ins	planktn
Spinosad	microbial	yes	no	U	III	none	no data	MT	HT	PNT		ST			HT	MT
Spiromesifen	tectronic acid (keto-enol)	yes	no	none	III	none	no data	HT	ST	MT		MT				
Thiacloprid	chloro-nicotinyl	yes	no	II	II	Cancer-probable	no data		MT	ST		MT			VHT	ST
Thiamethoxam	neonicotinoid	yes	no		III	Cancer-probable	no data	PNT	HT	PNT		PNT	PNT	PNT	PNT	
Thiodicarb	carbamate	yes	no	II	II	Cancer-probable	no data	MT	MT	PNT			MT	VHT		HT
Trichlorfon	OP	yes	no	II	II & III	cancer-possible	no data	ST	PNT	HT	ST	ST	MT	MT	MT	ST
	trichlofon banned/restricted/canceled in 2 countries															
zeta cypermethrin	pyrethroid	yes	yes	Ib	II, III	Cancer-possible endocrine suspect	no data	VHT	VHT	NAT		NAT	VHT	VHT	VHT	

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Fumigants

Active Ingredient	Class	EPA Reg	RUPs	Human Health Issues: Acute tox WHO	Acute tox EPA	Chronic tox Issues	G-water	Ecotox: fish	bees	birds	amphib	worm	molusk	crust	aqu ins	planktn
aluminum phosphide	inorganic	yes	yes	none	I	none	no data	HT	HT	HT				MT		
metam sodium	dithiocarbamate	yes	yes	II	I	Cancer-probable R&D toxin		MT	MT	MT		VHT		VHT		HT
methyl bromide	halogenated organic	yes	yes	none	I	R&D toxin	no data	MT	PNT		MT	MT	MT	MT	MT	MT
zinc phosphide	inorganic	yes	yes	Ib	I, II, III	R&D toxin	no data	HT	VHT	HT						

Rodenticides

Brodifacoum	coumarin	yes	no	Ia	III	none	no data	MT				MT				
Flocoumarfen	coumarin	no		Ia		none	no data	HT		MT				MT		
zinc phosphide	inorganic	yes	yes	Ib	I, II, III	R&D toxin	no data	HT	VHT	HT						

Molluscsicides

Metaldehyde	aldehyde	yes	yes	II	II & III	Cancer-probable	potential	NAT	PNT	MT	PNT	PNT	PNT	PNT	PNT	PNT
iron phosphate	inorganic	yes	no	none	III	none	no data									

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Fungicides

Active Ingredient	Class	EPA Reg	RUPs	Human Health Issues: Acute tox		Chronic tox Issues	G-water	Ecotox								
				WHO	EPA			fish	bees	birds	amphib	worm	molusk	crust	aqu ins	planktn
Azoxystrobin	strobin	yes	no	U	III	none	potential	ST								VHT
Bacillus subtilis	bacterial	yes	no	U	III, IV	none	no data	NAT	ST	NAT		NAT		NAT		
benomyl (benlate)	benzimidazole	**no**	no	U	III	Cancer-possible Endocrin-suspect	no data	HT	PNT	MT	ST	HT		NAT		ST
	cancelled by EPA; dustable powder formulations: mix of benomyl, carbofuran, & thiram subject to interim PIC procedure															
Bordeaux mixture	inorganic	no		III		none	no data	HT	MT	MT		MT		MT		
boscalid (nicobifen)	carboximide (anilide)	yes	no	none	II & III	cancer-suggestive	no data	MT	MT	MT		MT		MT		
Captan	thiopthalamide	yes	no	none	I, II, III	known carcinogen	no data	HT	NAT	PNT	MT		MT	NAT	MT	MT
	captan banned/restricted/canceled in 8 countries															
Carbendazim	benzimidazole	yes	no	U	III	cancer-possible Endocrin-suspect	no data	MT	NAT	ST	ST			ST		HT
	carbendazim banned/restricted/canceled in 1 country															
Chlorothalonil	unclassified	yes	no	none	I & II	Cancer-probable	potential	VHT			HT		ST	VHT	MT	MT
copper hydroxide	inorganic	yes	no	II	II & III	none	no data	HT	MT	MT		MT	HT	NAT	HT	HT
copper oxychloride	inorganic	yes	no	none	I, II, III	none	no data	MT	MT	MT		MT				
copper sulfate	Inorganic	yes	no	II	I & III	none	no data	MT	HT	PNT	HT	HT	VHT	ST		ST
Cymoxanil	unclassified	yes	no	III	III	none	no data	MT	MT	ST		MT		MT	MT	ST

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Fungicides (continued)

Active Ingredient	Class	EPA Reg	RUPs	Human Health Issues: Acute tox		Chronic tox Issues	G-water	Eco-tox								
				WHO	EPA			fish	bees	birds	amphib	worm	molusk	crust	aqu ins	planktn
Cyprodinil	Unclassified	yes	no		III	none	potential	MT	ST	MT		MT		MT	MT	
Dicloran	Chlorophenyl	yes	no	U	II, III	none	potential	ST	MT	MT		MT		MT		MT
1, 3 dichloropropene	halogenated organic	yes	yes	none	I, II	known carcinogen	known	MT	ST	MT		VHT	MT		MT	MT
	1, 3 dichloropropene banned/restricted/canceled in 5 countries															
Dimethomorph	Morpholine	yes	no	U	III	none	no data	MT	MT	MT		MT				ST
Difenoconazole	Azole	yes	no	III	III	cancer-possible	no data	ST	MT	ST		MT		MT		HT
Dithianone	Pyrimidine	no		III		none	no data	HT	MT	MT	MT	MT	ST	MT	MT	
Famoxadone	Unclassified	yes	no	U	III	none	no data	HT	MT	ST				HT		
Fenamidone	Unclassified	yes	no	none	II & III	none	no data									
Fenarimol	Pyrimidine	yes	no	U	III	Endocrin-suspect	potential	MT	MT	MT			ST	MT	MT	
	fenamirol banned/restricted/canceled in 1 country															
Febuconazole	Triazole	yes	no	U	III	cancer-possible Endocrin-suspect	potential	ST	PNT	ST			HT	HT	VHT	HT
Fenhexamid	hydroxyanilide	yes	no	U	III	none	potential	MT	MT	MT		MT		MT		MT
fenoxaprop-p-ethyl	propionic acid	yes	no	none	I, II, III	none	no data	MT	ST	PNT		ST		MT		MT
Fludioxonil	Phenylpyrrole	yes	no	U	III	none	potential	MT	MT	MT		MT		MT		
Folpet	Thiophthalimide	yes	no	U	II & III	cancer-known	no data	HT	PNT	ST	HT	MT	ST	HT		MT
	folpet banned/restricted/canceled in 4 countries															
fosetyl aluminum	Unclassified	yes	no	none	III	none	potential	NAT	ST	ST		MT		NAT		MT

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HT = Highly Toxic; VHT = Very Highly Toxic; crust = crustaceans; aqu ins = aquatic insects

Fungicides (continued)

Active Ingredient	Class	EPA Reg	RUPs	Human Health Issues: Acute tox WHO	Acute tox EPA	Chronic tox Issues	G-water	Ecotox: fish	bees	birds	amphib	worm	molusk	crust	aqu ins	planktn
Iprodione	dicarboximide	yes	no	U	III	Cancer-probable	potential	MT	NAT	ST				HT		
kresoxim-methyl	strobin	yes	no	U	III	Cancer-probable	potential	ST	ST	ST		MT		MT		VHT
Mancozeb	dithiocarbamate	yes	no	U	III	Cancer-possible Endocrin-suspect R&D toxin-yes	no data	MT	MT	ST	HT					NAT
Maneb	carbamate	yes	no	U	III	Cancer-known Endocrin-suspect R&D toxin-yes	no data	MT	NAT	PNT	ST			ST		HT
Mefenoxam	unclassified	yes	no	none	II & III	none	no data	ST								
Metalaxyl	benzanoid	yes	no	III	II & III	none	potential	ST	PNT	PNT						ST
metam (potassium)	dithiocarbamate	yes	no	II	I	Cancer-probable R&D toxin-yes Endocrin-suspect	no data	ST	MT	MT				MT		Mt
metam sodium	dithiocarbamate	yes	yes	II	I	Cancer-probable R&D toxin		MT	MT	MT		VHT		VHT		HT
methyl bromide	halogenated organic	yes	yes	none	I	R&D toxin	no data	MT	PNT		MT	MT	MT	MT	MT	MT
Metiram	dithiocarbamate	yes	no	U	III	Cancer-probable R&D toxin-yes	no data no data	ST	PNT	ST						MT
Myclobutanil	azole	yes	no	III	III	R&D toxin										

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Fungicides (continued)

Active Ingredient	Class	EPA Reg	RUPs	Human Health Issues: Acute tox		Chronic tox Issues	G-water	Eco-tox								
				WHO	EPA			fish	bees	birds	amphib	worm	molusk	crust	aqu ins	planktn
pendimethaline	Dinitroanaline	yes	no	III	III	cancer-possible Endocrin-suspect	no data	MT	NAT	ST				MT	MT	
phosphorous acid	Inorganic	yes	no	U	III	none	no data	ST								
potassium bicarbonate	Inorganic	yes	no	none	III	none	no data									
propamocarb HCl	Carbamate	yes	no	none	III	none	no data		PNT							
propiconazole	Azole	yes	no	II	II & III	cancer-possible R&D toxin	potential	MT					MT	ST	MT	MT
propineb	dithiocarbamate Zn	no		U		R&D toxin	no data	MT	PNT	PNT			MT	MT	MT	MT
	propineb banned/restricted/canceled in 2 countries															
pyraclostrobin	Strobin	yes	no	none	II & III	none	no data	ST	MT	MT		MT		HT		
sodium tetrathiocarbonate	Inorganic	yes	no	none	I	none	no data	ST								
sulfur	Inorganic	yes	no	U	III	none	no data	NAT	NAT	NAT	NAT					NAT
tebuconazole	Azole	yes	no	III	II & III	Cancer-possible	potential	MT							MT	HT
thiofanate methyl	Benzimidazole	yes	no	U	III	Cancer-probable R&D toxin	potential	MT	PNT		NAT			ST		ST
thiram (TMTD)	Carbamate	yes	no	III	III	Endocrin-suspect R&D toxin	no data	HT	NAT	PNT	VHT	HT		NAT	HT	HT
triflumizole	Imidazole	yes	no	III	III	none	potential	HT	MT	ST				MT		
trifloxystrobin	Strobin	yes	no	none	III	none	no data	ST								
zineb	dithiocarbamate	no	no	U	II & III	Endocrin-suspect R&D toxin	no data	MT	MT	MT	NAT	MT	NAT	ST	ST	ST

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Herbicides

Active Ingredient	Class	EPA Reg	RUPs	Human Health Issues: Acute tox WHO	Acute tox EPA	Chronic tox Issues	G-water	Eco-tox: fish	bees	birds	amphib	worm	molusk	crust	aqu ins	planktn
2 4 D	chlorophenoxy acid	yes	no	II	III	cancer-possible Endocrin-suspect	potential	ST	HT	MT	ST	NAT	NAT	NAT	ST	ST
	24D banned/restricted/canceled in 5 countries															
glyphosate	Phosphonoglycine	yes	no	II & III	U	none	potential	ST	ST	NAT		PNT		MT		ST
bromoxynil	Hydroxybenzonitrile	yes	no	II	II	cancer-possible R&D toxin	no data	ST	MT	MT		MT	MT			VHT
clethodim	Cyclohexenone	yes	no	none	II & III	none	potential	ST								
clodinafop-propargyl	a propionic acid	yes	no	III	II & III	cancer-possible R&D toxin possible	no data	HT	MT	MT						
cloquintocet-mexyl	herbicide safener	no		none		none	no data	MT	MT	MT		MT		MT		
cycloate	Thiocarbamate	yes	no	III	III	R&D toxin	potential	MT	MT	MT	MT	MT				MT
DCPA (dacthal)																
diclofop-methyl	aryloxyphenoxypropionate	yes	yes	III	I & II	cancer-probable R&D toxin	no data	HT	NAT	ST						
dichlorprop-p	aryloxyalkanoic acid	no	no		III	cancer-probable R&D toxin	no data	NAT	ST	MT	NAT	MT		MT		
fenoxaprop-p-ethyl	propionic acid	yes	no	none	I, II, III	none	no data	MT	ST	PNT		ST		MT		MT
glyphosate	Phosphonoglycine	yes	no	II & III	U	none	potential	ST	ST	NAT		PNT		MT		ST
halosulfuron-methyl	Pyrazole	yes	no	U	III	none	potential	ST	MT	ST		ST		ST		NAT

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Herbicides (continued)

Active Ingredient	Class	EPA Reg	RUPs	Human Health Issues: Acute tox WHO	Acute tox EPA	Chronic tox Issues	G-water	Ecotox: fish	bees	birds	amphib	worm	molusk	crust	aqu ins	planktn
isoproturon	urea	**no**		III		none	no data	MT	ST	MT		MT	HT			
MCPA	chlorophenoxy acid	yes	no	II	II, IIII	cancer-possible	no data	ST	PNT	NAT	ST		ST	NAT	NAT	ST
	MCPA banned/restricted/canceled in 1 country															
mecoprop-p	chlorophenoxy acid or ester	yes	no	III	I, II, III	cancer-possible	potential	MT	MT	MT		MT				
metazachlor	chloroacetanilide	no		U		none	no data	MT	MT	MT				MT		
	metazachlor banned/restricted/canceled in 1 country															
oxadiazon	oxidiazole	yes	no	U	II & III	cancer-known R&D toxin	no data	MT	MT	ST	MT	MT		ST		HT
paraquat	bipyridylium	yes	yes	I & II	II	Parkinsons	potential	ST	NAT	MT	ST		ST	ST	NAT	ST
phenmedipham	bis-carbamate	yes	no	U	III	none	potential	ST	ST	MT		MT	ST	MT		
sethoxydim	cyclohexadione	yes	no	III	II & III	none	potential	ST	MT	ST	MT	MT	ST		ST	ST
trifluralin	dinitroanaline	yes	no	U	II & III	cancer-possible Endocrin-suspect	no data	HT	PNT	PNT	MT	HT	ST	ST	ST	MT
	trifluralin banned/restricted/canceled in 3 countries															

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Attachment 1: SCOPE OF WORK

For a Pesticide Evaluation Report and Safe Use Action Plan (PERSUAP)
in support of USAID activities on the
Accelerating Sustainable Agriculture Program (ASAP)

1. Purpose

This Scope of Work (SOW) describes the services requested for one Pesticide Management Specialist (hereafter referred to as the "Consultant") who will perform services through an existing subcontract between Chemonics International and Cadmus Group, Inc. for the USAID-funded Afghanistan Accelerating Sustainable Agriculture Program (ASAP).

The Consultant will be responsible for preparing a *Pesticide Evaluation Report and Safe Use Action Plan* (**PERSUAP**) in accordance with 22CFR 216.3(b), USAID's pesticide procedures, to:

- Ensure compliance with the Agency's pesticide procedures;
- Ensure compliance with the Government of Afghanistan's pesticide importation, testing, storage, use, disposal and registration regulations, laws, policies and procedures, if practical and available;
- Identify and recommend appropriate mitigation actions for ASAP activities;
- Identify and recommend alternative actions and/or pesticides, as appropriate;
- Facilitate use of Integrated Pest Management (IPM) with a view to avoiding or reducing unnecessary pesticide risk; and
- Identify and address key pesticide use issues in Afghanistan, particularly those affect pesticide use by small-scale producers and farm laborers.

2. Description of Relevant ASAP Activities

The United States Agency for International Development's Mission to Afghanistan (USAID/Afghanistan) has selected Chemonics International to implement ASAP. The purpose of this 40-month program (12/2006 – 3/2010) "is to accelerate broad-based, market led agriculture development capable of responding and adapting to market forces in ways that provide new economic opportunities for rural Afghans." ASAP will, in concert with other project efforts, emphasize relevant technology generation and transfer, with an increased focus on marketing of high-value commodities, competitiveness, sustainability and natural resource management. Together, these initiatives will foster competitive private-sector agriculture.

ASAP works in both the livestock and horticulture subsectors. This SOW is concerned with ASAP's plant protection activities, including both pest and disease control. These occur as part of three distinct initiatives:

- The existing demonstration farm at Badam Bagh, located on government land on the outskirts of Kabul;
- The proposed Mazar Foods Corporation, a large-scale commercial farming operation expected to be funded by both USAID and the Overseas Private Investment Corporation (OPIC); and
- Technical assistance to selected farm stores and producers in ASAP's 19 target provinces, related to procurement and use of pesticides, fungicides, and other plant disease control agents.

3. PERSUAP Background, Scope and Application

General Description

All USAID activities are subject to evaluation via an Initial Environmental Examination (IEE). Use or procurement of pesticides automatically triggers the Pesticide Procedures described in 22 CFR 216.3 (b)(1)(i)(a through l). Preparation and implementation of an approved PERSUAP is the primary compliance mechanism. While the IEE itself can be very brief, the PERSUAP contains the detailed analysis and recommendations.

When the U.S. Environmental Protection Agency (EPA) registers pesticides for use in the United States, it specifies the manner in which the product can be "safely" used (i.e., with an acceptably small risk), including required safety equipment, application guidelines, allowed uses, etc. In allowing the use of certain pesticides in its overseas programs, USAID cannot rely on the same factors as EPA to assure appropriate use of the product (e.g., near-universal literacy). The PERSUAP identifies practical actions by which to reduce the risks of using pesticide products in a program, taking into consideration the context in which the products will be used, the particular elements of the program, and the different capacities of the partners involved.

Scope

A PERSUAP consists essentially of two parts: The Pesticide Evaluation Report (PER) section, which performs the systems analysis of the country's pesticide system from import to ultimate disposal and addresses the 12 components of USAID's Pesticide Procedures and the Safer Use Action Plan (SUAP), which converts the conclusions and recommendations reached in the "PER" to an implementation plan.

The PERSUAP will address ASAP activities that involve assistance for the procurement or use of pesticides, fungicides, and other plant disease control agents (see the three relevant ASAP initiatives listed above). Assistance is broadly defined to include making recommendations on the procurement or use of pesticides and conducting training programs in pesticide handling and use.

Roles

USAID/Afghanistan, through its Cognizant Technical Officer (CTO) and Mission Environmental Officer (MEO), will answer technical questions and conduct an initial review of the draft PERSUAP. USAID/Washington Asia and the Near East (ANE) Bureau Environmental Officer (BEO) will review the final PERSUAP for technical soundness and compliance and is responsible for approving the document.

Lorene Flaming, ASAP's performance monitoring and communications director, will assist the Consultant by providing information available locally in Afghanistan for each target crop, specific local and scientific names of Afghan pests, diseases and other production constraints, uses and conditions of use for pesticides, types and scale of activities, and the roles and responsibilities of implementing partners (such as business service centers, rural farm stores, farmers, laborers, and extension officers, etc.) — to ensure that all relevant pesticides are covered and help the Consultant design an appropriate training program for those at risk to exposure. The information provided by ASAP will be in raw form and the Consultant will be responsible for synthesizing and analyzing it for inclusion in the PERSUAP. ASAP will also provide the Subcontractor with translation/interpretation assistance, as necessary.

The Consultant will also work with ASAP to ensure that supplemental IEE is completed according to USAID requirements.

The Cadmus Group will provide the services of Patrick Hall (6 days) and Jody O'Grady (2 days) to help the Consultant prepare the PERSUAP. Cadmus will also review and comment on the Consultant's deliverables for quality control purposes.

The Consultant will be responsible for: 1) acquiring and synthesizing information on the agricultural sector in Afghanistan and the partners' abilities (including that of the Government of Afghanistan) to regulate or control the acquisition, distribution, usage, storage and disposal of pesticides; 2) any national parks, bodies of water, or endangered species and restrictions on use of pesticides (e.g.,

information from the Afghanistan Ministry of Environment); 3) determining the conditions under which various pesticides may be used (climate, flora, fauna, geography, hydrology, soils, near water bodies, etc.); and 4) determining, from information on ASAP project activities and Internet searches, the extent to which the pesticide use is — or could be — part of an integrated pest management (IPM) program.

4. Consultant's Principal Duties and Responsibilities

The Consultant (Pesticide Management Specialist) is responsible for the following:

- Reviewing the list of potential pesticides to be procured/used under ASAP activities and the USEPA status of the pesticides;
- Determining the toxicity classifications and any use restrictions of the proposed pesticides;
- Determining the human health and environmental risks of each pesticide with ways to reduce risk;
- Suggesting integrated pest management techniques;
- Identifying primary and special concerns for the use of each pesticide;
- Assessing the overall capabilities and limitations of the ASAP program's pesticide management relative to the more common pesticide use problems affecting the targeted farmers, wherever practical;
- Recommending/outlining a training program, including a plan to train participants who will be implementing the recommendations of the study;
- Identifying "Off the Shelf" IPM and GAP (Good Agriculture Practices) measures that could be tried and used by the project's clients for each production or commodity constraint;
- Following a description of the proposed usage and expected benefit of the requested pesticides, addressing each of the following factors listed under 22 CFR 216.3(b)(1)(i):
  - a) The USEPA and Afghanistan registration status of recommended pesticides;
  - b) The extent to which the proposed pesticide is part of an integrated pest management approach;
  - c) The proposed method of application, including appropriate application and safety equipment;
  - d) Any acute or long-term toxicological hazards, either human or environmental, associated with the proposed use, and measures available to minimize such hazard;
  - e) The effectiveness of the pesticide for the proposed use;
  - f) The compatibility of the proposed pesticide with target and non-target ecosystems;
  - g) The availability and effectiveness of other pesticides or non-chemical control methods;
  - h) Provisions made for monitoring the use and effectiveness of the pesticide;
  - i) Ability of the Government of Afghanistan to regulate or control the distribution, storage, use, and disposal of the pesticide; and
  - j) Provisions made for training of users and applicators, and outlining a training plan for participants and extension officers.
- Writing the PERSUAP;
- Responding to comments from ASAP and USAID environmental officers, including modifying the PERSUAP as needed to obtain USAID approval in a timely manner. Any response to USAID comments will be submitted to ASAP for communication with USAID. The Consultant may not communicate directly with USAID without prior written approval of the ASAP Chief of Party;
- Commenting on and revising the draft supplemental Initial Environmental Examination (IEE) prepared by ASAP, as needed; and
- Drafting a supplemental IEE that covers all program activities (including ASAP and Mazar Foods) not covered in the original strategic objective-level IEE issued by USAID/Afghanistan.

5. Deliverables and Deadlines

The primary deliverable is the ASAP PERSUAP, prepared in full compliance with 22CFR 216.3(b) requirements. At least three drafts are envisioned:

- Deliverable No. 1: First draft of PERSUAP & IEE for ASAP internal review
  The first draft should be in Microsoft Word format.
- Deliverable No. 2: Second draft of PERSUAP & IEE for ASAP internal review
  The second draft should be in Microsoft Word format.

- Deliverable No. 3: Final PERSUAP & IEE
  The final report should be sent in both Microsoft Word and PDF formats.

The Consultant shall submit the deliverables described above in accordance with the following Deliverables Schedule:

Deliverable No.*	Deliverable Name*	Due Date
1	First draft of PERSUAP and IEE	June 4 EST
2	Second draft of PERSUAP and IEE	June 7 EST
3	Final draft of PERSUAP and IEE	June 14 EST

All deadlines are close of business Eastern Standard Time (EST).

6. Duration of Assignment and Level of Effort

The duration of this assignment is approximately 1.5 months, from May 1st to June 15th, 2008. The level of effort is up to 20 billable days for the Pesticide Management Specialist and up to 8 days for his support team, subject to the number of days actually worked on this assignment by the Consultant and support team. This assignment may be extended with Chemonics and/or USAID approval.

7. Location of Assignment

The location of assignment is the United States.

8. Supervision and Reporting

The Consultant will report to and be supervised by the ASAP Performance Monitoring and Communications Director. During the period that the Performance Monitoring Director is on leave (May 8-25), the Consultant will report to and be supervised by the ASAP Contracts Director.

9. Job Qualifications

- Advanced degree (masters or Ph.D.) in a relevant discipline, such as agriculture, environmental science, entomology, toxicology, or natural resources management;
- In depth knowledge of 22 CFR 216 and experience preparing a PERSUAP, including a track record of obtaining USAID approval.
- At least 5 years of overseas consulting experience.
- Fluency in English, including excellent writing skills.

Attachment 2: Toxicity of pesticides: EPA and WHO classifications

General Toxicity

Pesticides, by necessity, are poisons, but the toxicity and hazards of different compounds vary greatly. Toxicity refers to the inherent intoxicating ability of a compound, whereas hazard refers to the risk or danger of poisoning when the pesticide is used or applied. Pesticide hazard depends not only

on toxicity but also on the chance of exposure to toxic amounts of the pesticide. Pesticides can enter the body through oral ingestion, through the skin, or through inhalation. Once inside the body, they may produce poisoning symptoms, which may be either acute (from a single exposure) or chronic (from repeated exposures or absorption of smaller amounts of toxicant).

EPA and WHO Toxicity Classifications

Basically, there are two systems of pesticide toxicity classification. These are the USEPA and the WHO systems of classification. It is important to note that *the WHO classification is based on the active ingredient only, whereas USEPA uses product formulations to determine the toxicity class of pesticides.* The WHO classification shows relative toxicities of all pesticide active (or technical) ingredients, whereas EPA classification shows the actual toxicity of the formulated products, which can be more or less toxic than the active ingredient alone and are more representative of actual dangers encountered in the field. The tables below show classification of pesticides according to the two systems.

a) USEPA classification (based on formulated product = active ingredient *plus inert and other ingredients*)

Class	Descriptive term	Mammalian LD_{50}		Mammalian	Irritation		Aquatic invert/fish (LC_{50} or EC_{50})[2]	Honey bee acute oral (LD_{50})
		Oral	Dermal	Inhalation LC_{50}	Eye[1]	Skin		
I	Extremely toxic	≤50	≤200	≤0.2	Corrosive	Corrosive	< 0.1	
II	Highly toxic	50-500	200-2000	0.2-2.0	Severe	Severe	0.11-1.0	< 2 µg/bee
III	Moderately toxic	500-5000	2000-20000	2.0-20	No corneal opacity	Moderate	1.1-10.0	2.1-11 µg/bee
IV	Slightly toxic	≥5000	≥20000	≥20	None	Moderate or slight	10.1-100	
	Relatively non-toxic						101-1000	
	Practically non-toxic						1001-10,000	> 11 µg/bee
	Non-toxic						> 10,000	

[1] Corneal opacity not reversible within 7 days for Class I pesticides; corneal opacity reversible within 7 days but irritation persists during that period for Class II pesticides; no corneal opacity and irritation is reversible within 7 days for Class III pesticides; and Class IV pesticides cause no irritation
[2] Expressed in ppm or mg/l of water

b) WHO classification (based only on active or 'technical' ingredient)

Class	Descriptive term	Oral LD_{50} for the rat (mg/kg body wt)		Dermal LD_{50} for the rat (mg/kg body wt)	
		Solids	Liquids	Solids	Liquids
Ia	Extremely hazardous	≤5	≤20	≤10	≤40
Ib	Highly hazardous	5-50	20-200	10-100	40-400
II	Moderately hazardous	50-500	20-2000	100-1000	400-4000
III	Slightly hazardous	≥501	≥2001	≥1001	≥4001
U	Unlikely to present acute hazard in normal use	≥2000	≥3000	-	-

Attachment 3: Afghanistan Pesticide Regulations
Pesticides import, distribution and utilization regulation

Pesticides import, distribution and utilization regulation

Chapter 1
General Provisions

Article #1:

1. This regulation has been legislated to higher the level of agricultural yields, safety of consumers health, import, distribution and proper usage conditions of high quality and safe pesticides and other relevant issues.
2. Those pesticides which are used for the health of human and livestock are not included in the provisions of this regulation.

Article #2:

Pesticide are used during the period of growth, storage, delivery of agricultural products, human and livestock food stuff processing and distribution period to prevent from various pests, their absorption and observation or against internal parasites of the livestock. It also includes those material which are used to manage the growth of the plants, leaves shedding, dryer medicine, fruit thinning factor, medicine that prevent budding and those materials which are used before and after harvesting during storage, delivery period to prevent the yields from rotting.

Chapter 2
Registration

Article #3:

Pesticides imports, distribution and usage is accomplished upon the agreement of Ministry of Public Health after certification of quantity and quality by Plant Protection and Quarantine Department and obtaining their registration document.

Article #4:

Producer organization can request for modification of the registration. Seller organization with the permission of producer organization and to mention the date, can request for modification of the registration and then sign it.

Article #5:

Registration letter should include essential information regarding physical and chemical properties and effectiveness of pesticide, degree of poisoning, duration of poisoning and environmental effects and required experimental materials that have been written in annex #1. Relevant to the present technical annexes and other annexes are prepared issued according to the need by MAIL in collaboration with MoPH.

Article #6:

The organization that has already registered its pesticides temporary and commercially. If other organization gets their materials and formulates them, in this case the second organization is also responsible to request for registration of these materials.

Article #7:

Any kind of registration and modification requests of producer and or seller organizations are presented to Plant Protection and Quarantine Department of MAIL.

Article #8:

Pesticides supplier organization together with producer and seller organizations can present their request for registration through one of the following:

1. Experimental registration.
2. Temporary registration.
3. Commercial registration.

To accomplish each kind of the above mentioned registration in the country, a registration letter is presented according to the background and previous usage of pesticides.

Article #9:

Commercial registration is done only for those kinds of pesticides that have been not used in the country yet. The pesticides that are registered as a commercial registration are comprehensively tested to specify the level of remainder of pesticides in those crops on which the mentioned pesticides have been used and to identify the space between the last phase of pesticides usage and harvesting period and to provide specification on their usage. Experimental registration is valid for two years. The results of experiments which are prepared by customer will be studied for temporary registration of pesticides after one year.

Article #10:

1. Temporary registration is accomplished before distribution of pesticides.
2. Request for temporary registration is only accomplished for those pesticides that have the following properties:
   a) Has been used without side effect for a few years in the country.
   b) Side effects of the remainder are lower than the international identified level.
   c) Temporary registration period is valid for three years, if the pesticides have given good results in other countries. The utilization period will be limited, when the obtained figures of quantity and quality, comprehensive study and analysis don't let to use the pesticides permanently.

Article #11:

Commercial Registration: Commercial registration is accomplished when it will show all required figures to use pesticides without more losses. They are valid to be used for five years.

Article #12:

Supervision of registration request letter with fee is accomplished according to the second annex. The fee is delivered to the imports account of Islamic Republic of Afghanistan. Service expenditure to imports chemical materials required for pesticides analysis laboratory is accomplished according to the commandments of legislative documents.

Article #13:

Registration can be renewed and modified in every stage according to the information.

Article #14:

Test and registration of the pesticides is accomplished according to the present situations of the country except those medicines that are not necessary with due regard to the present experiences and information of Plant Protection and Quarantine Department. Request letter for testing pesticides next year is presented before January.

Article #15:

In provinces, Research Associations and Universities, the pesticides are tested by technical members or direction of technical members of Plant Protection and Quarantine Department of MAIL.

Article #16:

Pesticides are tested according to the accepted international approaches, where they will not have negative effects on ground water.

Article #17:

If the remaining amount of toxicity on the yields where pesticides are tested is lower than the accepted international amount, in this case they will be used by both human and animal.

Article #18:

If the remaining amount of toxicity on the yields where pesticides are tested is more than the accepted international amount or if the remaining amount of toxicity can not be measured due to measurement reasons, in this case the cost of the yields should be compensated from a specific budget that are approved for the given test and experiments.

Article #19:

The figures and information that have been achieved from the experiments is evaluated according to the annex three by registration board.

Article #20:

The information and results that have been achieved from experiments of pesticides is only presented to the applicants, officers and Deputies of the relevant organizations that have been participated in registration process, registration board officer and Director of Plant Protection and Quarantine Department before issuing of registration documents that have bee written in article #3 of this regulation

Article #21:

The figures which are presented by the applicant for registration are kept safely and could be not disclosed without agreement and permission of the applicant.

Chapter 3
Limitations

Article #22:

MAIL rejects the temporary and commercial registration request letter in the following cases:

1. Although they have been used accurately, have side effects on environment, human and plants.
2. When the presented figures are not enough for comprehensive assessment of the pesticides.
3. Lack of satisfactory biological effects and quality of pesticides.

Article #23:

MAIL can reject and limit temporary or commercial registration that includes the following characters:

1. Whenever it is harmful and risky for cultivated plants, consumers and environment.
2. Quality is low.
3. Can not be presented and used for a long period.

Article #24:

When the store of pesticides is rejected or limited, in this case the pesticides from the store can be only used according to the specific guidance of the Plant Protection and Quarantine Department.

Article #25:

In emergency cases, Plant Protection and Quarantine Department of MAIL issues the permission of providing required pesticides maximum for one year to prevent the transmission of pests attack and inform the Ministry of Public Health in this regard.

Article #26:

In emergency cases, organizations and individual traders who have license, take action without registration process with accordance to the guidance of the MAIL and provide required pesticides in a short time.

Chapter 4
Import and Distribution

Article #27:

To keep the plants of the country, Plant protection and Quarantine Department confirms and determines type and amount of required pesticides every year.

Article #28:

Pesticides are only imported by those organizations and individual traders who has a license from Islamic Republic of Afghanistan according to the schedule improves by PPQD of MAIL, observance of those regulations and limitations which are stated to ensure the health of workers related to pesticides and consumers by preventive medicine of Ministry of Public Health. The information that should be provided by organizations and individual traders for approval to imports pesticides, are determined by MAIL and Ministry of Public Health.

Article #29:

Pesticides are distributed in the capital and provinces of the country by agencies, retailers, organizations and individual traders who have the license to import pesticides.

Article #30:

The license is issued to the retailers according to the needs by PPQD upon a written request letter from importers and individuals. If they provide safe and suitable place for storage and sales of the pesticides according to storage and sales procedures of pesticides that are stated by both MAIL and Ministry of Public Health. The previous license is renewed, if the conditions of license have been observed.

Article #31:

Pesticides importers are responsible for the activities of their store agencies and retailers and monitor activities of the retailers and status of the warehouses and retailer stores on regular basis.

Article #32:

PPQD can take away the licenses of those retailer stores who haven't observed the conditions of the license.

Article #33:

Pesticides are sold in specific shops and are not permitted to sell them on the road sides.

Article #34:

Organizations and individual traders should ensure the sales of their imported pesticides that are accomplished according to the commandments of this regulation by licensed retailers and enforce the relevant retailers to renew their licenses on time.

Article #35:

The sellers who have started to sell pesticides without license are punished with due regard to annex # 4 of this regulation.

Article #36:

Without prior information to the PPQD, the pesticides that are sold on the road sides are collected by police and rejected by the court's order.

Article #37:

Direction and monitoring of pesticides distribution is accomplished by Plant Protection and Quarantine Department in the capital and Plant Protection and Quarantine Directorates in the provinces of the country.

Article #38:

To manage purchasing and using of dangerous pesticides, Plant Protection and Quarantine Department in the capital and Plant Protection and Quarantine Directorates in the provinces are responsible to issue purchasing and selling certificate to the qualified people.

Article #39:

The pesticides seller agencies are responsible to keep pesticides sales record book, In addition to the name of pesticides they are also responsible to write the amount and sales card # during the selling of medium or more dangerous pesticides.

Article #40:

More dangerous pesticides are sold only to those people who have purchasing and using certificate.

Article #41:

Pesticides can be only delivered for distribution and sell, when the package has Pashto or Dari trade mark.

Article #42:

If pesticides have been packed in small packages and only include name, number, grade, toxicity and inflammability, in this case extra information and direction on how to use the pesticides are packed with the packages.

Article #43:

Packing of pesticides in small packages is accomplished with the agreement of both MAIL and Ministry of Public health by licensed organizations.

Article #44:

MAIL and Ministry of Public Health together provided approaches to destroy the empty packages of pesticides on regular basis and are published in mass media.

Chapter 5
Qualitative necessities

Article #45:

The pesticides supplied to the market should have the properties written in the registration books. Importer organizations are responsible to inform the pesticides companies and foreign traders regarding the properties of target pesticides.

Article #46:

Pesticides are evaluated by analysis laboratory of PPQD of MAIL as a following:

1. The pesticide sample is taken according to the annex #5 by analysis Laboratory of PPQD from all warehouses, sell centers, retailers or from the area where these pesticides are used.
2. If the original package of the pesticides is opened for taking a sample, in this case it could be sold after safe and accurate repacking and determination of the amount that has been taken for sample. The person who is taking a sample is responsible to seal the package and sign it.

Article #47:

PPQD of MAIL can limit and refuse distribution of the pesticides which doesn't have qualitative and desirable requirements.

Article #48:

The pesticides that have been stored due to any reason for a long time and their quality has been changed, are destroyed with the direction of Minister office of MAIL by Afghan Fertilizer and Agricultural Services Department.

Chapter 6
Utilization

Article #49:

Pesticides are only used according to the direction and instruction of PPQD.

Article #50:

If medium or more toxic pesticides are used, in this case date of use, concentration, location and the area of treated plants is written in pesticides spraying record book by a responsible person.

Article #51:

Written information and instructions should be distributed for accurate use during the selling of pesticides. PPQD staffs are responsible to provide and present necessary information regarding the accurate use of the pesticides to the farmers through mass media.

Article #52:

Interval between the use of pesticides and harvesting and the maximum remainder of permitted and identified pesticides that are includes in registration documents are:

1. Interval before harvesting is the time that starts from last use of the pesticides until harvesting or if the pesticide is used after harvesting, in this case start after harvesting until the yields are delivered to the market. This interval is counted by the number of days.
2. The maximum amount of pesticide's remainder is the maximum concentration of the pesticides that remains on the yields after the use of pesticides until harvesting and their delivery to the market.

Article #53:

MAIL Publish and broadcast the contents of maximum amount of the permitted pesticide's remainders and the interval before harvesting through mass media.

Chapter 7
Control and Supervision of the remainders

Article #54:

If the pesticides have been used on the crops which are used for food, in this case the mentioned crops are supplied to the market when the interval before harvesting is ended.

Article #55:

If the crops have the maximum amount of pesticides remainders than the amount permitted or have been harvested before the end of the interval, in this case the sales of these crops are not allowed.

Article #56:

MAIL analysis and toxicology laboratory limits and prohibits the sales of those crops that have maximum amount of pesticides remainders than the amount permitted.

Article #57:

The remainders of pesticides on crops are analyzed by analysis and toxicology laboratory of PPQD of MAIL and Ministry of Public Health.

Article #58:

A sample is taken from crops by PPQD staffs of MAIL and Ministry of Public Health to analyze and search the remainders of pesticides on crops.

Article #59:

MAIL or Ministry of Public Health gives certificate to their staffs who are taking sample.

Chapter 8
Final Commandments

Article #60:

Ministry of Public Health observes all related activities of pesticides to ensure the health of workers, consumers and environment.

Article #61:

This regulation is enforced from the date of approval and should be published in official gazette. The regulation of pesticides import, distribution and utilization which was published on 22nd October 1989 in official gazette is canceled along with all annexes whenever this regulation is enforced.

Attachment 4: Restricted Use Pesticides Criteria

Pesticide Active Ingredient (AI) name	Specific Formulations	Specific Uses	Criteria for RUP
Acetochlor	Emulsifiable concentrate	Field corn, popcorn, forage/feeder corn	Ground and surface water concerns
Acrolein	As sole active ingredient	All uses	Human inhalation hazard, adverse effects on avian and aquatic organisms
Alachlor	All formulations	All uses	Oncogenic potential
Aldicarb	As sole active ingredient and in combination with other actives; all granular formulations	All uses	Accident history
Aluminum phosphide	As sole active ingredient	All uses	Human inhalation hazard
Amitraz	All formulations	Pears	Possible oncogenicity
Amitrole	All formulations	All uses except homeowner	Oncogenic potential
Arsenic acide	All formulations except brush-on	All dessicant uses; all wood preservative uses	Oncogenicity, mutagenicity and repro/fetotoxicity
Arsenic pentoxide	All formulations	Wood preservative uses	Potential oncogenicity, mutagenicity, repro/fetotoxicity
Atrazine	All manufacturing and end use	Agricultural and industrial uses	Ground water contamination potential; worker exposure concerns
Avermectin (Abamectin)	Emulsifiable concentrat	Cotton and citrus	Toxic to fish, mammals and aquatic organisms
Avitrol	All formulations	All uses	Hazard to fish and non-target birds
Azinphos-methyl	All liquids with greater than 13.5% concentration; others on a case-by-case basis	All uses	Human inhalation hazard, acute toxicity, hazard to avian, aquatic and mammalian species
Bendiocarb	Granular and wettable powder	Turf	Toxicity to aquatic and avian species
Bifenthrin	Emulsifiable concentrate	Cotton	Toxic to fish and aquatic organisms
Bis(tributyltin)oxide	Solution - ready to use	Antifouling paint	Toxic to aquatic organisms including shellfish
Carbofuran	All formulations except pellets and tablets	All uses	Acute inhalation toxicity; avian toxicity (granular)
Chlorophacinone	Tracking powder, dust and ready to use 0.2% (EPA Reg. Nos. 7173-113 and 7173-172	Inside buildings	Human hazard, potential for food contamination, possible inhalation hazard
Chloropicrin	All formulations greater than 2% and all formulations (rodent control)	All uses (greater than 2% including rodent control)	Acute inhalation toxicity, hazard to non-target organisms
Chlorpyrifos	Emulsifiable concentrate	Agricultural uses	Avian and aquatic toxicity
Chromic acid	All formulations except brush-on	All wood preservative	Oncogenicity, mutagenicity, teratogenicity and fetotoxic effects

Pesticide Active Ingredient (AI) name	Specific Formulations	Specific Uses	Criteria for RUP
Clofentezine	All formulations	All uses	Additional data required to remove the restriction
Coal tar	Solution - ready to use	Wood preservative	Oncogenicity and mutagenicity
Coal tar creosote	All formulations	Wood preservative	Possible oncogenic and mutagenic effects
Coumaphos	Flowable concentrate	Indoor food and indoor nonfood	Acute oral toxicity hazards
Cube resins other than rotenone	Emulsifiable concentrate	Small fruits, currants, certain berries	Chronic eye and inhalation effects
Cyfluthrin	25% Emulsifiable concentrate	Agricultural	Acute toxicity to applicators, fish and other aquatic organisms
Cyhalothrin	Emulsifiable concentrate	Cotton	Environmental data requirements
Cypermethrin	All formulations	All agricultural crops	Oncogenicity, hazard to non-target organisms
Deltamethrin	Emulsifiable concentrate	Cotton	High toxicity to aquatic organisms
Diazinon	Granular, emulsifiable concentrate and wettable powders	Small fruits and certain berries	Avian and aquatic toxicity
Dichlobenil	2,6-dichlorobenzonitrile	Terrestrial	Conditional
Dichloropropene	All formulations (94% liquid concentrate is the only formulation)	All uses	Probable human carcinogen, oncogenic, acutely toxic by oral and inhalation routes
Diclofop methyl	All formulations	All uses	Oncogenicity
Dicrotophos	All liquid formulations 8% and greater	All uses	Acute dermal toxicity, residue effects on avian species
Diflubenzuron	Wettable powders	All uses	Hazard to wildlife
Disulfoton	All ECs 65% and greater, all ECs and concentrate solutions 21% and greater with fensulfothion 43% and greater, all ECs 32% and greater in combination with 32% fensulfothion and greater	All uses, commercial seed treatment (non-aqueous solution 95% and greater).	Acute dermal toxicity, inhalation hazard
Emamectin benzoate	4-epimethlyamino-4-deoxykavermectin BLA and B1b benzoates	Insecticide, miticide	Toxicity to fish
Esfenvalerate	66% emulsible concentrate	Insecticide	Toxicity to fish and aquatic organisms
Ethoprop	Emulsifiable concentrates 40% and greater (aquatic uses); all uses (granular and fertilizer formulations	Aquatic uses (ECs 40% or greater); all uses (granular and fertilizer formulations)	Acute dermal toxicity
Fenamiphos	Emulsifiable concentrates 35% and greater	All uses	Acute dermal toxicity, avian acute oral toxicity, acute inhalation toxicity
Fenbutatin-oxide	Wettable powder	Grapes	Very high toxicity to aquatic organisms

Pesticide Active Ingredient (AI) name	Specific Formulations	Specific Uses	Criteria for RUP
Fenpropathrin	2.4 emulsifiable concentrate spray	Agricultural uses	Environmental concerns: toxic to fish and aquatic organisms
Fenthion	Emulsifiable concentrate	Mosquitocide	Very high acute toxicity to birds, fish and aquatic invertebrates
Fipronil	All formulations	Insecticide/miticide	Conditional amended
Hydrogen cyanamide	50% active ingredient	Desert grown grapes Potato	Corrosive effects to skin and eyes
Lambda-cyhalothrin	All formulations	All uses	Toxicity to fish and aquatic invertebrates
Magnesium phosphide	All formulations	All uses	Inhalation hazard
Methamidophos	Liquid formulations 40% and greater, dust formulations 2.5% and greater	All uses	Acute dermal toxicity, residue effects on avian species
Methidathion	All formulations	All uses except nursery stock, safflower and sunflower	Residue effects on avian species
Methiocarb	All formulations	Outdoor commercial and agricultural uses	Possible hazard to avian, fish and other aquatic organisms
Methomyl	As sole active ingredient in 1 to 2.5% baits (except 1% fly bait), all concentrate solution formulations and 90% wettable powder formulations (not in water soluble bags)	Nondomestic outdoor and all other registered uses (agricultural crops, ornamentals and turf)	Residue effects on mammalian species, other hazards - accident history
Methyl bromide	All formulations	All uses	Acute toxicity and accident history
Methyl isothiocyanate	Solution - ready to use	Fungicide for wood, wood preservative	Exceeds classification criteria of 40 CFR 152.170
Methyl parathion	All formulations	All uses	Residue effects on mammalian and avian species, hazard to bees, acute dermal toxicity
Niclosamide	All wettable powders 70% and greater	All uses	Acute inhalation toxicity, effects on aquatic organisms
Nicotine	Liquid and dry formulations 14% and greater (greenhouse); all formulations (cranberries)	Greenhouse applications, all applications to cranberries	Acute inhalation toxicity, effects on aquatic organisms
Nitrogen, liquid	Solution - ready to use	Termiticide	Highly corrosive upon contact with skin or eyes
Oxamyl	Liquid formulations, granular on a case-by-case basis	All uses	Acute oral toxicity, acute inhalation toxicity, avian oral toxicity
Oxydemeton methyl	All products	All uses	Reproductive effects
Paraquat	All formulations and concentrations except certain mixtures - see label	All uses	Human toxicological data, other hazards - use and accident history
Pentachlorophenol	All formulations	Wood preservative uses	Possible oncogenic, teratogenic and fetoxic effects

Pesticide Active Ingredient (AI) name	Specific Formulations	Specific Uses	Criteria for RUP
Pentachlorophenol, Sodium S	All formulations	Wood preservative uses	Possible oncogenic, mutagenic and/or fetotoxic effects
Permethrin	All formulations	Agricultural crop uses	Highly toxic to aquatic organisms, oncogenicity
Phorate	Liquid formulations 65% and greater (all uses); all granular formulations (rice)	All uses (65% and greater); granular formulations (rice)	Acute oral and dermal toxicity for granulars, residue effects on avian and mammalian species (foliar application of liquid formulation only), effects on aquatic organisms
Piperonyl butoxide	Emulsifiable concentrate	Small fruits, certain berries, currants	Not specified
Profenofos	Emulsifiable concentrate 59.4%, EPA Reg. Nos. 100-599 and 100-669	Cotton	Corrosive to eyes
Pronamide	All 50% wettable powders	All uses	Oncogenicity
Propanoic acid	Emulsifiable concentrate	Wheat, rice, edible chrysanthemum, cotton, clover, alfalfa, wheat-grass, sideoats grama, little bluestem	Not specified
Pyrethrins	Emulsifiable concentrate	No uses listed	Chronic eye effects
Resmethrin	All formulations	Mosquito abatement and pest control treatments at nonagricultural sites	Acute fish toxicity
Rotenone	2.5/5.0 EC, 5.0% +20.0% wettable powder	Fish toxicant	Chronic eye and inhalation effects
Simazine	Emulsifiable concentrate	Grapes and certain berries	Not specified
Sodium cyanide	All capsules and ball formulations	All uses	Human inhalation hazard, hazard to non-target species
Sodium dichromate	All wood preservative formulations except brush-on	Wood preservative uses	Oncogenicity, mutagenicity, teratogenicity and fetotoxocity
Sodium fluoroacetate	All solutions and dry baits	All uses	Acute oral toxicity, hazard to non-target organisms, use and accident history
Sodium hydroxide	Ready to use solution	Control tree roots in sewage systems	Acute toxicity; eye, inhalation and dermal hazard
Sodium methyldithiocarbamate	32.7% anhydrous	Soil fumigant to control soilborne pests of ornamental, food and fiber crops and for root control in sewage systems	Dermal toxicity and teratogenicity. Acute toxicity of metam sodium and its intended use in controlling sewer root growth
Strychnine	Dry baits, pellets and powder formulations - see specific labels	Formulations greater than 0.5%: all uses. All formulations: all uses calling for burrow builders. Formulations less than 0.5%: all uses except below-ground hand application.	Acute oral toxicity hazard to non-target avian species; use and accident history
Sulfotepp	Sprays and smoke generators	All uses	Inhalation hazard to humans
Sulfuric acid	Solution - ready to use	Potato vine desiccant	Extremely corrosive - acute toxicity to humans

Pesticide Active Ingredient (AI) name	Specific Formulations	Specific Uses	Criteria for RUP
Sulfuryl fluoride	All formulations	All uses	Acute inhalation hazard and possible acute toxicity hazard in humans
Tefluthrin	Granular formulations	Corn grown for seed	Environmental concerns Toxicity to fish and aquatic organisms
Terbufos	Granular formulations 15% and greater	All uses	Residue effects on avian species; acute oral and dermal toxicity and risks to aquatic organisms and other wildlife from runoff
TFM	Impregnated material	Aquatic pest control	Complexity in use- requires specialized training, equipment and clothing
Tralomethrin	All formulations	All agricultural crop uses	Toxicity to aquatic organisms
Tributyltin fluoride	Solution - ready to use	Antifouling paint	Toxicity to aquatic organisms including shellfish
Tributyltin methacrylate	Solution - ready to use	Antifouling paint	Toxicity to aquatic organisms
Triisopropranolamine	Emulsifiable concentrate	All uses	Hazard to non-target organisms, specifically plants both crop and noncrop
Triphenyltin hydroxide	All formulations	All uses	Possible mutagenic effects
Zinc phosphide	All dry formulations 60% and greater; all bait formulations; all dry formulations 10% and greater	All uses - non-domestic outdoor uses (other than 1-2% formulation in/around buildings); domestic uses	Hazard to non-target organisms, acute oral toxicity, acute inhalation toxicity

Attachment 5: Botanical Pesticides, Repellents, and Baits Regulated by USEPA

Name	Other Names	Use	Toxicity	EPA Tracking Number
Allium sativum	Garlic	Repels insects	Low	128827
Allyl isothiocyanate	Oil of Mustard	Kills & repels insects	Questionable	004901
Anise Oil		Repels vertebrates	Low	004301
4-allyl anisole	Estragole	Kills beetles	Low	062150
Azadirachtin	*Azadirachta indica* Neem tree extract	Kills & repels insects	Low, IV	121701
Bergamot		Repels vertebrates		129029
Canola Oil	*Brassica Napus* *B. Campestris*	Kills many insects	Low	011332
Capsaicin	*Capsicum frutescans*	Repels vertebrates	Low, III	070701
Castor Oil		Repels vertebrates	Low	031608
Cedarwood Oil		Repels moth larvae	Low	040505
Cinnamaldehyde	*Ceylon and Chinese* cinnamon oils	Kills insects, fungi & repels vertebrates*	Low	040506
Citronella Oil		Repels insects & vertebrates	Low	021901
Cloves, Crushed			Low	128895
Dihydroazadirachtin	Neem tree extract *Azadirachta indica*	Kills & repels insects	III-IV	121702
Eucalyptus Oil		Repels insects, mites fleas & mosquitoes	Low	040503
Eugenol	Oil of cloves	Kills insects**	Low	102701
Geraniol	Oil of rose isomeric w/ linalool	Repels vertebrates**	Low	597501
Geranium Oil			Low	597500
Indole	from all plants	Trap bait: corn root-worm beetles	Low	25000-
Jasmine Oil			Low	040501
Jojoba Oil		Kills & repels whitefly kils powdery mildew	Low	067200
Lavandin Oil		Repels clothes moth	Low	040500
Lemongrass		Repels vertebrates	Low	040502
Linalool	Oil of Ceylon isomeric w/ geraniol	Repels insects, ticks, mites & spiders	Low	128838
Maple lactone		Roach trap bait	Low	004049
Methyl salicylate	Oil of wintergreen	Repels moths, beetle & vertebrates	May be Toxic in large quantity	76601-

Mint	Herb	Kills aphids	Low	128892
Mint Oil		Kills aphids	Low	128800
Mustard Oil		Repels insects, spiders & vertebrates	Low	004901
Neem Oil		Kills whitefly, aphids	Low	025006
1-Octen-3-ol	From clover, alfalfa	Trap bait: mosquitoes	Low	69037-
Orange		Repels vertebrates	Low	040517
p-Methane-3,8 diol	*Eucalyptus sp.*	Repels biting flies, mosquitoes	Low	
2-Phenylethyl-propionate	From peanuts	Kills insects, ticks, mites & spiders	Low	102601
Pyrethrum	*Chrysanthemum sp.*	Stored products use	III	
Red pepper	Chilli	Repels insects	Low	070703
Rosemary	Herb		Low	128893
Rotenone	*Derris sp., Tephrosia*	Controls ticks	III	
Ryania	*Ryania speciosa*	Kills thrips, coddling moth, corn borers		
Sabadilla	*Schoenocaulon sp.*		III	
Sesame Oil	*Sesamum indicum*	Pyrethroid synergist	Low	
Soybean Oil	Soja	Kills insects, mites	Low	031605
Thyme	Herb	Controls aphids	Low	128894
1,2,4 Trimethoxy-benzene	From squash	Trap bait: corn rootworm, cucumber beetles	Low	40515-
Verbenone	From pine trees	Repels bark beetles	Low	128986

1. This table does not necessarily describe all plant oil active ingredients.
2. More detailed information available for most of the oils: http://www.epa.gov/pesticides/reregistration/status.htm
3. Natural Source: Only one or a few sources are listed. Most of these chemicals are found in many different plants.

* attracts corn rootworm beetles, ** attracts Japanese beetles

Attachment 6: A General IPM Planning and Design Protocol

An IPM program can be designed with all of the fundamental parts of any good management plan. The vital parts of a plan include a definition of the targeted primary (small or large-holder farmers) and secondary (marketers, processors, transporters, and consumers) beneficiaries, implementation partners (farmers, laborers, extension personnel, national, regional, and international organizations), listed production constraints (problem identification), and IPM strategies for dealing with them.

Elements of IPM Program

Since IPM is not generally an active part of crop production in Afghanistan, a basic understanding of the steps or elements needed in an IPM program is addressed below.

Step 1: Evaluate and use non-pesticide management options first.

Use both preventive and responsive/curative options that are available to manage pest problems. Farmers may prevent pests (and avoid requiring pesticides) by the way they select plants, prepare the site, and plant and tend growing plants. Along with prevention, farmers may respond to or cure the problem via physical, mechanical, or biochemical methods.

General Preventive Interventions

Plant selection

- Choose pest-resistant strains;
- Choose proper locally adapted plant varieties;
- Diversify plant varieties or inter-crop plants; and
- Provide or leave habitat for natural enemies.

Site preparation and planting

- Choose pest-free or pest-avoidance planting dates (e.g., early planting in rainy season avoids stem borers in cereals);
- Enhance/provide shade for shade-grown crops;
- Assign crop-free (fallow) periods and/or rotate crops ;
- Install buffer zones of non-crop plants and/or physical barriers;
- Improve soil health;
- Use an appropriate planting density;
- Rotate crops; and
- Low-till, no-till.

Plant tending/cultivation practices

- fertilize and irrigate appropriately
- remove weeds while small and before sowing crop

Responsive/Curative Interventions

Physical/mechanical control

- Remove or destroy diseased plant or plant parts and pests;
- Weed; and
- Install traps.

Biochemical control

- Pheromones (very effective, currently not easily accessible or economical, but they are becoming more so);
- Homemade botanical pesticides; and
- Repellents.

Biological control

- Release or augment predators;
- Release or augment parasites/parasitoids; and

- Release or augment microbial pesticides.

Step 2: Assess IPM Needs and Establish Priorities.

In planning an IPM project, consider crop protection needs, farmers' perceptions of pest problems, pesticide use history and trends, availability of IPM technology, farming practices, access to sources of IPM expertise, support for IPM research and technical assistance, and training needs for farmers and project field extension workers.

Next, identify strategies and mechanisms for fostering the transfer of IPM technology under various institutional arrangements, mechanisms, and funding levels. Define what is available for immediate transfer and what may require rapid and inexpensive adaptation and validation research. During the planning stages of an IPM program, the inputs from experienced IPM specialists will be extremely useful. If possible, set up an initial planning workshop to help define and orient implementation activities and begin to assign individual responsibilities.

Step 3: Learn and value farmers' indigenous IPM tactics, and link with and utilize all local resources/partners.

Most farmers are already using their own forms of IPM, many of which are novel, self-created, adapted for local conditions, and work well. These include mechanical and physical exclusion; crop rotation, trap crops, cover crops, and green manures; local knowledge of strategic planting or harvesting times; water, soil, and fertilizer resource management; intensive intercropping with pest-repellent plants; leaving refuge habitat for natural enemies; soil augmentation and care leading to healthy nutrient cycling; transplanting; and weeding.

Accurate assessments of these farmer technologies, as well as of actual losses due to different constraints in farmers' fields are a must before designing a crop production and pest management program. Crop loss figures provided by small and large farmers alike and projected and reported by international organizations are often inaccurate and overestimated.

Step 4: Identify key pests for each target crop.

Although hundreds of species of organisms can be found in a crop at any one time, only a few of them can cause substantial crop losses and are considered pests. Become familiar with the key pests of target crops, whether they are primary or secondary pests, and how to positively identify them. Monitor their population size, the kind of damage that they cause, and their life cycle. These usually amount to a relatively small number of species on any one crop and can include any combination of insects, pathogens, weeds, diseases, and vertebrates. A few other species, known as secondary or occasional pests, attain damaging status from time to time, especially if over-spraying occurs and kills natural predators that naturally regulate their populations.

The vast majority of insect species found in any one crop are actually predators and parasites of the plant-feeding species. Many smallholder farmers are not aware of these distinctions and must be taught to y identify the more common beneficial species, as well as pests, found in their crops. Incorrect identification of beneficial insects, predators, or neutral insect species, may lead to unnecessary pesticide applications. This diagnostic phase requires sampling and careful observation. Usually, most key pests are fairly well known by local farmers and government extension personnel. However, a few species may be poorly known or understood because they occur at night, are hidden, or small. These include soil-inhabiting species such as nematodes and insect larvae (wireworms, white grubs, cutworms), mites, and pathogens (viruses, bacteria, mycoplasma, fungi). In addition, farmers usually do not understand the role of some insects as vectors of plant diseases.

Step 5: Do effective activities and training to promote IPM.

Several activities are very effective in promoting IPM in developing countries:

Learning-by-doing/discovery training programs. Small- and large-holder farmers adopt new techniques most readily when they acquire knowledge and skills through personal experience, observation, analysis, experimentation, decision-making, and practice. First, trained instructors or extension agents should conduct frequent (usually weekly) sessions for 10 to 20 farmers during the

cropping season in farmers' fields. Because these IPM training sessions take place in the farmers' own environment, they take advantage of the farmers' own knowledge, and the farmers understand how IPM applies to their own farms.

Of these IPM training sessions, four or five analyze the agroecosystem. They identify and describe conditions such as soil type, fertility, and needs, weather, crop stage, each pest, their natural enemies, and relative numbers of both. Illustrations and drawings are provided, as necessary. Extensionists apply the Socratic method, guiding farmers with questions to discover important insights and supplying information only when absolutely necessary.

Farmers may also experiment with insect zoos, where they can observe natural predators of their pests in action and the impact of pesticides on both. Knowledge and skills necessary for applying IPM are best learned and understood through practice and observation, understanding pest biology, parasitism, predation and alternate hosts; identifying plant disease symptoms; sampling population size; and preparing seed beds.

Recovering collective memory. Pest problems often emerge because traditional agricultural methods were changed or lost. These changes can sometimes be reversed. This approach uses group discussions to try to identify what changes might have prompted the current pest problem.

Smallholder support and discussion groups. Weekly meetings of smallholders, held during the cropping season, to discuss pest and related problems can be useful for sharing the success of various control methods. However, maintaining attendance is difficult except when there is a clear financial incentive (e.g., credit).

Demonstration project. Subsidized experiments and field trials at selected farms can be very effective at promoting IPM within the local community. These pilots demonstrate IPM in action and allow comparison with traditional synthetic pesticide-supported cultivation.

Educational material. In many countries, basic written and photographic guides to pest identification and crop-specific management techniques are unavailable or out of date. Such material is essential. Videos featuring graphic pictures of the effects of acute and chronic pesticide exposure, and interviews with poisoning victims can be particularly effective. A study in Nicaragua found videos to be the most important factor in motivating farmers to adopt IPM.

Youth education. Promoting and improving the quality of programs on IPM and the risks of synthetic pesticides has been effective at technical schools for rural youth. In addition to becoming future farmers, these students can bring informed views back to their communities.

Organic food market incentive. Promoting organic certification for access to the lucrative and rapidly growing organic food market can be a strong incentive to adopt IPM.

Step 6: Partner successfully with other IPM implementers.

Many IPM programs consist of partnerships between two or more organizations, e.g., donors, governments, PVOs, and NGOs. If these partnerships are not forged with care, the entire project may be handicapped. The following design steps are considered essential.

Articulate the partnership's vision of IPM. Organizations may forge partnerships based on a common commitment to "IPM," only to discover too late that that their visions of IPM differ considerably. It is important that partners articulate a common, detailed *vision* of IPM, centered on the crops and conditions the program will encounter.

Confirm partner institutions' commitment. Often, organizations make commitments they do not intend to (or are unable to) fulfill completely. The extent of commitment to IPM integration into project, design, and thus implementation depends strongly upon the following key variables:

- **IPM program integration into larger project**. The IPM program is likely to be part of a larger "sustainable agriculture" project. The IPM program must fit into a partner's overall program. The extent of this integration should be clearly expressed in the proposed annual work plan.
- **Cost sharing**. The extent of funds (or in-kind resources) is a good measure of a genuine partner commitment.

- **Participation of key IPM personnel.** Large partner organizations should have staff with expertise in IPM who are assigned specifically to IPM work. In strong partnerships, these staff members are actively involved in the partnership.

Step 7: Monitor the fields regularly.

The growth of pest populations usually is closely related to the stage of crop growth and weather conditions, but it is difficult to predict the severity of pest problems in advance. The crops must be inspected regularly to determine the levels of pests and natural enemies and crop damage. Current and forecast weather should be monitored. Farmers, survey personnel, and agricultural extension staff can assist with field inspections. They can train other farmers to be able to separate pests from non-pests and natural enemies, and to determine when crop protection measures, are necessary.

Step 8: Select an appropriate blend of IPM tools.

A good IPM program draws from and integrates a variety of pest management techniques. IPM does not require predetermined numbers or combinations of techniques, nor is the inclusion or exclusion of any one technique required for IPM implementation. Flexibility to fit local needs is a key variable. Pesticides should be used only if no practical, effective, and economic non-chemical control methods are available. Once the pesticide has been carefully chosen for the pest, crop, and environment, it should be applied only to keep the pest population low. When dealing with crops that are already being treated with pesticides, IPM should aim first at reducing the number of pesticide applications through the introduction of appropriate *action thresholds*, while promoting appropriate pesticide management and use practices and shifting to less toxic and more selective products and non-chemical control methods. In most cases, NGOs/PVOs will probably need to deal with low to moderate levels of pesticide use. Either way, an IPM program should emphasize preventive measures and protect a crop, while interfering as little as possible with the production process.

Step 9: Develop education, training, and demonstration programs for extension workers.

Implementation of IPM depends heavily on education, training, and demonstration to help farmers and extension workers develop and evaluate the IPM methods. Hands-on training conducted in farmers' fields (as opposed to a classroom) is a must. Special training for extension workers and educational programs for government officials and the public are also important.

Step 10: Monitor and Evaluate.

First, develop data collection tools, and then collect baseline data at the beginning of the project to identify and determine the levels of all variables that will need to be tracked. These may include numbers and types of pests, predators, and soil microorganisms; relative numbers of all non-target animals (birds, lizards, etc.) that may be negatively impacted if pesticides are used; soil and water samples to determine levels of pesticide residue; soil samples to learn dominant soil types and to predict soil nutrition, requirements, and fertilizer/pesticide activities; pesticides, application and safety equipment available; and, amounts and type of training received by target audiences.

Develop methods for measuring the effectiveness of each IPM tactic used, and of their sum in reducing pest damage and crop losses. Also, develop methods for monitoring environmental health (maintaining and encouraging high levels of predators and soil microorganisms) and human health if pesticides are used. Kits are available for determining the level of cholinesterase-inhibiting pesticides to which farmers and applicators have been exposed. Make checklists for farmers to use when applying pesticides that indicate the type of application and safety equipment used, and the rates at which pesticides were applied.

Attachment 7: ASAP Responses to Questionnaires

no	Question	Answer
1	All of the major production constraints (Afghan pests & nutrient issues) for each crop (ABAS)	See xl file
2	Pesticide(s) and fertilizers proposed for each crop constraint (ABAS	See xl file
3	What is the recommended application rate desired for each proposed pesticide? (ABAS)	See xl file
	What is the primary basis for selection for pesticides in Afghanistan: price, efficacy, availability, safety, environmental concerns, or other? (ABAS)	price, efficacy, availability
	For pesticides that your project intends to use, how are they generally applied? By hand-pump backpack sprayer with wand, motorized backpack sprayer, hand-held micro-ULV sprayers, granular applicators, truck-mounted sprayers, boom sprayers, or air-blast sprayers? (ABAS)	Mostly applied by knapsack sprayer Motorized pump are used in some areas
4	Which of the following tools/techniques are used for each target crop (ABAS):	
	Soil nutrient, texture and pH testing	Apple, grape, pomegranate, almond, strawberry
	Pest resistant/tolerant seed	Tomato, potato, spinach, carrot, melons
	Seed treatment with pesticides	Tomato, potato, spinach, carrot, melons
	Solar soil sterilization	Not applied in Afghanistan yet
	Raised-bed planting technique	potato, carrot
	Plastic or other mulches	Tomato
	Follow seeding rate & thinning recommendations	None
	Soil moisture measurements	None
	Use of organic fertilizers (manure, compost)	Apple , grape , pomegranate, almond , strawberry, tomato, potato, spinach, carrot, melons
	Use of purchased mineral fertilizers	Apple, grape, strawberry, tomato
	Combinations of organic and mineral fertilizers	Apple, grape, pomegranate, almond, strawberry, tomato, potato, spinach, carrot, melons
	Crop rotation	Tomato, potato, spinach, carrot, melons
	Use of green manure crops	Apple, grape, pomegranate, almond
	Early/late plantings/harvestings to avoid pests	Tomato, potato, spinach, carrot
	Use of trap crops to trap and destroy pest	Apple
	Pruning and sanitation of diseased plants/trees	Apple, grape , pomegranate, almond
	Farmer ability to correctly identify pests	None
	Farmer ability to correctly identify predators & parasites	None
	Weekly field scouting to assess pest levels/damage	None
	Mechanical weed control by hoe or tiller	Apple, grape, pomegranate, almond, strawberry, tomato, potato, spinach, carrot, melons

no	Question	Answer
	Use of herbicides for weed control	Apple, grape, pomegranate, almond
	Mechanical pest control by hand picking	Pomegranate borer
	Spot treatment of pest hotspots with pesticides (instead of area spraying)	Apple , grape , pomegranate, almond
	Use of pheromone traps to monitor moth pest levels	Apple by some NGOs
	Use of pheromone inundation to confuse moth mating	Apple by some NGOs
	Crop residue destruction at end of season	Apple , grape , pomegranate, almond , strawberry, tomato, potato, spinach, carrot, melons
	Apply local artisanal plant extracts to kill pests	None
	Do things to encourage predator/parasite build-up	None
5	What are the names of the manufacturers for each pesticide used, for example BASF, Bayer, Dow AgroSciences, DuPont, FMC, Monsanto, Syngenta, Sumitomo, or others, including national pesticide producers, formulators, or re-packagers in the region? (ABAS)	BASF, Bayer, FMC, Syngenta, Dow Elanco.
6	Do staff and farmers who use pesticides generally use safety equipment while applying the pesticides? What do they use? Goggles, chemical cartridge respirator and filtering cartridges or elements, gloves, spray suit or coveralls with long pants and long-sleeve shirt, hat, boots? (ABAS)	They use just goggles and gloves mostly nothing more
7	Have any of the farmers or project staff members that currently have pesticide responsibilities had training in good agriculture practices (GAPs) and integrated pest management (IPM) to find least-toxic pest control alternatives or combinations? (ABAS and Tom)	Some of the NGO provide some kind of trainings
8	Do any of the pesticides you propose to use or are using show signs of working less and less effectively over time in your part of the country? In other words, does it take increasingly larger doses of any of the pesticides to control the disease, insect or weed pests of your project's crops? (ABAS)	In generally it dose affect the usage dosage because of the lack of knowledge and facilities.
9	Do any of the farmers use traditional (non-pesticide) control measures for diseases, insects, or weeds pests of crops? What do they use? Do these work well? (ABAS)	Yes they use some of other crop instruct for example. Tobacco with soap, burning weeds, in general. conventional pesticides are cheaper and easier to use for farmers
10	In general, how do farmers or project staff store pesticides? (ABAS)	Farmers keep the pesticide at room temperature not in proper stores Some of the NGOs keep in some
11	Have there been any pesticide human poisonings related to the crops you work on in your region? (ABAS)	Not seen, but there is no poisoning reporting in the health care system.
1	Afghan registration status for each proposed pesticide (provide a list of currently- registered pesticides, formulation, concentration and registered uses)	I asked the director of plant protection. He told me there is no list only FAO has a list of the pesticide. Although there is a process for the registration of pesticides. Any company who want to import pesticide to Afghanistan is responsible to carry a sample to the department of plant protection to be tested on related plants and then the department will decide to issue the letter for import. If you want to have the list you may ask FAO for more information

no	Question	Answer
2	Afghan regulations for safe use (import, storage, application, disposal) of pesticides	There is a 28-page law issued in year 2000. This law provides for safe use of pesticides; however this law has never been implemented. There are some important parts I would like to mention: 1) import, distribution and use of pesticides must be preformed under the MAIL Plant Protection Department and the Ministry of Health; 2) there are three different registration methods (experimental, provisional, trade mark).
3	What mechanisms exist for enforcing Afghan pesticide regulations? To what extent do they work?	The Department of Plant Protection has the authority to stop and hand over any company responsible for not applying the pesticide law to police and any one from the pesticides sell or use according to the regulations but never been applied due to the conflict .
4	The conditions under which the pesticides are to be used, including soil types and characteristics, hydrology (watersheds, groundwater and surface water resources), geography, climate, endangered flora and fauna (has an FAA 118/119 study been performed?) (Cadmus, based on Mazar Foods EA findings and Internet research)	
5	Have any soil tests been performed to determine soil inputs needs? If so, what was found? (Cadmus, based on Mazar Foods EA findings and Internet research)	
6	Will any irrigation be used? Is there capability to test water for toxins (E. coli, arsenic, chlorinated hydrocarbon pesticide residues, etc)?	Traditional methods of irrigation are used in Afghanistan. NEPA (National Environment. Protection Agency) is testing water for the following tests pH , EC, T.D.S , Free chlorine , total chlorine , Nitrate NO3-N3, Ammonia NH3-N, PO4, Sulfide S, Oxygen, Free cadmium, Total cooper , total iron Boron B , Barium Ba, Fluoride F , Iodine I2 , Cooper Cu, Molybdenemume MO, Arsenic, Manganese, Calcium, turbidity
7	Is there capability to do soil moisture testing? (Tom)	Unfortunately due to the lack of lab it is not possible to test moisture except through some primary methods such as by small moisture testing kits.
8	Will any of the production be exported? To where? Under any standards/certification schemes (BRC, ISO, Organic, Global GAP)?	Some of the products, apple, apricot almond and grape are being exported mostly to the neighboring countries, Pakistan and India. Although there is no certification scheme or standards

Description of ASAP-supported AgDepots (rural farm stores), in response to survey question: The AgDepots have upgrades of ceramic marble or concrete floor, concrete ceilings (painted or fabric covered), overall inside white paint with green paint at the front of the store, shelves, a customer table with vetrin, a water tank and soap for washing hands, an advertisement board, and a chair for the AgDepot owner.

These stores were selected, upgraded, and refurbished by Durukhshan Association, with the collaboration of our IFDC/ASAP staff working as field coordinators. I have visited a good number of these AgDepots in Kabul, Parwan, Herat, Balkh, Samangan, and Pule Khumry provinces.

Durukhshan Association is importing their input supply from: 1) 5/f zhenxin building, 2 East Hailian Road Xinpu Lianyungang Jiangsu China, Phone: 0086-0518-82796219, 85826219, e-mail: suqian10000@sina.com; and 2) Veterinary and Agricultural Products Mfg Co Ltd, P.O.Box 17058, Amman 11195, Jordan, Prince Shaker Bin Zaid Street # 12, Phone: 00-962-6-5694991, Fax: 00-962-6-5694998, 00-962-6-5696770, e-mail: vapco@vapco.net, Website: www.vapco.net.

Safety gear is stocked in the main regional centers and the larger stores with many customers. Overall, the Durukhshan Agricultural and Social Association's safety gear includes cap, safety eye glasses, protection mask for mouth and nose, and plastic boots.

ASAP staff have been teaching the AgDepot owners safety procedures for handling, storing, selling and using the pesticides.

There were some joint AgDepot – Veterinary Field Unit stores. They are separated into adjacent but separate stores run by different persons.

In principle, all of our AgDepots should obtain their input supply from the Durukhshan Association. Through our AgDepot Profile Survey, a small number of AgDepot owners obtain some supplies from other sources. Our AgDepot owners have been told that if they encounter any problems (such as no effectiveness), they will be responsible. Durukhshan is liable for any problems with their products.

ASAP's mandate is to instruct the AgDepot owners on which inputs, especially pesticides, should be stocked, based on knowledge of local disease and pest trends (for example, Deltmethrin should be stocked in melon-growing provinces in Northern and Western Afghanistan).

The Durukhshan Grant Document is about 180 pages. If needed, we will provide a soft or a hard copy.

Attachment 8: Mitigating Potential Pesticide Dangers

General measures to ensure safe use

If there are no feasible alternatives to pesticides, take the following measures to mitigate and reduce the risks to human health and the environment. Note that risk is a function of both toxicity and exposure. Reducing risk means (1) selecting less toxic pesticides and (2) selecting pesticides that will lead to the least human exposure before, during, and after use.

Reduce exposure time or the degree of exposure

Before using

Transport:

- Separate pesticides from other materials being transported.

Packaging:

- Follow international and national norms and guidelines;
- Use packaging (small containers) adapted to local needs; and
- Eliminate re-use of packaging materials.

Storing:

- Develop strict guidelines for village-level storage;
- Ensure permanent, well-marked labeling;
- Follow and respect national norms; and
- Use appropriate language and approved pictograms.

Formulating:

- Use appropriate type and concentration.

During use

Training:

- Should be continuous.
- Should identify level and audiences (distributors, farmers, transporters, etc.).

Use application equipment:

- Should be adapted to user needs and possibilities.
- Should assure maintenance and availability of parts and service.

Use protective equipment and clothing:

- Should be adapted to local climatic conditions;
- Should be adapted to user needs and resource possibilities; and
- Should eliminate exposure rather than just reduce it, if at all possible.

Focus on "buffer zones" around the following:

- Housing
- Environment: water, sensitive areas

After using

- Know, enforce, respect exclusion or reentry periods after application;
- Assure proper cleaning and rinsing off of
  - Applicators' preparation and application equipment;
  - Applicators' clothing; and
  - Storage containers
- Develop a workable monitoring and evaluation system for:
  - Adherence to national and international policies regarding pest management and pesticides;
  - Health effects on applicators, the local population, and domestic animals;
  - Efficacy on target pests;
  - Impact on the environment: above- and below-ground water, soils, air, drift, biodiversity; and
  - Elimination of pesticide leftovers and containers.

Attachment 9: Protective Clothing and Equipment Guide

USEPA Recommended Worker Protection Standards

HANDLER PPE FOR WORKER PROTECTION STANDARD PRODUCTS				
Route of Exposure	**Toxicity Category by Route of Exposure of End-Use Product**			
	I DANGER	II WARNING	III CAUTION	IV CAUTION
Dermal Toxicity or Skin Irritation Potential[1]	Coveralls worn over long-sleeved shirt and long pants Socks Chemical-resistant footwear Chemical-resistant Gloves[2]	Coveralls worn over short-sleeved shirt and short pants Socks Chemical-resistant footwear Chemical-resistant Gloves[2]	Long-sleeved shirt and long pants Socks Shoes Chemical-resistant Gloves[2]	Long-sleeved shirt and long pants Socks Shoes No minimum[4]
Inhalation Toxicity	Respiratory protection device[3]	Respiratory protection device[3]	No minimum[4]	No minimum[4]
Eye Irritation Potential	Protective eyewear[5]	Protective eyewear[5]	No minimum[4]	No minimum[4]

1. If dermal toxicity and skin irritation toxicity categories are different, PPE shall be determined by the more severe toxicity category of the two. If dermal toxicity or skin irritation is category I or II, refer to the pesticide label/MSDS to determine if additional PPE is required beyond that specified in Table.
2. Refer to the pesticide label/MSDS to determine the specific type of chemical-resistant glove.
3. Refer to the pesticide label/MSDS to determine the specific type of respiratory protection.
4. 4 Although no minimum PPE is required for these toxicity categories and routes of exposure, some specific products may require PPE. Read pesticide label/MSDS.
5. “Protective eyewear” is used instead of “goggles” and/or “face shield” and/or “shielded safety glasses” and similar terms to describe eye protection. Eyeglasses and sunglasses are not sufficient eye protection.

Attachment 10: Basic First Aid for Pesticide Overexposure

Get medical advice quickly if you or any of your fellow workers have unusual or unexplained symptoms during work or later the same day. Do not let yourself or anyone else get dangerously sick before calling a physician or going to a hospital. It is better to be too cautious than too late.

First aid is the initial effort to help a victim while medical help is on the way. If you are alone with the victim, make sure that the victim is breathing and is not being further exposed to the poison before you call for emergency help. Apply artificial respiration if the victim is not breathing.

Read the first aid instructions on the pesticide label, if possible, and follow them. Do not expose yourself to poisoning while you are trying to help. Take the pesticide container (or the label) to the physician. Do not carry the pesticide container in the passenger space of a car or truck.

Poison on skin

- Act quickly;
- Remove contaminated clothing and drench skin with water;
- Cleanse skin and hair thoroughly with detergent and water; and
- Dry victim and wrap in blanket.

Chemical burn on skin

- Wash with large quantities of running water;
- Remove contaminated clothing;
- Cover burned area immediately with loose, clean, soft cloth; and
- Do not apply ointments, greases, powders, or other drugs in first aid treatment of burns.

Poison in eye

- Wash eye quickly but gently;
- Hold eyelid open and wash with gentle stream of clean running water;
- Wash for 15 minutes or more; and
- Do not use chemicals or drugs in the wash water; they may increase the extent of injury.

Inhaled poison

- Carry victim to fresh air immediately;
- Open all doors and windows so no one else will be poisoned;
- Loosen tight clothing; and
- Apply artificial respiration if breathing has stopped or if the victim's skin is blue. If patient is in an enclosed area, do not enter without proper protective clothing and equipment. If proper protection is not available, call for emergency equipment from your fire department.

Poison in mouth or swallowed

- Rinse mouth with plenty of water;
- Give victim large amounts (up to 1 quart) of milk or water to drink; and
- Induce vomiting only if instructions to do so are on the label.

Procedure for inducing vomiting

- Position victim face down or kneeling forward. Do not allow victim to lie on his back, because the vomit could enter the lungs and do additional damage;
- Put finger or the blunt end of a spoon at the back of victim's throat or give syrup of ipecac;
- Collect some of the vomit for the physician if you do not know what the poison is; and
- Do not use salt solutions to induce vomiting.

When *not* to induce vomiting

- If the victim is unconscious or is having convulsions;
- If the victim has swallowed a corrosive poison. A corrosive poison is a strong acid or alkali. It will burn the throat and mouth as severely coming up as it did going down. It may get into the lungs and burn there also; and
- If the victim has swallowed an emulsifiable concentrate or oil solution. Emulsifiable concentrates and oil solutions may cause severe damage to the lungs if inhaled during vomiting.

Attachment 11: Pesticide Disposal Options

Pesticide Disposal

If you end up with excess pesticide concentrate, dilute it as directed on the label, then apply it to an area listed on the label. You can dispose of excess pesticide mix by applying it to an area listed on the label. Do not apply more than is recommended. You can also store leftover pesticide until you are able to take it to a hazardous-waste collection site.

An empty pesticide container is not as empty as you might think; a significant amount of pesticide residue can remain inside it. Triple-rinse an empty container of liquid pesticide before you toss it into the trash. Here's how: First, when you are down to the last amount of pesticide concentrate, drain the pesticide container into your spray tank for at least 30 seconds.

Fill the empty container one-fifth to one-fourth full of water and rinse thoroughly. Use this rinse water as dilution water for the pesticide concentrate in the sprayer. If the dilution rate allows you to pour all the rinse water into the sprayer, drain it into the sprayer for at least 30 seconds.

Follow the procedure in Steps 2 and 3 two more times. Then spray the pesticide mixture on areas listed on the label. Do not exceed the label's application rate.

Container Disposal

All empty pesticide containers must be destroyed, and never re-used. It is extremely dangerous to use them for anything else. Consult the pesticide label, the manufacturer, or the manufacturer's representative for specific recommendations regarding container cleanup and disposal. The following are general guidelines. There are two basic methods for cleaning pesticide containers before disposal. Both require that the container be turned upside down and allowed to drain into the spray tank for at least 30 seconds, followed by adding water to the container and rotating it well to wet all surfaces, then draining it again into the spray tank as an additional dilutent.

- *Triple Rinse Method:* Add a measured amount of water or other specified dilutent so that the container is one-fifth to one-fourth full. Rinse container thoroughly, pour into a tank, and allow it to drain for 30 seconds. Repeat three times. The water rinsate can be used to mix with or dilute more of the same pesticides or it can be sprayed on the target crop.
- *Pesticide Neutralization Method:* Empty organophosphate and carbamate containers can be neutralized by adding alkaline substances. The following procedure is recommended for 200-liter barrels. Use proportionally less material for smaller containers.

1. Add 20 liters of water, 250 milliliters of detergent, and one kilogram of flake lye or sodium hydroxide.
2. Close the barrel and rotate to wet all surfaces.
3. Let stand for 15 minutes.
4. Drain completely and rinse twice with water. The rinsate should be drained into a shallow pit in the ground located far away from wells, surface water, or inhabited areas.

Containers cleaned by any of the above methods are still not safe to use for any other purpose. Glass containers should be broken and plastic or metal containers punctured or crushed. Containers can then be buried in an isolated area at least 50 cm below ground surface.

Container Type	Disposal Statements
Metal Containers (non-aerosol)	Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of container in a sanitary landfill, or by other procedures approved by state and local authorities.
Paper and Plastic Bags	Completely empty bag into application equipment. Then dispose of empty bag in a sanitary landfill or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.
Glass Containers	Triple rinse (or equivalent). Then dispose of in a sanitary landfill or by other approved state and local procedures.
Fiber Drums with Liners	Completely empty liner by shaking and tapping sides and bottom to loosen clinging particles. Empty residue into application equipment. Then dispose of liner in a sanitary landfill or by incineration if allowed by state and local authorities. If drum is contaminated and cannot be reused, dispose of it in the manner required for its liner.
Plastic Containers	Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.
Compressed Gas Cylinders	Return empty cylinder for reuse (or similar wording).
Foil outer pouches of water soluble packets (WSP)	Dispose of the empty outer foil pouch in the trash, as long as WSP is unbroken.