

Report

**USAID/Uganda Agricultural Sector
Pesticide Procedures Guide: Compliance and
Capacity Building (ASPPG)**

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Report

USAID/Uganda Agricultural Sector Pesticide Procedures Guide: Compliance and Capacity Building (ASPPG)

Section I: Report on Pesticide Use By SO 1 Partners and on Uganda's Pesticide Regulatory Status

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Preface

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Acronym List

AAH	Aktion Afrika Hilfa
ACB	Agricultural Chemicals Board
ACDI-VOCA	Agricultural Cooperative Development Inc.-Volunteers in Overseas Cooperative Development
ACR	Agricultural Chemical Regulations of 1993
ACS	Agricultural Chemical Statute
ACTC	Agricultural Chemicals Technical Committee
ADC	Agribusiness Development Centre
ADI	Acceptable Daily Intake
AEC	Agency Environmental Coordinator
AFR	Africa Bureau of USAID
AFR/SD	Africa Bureau of USAID, Office of Sustainable Development
AFS	(not spelled out, see p. vi)
ANRE	(not spelled out, see p. vi)
ASPPG	Agricultural Sector Pesticide Procedures Guide
ATU	Appropriate Technology Uganda
BEO	Bureau Environmental Officer
BHR	Bureau for Humanitarian Response
BRITE	Building Rural Income Through Enterprise
Bt	<i>Bacillus thuringiensis</i>
CARE	Global NGO (Cooperation for American Relief Everywhere)
CDP	Co-operative Development Programme
CFR	Code of Federal Regulations
COVOL	Cooperative Office For Voluntary Organizations of Uganda
CRSP	Collaborative Research Support Project
CV	Curriculum Vitae
DANIDA	Danish International Development Agency
EA	Environmental Assessment
EC	Emulsifiable Concentrate
EGAD	(not spelled out, see p. vi)
EIA	Environmental Impact Assessment
EIR	Environmental Impact Review
ENCAP	Environmental Capacity Building Program
EO	Environmental Officer
EPA	Environmental Protection Agency
EPIQ	Environmental Policy and Institutional Strengthening Indefinite Quantity Contract
EU	European Union
EXO	(not spelled out, see p. vi)
FAO	United Nations Food and Agriculture Organization
FEWS	Famine Early Warning System
FFP	Office of Food For Peace (Farmer to Farmer Project)
FFS	Farmer Field School

GATT	General Agreement on Tariffs and Trade
GC/AFR	Office of General Counsel, Africa Division, USAID
GCPF	Global Crop Protection Federation (formerly GIFAP)
GOU	Government of Uganda
GTZ	Gesellschaft fur Technische Zusammenarbeit GmbH, Germany
HPI	The Heifer Project
ICIPE	International Centre for Insect Physiology and Ecology
ICPS	International Program on Chemical Safety
ICRAF	International Center for Research on Agro Forestry
IDEA	Investment in Developing Agricultural Exports
IDP	Integrated Development Project
IEE	Initial Environmental Examination
IFAD	International Fund for Agricultural Development
IFDC	International Fertilizer Development Center
IITA	International Institute for Tropical Agriculture
ILO	(not spelled out, see p. 64)
IPM	Integrated Pest Management
IPM CRSP	Integrated Pest Management Collaborative Research Support Project
IQC	Indefinite Quantity Contract
IRG	International Resources Group
KARI	Kawanda Agricultural Research Institute
KR-2	Japanese Agricultural Commodities Donation Program (based on second Kennedy Round of negotiations on the General Agreement on Tariffs and Trade)
LD ₅₀	Lethal Dose (kills 50% of target organisms)
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries
MEO	Mission Environmental Officer
MRL	Maximum Residue Limits
MT	Metric Tonne
NARO	National Agricultural Research Organization
NEIC	National Environmental Information Center
NEMA	National Environment Management Authority
NEMP	National Environment Management Policy
NEPA	National Environmental Policy Act
NGO	Non-Government Organization
NTAE	Non-Traditional Agricultural Exports
NUFS	Northern Uganda Food Security Programme
OPP	Office of Pesticide Programs, EPA
PEP	Partnership for Enhanced Productivity
PHHS	Post-Harvest Handling and Storage
PL480	Public Law 480: U.S. Agricultural Trade, Development and Assistance Act of 1954, providing for assistance in the form of food commodities.
PMST	Pesticide Management Specialists Team
PMSTL	Pesticide Management Specialists Team Leader
PRESTO	Private Enterprise Support, Training and Organizational Development
PVO	Private Voluntary Organization
REO	Regional Environmental Officer

RUP	Restricted Use Pesticide
SAFE	Sustainable Agriculture and Food-Based Enterprises
SD	Sustainable Development
SG 2000	Saakawa Global 2000, President Carter NGO
SO 1	Strategic Objective 1
SOW	Scope of Work
ST	(not spelled out, see p. vi)
STIG	(not spelled out, see p. vi)
UFSI	Uganda Food Security Initiative
UNDA	Uganda National Drug Authority
UNEP	(not spelled out, see p. 64)
URL	Universal Locator Codes (Internet access)
USAID	United States Agency for International Development
USEPA	United States Environmental Protection Agency
UOSPA	Uganda Oilseeds Producers Association
VOCA	Volunteers for Overseas Cooperative Assistance
WHO	World Health Organization
WIS	(not spelled out, see p. 73)
WP	Wetable Powder
WTO	World Trade Organization

Executive Summary

USAID/Uganda's Strategic Objectives 1 (SO 1), "Increasing Rural Household Income," which encompasses the Special Objective on emergency feeding programs, is based on increased production and productivity of non-traditional agricultural exports as well as increased production of basic food crops. In contributing to this objective, USAID/Uganda has supported a number of agricultural production projects. In so doing, USAID recognizes that production must be sustainable and include protection of the environment.

Intensified agricultural production means increased pest problems necessitating enhanced pest management technology leading to possible human and environmental risks. Because of the potential for increased use of pesticides in several agricultural production projects, the present study reviewed these projects, ascertained the extent of pesticide use, and provided a guide to facilitate compliance with regulatory procedures e.g., CFR Regulation 216.3(b), Pesticide Procedures. In all, the team reviewed 13 projects, and the pesticide-related activities, delineated in Reg. 216, that would trigger an Initial Environmental Examination (IEE) were identified. The intent of the Pest Management Team i.e., to facilitate Reg. 216 compliance was explained to project implementers.

To the extent possible, specific pesticides and use practices were identified. These totaled about 75 in the final listing. The list was functionally reduced because of USEPA Restricted Use Requirements and the paucity of registered materials in Uganda. In the latter instance it was noted that only about 200 formulations have been registered thus far in Uganda, compared to a number in excess of 50,000 by USEPA. Clearly, for USAID-supported projects this places a severe constraint on pesticides available for general use without restriction. Perhaps more critical, the unavailability of several selective pesticides and related technologies places severe constraints on the development of Integrated Pest Management strategies.

An in-depth review of Uganda's Pesticide Registration and Enforcement Policies revealed that the registration statute only went into effect in 1994, thus explaining the paucity of available registered compounds. Recommendations are provided that the team hopes will lead to a more accelerated and responsive regulatory process.

Because of the lack of technical experience, many projects defer pesticide use/procurement activity in their IEEs. As referred to above, the Scope of Work (SOW) of the Pesticide Management Team included the development of a procedural guide to assist in the completion of the Initial Environmental Examination. However, the team concluded that the paucity of USEPA General Use pesticides registered in Uganda may require some projects to consider selection of pesticides with restricted use due to mammalian toxicity, or perhaps even materials restricted on the basis of environmental hazard, thus requiring the completion of an Environmental Assessment (EA). The Pesticide Procedures Guide, as proposed herein, is designed to facilitate completion on a step-by-step basis, providing wherever possible standardized information for Ugandan agriculture, and informational resources flexible enough

to accommodate the various project objectives. Where the project objectives can be reached with General Use Pesticides, less detailed information is required in the IEE, and mitigative activities are less stringent. To assist in those cases that may require more detailed information on monitoring and mitigative activities, including training programs, more stringent guidelines are provided. Clearly, the utility of the Guide can only be determined through field use, and the team anticipates that inadequacies of the Guide will be elucidated in trial and corrected where indicated.

The report concludes with a series of recommendations proposed for consideration by USAID that are intended to strengthen the capacity of GOU to improve its pesticide management capabilities through regulatory improvements, Integrated Pest Management research programs, and education and training for extensionists and farmers.

Section I: Report on Pesticide Use by SO 1 Partners and on Uganda's Pesticide Regulatory Status

1. Introduction

1.1 Purpose: USAID assistance activities must comply with Agency pesticide procedures. They should also look beyond compliance to ensure that procurement/use of pesticides is done as cautiously as practicable, with proper safeguards in place, and through the use of the least toxic means of effective pest control. Several projects in the SO 1 realm of responsibility have begun with the pesticide portion of the Initial Environmental Examination being deferred. A three member pesticide assessment team was assembled to complete the tasks detailed in the appended scopes of work and to prepare this report. The purpose of this report is to provide the necessary information to facilitate completion of the deferred examinations in a manner that:

1. ensures compliance with the Agenc's pesticide procedures;
2. ensures compliance with Government of Uganda pesticide registration regulations (including requirements of the National Environmental Management Authority);
3. identifies and recommends appropriate mitigating actions for incorporation into partners' programs and activities;
4. facilitates use of Integrated Pest Management (IPM) with a view toward reducing or avoiding unnecessary pesticide use; and
5. identifies and addresses key issues of Ugandan capacity in the pesticide sector, particularly those having an impact on SO 1 compliance with items number 1 to 4 above.

1.2 The SOW requires the pesticide assessment team to produce:

1. documentation on the specific uses of specific pesticides that will comply with 22 CFR 216.3(b)(1)(i)(a through l) for each SO 1, Title II, or Special Objective project or activity involved in procurement or use of pesticides, including promoting the adoption of particular pesticides and pesticide use technologies through USAID assistance; and
2. mechanisms for partners' capacity building, specifically to include design of a training plan to ensure that procedures required under 22 CFR 216.3(b)(1) are understood by partners and disseminated to those in the field the extension workers and farmers.

1.3 The following SO 1 activities were identified as those that may need to procure and/or use pesticides:

1. Investment in Developing Export Agriculture (IDEA)
2. Post-Harvest Handling and Storage (PHHS)
3. Title II programs: a) ACDI/VOCA, b) Africare, c) Technoserve, d) World Vision, and e) World Food Program
4. Northern Uganda Food Security (NUFS) [includes a) COVOL, b) AAH, c) ATU]
5. The Heifer Project (HPI)
6. Land O' Lakes

NOTE: During its debriefing the team learned that another project, Private Enterprise Support, Training and Organizational Development (PRESTO) may use pesticides for its STIG activity. PRESTO is a four-year initiative to support growth of the private sector in Uganda. In a proposal received for support of growth in the coffee industry, use of two pesticides, Fenitrothion for management of the coffee berry borer and copper hydroxide for control of coffee rust, was proposed. The team did not meet with PRESTO managers, but these two chemicals are discussed in this report.

The team spent approximately four weeks in Uganda interviewing each implementing partner and visiting selected implementation sites. The team assembled a complete list of all pesticides associated directly or indirectly with USAID-funded programs, then evaluated each pesticide for USEPA registration for similar use without restriction, Ugandan registration, and availability in Uganda.

This report presents a brief summary of each SO 1 activity, or group of activities to be addressed in an IEE. There are 12 of these. These summaries, including any pesticides mentioned for possible use, are based on information provided to the team by the implementing partners. The pesticide-relevant issues of each are presented along with activity specific recommendations, if any.

General Comments: Amending an IEE is not a time-consuming or difficult undertaking. Partners should refer to the Agricultural Pesticide Procedures Guide that forms a part of this report. In the amended IEE, Monitoring/Mitigation Measures (including training) should be included for each proposed pesticide use. Appendix II-A of the Agricultural Pesticide Procedures Guide should be consulted for definitions. Appendix II-C provides a list of USEPA restricted use pesticides, which need special attention in the amended IEE. Appendix II-D is a list of pesticides registered in Uganda, of which there are a limited number. If a non-registered pesticide is deemed necessary for adequate crop production, the USAID environmental officer should be approached for assistance.

2. Project Reviews Relative to Regulation 216.3

2.1 IDEA

The IDEA project focuses on increasing income through increased production of non-traditional agricultural exports (NTAEs). Targeted crop sectors include (low value) cereals, beans, and oil crops and (high value) spices and essential oils, cut flowers, vegetables, and fruits. Components related to Regulation 216.3(b) include technical assistance, extension, training, research, and small grants to assist producers to overcome production constraints.

High Value- Crop Sectors:

Cocoa: IDEA works only with small holders in this area. Research is being conducted by the Coffee Research Institute. Pest problems include the Capsid bug and the fungus *Phytophthora*. IPM initiatives are being developed through NARO. Activities include variety testing and horticultural training programs with demonstration sites for pruning, fermentation practices, etc.

Spices and essential oils: These represent low-input commodities with emphasis on dried chili and vanilla. Pesticides are rarely needed or used on chilies, and none is used on vanilla, so this report makes no recommendations.

Flowers: Roses are the most important cut flower export, and there is increasing interest in chrysanthemum cuttings, all grown in greenhouses under plastic. Excellent growing conditions exist in Uganda. IDEA is active in training growers in production practices, including safe pesticide use. European importers require (and inspect for) adherence to an established Code of Production Practices for horticulture, floriculture, and plant cuttings. The code limits what pesticides may be used in production and specifies acceptable residue levels for the approved pesticides.

Rose production is management intensive with routine applications of fungicides and insecticides. An environmental impact review report (Morton et al, 1994) stated that methyl bromide may be used to sterilize the soil. Pesticide requirements are difficult to predict, but four to six applications of Dursban or other material may be needed for control of cutworms, leaf-feeding insects, and thrips. Gramoxone may be used before seedling emergence. Others might include Rovral (iprodione) or copper-based materials for powdery mildew, and nemacur or furadan for nematodes. Pesticides are varied to avoid resistance buildup. Where available, IPM strategies are also used. Bagoora (1996), provided an extensive listing of pesticides used on cut flowers. This list should be compared to the currently supplied listing of pesticides in use.

Vegetables: Morton et al. (1994) noted that pesticide use in vegetables was often excessive and inappropriate. Correct safety advice was not given by suppliers, and protective clothing was rarely, if ever, used. An example of overuse was on mangetout (sugar peas) where sprays of benlate, dithane, or mancozeb were used for powdery mildew, and two applications of metasystox for aphids. Copper oxychloride (Bagoora, 1996) is used for *Ascochyta* (brown spot)

and for powdery mildew. Karate, Salut, and dimethoate are used for aphids and thrips. These are all possible candidate pesticides for IDEA project activities.

The ADC Final Report by Vinlaw Assoc. (1998), lists the following pesticides being used for vegetable insects: Sevin for leafhoppers, thrips, caterpillars, and beetles; chlorpyrifos for most pests, Ambush Super for leafhoppers, thrips, caterpillars, and beetles; diazinon for aphids, leafhoppers, thrips, caterpillars, beetles, and root maggots; dimethoate for aphids, leafhoppers, and thrips; Thionex/Thiodan for aphids, leafhoppers, caterpillars, and beetles; malathion for aphids, leafhoppers, thrips, caterpillars, and beetles.

Fruits: This activity could be associated with environmental impacts arising from the inappropriate use of agrochemicals. However, it was thought that expansion will be modest. It was noted that pesticides are rarely applied for matooke and apple ban.

Low-Value Crop Sectors:

The low-value field crop component of the IDEA project promotes the production and marketing of maize, beans, soybeans, and other selected field crops in several districts. It attempts to achieve these goals by supporting demonstrations (2,200/season, 4,400/year) of increased productivity from enhanced inputs, primarily better varieties and treated seeds, and by transfer of appropriate technologies. The project also supports the creation of private sector input suppliers (stockists) and provides assistance in marketing.

Packages of inputs are assembled at the IDEA headquarters for distribution to the farmers participating in the demonstrations. These packages include improved seeds of maize and beans (usually pesticide treated), planting instructions, seeds for green manure crops, and Bulldock, an insecticide (Beta-cyfluthrin) for stalk borer control. These packages are delivered by a trained extension worker who advises the farmer in proper use of the items in the package. Each extension worker will be responsible for five to seven demonstration sites and will monitor these throughout the season. Currently extension workers are paid according to the number of demonstration sites, but plans are to pay according to the adoption rate.

One way of increasing availability of recommended agricultural inputs is to provide support, in the form of payment guarantees, for stockists. However, since stockists also provide inputs other than those recommended by the IDEA project, it might seem that the project was supporting the availability of those products as well. The project actively provides training in proper pesticide use to the stockists with whom it works, and this, no doubt, provides for improved knowledge being given to the user by the vendor. Because extension workers are poorly paid, the low-value IDEA project is encouraging some of them to become stockists as well. This results in providing a well-informed stockist, but also creates a conflict of interest when the extension worker/stockist needs to recommend a pest management tool. Many times, a non-chemical management tool may be most appropriate, but this may not benefit the vendor in the short-term.

2.2 Post-Harvest Harvesting and Storage Project (PHHS)

The PHHS project divides its initiatives between low-value crops (maize and beans) and high-value crops (vegetables and spices). In the latter instance, emphasis is on solar drying of fruit, vegetables, and ginger.

The primary stored product pesticide used is Actellic-Super (pririmiphos-methyl+permethrin). Actellic was adequate until the appearance of the Larger African Grain Borer. Malathion dust is also occasionally used. For commercial scale fumigation, various formulations of aluminum phosphide are required. For purposes of open structure treatments (beyond the draped grain materials) fenitrothion, vapona, or dimethoate might be used. The project also works with locally available botanicals such as *Tephrosia* and Mexican marigold, as well as Neem.

A non-chemical method, solar heating, followed by bagging in pest-exclusive bags is used for weevil control. Bean weevil damage can also be reduced by sieving loose eggs five times at weekly intervals. This is a time-consuming and unpopular method, however. Also effective is placing the beans in bags and turning the bags at least daily for at least two weeks post-harvest. Bruchid problems start in the field, and their solution should start with field management of the pest....bean weevil attacks pods at filling, so it thus becomes essential to dry the pod well before storage. This results in the beetle's death.

The project started in 1996 and has a five-year duration. The project involves about a 50-50 split between research (exempt from pesticide IEE) and extension-outreach of results.

Title II Projects

2.3 ACDI/VOCA, PL480 Title II Monetization Program

Poverty and food insecurity continue to characterize the daily lives of over 50 percent of the population of Uganda. Eighty percent of Ugandans are engaged in agriculture with productivity varying between 13 and 33 percent of yields achieved on research stations. These low yields are due to use of unimproved seeds, poor input distribution, inappropriate crop husbandry methods, etc. Among the program's several goals is improved agricultural production of target crops (maize, beans, cassava, and oilseeds) by small farmers. CARE is among the sub-grantees of ACDI/VOCA in Uganda.

The program provides support for increased production of selected crops by funding such activities as training in agricultural production, marketing, and processing to small farmers; setting up and managing demonstration plots; and agricultural extension services. Some grantees are involved in pesticide and IPM training and pesticide use and procurement.

The ACDI-VOCA has prepared an Environmental Compliance Document, that notes that the most significant potential environmental and health impact of the production activities would result from the unsafe use of pesticides. Both small- and large-scale farmers typically lack

training in the safe storage, use, and disposal of pesticides. Recognition of these threats is the first positive step in developing mitigating activities. Further, the Environmental Compliance Document recorded that grantees occasionally recommend the procurement and use of pesticides as a last resort, in an IPM context, and for a specific use. The majority of these pesticides are procured by the beneficiary farmers and applied with supervision of grantee extension agents. Only in very limited circumstances are program funds used to procure pesticides. ACIDI-VOCA plans to further expand the IPM program and pesticide use procedures in an amended IEE.

To assist NGOs (grantees) the program has three technical partners: the IDEA project for maize and beans USOPA for oilseeds and IITA for cassava. The cassava program emphasizes promotion of improved varieties. Primary use of pesticides involved the application of the herbicide glyphosate (Roundup) to suppress initial weed growth in the multiplication plots at the NARO station in Namulonge. Farmers hand weed until the canopy suppresses future weed growth. A frequent problem in cassava plantings involves attack of the planting “stakes” by termites. If notified of termite attacks, IITA sends trained experts to apply Ambush (lambda cyhalothrin) to suppress damage. Biological control is used on the cassava mealybug and green mite. Further, a virulent strain of cassava mosaic is spreading rapidly, but early resistant varieties of cassava developed at IITA continue to provide protection. Bacterial blight remains a problem.

USOPA is involved in seed multiplication and oil production. In seed multiplication plots, fenitrothion is recommended for aphid control while dimecron is used for leaf feeders. Farmers do not currently use pesticides. Cultural strategies including hand weeding, rotation, early planting, and rogueing are used. Where termites are a problem, Ambush is applied. While some farmers use lindane, it is against the advice of project extension workers. For post-harvest protection of the seed, phostoxin is used in the project storage centers. Farmers are using actellic dust, as well as products of natural origin such as neem and marigolds, to control storage pests such as *Tribolium* and Indian mealy moth. Sunflower suffers from root rot, but this is associated with nematode populations that build up in potato fields that are then used for subsequent sunflower planting.

Grantees in the maize/beans sector depend on protection technology provided by the IDEA project. IDEA is closely involved with ACIDI and usually reviews proposals for harmonization with IDEA production recommendations. ACIDI activities are widespread in Uganda and more difficult to monitor than more geographically limited activities. Possible project pesticide recommendations include: glyphosate, chlorpyrifos (dursban), benylate, dimethoate, Kocide, 2,4,-D, carbosulfan (Marshall), cuprous oxide, and ridomil (metalaxyl).

Of particular interest to ACIDI is IPM and safe pesticide use training of grantee project managers and extension workers.

2.4 AFRICARE: Uganda Food Security Initiative (UFSI)

This Title II (PL480) Program was initiated in 1997 with a duration of five years, and is located in Kabale District in Southwest Uganda.

The UFSI has four initiatives:

1. Agricultural Production and Post -Harvest Handling
2. Rural Road Construction
3. Nutritional Education Involving Women and Children
4. Soil Erosion and Soil Preparation and Improvement

Clearly, initiative 1, involving crop production and post-harvest issues, is the only initiative potentially involving pesticide use and the triggering of Regulation 216.3 (b), Pesticide Procedures. The project will involve production of planting materials for Irish potatoes, sweet potatoes, climbing beans, other beans, and maize on a communal farm for release to cooperating villages. Presently 105 villages are targeted. Pesticides are not and will not be provided by the Project. However, increased production of potatoes and beans makes it likely that use of pesticide-treated seeds and use of fungicides will increase. Pesticides are used for seed protection; to control weevils and millipedes on sweet potato, for management of root rot; root maggot and aphids on bean; and for control of early blight and late blight on Irish potatoes. Further, it is likely that the “post-harvest” handling portion of Initiative 1 will also lead to some post-harvest treatments. In this regard, the project is interacting with the Kawanda post-harvest research program, as well as ICRAF, NARO, etc.

Pesticides commonly used on crops by farmers in Kabale District, according to project implementers, are listed below with the active ingredients in parentheses. While these pesticides are not provided by the project, the goals of the project increase the likelihood that they will be used or used more often. A statement relating to plans for training to mitigate potential hazards from this increased pesticide use should be included in the IEE.

Acrobat Mz	(dimethomorph)
Dithane M45	(mancozeb)
Ridomil Mz 63.5	(mancozeb, metalaxyl)
Ambush Super	(lambda cyhalothrin)
*Actellic 1%	(pirimiphos-methyl)
*Diazinon 60%	(diazinon)
Dursban 4E	(chlorpyrifos ethyl)
Tafgor 40EC	(dimethoate)
Sumithion 50EC	(fenitrothion)
Antracol 70 WP	(propineb)
Ripcord 5% E.C.	(Cypermethrin)
Benlate	(Benomyl)
* <i>Tagetes minuta</i>	(Mexican marigold)-a plant used by farmers as a repellent, in stored potatoes against Potato Tuber Moth. It is put on top of the seed potato heaps after flowering.

*Not registered for use in Uganda (except Actellic Super)

2.5 TECHNOSERVE Inc.: Building Rural Income through Enterprise (BRITE)

This Title II, five-year, monetization program will operate in the Apac, Arua, and Nebbi Districts in northern Uganda. The overall goal is to improve household food security in these selected districts. This will be accomplished through:

1. increased household income from produce sales through reduced post-harvest losses and improved quality, storage, marketing efficiency, transparency, and sales negotiations;
2. increased production and productivity through improved technology; and.
3. expanded availability and use of credit to support crop storage, marketing, and supply of production inputs.

The implementation procedures are the same as those employed in the IDEA project, but in areas not reached by IDEA. Each demonstration package will be provided along with a trained coordinator who will supervise the implementation and will monitor the process at five to seven sites. There are six proposed activities, the first of which began in February 1999. Activities 3–6 should be addressed in the pesticide IEE.

1. Selection and Planning—selecting crops, participants, conducting baseline surveys, and establishing guarantee funds with local banks.
2. Organization and Management—training participants in organization and leadership, business and financial management, and credit use and administration. Confirming credit needs and preparing loan requests.
3. Improve Marketing—linking existing marketing systems; training in post-harvest handling, selection, grading, and storage; establishing produce trading companies with bridge funding if necessary; disbursing inventory credits. Possible pesticide use in post-harvest crop protection of beans, but not likely in maize. The pesticides proposed for use must be identified and must comply with USAID pesticide procedures.
4. Increase Agricultural Productivity—Conducting field trials and demonstration field days to promote the performance of selected crops using environmentally sound, improved management techniques with varying input levels; providing improved seed and practices with and without fertilizer; initiating seed multiplication sites; and training of stockists in correct use and storage of inputs, which may include pesticides. The project will provide pesticide-treated seeds and facilitate availability of necessary pesticide inputs.

5. Crop Promotion—identifying and introducing additional moderate- to high-value crops with market potential (probably sesame and peppers). Some pesticide inputs may also be necessary for these crops; if so, an amended IEE will be required.
6. Monitoring and Evaluation—continuous as well as mid-term and final evaluations. The IEE should confirm that monitoring of pesticide-related activities will be included in these evaluations.

2.6 WORLD VISION, Food Security in the Horn of Africa: Northern Uganda

This proposal plans to use the proceeds from Monetization of 2,400 MT of hard red winter wheat to achieve the following three objectives:

1. Increasing production of traditional crops and introduction of non-traditional cash crops to IDPs and the local population through promotion of new crops, multiplication and dissemination of improved seeds, sustained provision of agricultural inputs, and demonstration and extension of improved farming technologies (including better storage practices).
2. Increasing access to markets via enhancing marketing systems for non-traditional cash crops through multiplication and sustained dissemination of high-yielding seed varieties, demonstration and extension of improved practices, distribution of market information, and organizing farmer cooperative associations at the sub-district (county) level.
3. Enhancing the capacity of African organizations to manage the transition from relief to development, including improved abilities to create formal organizations that ensure a steady food supply and market outlets for their products.

The proposal states that farmers in the region often have difficulty smoothing family income and food flows over the year due to a number of related factors, including poor storage technologies; poor agricultural terms of trade; lack of access to credit; weak organizational capacities for accessing improved inputs and marketing; and generally low production and incomes.

A wide range of crops can be grown in the region, including rice, millet, sorghum, maize, beans, groundnuts, and pigeon peas. Cash crops include cotton, tobacco, rice, sunflower, and sesame, while maize and beans have the potential to become significant “low-value” cash crops.

World Vision proposes to integrate development with relief assistance, a key feature of which is provision of critical supplies of agricultural tools and adapted varieties of seeds to families that return to their places of origin after a disaster. Such circumstances also favor the introduction of improved approaches to agricultural development.

World Vision will also promote increased production of beans, for their protein contribution to the diet and commercial potential, as well as improved mosaic-resistant cassava, as a famine food.

An intensive review of grain storage systems will be conducted by the project so that improvements can be introduced.

During the first year of this program (this is the second year), termites and cutworms attacked beans and maize crops. The project has been working with the IDEA project to identify pesticides that are EPA-approved. This information should be obtained from the USAID environmental officer or from EPA directly. Pesticide use and chemical crop protection methods are considered secondary to natural crop protection techniques whenever possible. According to the project implementers, extension agents regularly teach IPM. When chemical crop protection is necessary, World Vision told the team that it would remove itself from the actual handling of pesticides and emphasize extension training for farmers in proper handling and use of the chemicals. This “hands-off” reaction is not what is desired by USAID. Safer use of needed pesticides is more likely if implementers devise effective monitoring/mitigation measures.

Chemicals used on maize, beans, and groundnuts are Dursban, Nurelle solution, Dimethoate, Malathion dust (2 percent), Aluminium Phosphide tablets, and Cupric oxide powder (seed dressing).

World Vision’s extension staff, after being trained further in crop quality control techniques, will train representatives of the farmers’ cooperatives in moisture testing, and in assessment of other indicators of crop quality, such as insect infestation, color, and presence of defective and damaged grains.

2.7 World Food Program

Because of the emergency nature of the World Food Program activities, the IEE was deferred. However, this program is not exempt from environmental review and sound implementation. (WFP has its own Environmental Guidelines (1999), modeled in part after USAID’s.) The ASPPG team was told that the only use of pesticides in the World Food Program is for fumigation of commodities in storage. When needed, a local, professional fumigator is contracted with to do the work. Because they are professional, no oversight is conducted. This exclusive use of professional applicators, and any other monitoring/mitigation measures, needs to be described in the environmental documentation.

2.8 AAH, Northern Uganda Food Security (NUFS), Moyo Food and Income Security Program

The overall goal to which the 1999, NUFSS operations will contribute is, improved standard of living of the people of the Moyo District. The overall purpose is to establish structures and systems to ensure improved food and income security. Results will include:

increased production, and improved marketing; construction/rehabilitation of necessary facilities; community mobilization, involvement, and contribution; adequate human resources development; and adequate planning and management.

Of the above, clearly the most relevant activity to Regulation 216.3(b), Pesticide Procedures, is that of improved production. In relation to improved crop production, the strategy includes training in better methods of crop management. Demonstrations in integrated farming methods will be established. Necessary inputs provided will include new crop varieties and seed multiplication. Among tools to be provided for the latter are selected fungicides. Possible pesticides will include Dithane M45 and mancozeb for tomatoes, Rogor for aphid (vectors of Rosette virus) control on groundnuts, and Suscon or Marshall for termite control on woodlot establishment. Neem extracts may be proposed for various purposes. Non-pesticide activities include the planting of nitrogen-fixing trees— i.e., Callandra (like *Lucaena*)—and the use of commercial fertilizers. New introductions to northern Uganda include pineapple, cassava, passion fruit, improved bean varieties, groundnuts, and sorghum. All are from the southern station. Clearly, the use of seeds here will require seed-protection chemicals, and the implementers welcome suggestions for appropriate pesticides.

Post-harvest handling is a further area of emphasis within the project. The plan is to establish demonstrations of recommended home-based storage facilities. The use of pesticides for post-harvest protection is under consideration.

Improved animal production is also of interest with regard to Regulation 216. As with crops, training is required for better methods of animal management, with emphasis on participatory training. Lack of a clear workplan has been a problem, so future efforts will be more directed and the implementers expect to be able to show progress within six months. Inputs are expected to be minimal, and emphasis will be more on demonstration. Agrochemicals are not generally available, but it is anticipated that they will be introduced as the need is indicated. With respect to control of vectors, facilities for spraying of animals will be provided. Equipment will include spray pumps to be provided to two individuals per parish. Acaricides will be provided for one year. Acaricides will be provided on credit to farmers with the improved animal breeds to ensure that the animals do not die of common diseases.

Tsetse traps are available, and specialized approaches are required for ticks, the vectors of East Coast Disease. Vector controls include Baytical, which is topically applied for the control of ticks. Other possible products include Renegade and Blitz. Both are products from the Union of South Africa. Drugs are used for disease control and do not come under the purview of Reg. 216.

References: Operational Plan. Food and Income Security Program. Moyo District. North Western Uganda. January/December 1999.

Baseline Survey Report. Moyo Food Security Project. August 1998.

2.9 COVOL: Northern Uganda Food Security Project (NUFS)

The Cooperative Office for Voluntary Organizations of Uganda is a U.S.-based non-profit voluntary organization, founded by a small group of friends in 1987 as a means of facilitating the efforts of Ugandan non-government organizations (NGOs). Since 1988, COVOL has been working in full partnership with Ugandan community-based organizations involved in agricultural development and environmental conservation. Most COVOL collaborative micro-projects involve small-holder farmers and the interactions between low external input agriculture and the local environment.

In its projects, COVOL encourages more intensive and sustainable farming through the introduction and extension of basic technological and procedural innovations.

Funded by USAID, COVOL implements the *dero* project (*dero* is a local term for granary), which buys surplus commodities from local farmers at harvest, stores them until the “hungry season,” and then sells them at prevailing market prices. The project tries to avoid buying from, or selling to, traders, preferring to deal with individual households. Currently, about 25 tons of commodities are in storage.

The project is not active in production areas, so pesticide use is limited to storage of commodities until sale. Two pesticides are used: Malathion dust, which is mixed with the commodity before it is placed in the polyethylene storage bag, and phosgene, used as a fumigant.

Consumers are told to wash off the malathion dust (probably all degraded after three months of storage) before cooking the commodity. The phosgene is applied by a COVOL staff member, who is trained in proper methodology by a Swiss organization, Societe Generale Surveillance.

While not recommended or applied by COVOL, two natural compounds are used to protect stored crops in the area. These are red pepper and *Hyptis spicigera*, a bushmint flower that is also hung in homes to repel mosquitoes.

2.10 Appropriate Technology Uganda (ATU)

Projects:

Sustainable Agriculture and Food Based Enterprises (SAFE)

The Farmer to Farmer Project (FFP)

The SAFE Project is a Northern Uganda Food Security (NUFS) activity funded by USAID, while the Farmer to Farmer Project (FFP) is a PL480-supported undertaking. SAFE operates in Kitgum and Gulu districts, and FFP operates in Masindi, Lira, Apac, Soroti, and Katakwi districts.

The SAFE Project emphasizes increased agricultural production and will involve multiplication of mosaic-resistant varieties of cassava. In an IPM context, cassava can be

intercropped with beans, groundnuts, and/or sunflower to manage pests and maximize yields. Pesticide-treated seeds will be supplied where needed in insecure areas. Both of these measures need to be considered in the amended IEE.

The Farmer to Farmer Project has three components that may require a Regulation 216.3(b) review. Increased production of crops, such as maize, beans, cassava and oilseeds, is achieved through collaboration with District-level extension staff via trials and demonstrations of improved varieties; production practices; enhanced access to improved agricultural inputs; and reduced losses through improved post-harvest handling. Enhanced access to improved agricultural inputs is achieved through a network of 90 private sector inputs suppliers (stockists). Reduced losses through improved post-harvest handling will be achieved by working in collaboration with the Kawanda post-harvest unit. Extension staff will be trained in improved post-harvest handling techniques and construction of improved granaries.

ATU will work with IDEA on maize/bean commodities; with USOPA on sunflowers; with AAH/NUFS on groundnuts; and with IITA on cassava. Pesticides will be marketed through stockists. The projects will work with IDEA particularly in reference to safe use practices. In fact, the project recently finished a safe use program using IDEA trainees. They have also used the Global Crop Protection Federation (GCPF, formerly GIFAP) training manuals. Specific pesticides to be recommended by the project have not yet been selected, but actellic, a fungicide, will likely be selected for control of rots on sunflower, and an insecticide will be made available for aphid control (to reduce transmission of Rossette virus to groundnuts).

2.11 HEIFER PROJECT: Strengthening Food Security and Environmental Protection through Livestock Development in Uganda

Activity Goal: To strengthen food security, promote environmental protection, increase rural household income, and preserve indigenous breeds (active in 16 districts of Uganda). The objectives of this activity are to:

- provide 600 in-calf heifers to 600 prepared farm families over the three-year period;
- train communities in zero-grazing, environmental protection, soil and water conservation, soil fertility maintenance, and integrated farming practices;
- preserve the germplasm of the Ankole cattle in selected areas of Mpigi and Mbarara districts;
- improve artificial insemination services by making available quality semen and equipment from the U.S.;
- construct 50 bio-gas plants for cooking and lighting using methane gas from animal waste for 50 households;

- provide 150 heifers to 150 new small-scale farmers (payback scheme from original 600 heifers) in the third year of the program; and
- promote linkages and collaboration with other institutions and NGOs.

The sustainability of this activity is achieved mainly through capacity building training and through the passing on of the first female calf by each beneficiary to another needy family. These heifers are maintained under “zero-grazing” conditions—that is, they are kept in a shelter with an attached, fenced, exercise area. All food is brought to them. Training/instruction is given with each heifer. The project also supplies dairy goats (one per family) under similar conditions, and the Heifer Project also gives farmers hives for wild bees.

Tick control: Weekly pour-on of Renegade (alpha-cypermethrin). Renegade is purchased by the project, then sold to the farmer—i.e., a revolving fund. Renegade is used because it is cheaper than a common alternative, Bayticol, plus it controls flies. The pour-on feature is important and is used at a rate of 15 ml/100 kg. Mean weight of heifers is 250–500 kg. Farmers have noted ticks, which can transmit Heartwater disease, on the imported goats. Only the exotic strains of goats are treated, as local strains are more resistant.

2.12 LAND O’ LAKES: Uganda Dairy Development Programme

Land O’ Lakes is a major private agricultural co-operative in the U.S. It implements formation of co-operatives in developing countries through its Co-operative Development Program (CDP). With funding from USAID, it began work in the development of Uganda’s private dairy sector in October 1994. The goals of the program are to:

1. increase food security and household incomes via broad-based economic development;
2. improve the health standards of Ugandans; and
3. promote the growth of the Ugandan dairy sector from a level that is currently below self-sufficiency to one that can begin to meet local demands and export to regional markets.

The major goal of the Land O’ Lakes CDP is to promote economic growth through the development and strengthening of financially viable agri-business co-operatives. About 65 such co-operatives are in operation with about 60 members each. These co-operatives use their buying power to get favorable prices on necessary inputs such as acaricides, antibiotics, etc. Although nothing has been finalized, the Kampala headquarters of Land O’ Lakes is expecting to form a link with Monsanto to provide fertilizers, pesticides, and acaricides. Herbicides are used by some of the farmers, but are not part of the Land O’ Lakes program.

Acaricides are recommended because participant farmers have been provided with high-milk-producing, hybrid cows that have little or no resistance to tick-transmitted diseases such as East Coast Fever. The project decides which acaricide to recommend based on advice from the Ugandan Ministry of Agriculture. Farmers are advised by Land O' Lakes to use only acaricides accepted by the National Drug Authority (unlike other pesticides approved by the National Pesticide Board, acaricides are treated as a veterinary drug and approved by the National Drug Authority); that have not expired (should check on the date of manufacture and expiration); that were bought from a recognized farm shop (the farmer should get a receipt); that have directions for its use; and that are safe for both the animal and the farmer.

Second, farmers are advised by the CDP to select an acaricide keeping in mind the following points:

1. Cost (consider productiveness of cow)
2. Effectiveness and concentration
3. Spectrum of activity
4. Length of residual effect
5. Frequency of application
6. Mode of application

Table 1. Available Acaricides

Acaricide	Active Ingredient	Quantities/pack	Comments
Tsetse Tick	Cypermethrin 100g/l, EC for dilution as a spray or dip	250ml packs and 1 liter packs	
Tsetse Tick pour on	Deltamethrin 10g/l	250mls packs	
Decatix	Deltamethrin 5% weight per volume. For dilution in water	200mls packs and 1 liter packs	Kills ticks and flies. One week residual.
Renegade	Alphacypermethrin 50g/l	¼ l packs and 1 liter packs	
Supona extra	EC, 100g/l Chlorfenuiniphos	¼ l packs	No residual. Costs less but more frequent application required. Does not kill flies.
Spoton	EC 1% Deltamethrin		Pour on. Kills ticks and flies
Bayticol	EC 6% flumethrin		Pour on
Tactic	EC 12.5% amitraz		Spray
Milbitraz	EC 12.5% Amitraz		Four-week residual. Spray or pour on.

2.13 VOCA: Partnership for Enhanced Productivity (PEP)

Although it is not an activity of the type requiring an IEE, the team also visited the VOCA Farmer to Farmer program and its ancillary activity, the Partnership for Enhanced Productivity (PEP). This Farmer to Farmer activity is a centrally funded program to provide technical assistance to development projects. The PEP is a USAID/Kampala-funded project to provide short-term technical assistance to SO 1 projects in Uganda. PEP volunteers are recruited in the U.S. based on Scopes of Work developed by VOCA/Uganda and the project requesting the assistance. These SOWs, as well as those similarly developed for the centrally funded Farmer to Farmer program, are evaluated by USAID/Kampala's SO 1 Team Leader and, if approved, forwarded to VOCA offices in the U.S. (California in Uganda's case) for approval and recruitment of a qualified volunteer. The volunteer's CV is sent to Uganda and evaluated by VOCA, the requesting project, and the SO 1 Team Leader who gives the final go ahead to bring the volunteer to Uganda. The PEP provides three volunteers/year to the Post Harvest project; two per year to the IDEA project; six over four years to the FEWS project; and two per year to the Land O' Lakes Dairy project.

In some cases the volunteer does provide pesticide-related input. In fact, the IDEA publication (in preparation) titled, "Quick Reference Guide to Crop Chemicals," was written by VOCA PEP volunteer Ben Hatfield. VOCA volunteers should be briefed so that they will comply with the requesting project's IEE. An IEE by the PEP project would be impractical because the technical assistance to be required cannot be predicted. Further, all SOWs are reviewed and approved by the SO 1 team leader, and any required amendments to the requesting project's IEE would be noted during that review.

3. Uganda Pesticide Regulatory and Environmental Management Capabilities

3.1 Pesticide Regulatory Status

The laws and regulations that govern agricultural chemical (including pesticides) manufacture, importation, distribution and storage have been evolving in Uganda. Until 1970, pesticides were regulated by the Control of Pesticides Act of the East African Community. During that period, there was no formal registration of pesticides, and pesticides were only recommended for crops, through an Agricultural Handbook. In 1970, the Pharmacy and Drug Act was enacted in Uganda, but this also did not establish a system for registration, regulation, and enforcement of pesticide use and distribution practices in the country. It was not until 1989 that an Agricultural Chemicals Statute came into effect that began to address these issues.

The manufacture, storage, distribution, trade, importation, and exportation of pesticides in Uganda are now controlled by the Agricultural Chemicals Statute (ACS) Number 8 of 1989 and by Statutory Instrument Supplement No. 23 of the Agricultural Chemical (Registration and Control) Regulations of 1993 (ACR). These statutes established the Agricultural Chemicals Board consisting of 13 members (see box). The functions of the Board are to ensure that agricultural chemicals are duly registered in the country and are used in a manner consistent with

the rules made by the state. It is also responsible for regulation of agricultural chemicals imports and advises the government on matters related to enforcement of provisions of the statute. The statute further empowers the agricultural chemical Board to appoint an Agricultural Chemicals Technical Committee (ACTC) to advise the board on the technicalities of agricultural chemicals. This committee is responsible for receiving applications for registration of pesticides, technical analysis, and verification of the efficacy of agricultural chemicals. The Agricultural Chemical Board and its technical committee fall under the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF).

Since the establishment of the Uganda National Drug Authority (UNDA) in 1994, which is responsible for registration and regulation of veterinary and human drugs, registration of acaricides was transferred from ACB to UNDA. This has caused some overlap in that some acaricides are also used on crops. At times it is not clear who is responsible for such acaricides.

3.1.1 Distribution

The regulations, among others, clearly spell out that:

- | | |
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| <ol style="list-style-type: none"> 1. No pesticide—whether imported or manufactured in Uganda—shall be used, stored, distributed, or dealt in unless it is duly registered in accordance with rules and regulations of the Agricultural Chemicals Statute. 2. No person by way of business shall deal in pesticides unless the same is registered as a fumigator or commercial applicator with a certificate from the Agricultural Chemicals Board (ABC). 3. Any premise used in dealing in pesticides must be appropriate and registered by the Agricultural Chemicals Board as indicated in the statutory instrument of 1993. 4. Any person employed in the manufacturing, formulating, packaging and applying of pesticides shall have his/her health monitored, and be well protected with the appropriate equipment and safe practices. | <p>Composition of Agricultural Chemicals Board</p> <ul style="list-style-type: none"> Commissioner of Plant Protection Head of agricultural research system Dean of the Faculty of Agriculture and Forestry, Makerere University Dean of Veterinary Medicine, Makerere University Chairman of the Agricultural Chemicals Technical Committee An Advocate Agricultural chemicals industry representative Farmers' representative Government chemist Commissioner for Veterinary Services Chief Forestry Officer Commissioner of Medical Services Representative of the National Bureau of Standards Representative of the National Environmental Management Authority |
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For a pesticide to be registered:

- It must undergo official screening and testing to prove that it is effective, safe, and not a danger to public health.

- It must be assessed by the Agricultural Chemical Control Technical Committee for active ingredient purity, and for toxicological, public health and environment acceptability.
- The ACB is responsible for appointing a researcher to test the candidate pesticide following specific standards and guidelines. The guidelines are currently under review to conform to international standards.
- A fee of Uganda Shillings two million (2,000,000/=) shall be paid by the registrant (pesticide manufacturer, reformulator, re-packager, re-seller, etc.) to cover the cost of testing and temporary registration.
- The new pesticide shall be tested for a minimum of three crop-growing seasons in different locations in Uganda, to cover the appropriate agroecological zones.
- Approval shall be granted or denied to a pesticide within six months from the end of the period required for testing. Pesticides are registered on the basis of their efficacy.
- The company submitting the pesticide shall provide all technical information necessary to guide the testing process—that is, toxicity to humans and the environment, the toxicity index (LD₅₀), Maximum Residue Limits [MRLs] and tolerance levels, and any other relevant information.
- A pesticide is (duly) registered on payment of (an additional) fee of Uganda Shillings 500,000/=.

To register as a fumigator and/or commercial applicator, a person must:

- Submit certified copies of relevant documents regarding the technical knowledge of the applicant.
- Pay a fee of Uganda Shillings 500,000/= only for a certificate of registration that remains valid until suspended or canceled.
- A tested pesticide shall be recommended for the control of specific pests on all host crops rather than for specific crops.

To register a premise as a pesticide seller or related business:

- An application on Form F is submitted to the ACB by the applicant.
- The pesticide business, in relation to the premise, must be under immediate supervision of a registered fumigator or commercial applicator.

- A fee of Uganda Shillings 500,000/= is paid to the ACB for a certificate of registration.
- Registration is for a period of five years, after which a new application must be made.

Registration may be canceled by the ACB if any of the provisions of the Agricultural Chemicals Statute are contravened.

3.1.2 Storage, Labeling, Packaging, and Transportation

- The agricultural chemicals regulation statutory instruments give clear details of how storage, labeling, packaging, and transportation of pesticides ought to be carried out safely. For example it stipulates, among other things, that:
- No pesticide shall be imported, distributed, sold, or used without a label; and that such a label should conform to FAO standards.
- There shall be no removal or alteration of the pesticide labels.
- Packaging and re-packaging shall be carried out on premises registered by the ACB.
- Every manufacturer or distributor of a pesticide shall provide a range of packaging sizes that can be used safely and appropriately by small-scale farmers and other users in Uganda.
- Premises on which pesticides are stored shall be a separate building strictly for purpose of storage of agricultural chemical and shall comply with specified requirement of the statute.
- Pesticide stores and shops shall not be used for sitting or sleeping.
- Food, feeds, and drinking water shall not be kept in pesticide premises, and premises shall not be used as sleeping places for human beings and livestock animals.
- There shall be sufficient space for storing empty containers, damaged containers, spills of pesticide, and out-of-date stocks awaiting disposal.

3.1.3 Use and Disposal of Pesticides

The Agricultural Chemicals Statute gives adequate guidelines and rules on how pesticides should be used, the precautions that should be taken (before, during, and) after application, and how pesticides should be disposed of. For example it indicates that:

- Protective clothing shall be worn whenever applying pesticides.

- Recommended applicators shall be used to apply pesticides.
- Pesticides shall be used in such way as to safeguard the environment.
- Pesticides shall not be disposed into open waters or any waterway.
- Any pesticide that expires before use shall be disposed of by professional handlers, and expired material must be reported to the Board.
- Monitoring of pesticides shall be mandatory by agents of manufacturers and distributors concerned to assess the impact on the environment.
- Pesticides shall be used only when they cannot be avoided.
- Indiscriminate use of pesticides is prohibited.
- Pesticides least damaging to the environment shall be encouraged.

3.2 Role of the National Environment Management Authority (NEMA) in Pesticide Management

A comprehensive National Environment Management Policy (NEMP) was established in 1994 and covers various sectors of the economy. Several sectoral objectives affect pesticide management. For example, the policy seeks to conserve, preserve, and restore ecosystems and maintain ecological processes and life support systems, especially conservation of national biological diversity. More specifically, the aspects of pesticides are considered under the sectoral policy objective on control of pollution and management of domestic and industrial waste and hazardous materials. Besides giving guidelines on how various sectors of the economy should manage the environment, the NEMP (1994) and the National Environment Statute (1995) empower the National Environment Management Authority (NEMA) to be the principal agency in Uganda for management of the environment, and to co-ordinate, monitor, and supervise all activities in the field of the environment. As far as management of chemicals is concerned, it is stipulated that NEMA shall promote:

- Training and encouragement of farmers and extension workers in the safe use of agro-chemicals.
- Preparing environmental guidelines/legislation for management of hazardous chemicals installations.

Furthermore, the policy recommends conducting of Environmental Impact Assessments (EIAs) for all development activities and land use practices, so that adverse environmental impacts can be foreseen and eliminated or mitigated.

The functions of the Authority, among others, are to:

- Liaison with the private sector, inter-governmental organizations, non-governmental organizations, and governmental agencies of other states on issues related to environment.
- Review and approve environmental impact assessments and environment impact statements submitted in accordance with the law.
- Ensure observance of proper safeguards in the planning and execution of all development projects.

On the issue of management of toxic and hazardous chemicals (including pesticides) and materials, the National Environment Statute stipulates that NEMA shall consult the ACB in providing guidelines and measures on:

- Registration, labeling, packaging, advertising, distribution, storage, transportation, and handling of pesticides.
- Monitoring of the effects of chemicals and their residues on human health and the environment.
- Disposal of expired and surplus chemicals.
- Restricting and banning of extremely toxic and hazardous chemicals and materials.

3.3 Challenges Facing Pesticide Registration and Management in Uganda

Importation and distribution of pesticides and other agricultural inputs used to be conducted by the Government of Uganda and its parastatals, which had proper procedures for safe handling and distribution of pesticides. Under the privatization drive, however, the government has withdrawn from this role and removed subsidies on inputs. Even in cases where bilateral aid involves inputs (including pesticides), as in the case of KR-2, an agricultural commodities donation program by Japan, the GOU is merely playing a coordinating role, linking the private sector with donor agents and sources of pesticides, and ensuring that the right chemicals are imported.

3.4 Private Sector Participation in Inputs Marketing

Meltzer et al. (1994) argued that private importers and distributors, in the absence of a marketing infrastructure, would react cautiously to the privatization of pesticide marketing and distribution. The authors also speculated that pesticide prices would continue to rise, and given the insufficiency of distribution channels and farmers' limited purchasing power, the availability and consumption of pesticides would be constrained for at least three to five years. This period was characterized as a "window of opportunity" for the government and donors to address the dampening impact the removal of subsidies would have on demand, in changing the system of supplying pesticides to a private sector-driven one.

One response by the GOU was the removal of the import tax on agricultural chemicals, which has brought pesticides back within the purchasing power of more producers. Likewise, the economy has picked up significantly in the past five years. Thus, the private sector appears to have remained more active than was expected. The number of pesticide shops and dealers in Kampala and in up-country towns either remained constant or increased, suggesting that consumption of pesticides is still substantial or growing, despite withdrawal of Government subsidies and involvement. Due to a rapidly growing population and the need to increase food production, the demand for pesticides is likely to persist and even increase. This is being indirectly supported by agricultural development projects like IDEA, which is supporting the so-called input stockists (pesticide sellers) program in many parts of the country with the assistance of SG 2000. Similarly, via the KR-2, activity (donations by Japan, in a counterpart fund) is apparently providing grants for inputs to be accessed by farmers through private stockists. While the private sector may be beginning to fill the vacuum left by government withdrawal from supplying inputs, privatization has highlighted other issues of distribution and safe handling of pesticides by the private sector. A number of stockists, particularly up-country, are not registered, have inadequate premises for pesticide handling, and are not aware of the dangers of dealing in pesticides.

This situation requires full enforcement of existing regulations on distribution, storage, use, and disposal of pesticides by private dealers. It was in an attempt to address these issues that both the Agricultural Chemicals Board and agricultural chemicals regulations were put in place.

As observed by Meltzer et al. (1994), Uganda has good environmental management and pesticide regulations, which, if properly interpreted and enforced would ensure safer use of pesticides and minimize pollution of the environment.

3.5 Current Status of Implementation of the ACS

Since the establishment of the Agricultural Chemicals Board in the Ministry of Agriculture, Animal Industry and Fisheries, there has been improvement in regulation of importation, storage, distribution, and safe use of pesticides. Some of the improvements include:

- A list of registered pesticides. Currently there are 190 tradenames of pesticides registered in Uganda. The list is likely to increase as more pesticides are registered. This list is likely to play a significant role in policing, leading to withdrawal of unregistered, substandard, and unsafe pesticides from the market.
- Registration of pesticide dealers is steadily increasing.
- Most of the pesticide premises have been registered, resulting in increased numbers of dealers selling only agricultural chemicals.
- Several training seminars and workshops on safe pesticide use have been conducted for pesticide dealers and agriculture extension officers.

- Radio and television programs to be aired on pesticide safety awareness are being developed by the Plant Protection Division of the Ministry of Agriculture Animal Industry and Fisheries in collaboration with NEMA.

3.6 Constraints in Implementation

There are, however, many constraints in implementing the pesticides and environmental management regulations and policies.

3.6.1 Lack of Monitoring, Enforcement and/or Policing Mechanisms

Although pesticide regulations are in place, they are not being properly enforced. While it is illegal to sell unregistered pesticides, some pesticides are being sold without an ACB registration. Examples include: malathion, diazinon, Rogor, and sulfur. Similarly, there are cases of pesticides being re-packaged, and sold in smaller amounts without any, or at least proper, labels. It is also uncommon to find pesticide premises in a separate building, as stipulated in the rules. It is illegal for pesticides to be sold in small rooms without appropriate ventilation, or for people to live and sleep on the premises. A visit to the container village, the main area in Kampala where pesticides are sold, amply demonstrates that all the above are in fact occurring. This situation needs to be corrected

Lack of sufficient human resources and lack of facilities to inspect and enforce the regulations are the main causes of non-compliance of many pesticide dealers. Currently, only one person (the registrar) is responsible for handling pesticide registration applications and inspection of pesticide premises for the whole country. The ACB and Commissioner for Plant Protection are taking steps to try and alleviate the problem of enforcement. At their request, the Ministry of Public Service has approved two positions of pesticide inspectors out of 10 positions that had been proposed. This is not sufficient to inspect and enforce pesticides regulations throughout the country. Consequently, the ACB is negotiating with local government authorities to develop a process in which district agricultural officers are used in pesticide regulation, enforcement, and inspection. Furthermore the Commissioner for Plant Protection has secured some funding, from DANIDA, to support pesticide regulatory services in the country. These steps, coupled with proper training in pesticide management and regulation, will improve compliance with the rules.

3.6.2 Application of Registration Procedures

While the procedures for registration of pesticides, premises, applicators, and fumigators are in place, some are not followed because of lack of facilities and know-how, while others are ambiguous and need clarification. The main concerns include:

- *Lack of residue and formulation analytical capacity to test for purity of active ingredients, residues on foods, and toxicological acceptability.* The departments of Chemistry and Veterinary Medicine at Makerere University and the Government Chemist have partial capacity for conducting formulation and residue analysis. This

potential needs to be developed further if aspects of pesticide pollution and residues are to be addressed appropriately. This team suggests that Makerere University should be supported in developing this analytical capacity, since it would be used for training, research on pesticide quality, and monitoring of residues in the environment for research and teaching purposes. Makerere could become the country's center of excellence in this regard. It is noted that NEMA is expected to develop a well-equipped laboratory for chemical residual analysis as a service to all the sectors of the economy. Similarly, the Victoria Management Authority is to provide facilities for monitoring of pesticides off-loading in Lake Victoria. These programs, if implemented, are likely to increase pesticide residue and formulation analysis capacity in Uganda, which in turn will be reflected in improvements in safe handling of pesticides.

- *Lack of registration of pesticides for specific use on specific crops.* The current system of registering pesticides for general use is not in harmony with registration procedures in developed countries, making it difficult for USAID-funded projects to comply with pesticide application regulations. It also leads to application of unsuitable pesticides on food crops.
- All chemicals currently registered in Uganda are considered for general use, irrespective of their level of toxicity. The only pesticide registered under restricted use is aluminum phosphide, a highly volatile fumigant used in post-harvest stored product protection. Furthermore, although the regulations indicate that pesticides shall be applied by registered applicators, this is not always the case because farmers spray their own crops. Therefore, to ensure safe use of pesticides by farmers, the ACB advocates training of pesticide dealers/stockists and extension agents, who in turn should educate their customers.
- *Lack of specificity in the agricultural chemicals control statute.* For example, the ACS does not give direction as to what is considered an appropriate minimum size/space for pesticide premises.
- *Lack of adequate public information on registered pesticides.* Currently, the registered pesticides appear in the *Uganda Gazette*, which only provides information on trade and common names, the date of registration, and the manufacturers. There is no information on which crops specific pesticides should be used, precautions that should be taken, or effects on the environment and non-target organisms, etc.
- *Limited number of registered pesticides.* The number of pesticides registered in Uganda is very small. Currently 190 pesticide formulations have been registered (includes insecticide, fungicides, and herbicides), which is very few, compared to USEPA, where over 50,000 have been registered. This is a great disadvantage to pesticide users who have limited choice for safe pesticides. It is also a problem for development agencies, which may be required by the donor community to use only pesticides registered in a particular donor country.

3.6.3 Issues on Distribution, Use, and Disposal of Pesticides

- *Limitations in enforcement.* The agricultural chemical regulations provide good guidance on safe use and disposal of pesticides. There are, however, limitations in their enforcement. For example, it is stipulated that pesticide quality monitoring is mandatory by agents of the manufacturers and distributors concerned, to assess the impact of pesticide formulations on the environment. This is hardly ever done. Similarly, it is stipulated that the use of least damaging pesticides on the environment is encouraged. Despite these provisions, there is no clear way for the Board to effect them.
- *Lack of appropriate disposal mechanisms for expired and obsolete pesticides.* In past years, the Plant Protection Department had to re-export expired and obsolete stocks from Uganda. The Plant Protection Department currently has a consultancy on pesticides disposal, and DANIDA is committed to construction of a pesticide disposal facility in Uganda.
- *Lack of an established administrative body (structure) for registering and regulating agricultural chemicals.* Currently, registration and regulation duties of agricultural chemicals are conducted by the ACB secretariat under the Plant Protection Department in the Ministry of Agriculture Animal Industry and Fisheries. The Secretariat is basically composed of the Registrar, Mr. James Komayombi, and the Commissioner for Plant Protection (Mr. Bazirake) (as already indicated, two new pesticide inspector positions have just been created but not yet filled). The Secretariat, besides managing pesticide registration issues, is also responsible for other national crop protection issues, including monitoring of insect pests and disease outbreaks, and training and advising subject matter specialists at the district level on pest management. They are, therefore, overwhelmed by the work. It may be advisable to establish a Uganda Agricultural Chemical Authority such as the National Drugs Authority. A visit to the container village (pesticide stores in Kampala) indicted that veterinary products outlets (which fall under UNDA regulation) seemed consistently cleaner, better organized, less cluttered, and had more informative posters than the Agricultural Chemical outlets, presumably because of better-organized policing from UNDA. The UNDA is autonomous, with over 50 employees, whose main activity is regulation of veterinary and human drugs in the country.

3.7 Conclusions and Recommendations

There clearly, certain issues must be addressed by the Government of Uganda to ensure safer handling of pesticides. There are also some aspects that need to be examined and support given by development agents like USAID. These areas are highlighted below:

3.7.1 *Suggestions to Government of Uganda with Respect to Regulatory Activities*

As was pointed out by Meltzer et al. (1994), enforcement of pesticides regulations is unlikely to be fully realized without significant additional support and technical assistance. It is, therefore, suggested that there is a need for the Government to promote or provide for:

- *Adequate funding and staffing for the ACB Secretariat.* The major limiting factor in the pesticides regulation and registration processes is lack of adequate funding. Although substantial income is generated from registration, none of it is returned to the ACB account. There is need to ensure that money from registration of pesticides is plowed back into pesticide regulation activities, which is not the case now.
- *Additional staff in pesticide inspection and ACS enforcement.* The staffing situation in the ACB Secretariat is inadequate and does not allow effective enforcement and policing of pesticide regulations. There is, therefore, a need for the Government of Uganda to consider increasing the number of pesticide inspectors and supporting them adequately to enable them to do the work effectively. There are roles that could be played by development agencies in ensuring enforcement of inspection and policing of pesticide regulation compliance. Among these is provision of facilities for transportation and for pesticide analytical kits. Further, officers dealing directly with pesticide stockists in development programs, like those supported by USAID, could also serve as inspectors by ensuring that the stockists only deal in officially registered pesticides.

3.7.2 *Training*

Well-targeted and practical training in integrated pest management and safer pesticide management

It is one thing to have pesticide regulations in place, and another to have them adhered to. The only way of raising the population's awareness of problems associated with pesticides, and how those problems can be avoided, is through continuous training. Training for "safer pesticide use" is a common approach to mitigating the potential negative health and environmental impacts of pesticides. This conventional approach promotes reducing health risks of pesticides by safer use of the products through training, use of protective equipment and technology improvements, as well seeking to reduce pesticide hazards via regulations and enforcement. For training to be effective and appropriate, it has to be at different levels. Four levels of training are proposed for the USAID-funded projects:

1. *Training of trainers in IPM and safer pesticide management.* There is need for training of all Field Officers of USAID-assisted projects in integrated pest management and safer pesticide use who would, in turn, become trainers. These trainers will then train their own system of extension agents. For example, ACDI-VOCA's Title II program alone operates in 33 districts in three regions, with 200 extension agents, each of whom deals with 10 farmer trainers, each of whom

works, in turn, with about 20 farmers—thus in the aggregate reaching on the order of 40,000 farmers.

The MAAIF and USAID partners should host, with assistance of USAID/AFR and USAID/BHR, a tailored IPM course in Uganda in 1999, with sufficient emphasis on pesticide management to meet the practical needs of the participants. Makerere University may be in a position to take the lead in organizing the technical aspects with USAID/AFR and CARE.

2. *Pesticide management training of pesticide wholesalers, dealers, and stockists.* The existing stockists training programs of IDEA, VOCA, and SG 2000, while laudable, should be strengthened in pesticide management, and broadened throughout the distribution chain. While IDEA is currently working with about 300 stockists and SG 2000 with about 200 (some are with both) (IFDC, 1999), their geographic coverage is limited. As yet, farmers have inconvenient and limited access to enlightened distribution of crop and animal protection chemicals. However, these programs are likely to stimulate a significant expansion in the foreseeable future.

It is, therefore, highly desirable that the geographic coverage, quality, and frequency of trader, dealer, and stockist training be enhanced to include special emphasis on crop protection chemicals, to be implemented by all applicable programs in the country. Pesticide handling and management training should be specifically tailored to the different target groups, depending on their level of involvement with pesticides. The existing training materials developed by IDEA and VOCA can be readily adapted and supplemented.

3. *Training of public sector extension agents to become better at providing objective and research-based knowledge of crop production and protection practices and strategies, including non-chemical alternatives.* This includes the network of agents supported by the Title II PVOs.
4. *Training farmers in integrated pest management through the establishment of farmer field school (FFS) types of participatory learning and research programs,* jointly with farmers, extensionists, and researchers. The FFS approach involves a growing season-long informal learning experience in the farmers' own fields. Farmers apply integrated pest management concepts in practice, to give them an understanding of basic diagnostics, biology of crop and agro-ecosystems, and are introduced to alternatives to synthetic chemicals. A great deal can be accomplished toward reducing the need for pesticides by being able to recognize and distinguish pests and their natural enemies; practicing cultural control (e.g., crop rotation, correct planting dates); cover crops; and agro-ecosystem diversity, and monitoring and decision criteria.

3.7.3 Applied Research

A stronger emphasis on applied research and development and implementation of integrated pest management (IPM)

Although pesticides are being used, it is now the Government of Uganda's pesticide policy to use them as the last resort. Both the NARO and Plant Protection Department advocate the use of IPM for agricultural pests. Although information on integrated management of such pests is not complete, several research projects in Uganda dealing with IPM have generated significant information, and could and should be used by development agencies. Among these are:

- *The IPM CRSP*, a USAID global program, is working in Uganda with NARO and farmers to develop IPM technologies and strategies on field and stored maize, beans and cowpeas, millet, and groundnuts. Over the last three years, the IPM CRSP has been active in Uganda and has identified a number of IPM interventions for control of different pests.
- On beans, IPM technologies for control of bean stem maggot have been identified. On groundnuts, management of groundnut Rosette-based on resistant variety and high planting density has been validated.
- In the area of post-harvest storage pests, natural plant extracts and solarization of stored products have been shown to be effective against bean and cowpea bruchids.
- *Cotesia flavipes*, an exotic parasitoid wasp of stem borers, was released in Uganda in collaboration with ICIPE and appears to be establishing well in Eastern Uganda.
- Similarly, high plant density and a Rosette-resistant groundnut, Igola 1, have shown to be effective in controlling groundnut Rosette.
- The *GTZ project on IPM of Horticultural Crops* is working to develop IPM interventions for vegetables, fruits, flowers, and ornamental crops in Uganda. A parasitoid for cottony wooly scale has been introduced.
- *NARO research institutes* are conducting research aimed at developing IPM packages for their mandated crops.

These projects are good sources of alternative pest management technologies and strategies that could minimize pesticides use. It is therefore advisable that development projects promoting enhanced agricultural productivity through reduced losses due to pests should link up with the above sorts of research and IPM implementation projects. Linking up with IPM-CRSP could be particularly beneficial to the various projects because of its built-in broader collaborative linkages with other partners and sponsorship by USAID at the central level.

3.7.4 Provision of Facilities for Pesticide Formulation and Residue Analysis

Everyone the team talked to during this study indicated the need for pesticide formulation and residue analysis facilities as a way of ensuring minimum contamination of environment and food.

4. Monitoring and Mitigation Including Training

4.1 Monitoring

Whether monitoring for pesticides or compliance, the bottom-line objective is to protect the health of both humans and the environment. Pesticide monitoring involves the identity and quantification of pesticides in humans, agricultural products, and the environment. In every instance the decisions to monitor, what to monitor, how to monitor, when to monitor, and when to stop monitoring require allocation of considerable resources. Such resources include modern, state-of-the-art analytical laboratories, highly skilled analytical chemists, and large numbers of human resources for surveillance and sampling. Clearly, this is a costly undertaking and currently does not rank highly with the many needs competing for limited fiscal resources in Uganda.

Until such means become available, either nationally or regionally, monitoring activities remain limited to compliance. Compliance is meant to include adherence to “pesticide procedures” of the Code of Federal Regulations 216, as well as local laws and regulations. As discussed in Section 3, Uganda lacks the capabilities of enforcement of its pesticide statutes. Recourse for monitoring pesticide procurement and use within USAID-supported projects, thus, remains with the Mission/Regional Environmental Officers and even more rigorously with project personnel directly. In the latter instance this can best be accomplished by creating an advocacy for the intent of the “Procedures”—that is, protection of man and his environment.

4.2 Mitigation

In addition to the role of appropriately designed and enforced pesticide regulations, most of the risks (except for resistance, which may be more of a delaying action) associated with the use of pesticides can be mitigated through research and, most important, through education and training.

4.2.1 Research

Pesticide use represents a primary tactic in our multi-tactic arsenal, and proper pesticides’ management represents a high-priority research area within IPM. Research on sampling and critical pest densities is essential to the proper use of pesticides. Of paramount importance is emphasis on reduced risk. In IPM, pesticides are to be used in conjunction with alternative methods, and greater emphasis should be placed on validating alternative strategies, particularly in developing countries.

4.2.2 *Training and Education*

Training and education should be approached within two frameworks—the broad field of pesticide management with emphasis on safe use practices and the identification and use of alternative (non-chemical) tactics in an Integrated Pest Management (IPM) approach, a knowledge/information-based system. Each should be designed to accommodate the needs and requirements of the differing strata of users, including crop protection specialists, extensionists, stockists, applicators, field workers, and others. In the case of pesticide management, not all workers need the same level of training since the intensity and length of exposure varies with different types of jobs. All individuals who may come in contact with pesticides as part of their work should receive a certain basic level of training, increasing in direct proportion to the exposure use level. Certainly there is much useful information is available, but until it is transmitted to the users it is of little value.

4.3 **Outline of Courses for Proposed IPM and Safer Pesticide Use Training**

As indicated above, different levels of training are required for different cadres. For each of the levels, training will have different resource requirements. Depending on the level of training, for example, experts from outside Uganda may be required to conduct the courses. In other cases, locally available expertise may be sufficient. With this in mind, the following course outlines are proposed.

4.3.1 *Training for Trainers of Trainers*

Target Audience: Field officers of USAID-funded projects, District Agriculture Officers designated as subject matter specialists-Crop protection.

Justification:

USAID-funded projects are implemented by field officers recruited by the various projects. They are responsible for various production activities, including use of pesticides. During this study, however, it became clear that some of the officers were not conversant with principles of integrated pest management. Furthermore most of them were not well informed on safe application and handling of pesticides and the impact of pesticides on environment. Thus, most field officers were not looking at well-managed pesticide use as being part of an IPM program. Finally, the study also seemed to indicate that most of the officers were not aware of the pesticide regulations in Uganda and the U.S., hence leading to non-compliance.

In the process of implementing various development projects, field officers act as extension agents as they come in contact with the farmers. There is, therefore, a need to equip the USAID funded field officers with sound information on pest management strategies and safer pesticide use. They would, in-turn, train assistant field extension officers. The assistant field officers are responsible for training farmers at the grassroots level.

Course content:

The course would consist of two main parts: (I) Principles of Pest Management (24 hrs) and (II) Pesticide Management (24 hrs).

The Principles of Pest Management course would emphasise pest management decision tools (including concepts of sampling and pest monitoring), ecological/cultural management, biological control, host plant resistance, genetic control, and a theoretical approach to integrated pest management, differentiating between IPM approaches for resource-poor farmers and resource-rich farmers.

For the Pesticide Management Course would emphasise various types of pesticides, pesticide formulations, active ingredients, pesticide application, calibration of sprayers, calculation of application rates, pesticide fate and toxicology, safety in pesticide handling, impact of pesticides on the environment, non-target organisms, and human beings, pesticides as part of integrated pest management, and pesticide regulations.

Duration:

The course would be covered in six working days; five hours of theory and three hours of practicals every day.

Resource persons:

This course is for a high-caliber audience, aimed at imparting both theoretical and practical skills to prospective trainers. It is therefore recommended that at least one consultant, who is an expert in pesticide use, be involved in the training. The course should be hosted by Makerere University under the Centre for Continuing Agricultural Education. The University has the resource persons and facilities to mount the course. In addition, it is surrounded by agricultural research institutes that would be used in practical classes.

4.3.2 Training for Pesticide Dealers

Target group:

Pesticide traders, stockists and wholesalers.

Justification:

This study revealed that local pesticide dealers and stockists (some of whom are being facilitated by IDEA, SG 2000, and KR-2) are a main source of information on pesticide application for farmers. They prescribe how pesticides are used. In the eyes of local farmers, stockists are the experts in pesticide application. Therefore, if they stockists are misinformed, the farmers are likely to be, also. Consequently, there is a need for dealers and stockists to be trained in appropriate handling and application of pesticides.

Course content:

The target group is mainly business persons, whose main interest is making money. Consequently, this group has minimal interest in theoretical background and needs to be introduced to the practical aspects of pesticide management. Therefore, the course recommended here would include types of pesticides, pesticide formulations, toxicity classification, types of pesticide labels, concentration mixing, fate of pesticides in the environment, safer use of pesticides (including selection, handling, application, storage, and protective clothing), and combining pesticides with non-pesticide methods.

Duration:

The training would be conducted in five days.

Resource persons:

The resource persons would include trainers trained at the above course, with backstopping from Makerere University. The course would be conducted at zonal farm training institutes. Additional resource materials may be available from ADC and VOCA.

4.3.3 Training for Field Extension Officers

Target group:

Assistant agricultural field extension officers.

Justification:

Field extension agents at sub-parish levels are concerned with advising farmers on all aspects of agricultural production, including pest management. Consequently, if field extension officers are to advise on judicious use of pesticides, they need to be well-equipped with sound information on pesticides use and pest management systems. Currently, ACD/VOCO and IDEA Projects are interacting/collaborating with a large number of field assistants who would benefit from the proposal course.

Course Content

- General introduction to causes of pest problems,
- Introduction to use of participatory methods in understanding pest problems.
- Introduction to insect pest sampling/monitoring and use of action thresholds.
- Overview on use of cultural, biological, host plant resistance methods in control of crop pests.
- Introduction to elements of pesticide control tactic and safety in pesticide handling.
- Impact of pesticides on the environment and
- Integrating pesticides in an IPM program.

Duration:

Eight days.

Resource Persons:

The courses should be conducted at District farm institutes, and organized by the subject matter specialist in collaboration with USAID-funded project officers.

5. Conclusions and Recommendations

Many of the issues raised here have been introduced and discussed elsewhere in this report. For purposes of clarity and summarization they have been collated and further emphasized here, not necessarily in order of relative importance. Further, these recommendations are only that, and they must ultimately be placed in the context of USAID/Uganda's Strategic Objectives, overall priorities, budgetary limitations, and other donor interests.

5.1 Enforcement and Support of Ugandan Pesticide Regulations

The constraints and needs with respect to this very important GOU issue, and recommendations for consideration, are detailed in Section 3 of this report. While the GOU has made significant regulatory progress, the mitigative benefits of enforcement have not been realized. The lack of such enforcement to date, however, may not, in every instance, be attributable to a paucity of funding and manpower. Inadequate numbers of registered products are available, and enforcement of the registration requirement may not yet be advisable. That is, enforcement of the regulations in 1993, at which time few, if any, pesticides were registered, would have removed many useful pesticides from the marketplace. Even at this date, with only about 200 formulations being registered, compared with 50,000 by USEPA, enforcement would necessitate the removal of such materials as malathion, diazinon, sulfur, and others from the market. The challenge then is to accelerate the registration process to make suitable materials available while restricting the availability of hazardous materials.

Recommendation

USAID/Uganda, through its donor coordination functions, might have an appropriate policy dialogue role with the GOU, with the objective of influencing resource allocation and the reshaping of appropriate regulatory frameworks. In this regard, DANIDA, through its Agricultural Sector Support Program, has reviewed the status of pesticide regulation in Uganda and has recognized the various constraints raised in Section 3 of this report.

Regional harmonization of pesticide registration is also called for. For example, this would encourage the adoption of a system of "reciprocity" in which the pesticide registration systems of the Great Lake countries would be mutually acceptable. In this manner, the costs of

efficacy testing and quality testing could be shared, there would be less duplication of effort, and more resources would remain for the proper role of the private sector—enlightened enforcement.

5.2 Pesticide Distribution by Public Sector Extension Agents

Extension agents should be providing objective, balanced, and research-based information on crop production practices. They have no business explicitly or one-sidedly promoting pesticide products, much less actually selling or distributing them (even “samples”). They simply should not be in the business of pesticide distribution, period. It is a clear conflict of interest. The logic that they could help the spread of, or create a demand for, crop protection chemicals and other inputs does not apply to public sector agents, and *this practice should be strongly discouraged*.

USAID-funded NGO/PVO implementers of agricultural activities, as well as IDEA contractors and SG 2000, should not, explicitly or implicitly, encourage such practices by public sector agents. On the other hand, whatever can be done to encourage the growth of a properly regulated and competitive private sector market system should be. But the respective roles of the public and private sector should not be merged in this instance.

Likewise, agricultural *extension agents should never double as enforcement agents*. This only compromises their proper role as unbiased, well-informed (though not well-paid) advisors and providers of technical assistance.

Recommendation

Eliminate the practice of having public sector extension agents assume the role of promoters, sellers, or distributors of pesticides.

5.3 Training in Integrated Pest Management and Safer Pesticide Use

The importance of training and education has been raised in Section 3.7 with regard to environmental management capabilities in Uganda, and in Section 4 with regard to their importance in mitigating the harmful potential of pesticide use.

Recommendation

USAID partners should be encouraged to host, with assistance of USAID/AFR and USAID/BHR, a tailored IPM course in Uganda in 1999. The focus will be on the IPM approach and should include post-harvest crop protection in storage and transport; maize, bean, cassava, and oilseed production; horticultural crops production; termite management; livestock tick and tsetse management; and safer pesticide use. The training should emphasize a practical approach, with hands-on field work and demonstrations. ACDI/VOCA and Africare have expressed willingness to help identify appropriate training sites near field demonstration sites and to provide assistance in logistics.

Recommendation

The geographic coverage, quality, and frequency of trader, dealer, and stockist training should be enhanced to include special emphasis on crop protection chemicals. Such training should be implemented by all relevant programs in the country.

Recommendation

IFAD is proposing the introduction of FFS in Uganda. USAID should strongly encourage this and should seek ways to link farmers in its programs with this initiative.

5.4 Applied Research and Development and Implementation of Integrated Pest Management (IPM)

Although pesticides are being used, it is now Government of Uganda policy to use them only as a last resort. Both the NARO and Plant Protection Department advocate the use of IPM in management for various pests. Although information on integrated management of pests of various crops is not complete, several research projects in Uganda dealing with IPM have generated significant information on IPM, and could and should be used by development agencies

Recommendation

These projects are good sources of alternative pest management technologies and strategies that could minimize pesticides use. It is therefore advisable that development projects promoting enhanced agricultural productivity through reduced losses due to pests should link up with the above sorts of research and IPM implementation projects. Linking up with IPM-CRSP could be particularly beneficial to these projects because of its built-in broader collaborative linkages with other partners, and sponsorship by USAID at the central level.

5.5 Revision of “Quick Reference Guide for Crop Chemicals” (July 1998)

The draft Quick Reference Guide is a commendable, innovatively formatted, comprehensive, and largely factual document produced by a VOCA volunteer in relatively short order. While it appears to cover products encountered in the marketplace or in actual use, close examination of the list reveals that fewer than half of the recommended chemicals are registered for use in Uganda thus far—15 of 32 (47 percent) of the fungicides; one of four seed dressings, 23 of 57 insecticides (40.4 percent), and 11 of 22 herbicides (50 percent). Also, it apparently has not yet been fully reviewed by Ugandan crop production experts and regulatory authorities. Particularly useful and appropriate is the inclusion of fertilizers and seed dressings. The sections on safety tips for handling pesticides and non-chemical controls are also very much on the right track.

With relatively minimal additional effort, this document could be turned into a Ugandan document that covers all, or nearly all, of the registered pesticides in the country. In the meantime, for “internal use” by immediate USAID partners, the draft Quick Reference Guide could be revised with, at minimum, some adjustments in the recommended pesticides according to the judgment of the pesticide management team.

Recommendation

Ways should be found to fund the refinement of the Quick Guide in such a way that it becomes a document with Ugandan “ownership.” This process could be facilitated through a partnership among VOCA, the IPM/CRSP, and the appropriate Ugandan specialists.

The following constitute the sorts of changes recommended to make this a truly outstanding, open-minded, and maximally useful document for the greatest number of users in Uganda:

- Limit coverage to food crops and change the title accordingly.
- Strengthen the disclaimer with respect to the fact that the sponsors of the Quick Guide take no responsibility for accuracy of the registration status of the pesticides, adding that no endorsement of products is implied by the listing of specific registered products.
- Add acknowledgments.
- Add information on several omitted crops—e.g., cowpeas, cucurbits (cucumbers, squash, melons), eggplants, and tree crops other than cacao.
- Where available, add photographs of the listed crops’ pest problems (could be done in second edition).
- Drop page on “routine preventative spraying” for peppers and maize. This is not a recommended practice for insect control, as opposed to spraying only when needed. Monitoring should be routine.
- Verify the accuracy and appropriateness of all problems identified; at least a few inaccuracies appear to have crept in (e.g., banana nematodes do not normally cause root knots).
- Refine the chemical recommendations to include only those already registered in Uganda, with a clear note that the most toxic categories are not recommended for small-holders’ use.
- Add non-chemical measures for all crops, where available.
- Strengthen the “non-chemical controls” section

- Add an IPM briefer.
- Use standard international FAO symbols and colors for the safety and pesticide categories, rather than the creative but ad hoc one used currently.
- Change the cover graphic to depict appropriate practice (dusting maize with bare hands and feet, remove duster to show woman monitoring whorls).

5.6 Availability of “Biorational” Crop Protection Technologies

Extension services have tended to encourage the uncritical “schedule” and “recipe” approach to crop production, recommending pesticides as tools of first, rather than last, resort. This is in part because not many alternatives have been available. Commercially available alternative products could be identified and promoted for sale in certain pilot markets where there would be a plausible demand. For example, products such as disease-resistant varieties of crops (cassava, groundnuts, beans, tomatoes, etc.), neem kernel extract (a reasonably effective plant-based repellent and relatively safe insecticide), pyrethrum (East African origin), and other botanical products. (There are at least 10 botanical products available commercially, although most are probably not available in Uganda because they are not supported by multi-national agrichemical firms.) *Bacillus thuringiensis*, a bacterial disease of specific groups of insects, safe to humans and non-target organisms, offers a valuable addition to the crop protection arsenal, but is not yet registered for use in Uganda. In some cases, other bio-rational products such as pheromone (sex attractants) traps may be feasible and useful.

Recommendation

USAID and other donors should promote development of the market for bio-rational alternatives to synthetic chemical pesticides for crop protection.

5.7 Facilities for Pesticide Formulation and Residue Analysis

The need for analytical facilities to ensure standardization of pesticide formulations and monitor pesticide residues in food products as well as the environment is self-evident. The cost of maintaining such a facility is significant, and fees fail to support such costs.

Recommendation

USAID, other donors, and the GOU should investigate the possibility of developing a regional facility.

5.8 Role of Credit in Provision of Pesticides

USAID activities are providing loan guarantees to providers of credit and other financial intermediary services to enable loans to be provided to stockists to purchase inputs and

equipment, including pesticides. Crop and animal pesticides are clearly often needed for productive agriculture.

Recommendation

Because of the special risks associated with pesticide use, it seems appropriate that some mechanism of screening and awareness building be developed in which the loans facilitated through such intermediaries do not promote use of the most dangerous pesticide products and are in compliance with regulatory statutes.

Further, more USAID partners should work out ways to discourage via advisories, screening checklists, or similar mechanisms, and continued training of dealers and producers, the use of the most dangerous products (Class I and II) to the extent possible.

5.9 Pesticide Association and other Organizational Arrangements

An active professional business association of pesticide marketers, when operating effectively, can do a great deal to raise the level of responsibility and professionalism of the entire business sector in a country. Business associations can promote self-imposed standards of doing business and self-policing with respect to regulatory requirements, training programs, educational materials, and other services on behalf of all members. Various incentives could be provided for membership that could increase the participation of micro and small enterprises and increase the association's effectiveness in representing the members' interests. Thus, the safety and effectiveness of the pesticides use would increase.

Recommendation

USAID/Uganda's own Private Enterprise Support, Training and Organizational Development Project (PRESTO) might consider the potential of developing an organization-specific strengthening program for a business association of pesticide marketers, including stockists.

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Report

USAID/Uganda Agricultural Sector Pesticide Procedures Guide: Compliance and Capacity Building (ASPPG)

Section II: USAID/Uganda Pesticide Procedures Guide for Initial Environmental Examinations

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Section II: USAID/Uganda Pesticide Procedures Guide for Initial Environmental Examinations

1. USAID/UGANDA: Agricultural Sector Pesticide Procedures Guide

2. Introduction

Agricultural crops and livestock are subject to attack by a large variety of pest organisms. Implicit in any agricultural production project is the need to control (manage) pest levels using a variety of control strategies. In projects involving local farmers who have not been using pesticides, there is an opportunity to further encourage the use of preventive, non-chemical pest management strategies. If farmers are already using pesticides, the project team has an opportunity to promote the adoption of alternative control measures and provide training in appropriate pesticide management.

Pesticides, appropriately selected and used, will have positive effects on agronomic productivity. USAID supports the use of selected pesticides in the context of an integrated pest management system (IPM—that is, used as a last resort and in conjunction with alternative (non-pesticide) tactics. Such a proactive stance provides the Agency an opportunity to positively influence pest management strategies that have frequently been abused in the past.

Inappropriate pesticide use, including overuse, offers strong potential for adverse impacts on human health and the environment. These include acute pesticide poisoning of farmers, pesticide applicators, field workers, and rural families in general; long-term health risks, such as cancer; soil contamination, particularly in mixing areas; contamination of surface and groundwater; pesticide drift to non-target areas affecting humans, other crops, wildlife, etc.; destruction of pests, natural enemies, leading to outbreaks of secondary pest problems; and development of pesticide resistance. In addition to improper use by farmers, adverse environmental effects can result from inadequate local policies, regulations, and enforcement at all stages from manufacture to use. USAID’s strategy includes the strengthening of pest management infrastructures in developing countries, improvements in schemes for regulation and enforcement of pesticide use, and monitoring the effects of pesticides on humans and the environment.

To anticipate such adverse environmental impacts, and to comply with the U.S. National Environmental Policy Act, USAID has agreed to abide by federal regulations governing activities involving pesticide use in USAID-supported projects. The pesticide procedures dictated by these regulations are delineated in Title 22, Chapter 11 of the Code of Federal Regulations identified as Part 216.3 (b) of the Environmental Procedures, frequently referred to as “Reg. 216.”

Recognizing the complexities involved when completing the Pesticide Procedures requirements, USAID/Uganda commissioned the present team to develop a field guide, or manual, to provide guidance and the information necessary to facilitate completion of the initial environmental examination (IEE) in a manner that:

- ensures compliance with the Agency’s pesticide procedures;
- ensures compliance with the Government of Uganda’s registration and regulations;
- identifies and recommends appropriate mitigating actions for incorporation into the partners’ programs and activities; and
- facilitates use of IPM with a view toward reducing or avoiding unnecessary pesticide use.

In preparing the present guide, every attempt has been made to reduce the “procedures” to the basic elements of an IEE and, to the extent practicable, include the specific elements of existing projects. However, because of the desire to make the guide useful for yet undeveloped projects, a generic overlay has been attempted. Further, in those cases where there is a questionable decision on potential impacts exists, suggestions for the supply of additional information that may facilitate a negative (no effect) decision by Agency Environmental Officers is provided. If the latter efforts effect undue confusion, it may be necessary to modify the guide, and feedback from users is encouraged. Refer to the Glossary in Appendix II-A for definitions of technical terms used in this guide.

3. Part 216-Environmental Procedures (Appendix II-B)

Sections 216.1 and 216.2 of the Environmental Procedures involve introductory discussions and their applicability to the full range of development assistance programs. The more relevant portions of the Environmental Procedures—e.g., 216.3—pertain to the main decision points in the procedures and are discussed briefly here. They include **General Procedures** (216.3[a]) and more specifically, the **Pesticide Procedures** (216.3 [b]).

4. General Procedures

4.1 Purpose

The initial environmental examination (IEE) is the first review of the foreseeable effects—i.e., reasonably expected effects—of a proposed action on the environment. The purpose of the IEE is to enable USAID officials to determine whether a significant adverse environmental impact is likely. If the proposed action will have a significant effect on the environment—i.e., a positive effect—then a Positive Threshold Decision is issued and a more detailed Environmental Assessment is required. If the proposed action should not have a

significant impact on the environment—i.e., a negative effect—then a Negative Threshold Decision is issued. No further reviews are required, and the project may proceed.

While some USAID project activities may be exempted or “categorically excluded” from conducting an IEE, *all activities involving the procurement and/or use of pesticides must prepare an IEE*. Similarly, the situations under which exceptions may be possible (e.g., emergencies or compelling foreign policy objectives) are exceedingly uncommon and difficult to justify. For more information on this, please refer to the appropriate Reg. 216 section [216.3(b)(2)], and to Section 2.2 of the Environmental Documentation Manual (Bingham, et al., 1999) and Section 5 of the Africa Bureau Environmental Guidelines (USAID, 1996).

4.2 Pesticide Procurement or Use

USAID/Uganda is a leading donor in the agricultural sector. As such, its intent is not only to comply with Agency Pesticide Procedures, but to set an example for the GOU and other donors by looking beyond compliance to ensure that the procurement/use of pesticides is done as cautiously as practicable, with proper safeguards in place, and through the use of the least toxic means of effective pest control.

USAID interprets “pesticide procurement or use” in its broadest sense. It encompasses all direct and most indirect forms of support to the actual acquisition and use of pesticides.

- **Procurement** includes not only direct purchase, but also payment in kind, as well as donations, provision of free samples, and other forms of subsidy. Provision of credit to borrowers—or even guarantee of credit to banks or other credit providers—for pesticide inputs could also be interpreted as procurement.
- Similarly, **use** is interpreted broadly to include the sale, handling, transport, storage, mixing, loading, application, cleanup of spray equipment, and disposal of pesticides—in other words, cradle to grave.
- **Use** also includes indirect support to use, such as the provision of fuel for transport of pesticides, and providing technical assistance in pesticide management operations.

4.3 Exceptions to Pesticide Procedures

- Support to limited pesticide research, that is, on a surface area of under 4 ha., supervised by researchers, with application done by trained applicators, and treated products not consumed by people or animals.
- Technical assistance and related support to development of enforcement of the host country’s pesticide regulatory activities.

Likewise, support can be provided for training in safer pesticide use, as long as it does not involve actual application or use of pesticides by the farmer. USAID also strongly encourages that integrated pest management and alternatives to pesticides be included in any training on pesticide use. Further, pesticides are considered a tool of “last resort” and the pesticides chosen should, as far as feasible, be the “least toxic” ones. (USAID 1996, Bingham, et al., 1999)

4.4 IEE Review and Approval Process

IEEs should be prepared, along with the initial proposal, so that any modifications can be made to the activity design with a minimum of delay or difficulty. IEEs are prepared in the field by USAID staff and/or project grantees/implementers, and then reviewed by USAID Environmental Officers (EOs). Increasingly, USAID’s partners are encouraged to prepare the IEEs because they are closest to the action on the ground. A good resource for preparing an IEE is the Environmental Documentation Manual, esp. Section 4 (Bingham et al., 1999). Normally, four levels of USAID staff are involved in the environmental review and approval process:

- Mission Environmental Officer (MEO). The USAID/MEO is responsible for preparation of the environmental review documents for Mission projects.
- Regional Environmental Officer (REO). The REO in Nairobi is responsible for assisting the USAID/Uganda mission to prepare environmental review documents.
- The Bureau Environmental Officer(s) (BEO). The Africa EO and Human Resources EO (Title II) are responsible for reviewing and approving IEEs.
- General Counsel, Bureau for Africa (GC/AFR) provides clearance.
- Agency Environmental Coordinator (AEC). Oversees the effective implementation of 22 CFR 216 throughout the Agency. Not involved in routine decisions, but renders judgments in cases involving significant issues.

4.5 Environmental Assessments

Initial Environmental Examinations (IEEs) of USAID activities provide the first level of risk analysis of environmental harm. On the other hand, Environmental Assessments (EAs) typically represent a higher level of effort and are more formal. For both, specific requirements are laid out in Reg. 216. An IEE level of analysis of pesticide use should suffice, however, for situations where relatively modest amounts of only “general use pesticides” are involved— i.e., those registered for same or similar uses without restriction by the USEPA. An EA may be called for when larger surface areas and pesticide amounts are involved, and/or products of a higher toxicity level, or especially if the product, formulation, or particular use pattern is not registered, or if the product is a USEPA “restricted use pesticide” on the basis of user or environmental hazard. Usually, IEEs are completed first to determine whether an EA is called for. A

categorization of environmental review requirements of pesticides according to use and USEPA regulatory status is given in Knausenberger et al., 1996 Appendix II-C.

4.6 IEE Procedures

The Basic Procedure for an IEE

Deferral: Where it is not possible to identify activities in sufficient detail to permit completion of the IEE, the proposal shall contain:

- an explanation of why the IEE cannot be completed,
- an estimate of the time required,
- a recommendation that the threshold decision be deferred.

5. A General Outline of a Representative IEE Addressing Pesticide Use

Presented here is a sample outline of an amended or new IEE for agricultural activities involving pest and pesticide management. It is modified from an outline prepared by Walter Knausenberger. Much of the information needed is available in IEEs already submitted, additional pest and pesticide information is made available in the ASPPG above.

5.1 Background and Activity Description

- Purpose and scope of the IEE.
- Re-cap information in existing IEE or conduct a new IEE.
- Amend an existing IEE to comply with USAID Pesticide Procedures
- Overview of activities involving or related to agricultural pest management. Include a description and attach a list of current staffing categories and capacity for agricultural activities and pest and pesticide management by the NGOs, their grantees, and other partners operating in connection with the projects.
- Describe the pesticide procurement and/or use activity triggering the Pesticide Procedures analysis. Provide a list of requested pesticides and, where possible, include the commodity and pest against which it is to be used along with the common and tradename of the pesticide.

5.2 Pesticide Procedures: Provisions of Section 216 3(b)(1)(i)

Factors to be considered should include, but not necessarily be limited to, the following:

5.2.1 *The EPA Registration Status of the Requested Pesticide(s)*

This information may be obtained by comparing the list of requested materials with their categorical listing in Table 1, below.

The USEPA is responsible for registering each pesticide for specific uses—i.e., commodity and pest. In registering a pesticide, USEPA takes into account economic, social, and environmental costs and benefits of decisions. Pesticides may be registered for:

General Use—a pesticide that has been designated by USEPA for use by the general public as well as by licensed or certified applicators. Note: The label does not bear the term “General Use.”

Restricted Use—a pesticide designated such by USEPA as a result of its high potential for causing harm to humans and/or the environment. See Appendix II-C. Its use is thus restricted to licensed or certified (trained) applicators in the U.S. Such pesticides are too hazardous for general use in USAID projects, but in exceptional circumstances they may be approved if their use is determined essential and the project includes training with safe use and IPM components. The label must display the correct RUP statement.

Same or Similar Use—use of a substantially similar formulation in a comparable use pattern (target pest, crop, or animal, site, application technique, rate, and frequency). USAID recognizes that pest problems in developing countries do not mirror exactly those found in the U.S. Some may be inappropriate in the U.S., yet ideal for use in Africa—for example, tsetse or locust control. Similarly, developing countries have crops, pests, and habitats not found in the U.S. Thus, by implication, the registration status should not routinely or automatically apply to developing countries because of contrasting conditions.

Uganda Registration—No pesticide, whether imported or manufactured in Uganda, shall be used, stored, distributed or dealt in unless it is duly registered (see Appendix II-D) in accordance with rules and regulations of the Agricultural Chemical Control Statute No. 8 of 1989 and by Statutory Instrument (Registration and Control) of 1993. It is important to note that relatively few materials have been registered for use in Uganda since 1993. The status of such registration creates a paucity of general use materials suited for use in Uganda-based projects.

Please Note: Due to likely evolution in registration status, the information provided in Table 1 may not remain current. Information regarding registration is best obtained from the label of the product. For additional information and label access, the following resources are suggested:

On the Internet:

Ag Chem Database:

EPA Office of Pesticide Programs

EPA Registration and Fact Sheets

Pesticide Management Resource Guide

Pesticide Info. Profiles-Exttoxnet

Database of IPM Resources

Pesticides (General)

Hard Copy

Farm Chemicals Handbook

[http:// + the following URLs](#)

www.CDMS.net

www.epa.gov/pesticides/

www.epa.gov/oppsrrd1/REDS/

www.epa.gov/oppfead1/pmreg/

ace.orst.edu/info/extoxnet/

www.ippc.orst.edu/cicp/tactics/category.htm

www.ianr.unl.edu/pubs/Pesticides/

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Table 1. Pesticide Groups Proposed to Facilitate an IEE Decision

I. Registered in Uganda and USEPA for general use without restriction. If your proposed pesticides are in this list, your IEE will probably lead to a Negative Impact Decision

A. Pesticides/ Acaricides/ Fumigants	<p>1. Toxicity Class III-IV (See tables 3 and 4)</p> <p>Bulldock 025-(beta-cyfluthrin) used on corn, peanuts, potatoes, vegetables, and ornamentals</p> <p>Orthene (Acephate) vegetables, peanuts, ornamentals</p> <p>Sevin 85S-(Carbaryl) many crops, vegetables and ornamentals</p> <p>Confidor, Gaucho-(imidacloprid) soil, seed or foliar in maize, potatoes,vegetables; highly systemic seed, or soil</p> <p>2. Toxicity Class II</p> <p>Rogan-(dimethoate) for a wide range of insects and mites on soyeans, tomatoes, ornamentals, corn, safflower, vegetables, and wall spray in dairy barns for flies</p> <p>Neem Super-(azadirachtin) disrupts insect molting and as a feeding deterrent</p> <p>Neemal see Neem Super</p> <p>3. Toxicity Class I</p> <p>Thiodan, Thionex 35EC-(endosulfan) grains, nuts, oil crops, ornamentals, vegetables, Note: Because of its toxicity level, some states in the U.S. have designated thiodan a Restricted Use Product.</p>
B. Herbicides	<p>1. Toxicity Class III IV</p> <p>Sencor 70 W.P.-(metribuzin) controls a large number of grasses and weeds in agricultural crops; fallowland, field corn, peas, potatoes, soybeans, tomatoes</p> <p>Stomp 500E Selective herbicide; beans, field corn, grain sorghum, peanuts, potatoes, sunflowers, ornamentals</p> <p>MCPA-Banvel Esters post-emergent herbicide-non-croplands, for many annual and perennial broadleafs</p> <p>Gesapax,(Ametryn 80WP) selective herbicide against most annual broadleaf, grassy weeds; for post-direct use in corn</p> <p>Dual 960EC (metolachlor) selective, pre-emergent ,and preplant incorporated herbicide corn, soybeans, peanuts, grain sorghum, potatoes, pod crops</p>

2. Toxicity Class II

Roundup, Touch down (Glyphosate) non-selective post-emergent herbicides; can be applied pre-plant or pre-emergent for over 150 crops for control of most annual weeds

2,4,-D selective post-emergent herbicide; for grasses in fallow land, millet, sorghum corn. **Note:** Many broadleaf crops are extremely sensitive.

3. Toxicity Class I

MCPA-Banvel Acids and Salts post-emergence selective herbicide; use MCPA-Banvel-Esters; see above.

C. Fungicides/Seed Dressings

1. Toxicity Class III IV

Topsin-M, systemic fungicide; broad-spectrum disease control in vegetables soybeans, peanuts; registration cancelled for post-harvest use

Dithane M-45 fungicide for field crops, vegetables ornamentals; seed treatment for potatoes, corn, sorghum, peanuts, tomatoes

Mancozeb see Dithane

Acrobat MZ fungicide for phytophthora on potatoes and tomatoes

Rovral 50WP contac-locally systemic fungicide; for broad spectrum of diseases vegetables, ornamentals, potatoes; seed treatment for vegetables

Benomyl systemic foliar fungicide; controls a wide range of diseases on vegetables

Benlate see benomyl

Agromyl see benomyl

2. Toxicity Class II

Cupravit (copper oxychloride) fungicide for use on tomatoes, potatoes, vegetables, ornamentals

3. Toxicity Class I

Kocide fungicide for bananas, beans, crucifers, vegetables

Champion, see Kocide

Blue Shield WP see Kocide

Saprol-(triforine) fungicide, ornamentals; may be used in IPM programs. (Note Danger Class I.

II. Pesticides registered for use in Uganda and registered by USEPA for RESTRICTED Use based on user hazard. Projects involving these materials may possibly be approved with Negative Impact Decision if hazards are appropriately mitigated via training in application and safe use practices.

A. Insecticides/Acaricides

1. Toxicity Class II (Warning)

Mitac (amitraz) possible oncogenetic [Class II]; mite control on ornamentals, ticks on cattle

Milbtraz see Mitac.

Toxicity Class I (Poison/Danger)

Supona Extra(chlorfenvinfos)-acute dermal toxicity-No crop uses.

Quickphos (aluminum phosphide)-fumigant, acute inhalation toxicity.

B. Herbicides

2. Toxicity Class II

3. Toxicity Class I

Paraquat (paraquat) Class I-Danger-Poison contact herbicide; non-crop use, ornamentals

Agrosate, Rodeo, Mamba, Sweep, Kalachi, Glyphgan see paraquat

Lasso EC (alachlor) pre-emergence herbicide; controls annual grasses and certain broadleaf weeds in corn, dry beans, peanuts, soybeans Danger Class I

C. Fungicides

1. Toxicity Class II

2. Toxicity Class I

III. Pesticides not registered for use in Uganda and/or USEPA or are restricted on the basis of environmental hazard but known to be available in Uganda. If your proposed pesticides are in this list, a Positive Impact Decision would be issued and a more detailed Environmental Assessment (EA) would be required.

Ambush (permethrin)—toxic to fish Class II

Ambush Super (lambda-cyhalothrin)—toxic to fish and aquatic invertebrates

Bacillus thuringiensis—not registered for use in Uganda.

Blitz (cypermethrin)—toxic to non-target organisms, fish, and bees

Cymbush (cypermethrin)—hazard to non-target, fish toxicity

Decis (deltamethrin)—highly toxic to fish Class II

Diazinon—not registered for use in Uganda.

Dursban 4EC (chlorpyrifos)—toxic to fish Warning II

Fastac (alpha-cypermethrin)—Not registered by USEPA

Fenom-P (Profenofos+cypermethrin)—cypermethrin toxic to fish Class II profenofos corrosive to eye)

Finitrothion (fenitrothion)—potential adverse effects on aquatics and birds

Furadan 5G (carbofuran)—avian, acute inhalation toxicity Class II

Gesaprim atrazine—Buffer zone required between application site and water Class III

Icon (lambda-cyhalothrin)—toxic to fish; not registered in Uganda

Karate (lambda-cyhalothrin)—toxic to fish and aquatic invertebrates Class I

Malathion—not registered for use in Uganda

Nemacur (fenamiphos)—acute dermal avian, acute oral and inhalation Class I

Nurelle (cypermethrin +chlorpyrifos)—both toxic to fish Class II

Peripel-55 (permethrin)—toxic to fish

Pounce (permethrin) toxic to fish.

Pyrinex (chlorpyrifos)—toxic to aquatics and birds

Ripcord-5EC (Cypermethrin)—hazard to non-target, fish toxicity Class II

Salut (chlorpyrifos + dimethoate)—chlorpyrifos toxic to fish Class II

Sulphur—not registered for use in Uganda

Sumithion (fenitrothion)—potential adverse effects on aquatic and avian Class II-III

Talstar (bifenthrin)—toxic to fish, broads spectrum miticide, termiticide Class II

Torque (fenbutatin-oxide)—very highly toxic to aquatics Class I

Tsetse Tick (cypermethrin)—see Blitz

Tsetse Tick Pour (deltamethrin)—see Decis (highly toxic to fish)

Vydate (oxamyl)—toxic to fish, avian, and bees Class I

5.2.2 *Basis for Selection of Requested Pesticide(s)*

Included here the factors leading to the decision to propose these particular pesticide(s). For example:

- Because it is registered and recommended for use on the specific pest/commodity.
- Because cost per unit, per application, and number of applications is acceptable.
- Because of local availability, effectiveness, and experience.
- Because small plot experiments showed the pesticide(s) to be promising.
- Because there are no known chemical or non-chemical alternatives.
- Because of low mammalian toxicity.
- Part of an IPM program.

5.2.3 *Extent to Which Proposed Pesticides Are Part of Integrated Pest Management (IPM) Approach*

A widely accepted IPM definition specifies the use of “all suitable techniques,” including pesticides. Current thought removes pesticides as a cornerstone tactic and shifts emphasis to more bio-intensive tactics, including biological control, host resistance, and cultural management. Only after these tactics are in place and understood is it advisable to use selected pesticides. It is USAID policy to promote IPM to the extent possible.

Past emphasis in IPM development has been directed toward the larger cash crop farmer, usually in monocultural situations, such as in the case of high-value export crops. It was thought that only in such situations were management skills and inputs adequate. Clearly, access to IPM information is more readily available in this sector, as is the ability to support the necessary training, scouting/pest level thresholds, monitoring, and pesticide management activities basic to an IPM program. Such activities should be noted here in section II-C of the IEE, along with the use of pest-resistant varieties, exclusion techniques (screening), timing, rotation, etc.

Among modern technologies, IPM has represented the most difficult challenge to the traditional small-scale farmer because of numerous constraints in developing countries. The situation, at least in Uganda, is changing, however. Agriculture in Uganda is in a transitional stage e.g. emergent agriculture, changing from subsistence agriculture to some cash cropping. As a result, NARO has reviewed its IPM research projects and has increased emphasis and established priorities in IPM research, including post-harvest, cotton, cassava, beans, and others. Adoption of IPM by traditional farmers is further encouraged by the recognized value of participatory research and on farm IPM training programs. Examples of specific tactics include the following:

Pest Problems on Specified Crops in Uganda

Tomatoes

Bacterial wilt-use resistant varieties; testing solar sterilization of soil using raised beds under polyethylene

Tomato blight plant later in the season.

Thrips tabaci

Aphids: *M. persicae*, *A. fabae*

American bollworm, *H. armigera*

Cutworms

Flea beetles

Semi-looper

Whitefly: *Bemisia tabaci*

Root knot nematode; *Meloidogyne*

Cabbage

Black rot Five-year rotation, use clean seed; Papa variety is resistant

Beans

Bacterial blight

Halo blight

Angular leaf spot

Rusts

White mold

Sclerotinea

Fusarium

Phytophthora

Anthraxnose

Mosaic virus diseases

Bean fly: *Ophiomyia phaseoli* eliminate plant reservoirs remaining after harvest, early planting also helps avoid *Aphis* and *Mylabris* spp.

Pollen beetle: *Coryna* spp.

Bean bruchid: *Acanthoscelidae obtectus*

Cowpea

Flower thrips: *Frankliniella* spp.

Spiney brown bugs: *Acanthomyia* early planting matures plant before *Acanthomyia* becomes abundant; early established seedlings withstand foliage beetle (*Ootheca*) attack

Mung moth

Leaf beetles

Cowpea bruchid: *Calosobruchus* spp.

Sugarpeas (mangetout) (Pisium sativum)

Aphids

Thrips

Ascochyta blight (grey spot): *Phoma exigua*

Powdery mildew: *Erysiphe* spp.

Potatoes

Phytophthora and Alternaria blights potatoes planted in the middle of the rains will ripen during a dry period, which is more favorable in terms of disease management

Bacterial wilt

Tuber moth: *Pthorimaea operculella* increase planting depth from 6 cms to 8 cms

Sweet Potatoes

Hand-pick larvae from leaves.

Weevil: *Cylas* spp. select deep-growing varieties, plant deeper, destroy all crop residues and volunteer plants

Maize

Stalkborers: *B. fusca*, *C. partellus*, Eledana, *Sesamia* early planting at start of first rainy season, destroy (burn) stalks, deep plowing.

Considerable success with introduced parasites. Select more resistant varieties (*Nyamula*), simultaneous planting in a region. Simply cutting stalks and laying them horizontally in the field allows internal temperatures to reach levels lethal to the borer. More vigorous, thick-stemmed plants can withstand attack better.

Sorghum shootfly: *Antherigona soccata*

American bollworm: *Heliothis armigera*

Maize tassel beetle: *Megalonnatha rufiventris*

Maize streak virus early planting

Common maize rust: *Puccinia sorghi*

White leaf blight: *Helminthosporium turicum*

Leafhoppers early planting

Groundnut

Aphid: *Aphis craccivora* earlier-planted crops are healthier because of fewer aphid vectors of Rosette virus

Rosette virus disease close spacing of plants

Bacterial wilt

Cassava

Mealybug parasitic wasp

Green mite predatory mites

Elegant grasshopper: *Zonocerus variegatus*

Cassava mosaic

Bacterial blight: *Xanthomonas manihoti*

Stored Product pests exclusion and improved storage designs, solarization i.e., frequent sun-drying of grains, store maize with sheath intact, cowpeas in pods, and groundnuts in shells; sanitation i.e., clean stores.

Angoumois grain moth: *Sitotroga cerealella*

Weevils: *Sitophilus* local maize varieties are more resistant than some improved varieties. Early harvest before attacked by weevil in the field, providing the grain is well dried. Traditional varieties of maize that ripen during the dry season are not as susceptible as the newer, earlier-ripening varieties.

Bean bruchid

Cowpea bruchid

Greater grain borer: *Prostephanus truncatus* use of the predatory beetle *T. nigrescens* is now well established in Uganda

Khapra beetle: *Trogoderma granarium*

Wide Spectrum Pests

Termites sorghum and millet are more resistant than maize. Cowpea and bambara are not attacked, while groundnuts suffer serious damage. Cassava sets can be seriously attacked. Normal cultivation and crop rotation will destroy mound builders and those with shallow nests.

Soil Pests-crop Rotation

5.2.4 Proposed Methods of Application

Will the application or handling methods (e.g., aerial application, fogging, run-off of unused spray materials) pose any special risks?

To conduct this part of the IEE, the preparer should visit the project site.

Check the pesticide label for the special precautionary statement of hazards and recommendation for protective clothing. See Table 2 for category-specific recommendations for protective clothing.

Summarize precautions and safety information found on the label, such as:

- How to avoid drift.
- Need to avoid smoking or eating during use.
- Need to enforce re-entry requirements. Pesticides in Category II require a 24 hour reentry period for field workers. Pesticides in Category III-IV require a 12-hour re-entry period.
- How to clean contaminated clothing.
- How to clean up pesticide spills.
- How to maintain application equipment.
- How to dispose of unused pesticides and containers.
- How to store and transport pesticides.

Table 2. Category-Specific Protective Clothing for Pesticide Applicators

Formulations	Label Signal Words		
	Caution	Warning	Danger
Dry	Long-legged trousers and long-sleeved shirt; shoes and socks.	Long-legged trousers and long-sleeved shirt; shoes and socks; wide-brimmed hat; gloves.	Long-legged trousers and long-sleeved shirt; shoes and socks; wide-brimmed hat; gloves; cartridge or canister respirator if dusts in air or if label precautionary statement says: "Poisonous or fatal if inhaled."
Liquid	Long-legged trousers and long-sleeved shirt; shoes and socks; wide-brimmed hat.	Long-legged trousers and long-sleeved shirt; shoes and socks; wide-brimmed hat; rubber gloves. Goggles if required by label precautionary statement. Cartridge or canister respirator if label precautionary statement says: "Do not breathe vapors or spray mists." or "Poisonous if inhaled."	Long-legged trousers and long-sleeved shirt; rubber boots, wide-brimmed hat; rubber gloves, goggles or face shield. Canister respirator if label precautionary statement says: "Do not breathe vapors or spray mists," or "Poisonous if inhaled."
Liquid (when mixing)	Long-legged trousers; long-sleeved shirt; shoes and socks; wide-brimmed hat; gloves; rubber apron.	Long-legged trousers and long-sleeved shirt; shoes and socks; wide-brimmed hat; rubber gloves; goggles; or face shield; rubber apron. Respirator if label precautionary statement says: "Do not breathe vapors or spray mist," or "Poisonous (or fatal or harmful) if inhaled."	Long-legged trousers and long-sleeved shirt, rubber boots, wide-brimmed hat, rubber gloves, goggles or face shield. Canister respirator if label precautionary statement says: "Do not breathe vapors or spray mists," or "Poisonous if inhaled."
Liquid (when mixing the most toxic concentrates)	Long-legged trousers; long-sleeved shirt; boots, rubber gloves, water proof wide-brimmed hat.	Water repellent, long-legged trousers and long-sleeved shirt, rubber boots; rubber gloves; rubber apron; water-proof wide-brimmed hat, face shield, cartridge or canister respirator	Water-proof suit, rubber gloves, water-proof hood or wide-brimmed hat.

Long-legged trousers and long-sleeved shirt, rubber boots, wide-brimmed hat, rubber gloves, goggles or face shield. Canister respirator if label precautionary statement says: "Do not breathe vapors or spray mists," or "Poisonous if inhaled ." Label Signal Word

5.2.5 Acute or Long-Term Toxicological Hazards

Acute toxicological hazards to humans relate to absorption through skin, inhalation, or eye contact. Acute hazards to the environment involve toxicity to honey bees, fish, birds, or other wildlife. Long-term (delayed) toxicological hazards to humans involve oncogenicity,

teratogenicity, carcinogenicity, and mutagenicity (see Appendix II-A). Ecological effects result in decreases in biodiversity and ecological stability, and/or contamination of aquifers. The pesticide label or other resources (see 5.2.1 above) will provide this information. **Reminder:** If a pesticide has a high potential for causing harm to humans and/or the environment, the USEPA designates it as Restricted Use. Except in those cases where restriction is based on human hazard and suitably mitigated, the proposal of Restricted Use pesticides will require a more detailed Environmental Assessment.

Table 3 lists acute oral and/or dermal LD₅₀ values, along with USEPA toxicity categories and signal words for the proposed pesticides. Acute oral LD₅₀ is the best indication of its potential short-term toxicity to humans. It is the amount necessary to kill 50 percent of test animals (usually laboratory rats), based on weight of pesticide per unit of body weight, i.e. mg. of pesticide/kg body weight. The lower the LD₅₀ the greater the toxicity potential to humans. Ingestion of just a few drops to a teaspoon of a pesticide with an oral LD₅₀ of less than 50 might be sufficient to kill an adult person. An adult may have to consume 16 tablespoons to 0.5 kg or more, of a pesticide with and acute oral LD₅₀ of 5000 before dying.

Hazard vs. toxicity: A pesticide’s formulation, percentage of active ingredient, and other factors, such as health of the person, determine its actual hazard level e.g., a pesticide with 15 percent active ingredient would be potentially more hazardous than a formulation of the same pesticide with only 5 percent active ingredient.

Category I pesticides are most toxic or hazardous and are not for general use in USAID projects. Many Category II pesticides are also too toxic and their use is permitted only if a subsequent Environmental Assessment (EA) indicates that project use patterns will adequately mitigate hazards.

Table 3. USEPA Labeling Toxicity Categories by Hazard Indicator

	Toxicity Category	Signal Word	Oral LD ₅₀	Dermal LD ₅₀	Inhalation	Eye Effects**	Skin Effects LD ₅₀ *
I	DANGER- POISON	Up to and including 50***	Up to and including 200	Up to and including 0.2	Up to and including 0.2	Corrosive; corneal opacity not reversible within 7 days	Corrosive
II	WARNING	From 50 through 500	From 200 through 2000	From 0.2 through 2.0	From 0.2 through 2.0	Corrosive; corneal opacity, reversible within 7 days; persisting for 7 days	Severe irritation at 72 hours
III	CAUTION	From 500 through 5000	From 2000 to 20000	From 2.0 to 20	From 2.0 to 20	No corneal opacity; irritation reversible within 7 days	Moderate irritation at 72 hours
IV	CAUTION	More than 5000	More than 20000	More than 20	More than 20	No irritation	Mild or slight irritation at 72 hours

*Based on one-hour exposure** The duration of the eye observation period now routinely extends to 21 days.

*** Based on mg of toxicant per kg. of body weight.

Table 4. WHO Classification System According to Acute Toxicity

Class	Hazard Level	Solids	Oral Toxicity* Liquids**	Dermal Toxicity*	
				Solids**	Liquids**
Ia	Extremely Hazardous	5 or less	20 or less	10 or less	40 or less
Ib	Highly Hazardous	5-50	20-200	10-100	4-400
II	Moderately Hazardous	50-500	200-2000	100-1000	400-4000
III	Slightly Hazardous	Over 500	Over 2000	Over 1000	Over 4000

** The terms “solids” and “liquids” refer to the physical state of the product or formulation being classified

5.2.6 Effectiveness of Requested Pesticide(s) for Proposed Use

Effectiveness refers to the ability of the pesticide to produce a desired effect on a target organism. It is difficult to measure, and many conditions i.e., weather, pest resistance, methods of application, etc. will determine effectiveness. Local experience and history often provide the best assessment.

Reportable issues could include:

- Are efficacy data available?
- If not, have local experts or farmers had experience with the pesticide?
- Is the pesticide superior to non-chemical methods or other pesticides?
- Is pest resistance to pesticides known to be a problem?

5.2.7 Compatibility of Proposed Pesticide(s) with Target and Non-Target Ecosystems

This section should point to potentially harmful effects of pesticide use in the target (crop) ecosystem itself or surrounding crops or natural ecosystems. Site visits are required to assess potential hazards to non-target organisms, water, and other elements in the crop and associated environment. Particular care must be taken in the lake areas and wetlands of Uganda. Section 119 of the Foreign Assistance Act requires that proposed actions by USAID do not endanger wildlife species or habitats critical for them, harm protected areas, or adversely affect biodiversity (species richness). It is important to know if there are any wildlife sanctuaries, preserves, or any other protected habitats in or near the project implementation area that might be affected by pesticide use. Non-target organisms such as natural enemies, honey bees, and other pollinators that inhabit crops may be especially vulnerable. Methods of application and drift potential should be evaluated.

Again, information on environmental risks can be found on the pesticide label and in the other resources listed above. If the pesticide is restricted on the basis of environmental risks, a site visit and an Environmental Assessment will likely be required prior to project approval.

5.2.8 *Conditions under Which Pesticide Is to Be Used*

Provide only a general description, except when detailing hazard situations, or when specific sensitive sites (aquatic, protected, etc.) or threatened/endangered species potentially would be affected. If possible, include a map of the sites and their contents.

Will the pesticides be used in demonstration, research, training, vector control, or production systems? Who will be using them: project staff, project recipients, others?

NOTE: Uganda's land area includes a large percentage of wetlands and waters with close to 17 percent or 51,000 sq. km, of its area dedicated to swamp or open water. Much of the country lies "between the lakes," an area receiving abundant rainfall and rich in tillable land. Such aquatic features act as a sink, and great care should be taken when using pesticides adjacent to, or on hillsides leading to, such aquatic environments.

5.2.9 *Availability and Effectiveness of Other Pesticides or Alternatives*

Are there other pesticides of comparable effectiveness that may be less hazardous to humans and the environment? See list of "General Use" pesticides in 5.2.1 above. Unfortunately, about 20 additional General Use pesticides on the list of pesticides proposed for use by the partners are registered by USEPA and available in Uganda, but not yet registered by the Uganda Agricultural Chemical Board. These may offer advantages in terms of effectiveness and reduced hazard as well as offering more versatility in IPM programs if registration was accomplished.

Non-chemical control methods. See IPM in 5.2.3 above.

Livestock. Bloodsucking ticks and flies transmit several fatal or seriously debilitating diseases to cattle in Africa, such as tick-borne East Coast Fever and nagana, transmitted by tsetse fly. Cattle dipping and area treatment with pesticides are often used to control the carriers of such diseases. Promising alternative strategies for control of these diseases, such as vaccines for the tick-borne diseases and highly effective tsetse traps using baits, are being researched.

5.2.10 *Requesting Country's Ability to Regulate*

The government of Uganda has in place Agricultural Chemical Statute No. 8 of 1989 and the Statutory Instrument No. 23 of The Agricultural Chemicals (Registration and Control) Regulations of 1993, which regulate the manufacture, storage, distribution, trade, importation, and exportation of pesticides. The regulations are in accordance with FAO Code of Conduct for distribution and use of pesticides. The statutes take adequate consideration of the protection of the environment and other living organisms. Supplementing the Agricultural Chemicals Statute is the comprehensive National Environmental Management Authority (NEMA). According to the two policies, all pesticides used in Uganda must be registered, stored, handled, applied, and disposed of in compliance with the laws stipulated in the statute.

The Agricultural Chemical Board (ACB), under the Ministry of Agriculture Animal Industry and Fisheries (MAAIF), established by the Agricultural Chemicals Statute, is

responsible for (1) registering agricultural chemicals and issuing licenses for pesticide dealers and fumigators, (2) regulating importation and distribution of agricultural chemicals, and (3) advising government (through the minister for the MAAIF) on all matters related to enforcement of the chemicals legislation.

The Commissioner for Plant Protection, under the Directory of Crop Protection Resources in the MAAIF, is responsible for implementation of the legislation, and monitoring and control of pesticide dealers, fumigators, and outdated chemicals through a system of pesticide inspectors.

Since the establishment of the ACB in 1994, significant progress in pesticide regulation has been made. For example, a list of registered pesticides has been published; registration of pesticide dealers is steadily increasing; most pesticide premises have been registered, resulting in dealers selling only agricultural chemicals; and several training seminars and workshops on safe pesticide use have been conducted for pesticide dealers and public extension officers. These are indicators that there is good legislation, and the country's capacity to regulate pesticides is steadily increasing.

Although good legislation is in place, because of the lack of adequate human resources and facilities, there are enforcement problems. The government is taking clear steps to address the problem, however. For example, the Public Service Commission has approved hiring two new pesticide inspectors to help enforce pesticide regulations. Because these new positions cannot adequately cover the entire country, the ACB and Commissioner for Plant Protection are currently negotiating with local authorities to develop a process of using District Agricultural Officers in pesticide regulation and inspection.

Furthermore, the Commissioner for Plant Protection has secured assistance from DANIDA to support pesticide regulatory services in the country. In addition there is an International Program on Chemical Safety (IPCS) being implemented in Uganda, Kenya, and Tanzania. It is a joint collaborative program of WHO, ILO, and UNEP. In Uganda, this project is focusing mainly on promotion of safe use of agricultural chemicals, supporting the review of existing legislation and administrative arrangements to ensure that inconsistencies in pesticide laws/regulations are harmonized. Finally, radio and television programs to be aired on pesticide safety awareness are being developed by the Plant Protection Division of MAAIF in collaboration with NEMA.

The above steps, coupled with continued proper training on pest and pesticide management, will significantly improve compliance with the pesticide regulations.

5.2.11 Provisions Made for Training of Users

Questions to be addressed in this section could include:

1. Who will do the training?

2. Who is the audience? Depending on the project, this will involve one or both of two levels i.e., trainers or users. The former includes; trainers of trainers, pesticide dealers, Field Extension Officers, and PVOs who are project managers or others in contact with users. The latter includes farmers (and families), pesticide applicators, mixers of pesticides, pesticide storage, etc.
3. What is their level of training i.e., well, moderately, or un-trained? Level of training will vary with extent of pesticide involvement in the program and the hazard category of the pesticide.
4. Which training framework is most appropriate, pesticide management or IPM? IPM training is most appropriate for the team crop protection specialist. Clearly, for the pesticide user/applicator to take the necessary precautions to avoid hazards, he/she should know basic facts about pesticides, safe handling procedures, protective clothing, hygiene and first aid, accident response, use of chemicals, and fundamentals of toxicology. The field worker, though not handling pesticides, may receive exposure through residues on the plant or through drift during the spraying operation. Training for field workers, then, should emphasize the need to delay entry to the field for a safe period, avoidance of drift, and removal of residues from the body by washing. In addition, the worker must be apprised of the contamination of clothing and the need for frequent change and laundering.

5.2.12 Provisions Made for Monitoring Use

Identify needs and provisions for monitoring in the following areas:

- Use patterns (frequency and intervals between applications, chemicals used, dosages)
- Pesticide safety practices during transportation, storage, application, and disposal (see 5.2.11 above).
- Pesticide effectiveness

The monitoring plan should include a description of the specific kinds of monitoring, who will do it, and who will be responsible for correcting unsafe practices or problems found during monitoring.

6. Summary of Mitigative Measures and Requirements

Briefly summarize all mitigative measures needed to reduce the risk of negative environmental impacts. This is a critical section because it influences the threshold determination, so it should be written carefully and clearly. This section could take the following form:

1. non-chemical methods of control used,
2. extent to which IPM will be emphasized via demonstration and training,
3. selection of pesticides,
4. have no acceptable non-chemical alternatives,
5. are EPA registered for same of similar use,
6. have low human toxicities and present no unacceptable acute or long-term toxicological hazards,
7. not classified by EPA for Restricted Use,
8. present no unacceptable hazards to the environment or non-target organisms,
9. provide pesticide training and protection to project personnel and participating farmers,
10. monitor project use of pesticides on farmer's fields and demonstration sites and enforce their proper use, and
11. comply with local laws and regulations.

7. References

Bingham, Charlotte, Walter Knausenberger, and Weston Fisher. 1999. Environmental Documentation Manual: For P.L. 480 Title II Cooperating Sponsors Implementing Food-USAID Development Programs. USAID Bureau for Africa and Bureau for Humanitarian Response. USAID/AFR/SD & USAID/BHR/FFP.

Bottrell, Dale G., et al., 1991. How to prepare Environmental Assessments of pesticide use in USAID projects. Consortium for International Crop Protection.

Appendix A: Glossary*

Absorption. The process by which a chemical is taken into the tissues of plants and animals.

Acaricide. A pesticide used to control mites or ticks.

Acceptable Daily Intake (ADI). The level of pesticide residue that may be consumed each day over the course of an average human life span without appreciable risk.

Active Ingredient (a.i.). The material in the pesticide formulation responsible for the toxic (or other desired) effects on the target pest.

Acute Dermal LD₅₀. The dose of a pesticide absorbed through the skin that kills 50 percent of a population of test animals; usually expressed in milligrams of pesticide per kilogram of body weight of test animal.

Acute Effects. The immediate effects (as opposed to delayed effects) of a pesticide.

Acute Oral LD₅₀. The dose of a pesticide ingested by mouth that kills 50 percent of a population of test animals; usually expressed in milligrams of pesticide per kilogram of body weight of test animal.

Acute (Short-Term) Toxicological Hazards. The immediate hazards of a pesticide.

Additive Effect. The complementary action of two or more chemicals giving an effect equal to the sum of the individual effects.

Adhesive. An adjuvant that helps a spray adhere i.e., stick to the surface of the target.

Adjuvant. Any substance that is included in the formulation of a pesticide to improve its efficiency—e.g., wetters, adhesives, and emulsifiers.

Adsorption. The process in which a substance becomes attached to the surface of a solid or liquid.

Adulterated. Any pesticide that has been illegally manipulated and whose purity and strength fall below the quality stated on its label.

* From “How to prepare environmental assessments of pesticide use in USAID agricultural projects” by the Consortium for International Crop Protection (CICP), 1991; partially based on, Marer, P. J., Flint, M. L., and Stimmann, M. W., The safe and effective use of pesticides. Pesticide Appl. Compendium 1, Univ. Calif. Statewide IPM Project, Div. Agr. Nat. Resources. Publ. 3324.

Aerosol. A fine mist of solid or liquid particles suspended in air.

Agro-ecosystem. The ecological community and physical environment in an agricultural land unit.

USAID Mission. The USAID representation in a foreign country.

USAID Environmental Procedures. Procedures of Title 22 of the Code of Federal Regulation, Part 216 to ensure that environmental factors and values are integrated into the USAID decision-making process.

USAID Pesticide Procedures. Procedures of the Code of Federal Regulation Part 216.3 (b) to ensure that the potential environmental impacts of pesticides are integrated into the USAID decision-making process.

Annual. Plants described as annuals germinate, flower, and seed within one year.

Antagonism. One organism or substance affecting negatively another organism or substance.

Antibiotic. A substance that is used to destroy bacteria.

Antidote. Treatment given to counteract the effects of poisoning.

Aphicide. A pesticide used for killing aphids.

Aquatic. Pertaining to water.

Attractant. A substance that attracts a specific species of animal. When manufactured to attract pests to traps or poisoned bait, attractants are considered to be pesticides.

Avian. Pertaining to birds.

Avicide. A pesticide used to control bird pests.

Bait. A food or food-like substance used to attract and, often, to poison pest animals.

Band Application. The application of a pesticide in discrete strips either within or between crop rows.

Beneficial. Helpful in some way to people, such as a beneficial plant or insect.

Biennial. A biennial plant is one that requires two years to complete its life cycle.

Bioaccumulation. The gradual buildup of certain pesticides within the tissues of living organisms after they feed on lower organisms containing smaller amounts of these pesticides. Animals higher in the food chain accumulate greater amounts of these pesticides in their tissues.

Biodegradation. The process by which micro-organisms use a substance as a source of energy and bring about its destruction; usually applied to biological processes in soil, water, and sewage.

Biodiversity. The richness or abundance of species of organisms or biotic life.

Biological Control. The use of natural enemies (predators, parasites, or disease agents) to control pests.

Boom. A pipe of varying length on a crop sprayer that carries a number of nozzles.

Brand Name. See Tradename.

Broadcast Application. A term used to describe the overall spreading of a pesticide over a field.

Broad Spectrum Pesticide. A pesticide that is capable of controlling many different species or types of pests.

Carcinogenicity. The cancer-causing potential of a substance.

Carrier. Inert ingredient in a pesticide formulation on or into which the active ingredient is adsorbed or absorbed— e.g., kaolin for dusts.

Caution. The signal word on labels of pesticide in EPA toxicity category II or IV; these pesticides have an oral LD₅₀ greater than 500 and a dermal LD₅₀ greater than 2000.

Chemical Name. Name of the chemical ingredients of a pesticide.

Chronic. Pertaining to long duration or frequent occurrence.

Chlorosis. The yellowing of a plant's green tissue.

Cholinesterase. The enzyme necessary in the insect and human body for proper nerve function. It is inhibited or damaged by organophosphates or carbamate insecticides.

Climate. The prevailing or average weather conditions of a place as determined by temperature and meteorology over a period of years.

Common Name. An approved non-technical name of a pesticide product. An approved non-technical name of an organism.

Compatibility. In USAID Environmental Assessments, refers to the degree of known hazards to the target ecosystem (crops to be treated) or the non-target ecosystem (surrounding non-cropping environment or crops not to be treated).

Concentrate. A pesticide, as sold, before being diluted for application.

Concentration. The amount of active ingredient in a given volume or weight of a formulation or mixture.

C.D.A. Controlled Droplet Application. The application of pesticides by a machine, frequently with a spinning disc, to give droplets of a uniform size.

Corneal Opacity. The eye's imperviousness to rays of light.

Corrosive. Having the power to corrode or wear away by chemical action.

Cotyledons. The first seed-leaves to appear when a seed germinates.

Cultural Controls. Crop management and other practices that make the environment less favorable for pests e.g., field sanitation, crop rotation, diversification, harvesting practices, time of planting, trap crops.

Curative Treatment. Control of an existing infection or infestation. (opp. preventive).

Cuticle. The outer skin of a plant.

Danger. The signal word on labels of pesticides in EPA Toxicity Category I pesticides with an oral LD₅₀ of 50 or less or a dermal LD₅₀ less than 200 or having specific, serious health or environmental hazards.

Deflocculating Agent (or Dispersant). A material added to a suspension to prevent rapid settling out of solids in the spray tank.

Defoliant. A chemical that causes plant leaves to die and fall off.

Degradation. The process by which a chemical is broken down or reduced to a less complex form.

Dermal. Pertaining to the skin. One of the major ways that pesticides can enter the body.

Dermal LD₅₀. See Acute Dermal LD₅₀.

Dessicant. A chemical that causes foliage to wither and die; sometimes used as an aid to harvesting.

Detergent. A liquid normally used as a cleaning substance. Some of these products may also be used as wetters to improve the covering and wetting capacity of pesticides.

Dicotyledon. A flowering plant with two cotyledons—e.g., a broad-leafed plant.

Diluent. Inert material used to dilute a concentrated chemical.

Direct Drilling. The planting of a crop without any cultivation or seedbed preparation since the previous crop.

Dose. The measured and prescribed quantity of a pesticide.

Drift. The movement of pesticide dust, spray, or vapor away from the application site.

Ecological. Consideration of the interrelationship between living organisms and the environment.

Economic Damage. Damage caused by pests to plants, animals, or other resources that results in loss of income or reduction in value.

Economic Injury Level. The point at which the value of the damage caused by a pest exceeds the cost of controlling the pest.

Ecosystem. An ecological community together with its physical environment.

Effectiveness, Efficacy. The ability of a pesticide to produce a desired effect on a target organism.

Emetic. A substance that will cause vomiting and that is used in first aid for certain types of pesticide poisoning.

Emulsifiable Concentrate (EC). A liquid pesticide consisting of an active ingredient, a solvent, and an emulsifier that mixes with water to form an emulsion.

Emulsifier. A chemical that helps one liquid to form tiny droplets that remain suspended in another liquid—e.g., one used to form a stable mixture of two liquids, such as oil and water, that would not ordinarily mix.

Endangered Species. A species in danger of extinction.

Environment. All of the living organisms and non-living features of a defined area.

Environmental Assessment. In USAID projects, a detailed study of the reasonably foreseeable significant effects, both beneficial and adverse, of a proposed action on the environment of a foreign country or countries.

Environmental Impact Statement. A detailed study of the reasonably foreseeable environmental impacts, both positive and negative, of a proposed USAID action and its reasonable alternatives on the U.S., the global environment, or areas outside the jurisdiction of any nation.

EPA Toxicity Category. Four categories used to indicate the potential hazard of EPA-registered pesticides, thus Class I (Danger-Poison), Class II (Warning), Class III-IV (Caution).

Exempt from Tolerance. Indicates that EPA has determined that minute amounts of pesticide residue on foods will cause no adverse effects on humans.

Fauna. Animal life.

Fetotoxicity. Pesticide toxicity to the unborn fetus.

FIFRA. The Federal Insecticide, Fungicide, and Rodenticide Act of 1947; governs the licensing or registration of pesticide products.

First Aid. Emergency treatment given to an injured person before he/she is treated by a trained doctor.

Flora. Plant life.

Foliar Spray. A chemical applied to the leaves i.e., the foliage, of the plant.

Food Chain. A succession of living organisms, each of which feeds, at least in part, on the preceding one.

Formulation. A mixture of active ingredients combined during manufacture with inert materials. Inert materials are added to improve the mixing and handling qualities of an insecticide.

Fumigant. Vapor or gas form of a pesticide used to penetrate porous surfaces for control of soil-dwelling pests or pests in enclosed areas or storage.

Fungicide. A pesticide used for the control of fungi.

General Use (Unclassified) Pesticide. A pesticide that has been designated by EPA for use by the general public as well as by licensed or certified applicators.

Genetic Control. A pest control method that makes use of selected strains of target species possessing genetic abnormalities that, when released, mate with normal organisms to produce sterile or weaker progeny.

Geography. The physical features (especially the surface features) of a region, area, or place.

Groundwater. Fresh water trapped in aquifers beneath the surface of the soil and used for drinking, irrigation, and manufacturing.

Habitat. The place where an organism lives.

Herbicide. A pesticide used to control weeds.

Host. A plant or animal species that provides sustenance for another organism.

Host Country. The country hosting an USAID project.

Host Resistance. The ability of a host plant or animal to ward off or resist attack by pests or to be able to tolerate damage by pests.

Hydrology. The science dealing with water, its distribution, and the evaporation and precipitation cycle.

Hydrophobic. Repels water.

Hygroscopic. Readily absorbs moisture.

Immune. Not susceptible to a disease or poison.

Inert Ingredient. A substance (such as a solvent) contained in a pesticide formulation that, by itself, does not add materially to the pesticide's effect on a pest.

Ingest. Eat or swallow.

Ingredients. The chemical composition of the pesticide.

Inhale. Breath into lungs.

Initial Environmental Examination (IEE). The first review of the reasonably foreseeable effects of a proposed action on the environment.

Inorganic Chemical. One that does not contain carbon.

Insecticide. A pesticide used to control insects. Some insecticides are also labeled for control of ticks, mites, spiders, and other arthropods.

Integrated Pest Management (IPM). Use of a variety of biological, cultural, and chemical control methods in a cohesive management scheme designed to maintain pest populations at levels below those causing economic injury.

Interval. The legal period of time that must elapse between application of a pesticide and worker re-entry into the treated field or the harvesting of produce.

Intoxication. A state of giddiness and loss of control caused by intake or exposure to a toxic substance.

Invertebrate. An animal with no backbone (e.g., an insect).

Irreversible. An effect that is not reversible or that cannot be appealed or annulled.

Knapsack Sprayer. A small portable sprayer carried on the back of a person making a pesticide application. Some knapsack sprayers are hand-operated, others are powered by small gasoline engines.

Label Signal Word. See **Signal Word**.

Larva. The grub stage of an insect that, after a period of feeding, will pupate.

LC₅₀. The lethal concentration of a pesticide in the air or in a body of water that will kill half of a test population; given in micrograms per milliliter of air or water.

LD₅₀. Abbreviation of a median lethal dose MLD. A dose of pesticide that kills 50 percent of a population of test animals; usually expressed in milligrams of pesticide per kilogram of test animal body weight.

Leaching. Removal of chemical substances from the soil by the movement of water.

Lethal. Capable of causing death.

Liability. Legal responsibility.

Long-Term (Delayed) Toxicological Hazards. Hazards occurring over or involving a relatively long period of time.

Mammalian Toxicity. A measure of how poisonous a substance is to mammals.

Maximum Residue Limit (MRL). The maximum residue level likely to arise when a pesticide is used according to recommendations reflecting good agricultural practices.

Metamorphosis. Change in form or structure of an insect during its life cycle, typically, egg, larva, pupa, adult.

Misuse Statement. Statement on a pesticide label that indicates when the pesticide is used incorrectly and the potential consequences.

Mites. Tiny, sometimes microscopic, relatives of insects that belong to the order *Acari* or the arthropod phylum.

Miticide. A chemical used to control mites.

Mitigative Measures. Action taken to avoid reduce, minimize, repair, or compensate for an adverse environmental impact.

MLD. Median lethal dose. See LD₅₀

Mode of Action. The way a pesticide reacts with a pest organism to destroy it.

Molluscicide. A pesticide used to control slugs or snails.

Monitoring. Sampling or observations of pesticide use, pesticide residues, natural enemies, etc.

Monocotyledon. A plant that produces one seed-leaf only—e.g., maize, rice, grain crops, and grasses.

Mutagenic. A chemical capable of causing mutations in the cells of living organisms.

Mutagenicity. The degree to which a compound can cause a biological mutation.

Natural Enemies. Predators, parasites, and microorganisms that cause the death of pests; biological control agents.

Necrosis. Death of a living tissue.

Necrotic. Showing a number of areas of dead tissue in any part of a plant.

Negative Determination or Negative Threshold Decision. A determination, following preparation of an IEE, that an action will have no reasonably foreseeable significant adverse impact on the environment.

Nematicide. A pesticide used to control nematodes.

Nematode. Elongated, cylindrical, non-segmented worms. Nematodes are commonly microscopic; some are parasites of plants or animals.

Non-chemical Method. Any method other than chemical pesticide used to prevent or control a pest.

Non-target Ecosystem. Animals or plants within or outside a pesticide treated area that are not intended to be killed or injured by the pesticide application.

Nozzle. A short tube at the end of a sprayer hose that breaks up a pesticide spray into small droplets and directs it toward the target area.

Nymph. The immature stage of an insect, such as a locust, grasshopper, and plant bug, that does not undergo complete metamorphosis.

Oncogenicity. A measure of the tendency of a compound to cause tumors.

Oral. Through the mouth; one of the routes of entry of pesticides into the body.

Organic Chemical. One containing carbon.

Organic Matter. Plant or animal material in varying stages of decomposition.

Organism. Any living thing.

Ovicide. A chemical used to kill insect (mite) eggs.

Parasite (Parasitoid). An organism that grows and feeds in on a host; often used in biological control programs to suppress pest populations.

Pathogen. A microorganism that causes a disease.

Perennial. A plant that normally lives for more than two years.

PEST-BANK. A database of SilverPlatter Information Services that allows access to information (registration status, residue tolerances, etc.) on EPA-registered pesticides.

Persistence. The quality of a pesticide to remain active for a given period e.g., certain organochlorines such as DDT and aldrin have long persistence.

Pest Control Practice. An action taken (such as plowing, rotating crops, etc.) to reduce a pest problem. Sometimes used interchangeably with **Tactic**.

Pest Management. Any deliberative action to prevent or reduce the density or harmful effects of a pest population.

Pest Scouting. Systematic sampling of pest populations in a crop with a view to determining the likely cost of damage compared with the cost of control (see **Economic Threshold**).

Pesticide. From “pest” and “cide” (a Latin derivative meaning killer), a natural or synthetic chemical agent that kills or in some ways diminishes the action of pests. It is a general term that includes herbicides, insecticides, nematocides, fungicides, antibiotics, rodenticides, plant growth regulators, etc.

Pesticide Formulation. The pesticide as it comes from its original container, consisting of the active ingredient blended with inert materials.

Pesticide Label. Information on a pesticide container required by USEPA.

Pesticide Management. Deliberative actions to reduce the harmful effects of pesticides; includes legislation and regulations as well as safe application, storage, and disposal.

Pesticide Resistance. Genetic qualities of a pest population that enable individuals to resist the effects of certain types of pesticides that are toxic to other members of that species.

Pests. Commonly include harmful insects, mites, ticks, weeds, bacteria, fungi, rodents, birds, and others.

PH. A measure of the relative acidity of a solution.

Pheromone. A chemical substance given off by one individual that causes a specific reaction by other individuals of the same species, such as sex attractants.

Phloem. A system of interconnected elongated living cells in plants that convey the products of photosynthesis from the leaf to the rest of the plant.

Photosynthesis. The conversion of carbon dioxide and water into carbohydrates (e.g., starch and sugar) that takes place in green plants in the presence of chlorophyll and light.

Phytotoxic. Injurious to plants.

Positive Determination or Positive Threshold Decision. Determination that significant impact is likely, based on the preparation of the IEE, which makes the case that an activity will have a reasonably foreseeable chance of significant adverse impact on the environment, and that preparation of an EA or WIS will be required.

Precautionary Statement. Statements on a pesticide label that gives precautions for using the product.

Precipitation. An alternative word for rainfall.

Predator. An organism that lives by preying on animals (prey); often used in biological control programs to suppress pest populations.

Pre-Harvest Interval. A period of time set by law that must elapse between pesticide applications to an edible crop and harvesting of the crop. Pesticide labels provide information on pre-harvest intervals.

Prey. Animals that serve as food for predators

Product. A commercial formulation of a pesticide.

Project Identification Document (PID). An internal USAID document that initially identifies and describes the proposed project.

Project Paper. An internal USAID document that provides the definitive description and appraisal of a project, particularly the implementation plan.

Prophylactic. A chemical or treatment used to prevent a pathogen from invading an organism and causing disease, as distinct from one used curatively.

Pupa. The inactive stage between larva and adult in insects that undergo complete metamorphosis.

Random Sampling. The most commonly used method of scouting for insect numbers and damage whereby samples are taken at random—i.e., without a plan with good field coverage.

Rate. The quantity or volume of pesticide that is applied to an area over a specified period of time.

Re-entry Interval. The period of time specified by law that must elapse after a pesticide is applied before people can resume work in the treated area.

Re-Entry Statement. Statement on the pesticide label concerning the time between application of the material and safe entry into the treated area.

Registration and Establishment Number. The registration number assigned to the product by EPA. For regular registrations, the number preceding the hyphen represents the registering company (establishment).

Reproductive Effects. Effects of a pesticide on reproduction in animals.

Residue. Traces of pesticide that remain on treated surfaces after a period of time.

Resistance. See **Pesticide Resistance** and **Host Resistance**.

Respirator. A device worn over the nose and mouth to prevent inhalation of toxic substances.

Restricted-Use Pesticide (RUP). A pesticide, usually in EPA toxicity Category I, that is available for purchase and use only by applicators who have a valid certified Pesticide Applicator license, or by persons under their direct supervision.

Reversible. Opposite of irreversible.

Rhizome. A belowground creeping stem by which certain plants spread rapidly e.g., *Cynodon dactylon* and *Imerata cylindrica*.

Rodenticide. A pesticide used to control rats or other rodents.

Rogueing. The removal of non-typical individual plants from a crop; mostly done by hand.

Rope Wick Applicator. A device used to apply contact herbicides onto target weed foliage with a saturated rope or cloth pad.

Rotation. The practice of growing crops on the same land in a regular sequence to maintain fertility and to prevent pests such as weeds, insects, or soil-borne diseases from reaching damaging population levels.

Safety Equipment. Face masks, goggles, respirators, etc., to reduce exposure to and risks from pesticides.

Scientific Name. This is normally in Latin and is the name used universally to identify a specific plant or animal.

Selective Pesticide. A pesticide that has a mode of action against only a single or small number of pest species.

Signal Word. The word “Danger,” “Warning,” or “Caution” that appears on the label of an EPA-registered pesticide to signify how toxic the pesticide is and what toxicity category it belongs to.

Significant Effect. A proposed action has significant effect on the environment if it does significant harm to the environment.

Slugs. Any of the gastropod land mollusks with rudimentary internal shells in their mantles.

Slurry. A mixture of a liquid and a wettable powder in a thick flowable paste or cream.

Snails. Gastropod mollusks living on or in water and having a spiral protective shell.

Soil Sterilant. A chemical applied to the soil to give general control of soil pests.

Solution. Mixture of solid, liquid or gas dissolved in a liquid.

Solvent. Liquid, such as water, kerosene or oil, that dissolves a pesticide and forms a solution.

Special Review. A process to determine if certain EPA risk criteria are exceeded by a particular registered pesticide. If the Review determines that a pesticide exceeds the risk criteria, the pesticide is presumed unsuitable for registration unless that presumption is rebutted.

Species. A group of plants or animals, with similar characteristics and common name, that propagate true to type.

Split Application. A treatment in which the total dose of a pesticide is divided between two or more applications.

Spot Treatment. The application of a pesticide to individual plants or limited areas.

Spreader. An adjuvant which helps droplets to cover the surfaces of a plant or evenly.

Statement of Practical Treatments. Statement on a pesticide label of acceptable procedures for treating people poisoned by or contaminated with the material.

Statement of Use Classification. Statement on a label to make proper use of the material understandable.

Storage (of pesticides). The way pesticides are kept when not being used.

Susceptible. Sensitive to disease, pesticide, etc., not immune.

Suspension. Finely divided solid particles distributed throughout a liquid or gas.

Symbiosis. The living together of two or more different organisms each giving and taking something from the other, e.g. root nodule bacteria with leguminous plants.

Synergism. The complementary action of two or more chemicals giving a combined effect greater than the sum of their independent effects.

Tactic. Any method (pesticidal, biological control agent, etc.) used to reduce a pest problem.

Target. Either the pest that is being controlled or surfaces within an area that the pest will contact.

Target Ecosystem. An ecosystem intentionally receiving a pesticide application such as a crop ecosystem.

Target Pest. A harmful organism at which a pesticide or other pest control tactic or practice is directed.

Teratogenicity. A measure of a compound's tendency to cause physical birth defects in the offspring of exposed parents.

Testicular Effects. Effects of a pesticide on a male's testes.

Threatened Species. Any species of fish, wildlife, or plant listed as having its existence threatened.

Threshold Decision. A formal agency decision that determines, based on an IEE, whether a proposed Agency action is a major action significantly affecting the environment.

Thyroid Effect. Effects of a pesticide on a thyroid gland.

Tolerance. The pesticide residue level permitted in or on raw agricultural commodities or processed foods.

Toxic. Poisonous

Toxicity. A pesticides potential for causing harm.

Toxicity Category. See EPA Toxicity Category.

Trace Elements. Elements needed in very small quantities by plants.

Trade Name. Trademark (brand) name of a pesticide, formulation, or other product.

Translocation. The movement of fluids in the vascular system of plants both upward and downward.

U.S. Environmental Protection Agency (EPA). The federal agency responsible for regulating pesticide use in the U.S.

Ultra Low Volume. A pesticide application technique in which very small amounts of liquid spray are applied over a unit area; usually 2 liters or less of spray per acre in row crops to about 20 liters of spray per acre in orchards and vineyards.

Unclassified, General Use Pesticide. See **General Use Pesticide.**

User (of Pesticides). Any person using (storing, mixing, applying, transporting, or disposing of) a pesticide.

Vascular System. The system of tube-like phloem and xylem cells in a plant that provides the means for transporting components of the plant from their sites of entry or synthesis to their sites of use or storage.

Vector. A carrier, such as an insect, that transmits a pathogen from a diseased plant or animal to a healthy one.

Vermin. Noxious animals, used commonly to describe rats and mice but also for some insects e.g., cockroaches.

Vertebrates. The group of animals that have an internal skeleton and segmented spine, such as fish, birds, reptiles, and mammals.

Virulence. Measure of the infectious potency of a pathogen.

Virus. A very small living organism that multiplies in living cells and is capable of producing disease symptoms in some plants and animals.

Volatile. Readily vaporizable at a relatively low temperature.

Warranty. The manufacturer's guarantee of the integrity of a pesticide product.

Warning. The signal word used on labels of pesticides in EPA toxicity Category II, having an oral LD₅₀ between 50 and 500 and a dermal LD₅₀ between 200 to 2000.

Wettable Powder. A pesticide formulation composed of an active ingredient mixed with a fine dust and a wetting agent that mixes readily with water and forms a suspension for spraying.

Xylem. Tube-like dead vessels in plants that carry water and minerals from the roots to the leaves and shoots.

Appendix B: Part 216 – USAID Environmental Procedures

These procedures have been revised based on experience with previous ones agreed to in settlement of a lawsuit brought against the Agency in 1975. The procedures are Federal Regulations and, therefore, it is imperative that they be followed in the development of Agency programs.

In preparing these Regulations, some interpretations and definitions have been drawn from Executive Order No. 12114 of 4 January 1979, on the application of the National Environmental Policy Act (NEPA) to extraterritorial situations. Some elements of the revised regulations on NEPA issued by the President's Council on Environmental Quality have also been adopted. Examples are: the definition of significant impact, the concept of scoping of issues to be examined in a formal analysis, and the elimination of certain AID activities from the requirement for environmental review.

In addition, these procedures: 1) provide advance notice that certain types of projects will automatically require detailed environmental analysis, thus eliminating one step in the former process and permitting early planning for this activity; 2) permit the use of specially prepared project design considerations or guidance to be substituted for environmental analysis in selected situations; 3) advocate the use of indigenous specialists to examine pre-defined issues during the project design stage; 4) clarify the role of the Bureau's Environmental Officer in the review and approval process; and 5) permit, in certain circumstances, projects to go forward prior to completion of environmental analysis.

Note that only minimal clarification changes have been made in those sections dealing with the evaluation and selection of pesticides to be supported by AID in projects or of a non-project assistance activity.

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INTERNATIONAL DEVELOPMENT COOPERATION AGENCY

U.S. Agency for International Development
22 CFR Ch. II (4-1-89 Edition) PART 216

ENVIRONMENTAL PROCEDURES

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Source: 41 FR 26913, June 30, 1976.

§216.1 Introduction

- (a) Purpose. In accordance with sections 118(b) and 621 of the Foreign Assistance Act of 1961, as amended, (the FAA) the following general procedures shall be used by USAID to ensure that environmental factors and values are integrated into the USAID decision making process. These procedures also assign responsibility within the Agency for assessing the environmental effects of USAID's actions. These procedures are consistent with Executive Order 12114, issued January 4, 1979, entitled Environmental Effects Abroad of Major Federal Actions, and the purposes of the National Environmental Policy Act of 1970, as amended (42 U.S.C. 4371 et seq.)(NEPA). They are intended to implement the requirements of NEPA as they effect the USAID program.
- (b) Environmental Policy. In the conduct of its mandate to help upgrade the quality of life of the poor in developing countries, USAID conducts a broad range of activities. These activities address such basic problems as hunger, malnutrition, overpopulation, disease, disaster, deterioration of the environment and the natural resource base, illiteracy as well as the lack of adequate housing and transportation. Pursuant to the FAA, USAID provides development assistance in the form of technical advisory services, research, training, construction and commodity support. In addition. USAID conducts programs under the Agricultural Trade Development and Assistance Act of 1954 (Pub. L. 480) that are designed to combat hunger, malnutrition and to facilitate economic development. Assistance programs are carried out under the foreign policy guidance of the Secretary of State and in cooperation with the governments of sovereign states. Within this framework, it is USAID policy to:
- (1) Ensure that the environmental consequences of USAID-financed activities are identified and considered by USAID and the host country prior to a final decision to proceed and that appropriate environmental safeguards are adopted;
 - (2) Assist developing countries to strengthen their capabilities to appreciate and effectively evaluate the potential environmental effects of proposed development strategies and projects, and to select, implement and manage effective environmental programs;
 - (3) Identify impacts resulting from USAID's actions upon the environment, including those aspects of the biosphere which are the common and cultural heritage of all mankind; and
 - (4) Define environmental limiting factors that constrain development and identify and carry out activities that assist in restoring the renewable resource base on which sustained development depends.

(c) Definitions

- (1) CEQ Regulations. Regulations promulgated by the President's Council on Environmental Quality (CEQ) (Federal Register, Volume 43, Number 230, November 29, 1978) under the authority of NEPA and Executive Order 11514, entitled Protection and Enhancement of Environmental Quality (March 5, 1970) as amended by Executive Order 11991 (May 24, 1977).
- (2) Initial Environmental Examination. An Initial Environmental Examination is the first review of the reasonably foreseeable effects of a proposed action on the environment. Its function is to provide a brief statement of the factual basis for a Threshold Decision as to whether an Environmental Assessment or an Environmental Impact Statement will be required.
- (3) Threshold Decision. A formal Agency decision which determines, based on an Initial Environmental Examination, whether a proposed Agency action is a major action significantly affecting the environment.
- (4) Environmental Assessment. A detailed study of the reasonably foreseeable significant effects, both beneficial and adverse, of a proposed action on the environment of a foreign country or countries.
- (5) Environmental Impact Statement. A detailed study of the reasonably foreseeable environmental impacts, both positive and negative, of a proposed USAID action and its reasonable alternatives on the United States, the global environment or areas outside the jurisdiction of any nation as described in §216.7 of these procedures. It is a specific document having a definite format and content, as provided in NEPA and the CEQ Regulations. The required form and content of an Environmental Impact Statement is further described in §216.7 infra.
- (6) Project Identification Document (PID). An internal USAID document which initially identifies and describes a proposed project.
- (7) Program Assistance Initial Proposal (PAIP). An internal USAID document used to initiate and identify proposed non-project assistance, including commodity import programs. It is analogous to the PID.
- (8) Project Paper (PP). An internal USAID document which provides a definitive description and appraisal of the project and particularly the plan or implementation.
- (9) Program Assistance Approval Document (PAAD). An internal USAID document approving non-project assistance. It is analogous to the PP.
- (10) Environment. The term environment, as used in these procedures with respect to effects occurring outside the United States, means the natural and physical environment. With respect to effects occurring within the United States see §216.7(b).
- (11) Significant Effect. With respect to effects on the environment outside the United States, a proposed action has a significant effect on the environment if it does significant harm to the environment.
- (12) Minor Donor. For purposes of these procedures, USAID is a minor donor to a multidonor project when USAID does not control the planning or design of the multidonor project and either

- (i) USAID's total contribution to the project is both less than \$1,000,000 and less than 25 percent of the estimated project cost, or
- (ii) USAID's total contribution is more than \$1,000,000 but less than 25 percent of the estimated project cost and the environmental procedures of the donor in control of the planning of design of the project are followed, but only if the USAID Environmental Coordinator determines that such procedures are adequate.

§216.2 Applicability of Procedures

- (a) Scope. Except as provided in §216.2(b), these procedures apply to all new projects, programs or activities authorized or approved by USAID and to substantive amendments or extensions of ongoing projects, programs, or activities.
- (b) Exemptions. (1) Projects, programs or activities involving the following are exempt from these procedures:
 - (i) International disaster assistance;
 - (ii) Other emergency circumstances; and
 - (iii) Circumstances involving exceptional foreign policy sensitivities.
 (2) A formal written determination, including a statement of the justification therefore, is required for each project, program or activity for which an exemption is made under paragraphs (b)(1) (ii) and (iii) of this section, but is not required for projects, programs or activities under paragraph (b)(1)(i) of this section. The determination shall be made either by the Assistant Administrator having responsibility for the program, project or activity, or by the Administrator, where authority to approve financing has been reserved by the Administrator. The determination shall be made after consultation with CEQ regarding the environmental consequences of the proposed program, project or activity.
- (c) Categorical Exclusions. (1) The following criteria have been applied in determining the classes of actions included in §216.2©(2) for which an Initial Environmental Examination, Environmental Assessment and Environmental Impact Statement generally are not required;
 - (i) The action does not have an effect on the natural or physical environment;
 - (ii) USAID does not have knowledge of or control over, and the objective of USAID in furnishing assistance does not require, either prior to approval of financing or prior to implementation of specific activities, knowledge of or control over, the details of the specific activities that have an effect on the physical and natural environment for which financing is provided by USAID;
 - (iii) Research activities which may have an affect on the physical and natural environment but will not have a significant effect as a result of limited scope, carefully controlled nature and effective monitoring.

- (2) The following classes of actions are not subject to the procedures set forth in §216.3, except to the extent provided herein;
- (i) Education, technical assistance, or training programs except to the extent such programs include activities directly affecting the environment (such as construction of facilities, etc.);
 - (ii) Controlled experimentation exclusively for the purpose of research and field evaluation which are confined to small areas and carefully monitored;
 - (iii) Analyses, studies, academic or research workshops and meetings;
 - (iv) Projects in which USAID is a minor donor to a multidonor project and there is no potential significant effects upon the environment of the United States, areas outside any nation's jurisdiction or endangered or threatened species or their critical habitat;
 - (v) Document and information transfers;
 - (vi) Contributions to international, regional or national organizations by the United States which are not for the purpose of carrying out a specifically identifiable project or projects;
 - (vii) Institution building grants to research and educational institutions in the United States such as those provided for under section 122(d) and Title XII of Chapter 2 of Part I of the FAA (22 USCA 2151 p. (b) 2220a. (1979));
 - (viii) Programs involving nutrition, health care or population and family planning services except to the extent designed to include activities directly affecting the environment (such as construction of facilities, water supply systems, waste water treatment, etc.)
 - (ix) Assistance provided under a Commodity Import Program when, prior to approval, USAID does not have knowledge of the specific commodities to be financed and when the objective in furnishing such assistance requires neither knowledge, at the time the assistance is authorized, nor control, during implementation, of the commodities or their use in the host country.
 - (x) Support for intermediate credit institutions when the objective is to assist in the capitalization of the institution or part thereof and when such support does not involve reservation of the right to review and approve individual loans made by the institution;
 - (xi) Programs of maternal or child feeding conducted under Title II of Pub. L. 480;
 - (xii) Food for development programs conducted by food recipient countries under Title III of Pub. L. 480, when achieving USAID's objectives in such programs does not require knowledge of or control over the details of the specific activities conducted by the foreign country under such program;
 - (xiii) Matching, general support and institutional support grants provided to private voluntary organizations (PVOs) to assist in financing programs where USAID's objective in providing such financing does not require knowledge of or control over the details of the specific activities conducted by the PVO;

- (xiv) Studies, projects or programs intended to develop the capability of recipient countries to engage in development planning, except to the extent designed to result in activities directly affecting the environment (such as construction of facilities, etc.); and
 - (xv) Activities which involve the application of design criteria or standards developed and approved by USAID
- (3) The originator of a project, program or activity shall determine the extent to which it is within the classes of actions described in paragraph ©(2) of this section. This determination shall be made in writing and be submitted with the PID, PAIP or comparable document. This determination, which must include a brief statement supporting application of the exclusion shall be reviewed by the Bureau Environmental Officer in the same manner as a Threshold Decision under §216.3(a)(2) of these procedures. Notwithstanding paragraph (c)(2) of this section, the procedures set forth in §216.3 shall apply to any project, program or activity included in the classes of actions listed in paragraph (c)(2) of this section, or any aspect or component thereof, if at any time in the design, review or approval of the activity it is determined that the project, program or activity, or aspect or component thereof, is subject to the control of USAID and may have a significant effect on the environment.
- (d) **Classes of Actions Normally Having a Significant Effect on the Environment.**
- (1) The following classes of actions have been determined generally to have a significant effect on the environment and an Environmental Assessment or Environmental Impact Statement, as appropriate, will be required:
 - (i) Programs of river basin development;
 - (iii) Irrigation or water management projects, including dams and impoundments;
 - (iii) Agricultural land leveling;
 - (iv) Drainage projects;
 - (v) Large scale agricultural mechanization;
 - (vi) New lands development;
 - (vii) Resettlement projects;
 - (viii) Penetration road building or road improvement projects;
 - (ix) Powerplants;
 - (x) Industrial plants;
 - (xi) Potable water and sewerage projects other than those that are small-scale.
 - (2) An Initial Environmental Examination normally will not be necessary for activities within the classes described in §216.2(d), except when the originator of the project believes that the project will not have a significant effect on the environment. In such cases, the activity may be subjected to the procedures set forth in §216.3.
- (e) Pesticides. The exemptions of §216.2(b)(1) and the categorical exclusions of §216.2 (c)(2) are not applicable to assistance for the procurement or use of pesticides.

§216.3 Procedures

(a) General procedures

- (1) Preparation of the Initial Environmental Examination. Except as otherwise provided, an Initial Environmental Examination is not required for activities identified in §216.2(b)(1), (c) (2), and (d). For all other USAID activities described in §216.2(a) an Initial Environmental Examination will be prepared by the originator of an action. Except as indicated in this section, it should be prepared with the PID or PAIP. For projects including the procurement or use of pesticides, the procedures set forth in §216.3 (b) will be followed, in addition to the procedures in this paragraph. Activities which cannot be identified in sufficient detail to permit the completion of an Initial Environmental Examination with the PID or PAIP, shall be described by including with the PID or PAIP:
 - (i) An explanation indicating why the Initial Environmental Examination cannot be completed;
 - (ii) an estimate of the amount of time required to complete the Initial Environmental Examination; and
 - (iii) a recommendation that a Threshold Decision be deferred until the Initial Environmental Examination is completed. The responsible Assistant Administrator will act on the request for deferral concurrently with action on the PID or PAIP and will designate a time for completion of the Initial Environmental Examination. In all instances, except as provided in §216.3 (a)(7), this completion date will be in sufficient time to allow for the completion of an Environmental Assessment or Environmental Impact Statement, if required, before a final decision is made to provide USAID funding for the action.
- (2) Threshold decision. (i) The Initial Environmental Examination will include a Threshold Decision made by the officer in the originating office who signs the PID or PAIP. If the Initial Environmental Examination is completed prior to or at the same time as the PID or PAIP, the Threshold Decision will be reviewed by the Bureau Environmental Officer concurrently with approval of the PID or PAIP. The Bureau Environmental Officer will either concur in the Threshold Decision or request reconsideration by the officer who made the Threshold Decision, stating the reasons for the request. Differences of opinion between these officers shall be submitted for resolution to the Assistant Administrator at the same time that the PID is submitted for approval.
 - (ii) An Initial Environmental Examination, completed subsequent to approval of the PID or PAIP, will be forwarded immediately together with the Threshold Determination to the Bureau Environmental Officer for action as described in this section.
 - (iii) A Positive Threshold Decision shall result from a finding that the proposed action will have a significant effect on the environment. An Environmental Impact Statement shall be prepared if required pursuant to §216.7. If an impact statement is not required, an Environmental Assessment will be prepared in accordance with §216.6. The cognizant Bureau or

Office will record a Negative Determination if the proposed action will not have a significant effect on the environment.

- (3) Negative Declaration. The Assistant Administrator, or the Administrator in actions for which the approval of the Administrator is required for the authorization of financing, may make a Negative Declaration, in writing, that the Agency will not develop an Environmental Assessment or an Environmental Impact Statement regarding an action found to have a significant effect on the environment when (i) a substantial number of Environmental Assessments or Environmental Impact Statements relating to similar activities have been prepared in the past, if relevant to the proposed action, (ii) the Agency has previously prepared a programmatic Statement or Assessment covering the activity in question which has been considered in the development of such activity, or (iii) the Agency has developed design criteria for such an action which, if applied in the design of the action, will avoid a significant effect on the environment.
- (4) Scope of Environmental Assessment or Impact Statement
 - (i) Procedure and Content. After a Positive Threshold Decision has been made, or a determination is made under the pesticide procedures set forth in §216.3 (b) that an Environmental Assessment or Environmental Impact Statement is required, the originator of the action shall commence the process of identifying the significant issues relating to the proposed action and of determining the scope of the issues to be addressed in the Environmental Assessment or Environmental Impact Statement. The originator of an action within the classes of actions described in §216.2 (d) shall commence this scoping process as soon as practicable. Persons having expertise relevant to the environmental aspects of the proposed action shall also participate in this scoping process. (Participants may include but are not limited to representatives of host governments, public and private institutions, the USAID Mission staff and contractors.) This process shall result in a written statement which shall include the following matters:
 - (a) A determination of the scope and significance of issues to be analyzed in the Environmental Assessment or Impact Statement, including direct and indirect effects of the project on the environment.
 - (b) Identification and elimination from detailed study of the issues that are not significant or have been covered by earlier environmental review, or approved design considerations, narrowing the discussion of these issues to a brief presentation of why they will not have a significant effect on the environment.
 - (c) A description of
 - (1) the timing of the preparation of environmental analyses, including phasing if appropriate,
 - (2) variations required in the format of the Environmental Assessment, and
 - (3) the tentative planning and decision making schedule; and
 - (d) A description of how the analysis will be conducted and the disciplines that will participate in the analysis.

- (ii) These written statements shall be reviewed and approved by the Bureau Environmental Officer.
 - (iii) Circulation of Scoping Statement. To assist in the preparation of an Environmental Assessment, the Bureau Environmental Office may circulate copies of the written statement, together with a request for written comments, within thirty days, to selected federal agencies if that Officer believes comments by such federal agencies will be useful in the preparation of an Environmental Assessment. Comments received from reviewing federal agencies will be considered in the preparation of the Environmental Assessment and in the formulation of the design and implementation of the project, and will, together with the scoping statement, be included in the project file.
 - (iv) Change in Threshold Decision. If it becomes evident that the action will not have a significant effect on the environment (*i.e.*, will not cause significant harm to the environment), the Positive Threshold Decision may be withdrawn with the concurrence of the Bureau Environmental Officer. In the case of an action included in §216.2(d)(2), the request for withdrawal shall be made to the Bureau Environmental Officer.
- (5) Preparation of Environmental Assessments and Environmental Impact Statement. If the PID or PAIP is approved, and the Threshold Decision is positive, or the action is included in §216.2(d), the originator of the action will be responsible for the preparation of an Environmental Assessment or Environmental Impact Statement as required. Draft Environmental Impact Statements will be circulated for review and comment as part of the review of Project Papers and as outlined further in §216.7 of those procedures. Except as provided in §216.3 (a)(7), final approval of the PP or PAAD and the method of implementation will include consideration of the Environmental Assessment or final Environmental Impact Statement.
- (6) Processing and Review Within USAID
- (i) Initial Environmental Examinations, Environmental Assessments, and final Environmental Impact Statements will be processed pursuant to standard USAID procedures for project approval documents. Except as provided in §216.3 (a)(7), Environmental Assessments and final Environmental Impact Statements will be reviewed as an integral part of the Project Paper or equivalent document. In addition to these procedures, Environmental Assessments will be reviewed and cleared by the Bureau Environmental Officer. They may also be reviewed by the Agency's Environmental Coordinator who will monitor the Environmental Assessment process.
 - (ii) When project approval authority is delegated to field posts, Environmental Assessments shall be reviewed and cleared by the

- Bureau Environmental Officer prior to the approval of such actions.
- (iii) Draft and final Environmental Impact Statements will be reviewed and cleared by the Environmental Coordinator and the Office of the General Counsel.
- (7) Environmental Review After Authorization of Financing.
- (i) Environmental review may be performed after authorization of a project, program or activity only with respect to subprojects or significant aspects of the project, program or activity that are unidentified at the time of authorization. Environmental review shall be completed prior to authorization for all subprojects and aspects of a project, program or activity that are identified.
 - (ii) Environmental review should occur at the earliest time in design or implementation at which a meaningful review can be undertaken, but in no event later than when previously unidentified subprojects or aspects of projects, programs or activities are identified and planned. To the extent possible, adequate information to undertake deferred environmental review should be obtained before funds are obligated for unidentified subprojects or aspects of projects, programs or activities. (Funds may be obligated for the other aspects for which environmental review has been completed.) To avoid an irreversible commitment of resources prior to the conclusion of environmental review, the obligation of funds can be made incrementally as subprojects or aspects of projects, programs or activities are identified; or if necessary while planning continues, including environmental review, the agreement or other document obligating funds may contain appropriate covenants or conditions precedent to disbursement for unidentified subprojects or aspects of projects, programs or activities.
 - (iii) When environmental review must be deferred beyond the time some of the funds are to be disbursed (e.g., long lead times for the delivery of goods or services), the project agreement or other document obligating funds shall contain a covenant or covenants requiring environmental review, including an Environmental Assessment or Environmental Impact Statement, when appropriate, to be completed and taken into account prior to implementation of those subprojects or aspects of the project, program or activity for which environmental review is deferred. Such covenants shall ensure that implementation plans will be modified in accordance with environmental review if the parties decide that modifications are necessary.
 - (iv) When environmental review will not be completed for an entire project, program or activity prior to authorization, the Initial Environmental Examination and Threshold Decision required under §216.3 (a)(1) and (2) shall identify those aspects of the project, program or activity for which environmental review will

be completed prior to the time financing is authorized. It shall also include those subprojects or aspects for which environmental review will be deferred, stating the reasons for deferral and the time when environmental review will be completed. Further, it shall state how an irreversible commitment of funds will be avoided until environmental review is completed. The USAID officer responsible for making environmental decisions for such projects, programs or activities shall also be identified (the same officer who has decision making authority for the other aspects of implementation). This deferral shall be reviewed and approved by the officer making the Threshold Decision and the officer who authorizes the project, program or activity. Such approval may be made only after consultation with the Office of General Counsel for the purpose of establishing the manner in which conditions precedent to disbursement or covenants in project and other agreements will avoid an irreversible commitment of resources before environmental review is completed.

(8) Monitoring. To the extent feasible and relevant, projects and programs for which Environmental Impact Statements or Environmental Assessments have been prepared should be designed to include measurement of any changes in environmental quality, positive or negative, during their implementation. This will require recording of baseline data at the start. To the extent that available data permit, originating offices of USAID will formulate systems in collaboration with recipient nations, to monitor such impacts during the life of USAID's involvement. Monitoring implementation of projects, programs and activities shall take into account environmental impacts to the same extent as other aspects of such projects, programs and activities. If during implementation of any project, program or activity, whether or not an Environmental Assessment or Environmental Impact Statement was originally required, it appears to the Mission Director, or officer responsible for the project, program or activity, that it is having or will have a significant effect on the environment that was not previously studied in an Environmental Assessment or Environmental Impact Statement, the procedures contained in this part shall be followed including, as appropriate, a Threshold Decision, Scoping and an Environmental Assessment or Environmental Impact Statement.

(9) Revisions. If, after a Threshold Decision is made resulting in a Negative Determination, a project is revised or new information becomes available which indicates that a proposed action might be "major" and its effects "significant," the Negative Determination will be reviewed and revised by the cognizant Bureau and an Environmental Assessment or Environmental Impact Statement will be prepared, if appropriate. Environmental Assessments and

Environmental Impact Statements will be amended and processed appropriately if there are major changes in the project or program, or if significant new information becomes available which relates to the impact of the project, program or activity on the environment that was not considered at the time the Environmental Assessment or Environmental Impact Statement was approved. When ongoing programs are revised to incorporate a change in scope or nature, a determination will be made as to whether such change may have an environmental impact not previously assessed. If so, the procedures outlined in this part will be followed.

- (10) Other Approval Documents. These procedures refer to certain USAID documents such as PIDs, PAIPs, PPs and PAADs as the USAID internal instruments for approval of projects, programs or activities. From time to time, certain special procedures, such as those in §216.4, may not require the use of the aforementioned documents. In these situations, these environmental procedures shall apply to those special approval procedures, unless otherwise exempt, at approval times and levels comparable to projects, programs and activities in which the aforementioned documents are used.

(b) Pesticide Procedures

- (1) Project Assistance. Except as provided in §216.3 (b)(2), all proposed projects involving assistance for the procurement or use, or both, of pesticides shall be subject to the procedures prescribed in §216.3 (b)(1)(i) through (v). These procedures shall also apply, to the extent permitted by agreements entered into by USAID before the effective date of these pesticide procedures, to such projects that have been authorized but for which pesticides have not been procured as of the effective date of these pesticide procedures.
 - (i) 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. Factors to be considered in such an evaluation shall include, but not be limited to the following:
 - (a) The USEPA registration status of the requested pesticide;
 - (b) The basis for selection of the requested pesticide;
 - (c) The extent to which the proposed pesticide use is part of an integrated pest management program;
 - (d) The proposed method or methods of application, including availability of appropriate application and safety equipment;

- (e) Any acute and long-term toxicological hazards, either human or environmental, associated with the proposed use and measures available to minimize such hazards;
- (f) The effectiveness of the requested pesticide for the proposed use;
- (g) Compatibility of the proposed pesticide with target and nontarget ecosystems;
- (h) The conditions under which the pesticide is to be used, including climate, flora, fauna, geography, hydrology, and soils;
- (i) The availability and effectiveness of other pesticides or nonchemical control methods;
- (j) The requesting country's ability to regulate or control the distribution, storage, use and disposal of the requested pesticide;
- (k) The provisions made for training of users and applicators; and
- (l) The provisions made for monitoring the use and effectiveness of the pesticide.

In those cases where the evaluation of the proposed pesticide use in the Initial Environmental Examination indicates that the use will significantly affect the human environment, the Threshold Decision will include a recommendation for the preparation of an Environmental Assessment or Environmental Impact Statement, as appropriate. In the event a decision is made to approve the planned pesticide use, the Project Paper shall include to the extent practicable, provisions designed to mitigate potential adverse effects of the pesticide. When the pesticide evaluation section of the Initial Environmental Examination does not indicate a potentially unreasonable risk arising from the pesticide use, an Environmental Assessment or Environmental Impact Statement shall nevertheless be prepared if the environmental effects of the project otherwise require further assessment.

- (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, the procedures in §216.3 (b)(1)(iii) shall be followed in lieu of the procedures in this section.
- (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; 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)(1)(i) above.

- (iv) Notwithstanding the provisions of §216.3 (b)(1)(i) through (iii) above, if the project includes assistance for the procurement or use, or both, of a pesticide against which USEPA has initiated a regulatory action for cause, or for which it has issued a notice of rebuttable presumption against reregistration, the nature of the action or notice, including the relevant technical and scientific factors will be discussed with the requesting government and considered in the IEE and, if prepared, in the EA or EIS. If USEPA initiates any of the regulatory actions above against a pesticide subsequent to its evaluation in an IEE, EA or EIS, the nature of the action will be discussed with the recipient government and considered in an amended IEE or amended EA or EIS, as appropriate.
 - (v) If the project includes assistance for the procurement or use, or both of pesticides but the specific pesticides to be procured or used cannot be identified at the time the IEE is prepared, the procedures outlined in §216.3 (b)(i) through (iv) will be followed when the specific pesticides are identified and before procurement or use is authorized. Where identification of the pesticides to be procured or used does not occur until after Project Paper approval, neither the procurement nor the use of the pesticides shall be undertaken unless approved, in writing, by the Assistant Administrator (or in the case of projects authorized at the Mission level, the Mission Director) who approved the Project Paper.
- (2) Exceptions to Pesticide Procedures. The procedures set forth in §216.3 (b)(1) shall not apply to the following projects including assistance for the procurement or use, or both, of pesticides.
- (i) Projects under emergency conditions.
Emergency conditions shall be deemed to exist when it is determined by the Administrator, USAID, in writing that:
 - (a) A pest outbreak has occurred or is imminent; and
 - (b) Significant health problems (either human or animal) or significant economic problems will occur without the prompt use of the proposed pesticide; and

- (c) Insufficient time is available before the pesticide must be used to evaluate the proposed use in accordance with the provisions of this regulation.
 - (ii) Projects where USAID is a minor donor, as defined in §216.1©(12) above, to a multi-donor project.
 - (iii) Projects including assistance for procurement or use, or both, of pesticides for research or limited field evaluation purposes by or under the supervision of project personnel. In such instances, however, USAID will ensure that the manufacturers of the pesticides provide toxicological and environmental data necessary to safeguard the health or research personnel and the quality of the local environment in which the pesticides will be used. Furthermore, treated crops will not be used for human or animal consumption unless appropriate tolerances have been established by EPA or recommended by FAO/WHO, and the rates and frequency of application, together with the prescribed preharvest intervals, do not result in residues exceeding such tolerances. This prohibition does not apply to the feeding of such crops to animals for research purposes.
- (3) Non-Project Assistance. In a very few limited number of circumstances USAID may provide non-project assistance for the procurement and use of pesticides. Assistance in such cases shall be provided if the USAID Administrator determines in writing that
- (i) emergency conditions, as defined in §216.3 (b)(2)(i) above exists; or
 - (ii) that compelling circumstances exist such that failure to provide the proposed assistance would seriously impede the attainment of U.S. foreign policy objectives or the objectives of the foreign assistance program. In the latter case, a decision to provide the assistance will be based to the maximum extent practicable, upon a consideration of the factors set forth in §216.3 (b)(1)(i) and, to the extent available, the history of efficacy and safety covering the past use of the pesticide the in recipient country.

§216.4 Private Applicants

Programs, projects or activities for which financing from USAID is sought by private applicants, such as PVOs and educational and research institutions, are subject to these procedures. Except as provided in §216.2(b), (c) or (d), preliminary proposals for financing submitted by private applicants shall be accompanied by an Initial Environmental Examination or adequate information to permit preparation of an Initial Environmental Examination. The Threshold Decision shall be made by the Mission Director for the country to which the proposal relates, if the preliminary proposal is submitted to the USAID Mission, or shall be made by the officer in USAID who approves the preliminary proposal. In either case, the concurrence of the Bureau Environmental Officer is required in the same manner as in §216.3(a)(2), except for PVO projects approved in USAID Missions with total life of project costs less than \$500,000.

Thereafter, the same procedures set forth in §216.3 including as appropriate scoping and Environmental Assessments or Environmental Impact Statements, shall be applicable to programs, projects or activities submitted by private applicants. The final proposal submitted for financing shall be treated, for purposes of these procedures, as a Project Paper. The Bureau Environmental Officer shall advise private applicants of studies or other information foreseeably required for action by USAID

§216.5 Endangered Species

It is USAID policy to conduct its assistance programs in a manner that is sensitive to the protection of endangered or threatened species and their critical habitats. The Initial Environmental Examination for each project, program or activity having an effect on the environment shall specifically determine whether the project, program or activity will have an effect on an endangered or threatened species, or critical habitat. If the proposed project, program or activity will have the effect of jeopardizing an endangered or threatened species or of adversely modifying its critical habitat, the Threshold Decision shall be a Positive Determination and an Environmental Assessment or Environmental Impact Statement completed as appropriate, which shall discuss alternatives or modifications to avoid or mitigate such impact on the species or its habitat.

§216.6 Environmental Assessments

- (a) General Purpose. The purpose of the Environmental Assessment is to provide Agency and host country decision makers with a full discussion of significant environmental effects of a proposed action. It includes alternatives which would avoid or minimize adverse effects or enhance the quality of the environment so that the expected benefits of development objectives can be weighed against any adverse impacts upon the human environment or any irreversible or irretrievable commitment of resources.
- (b) Collaboration with Affected Nation on Preparation. Collaboration in obtaining data, conducting analyses and considering alternatives will help build an awareness of development associated environmental problems in less developed countries as well as assist in building an indigenous institutional capability to deal nationally with such problems. Missions, Bureaus and Offices will collaborate with affected countries to the maximum extent possible, in the development of any Environmental Assessments and consideration of environmental consequences as set forth therein.
- (c) Content and Form. The Environmental Assessment shall be based upon the scoping statement and shall address the following elements, as appropriate:
 - (1) Summary. The summary shall stress the major conclusions, areas of controversy, if any, and the issues to be resolved.
 - (2) Purpose. The Environmental Assessment shall briefly specify the underlying purpose and need to which the Agency is responding in proposing the alternatives including the proposed action.
 - (3) Alternatives Including the proposed action. This section should present the environmental impacts of the proposal and its alternatives in comparative form,

thereby sharpening the issues and providing a clear basis for choice among options by the decision maker. This section should explore and evaluate reasonable alternatives and briefly discuss the reasons for eliminating those alternatives which were not included in the detailed study; devote substantial treatment to each alternative considered in detail including the proposed action so that reviewers may evaluate their comparative merits; include the alternative of no action; identify the Agency's preferred alternative or alternatives, if one or more exists; include appropriate mitigation measures not already included in the proposed action or alternatives.

- (4) Affected environment. The Environmental Assessment shall succinctly describe the environment of the area(s) to be affected or created by the alternatives under consideration. The descriptions shall be no longer than is necessary to understand the effects of the alternatives. Data and analyses in the Environmental Assessment shall be commensurate with the significance of the impact with less important material summarized, consolidated or simply referenced.
 - (5) Environmental consequences. This section forms the analytic basis for the comparisons under paragraph ©(3) of this section. It will include the environmental impacts of the alternatives including the proposed action; any adverse effects that cannot be avoided should the proposed action be implemented; the relationship between short-term uses of the environment and the maintenance and enhancement of long-term productivity; and any irreversible or irretrievable commitments of resources which would be involved in the proposal should it be implemented. It should not duplicate discussions in paragraph ©(3) of this section. This section of the Environmental Assessment should include discussions of direct effects and their significance; indirect effects and their significance; possible conflicts between the proposed action and land use plans, policies and controls for the areas concerned; energy requirements and conservation potential of various alternatives and mitigation measures; natural or depletable resource requirements and conservation potential of various requirements and mitigation measures; urban quality; historic and cultural resources and the design of the built environment, including the reuse and conservation potential of various alternatives and mitigation measures; and means to mitigate adverse environmental impacts.
 - (6) List of preparers. The Environmental Assessment shall list the names and qualifications (expertise, experience, professional discipline) of the persons primarily responsible for preparing the Environmental Assessment or significant background papers.
 - (7) Appendix. An appendix may be prepared.
- (d) Program assessment. Program Assessments may be appropriate in order to assess the environmental effects of a number of individual actions and their cumulative environmental impact in a given country or geographic area, or the environmental impacts that are generic or common to a class of agency actions, or other activities which are not country-specific. In these cases, a single, programmatic assessment will be prepared in USAID/Washington and circulated to appropriate overseas Missions, host governments, and to interested parties within the United States. To the extent practicable,

the form and content of the programmatic Environmental Assessment will be the same as for project Assessments. Subsequent Environmental Assessments on major individual actions will only be necessary where such follow-on or subsequent activities may have significant environmental impacts on specific countries where such impacts have not been adequately evaluated in the programmatic Environmental Assessment. Other programmatic evaluations of class of actions may be conducted in an effort to establish additional categorical exclusions or design standards or criteria for such classes that will eliminate or minimize adverse effects of such actions, enhance the environmental effect of such actions or reduce the amount of paperwork or time involved in these procedures. Programmatic evaluations conducted for the purpose of establishing additional categorical exclusions under §216.2© or design considerations that will eliminate significant effects for classes of actions shall be made available for public comment before the categorical exclusions or design standards or criteria are adopted by USAID. Notice of the availability of such documents shall be published in the Federal Register. Additional categorical exclusions shall be adopted by USAID upon the approval of the Administrator, and design consideration in accordance with usual agency procedures.

- (e) Consultation and review.
 - (1) When Environmental Assessments are prepared on activities carried out within or focused on specific developing countries, consultation will be held between USAID staff and the host government both in the early stages of preparation and on the results and significance of the completed Assessment before the project is authorized.
 - (2) Missions will encourage the host government to make the Environmental Assessment available to the general public of the recipient country. If Environmental Assessments are prepared on activities which are not country - specific, the Assessment will be circulated by the Environmental Coordinator to USAID's Overseas Missions and interested governments for information, guidance and comment and will be made available in the U.S. to interested parties.
- (f) Effect in other countries. In a situation where an analysis indicates that potential effects may extend beyond the national boundaries of a recipient country and adjacent foreign nations may be affected, USAID will urge the recipient country to consult with such countries in advance of project approval and to negotiate mutually acceptable accommodations.
- (g) Classified material. Environmental Assessments will not normally include classified or administratively controlled material. However, there may be situations where environmental aspects cannot be adequately discussed without the inclusion of such material. The handling and disclosure of classified or administratively controlled material shall be governed by 22 CFR Part 9. Those portions of an Environmental Assessment which are not classified or administratively controlled will be made available to persons outside the Agency as provided for in 22 CFR Part 212.

§216.7 Environmental Impact Statements

- (a) Applicability. An Environmental Impact Statement shall be prepared when agency actions significantly affect:
- (1) The global environment or areas outside the jurisdiction of any nation (e.g., the oceans);
 - (2) The environment of the United States; or
 - (3) Other aspects of the environment at the discretion of the Administrator.
- (b) Effects on the United States: Content and Form. An Environmental Impact Statement relating to paragraph (a)(2) of this section shall comply with the CEQ Regulations. With respect to effects on the United States, the terms environment and significant effect wherever used in these procedures have the same meaning as in the CEQ Regulations rather than as defined in §216.1(c)(12) and (13) of these procedures.
- (c) Other effects: Content and form. An Environmental Impact Statement relating to paragraphs (a)(1) and (a)(3) of this section will generally follow the CEQ Regulations, but will take into account the special considerations and concerns of USAID. Circulation of such Environmental Impact Statements in draft form will precede approval of a Project Paper or equivalent and comments from such circulation will be considered before final project authorization as outlined in §216.3 of these procedures. The draft Environmental Impact Statement will also be circulated by the Missions to affected foreign governments for information and comment. Draft Environmental Impact Statements generally will be made available for comment to Federal agencies with jurisdiction by law or special expertise with respect to any environmental impact involved, and to public and private organizations and individuals for not less than forty-five (45) days. Notice of availability of the draft Environmental Impact Statements will be published in the FEDERAL REGISTER. Cognizant Bureaus and Offices will submit these drafts for circulation through the Environmental Coordinator who will have the responsibility for coordinating all such communications with persons outside USAID. Any comments received by the Environmental Coordinator will be forwarded to the originating Bureau or Office for consideration in final policy decisions and the preparation of a final Environmental Impact Statement. All such comments will be attached to the final Statement, and those relevant comments not adequately discussed in the draft Environmental Impact Statement will be appropriately dealt with in the final Environmental Impact Statement. Copies of the final Environmental Impact Statement, with comments attached, will be sent by the Environmental Coordinator to CEQ and to all other Federal, state, and local agencies and private organizations that made substantive comments on the draft, including affected foreign governments. Where emergency circumstances or considerations of foreign policy make it necessary to take an action without observing the provisions of §1506.10 of the CEQ Regulations, or when there are overriding considerations of expense to the United States or foreign governments, the originating Office will advise the Environmental Coordinator who will consult with Department of State and CEQ concerning appropriate modification of review procedures.

§216.8 Public Hearings

- (a) In most instances AID will be able to gain the benefit of public participation in the impact statement process through circulation of draft statements and notice of public availability in CEQ publications. However, in some cases the Administrator may wish to hold public hearings on draft Environmental Impact Statements. In deciding whether or not a public hearing is appropriate, Bureaus in conjunction with the Environmental Coordinator should consider:
 - (1) The magnitude of the proposal in terms of economic costs, the geographic area involved, and the uniqueness or size of commitment of the resources involved;
 - (2) The degree of interest in the proposal as evidenced by requests from the public and from Federal, state and local authorities, and private organizations and individuals, that a hearing be held;
 - (3) The complexity of the issue and likelihood that information will be presented at the hearing which will be of assistance to the Agency; and
 - (4) The extent to which public involvement already has been achieved through other means, such as earlier public hearings, meetings with citizen representatives, and/or written comments on the proposed action.
- (b) If public hearings are held, draft Environmental Impact Statements to be discussed should be made available to the public at least fifteen (15) days prior to the time of the public hearings, and a notice will be placed in the FEDERAL REGISTER giving the subject, time and place of the proposed hearings.

§216.9 Bilateral and Multilateral Studies and Concise Reviews of Environmental Issues

Notwithstanding anything to the contrary in these procedures, the Administrator may approve the use of either of the following documents as a substitute for an Environmental Assessment (but not a substitute for an Environmental Impact Statement) required under these procedures:

- (a) Bilateral or multilateral environmental studies, relevant or related to the proposed action, prepared by the United States and one or more foreign countries or by an international body or organization in which the United States is a member or participant; or
- (b) Concise reviews of the environmental issues involved including summary environmental analyses or other appropriate documents.

§216.10 Records and Reports

Each Agency Bureau will maintain a current list of activities for which Environmental Assessments and Environmental Impact Statements are being prepared and for which Negative Determinations and Declarations have been made. Copies of final Initial Environmental Examinations, scoping statements, Assessments and Impact Statements will be available to interested Federal agencies upon request. The cognizant Bureau will maintain a permanent file

(which may be part of its normal project files) of Environmental Impact Statements, Environmental Assessments, final Initial Environmental Examinations, scoping statements, Determinations and Declarations which will be available to the public under the Freedom of Information Act. Interested persons can obtain information or status reports regarding Environmental Assessments and Environmental Impact Statements through the USAID Environmental Coordinator.

Appendix C: Pesticides Classified as Restricted Use by USEPA (RUPs)*

These products are for retail sale and use only by Certified Applicators or under their direct supervision. Many RUP statements are applicable to specific products (formulations), rather than the chemical. Read the label where the RUP statement is followed by the reason for the RUP classification.

Acetamide (atrazine)-H—water concerns

Acetochlor-H—oncogenicity, groundwater concerns, toxic to fish, moderate to bees.

Acrolein-H—human inhalation, residue effects avian and aquatic

Acrylonitrile—other hazards, accident history, *registration canceled*

Alachlor-H oncogenic potential

Aldicarb-I accident history. acute oral toxicity and groundwater contamination.

Alpha-chlorohydrin-R—*registration canceled*

Aluminum phosphide—fumigant-inhalation hazard

Amitraz possible oncogenicity

Amitrole-H—oncogenic potential

Atrazine-H—groundwater potential and worker exposure concerns

Avermectin—toxic to fish, mammals, and aquatic organisms

Avitrol—Avicide; hazard to fish and non-target birds

Azinphos methyl-I—acute toxicity

Bendiocarb-I—toxic to aquatic and avian

Bentazone-H—fish toxicity

Biphenthrin-I, A—toxic to fish and aquatic

Bis (Tributyltin) oxide—aquatics and shellfish

Brodifacoum-R—hazard to non-target organisms, *registration canceled*

Butylate-H—fish toxicity, *registration canceled*

* From USEPA's Restricted Use Products (RUP) Report, December 1998. Current Date 1/12/99

** I=insecticide, H=herbicide, F=fungicide, R=Rodenticide, N=nematicide, A=acaricide, M=molluscicide

Calcium cyanide—human inhalation, registration canceled

Carbofuran (furan)-I—acute inhalation toxicity, avian (granular)

Carbon tetrachloride—oncogenic, acute and sub-acute poisoning, *registration canceled*

Chlordane-I—human oncogenic, chronic liver effects, avian and fish, *registration canceled*

Chlordane technical— *registration canceled*

Chlordimeform-I, A—cancer in lab animals, registration canceled

Chlorfenvinphos-I—acute dermal toxicity, *registration canceled*

Chlorobenzilate-A—oncogenic, adverse testicular effects, *registration canceled*

Chlorophacinone-R—for use in official establishments only

Chloropicrin-F—acute inhalation toxicity, hazard to non-target

Chlorothalonil-F—fish toxicity

Chlorothoxyfos-I—acute toxicity, human, avian, and aquatic

Chlorpyrifos (Dursban)-I—avian and aquatic

Clofentezine-Apollo-A—data required.

Copper oxychloride-F—fish toxicity

Coumaphos-I—acute oral toxicity

Cube resins other than rote-I—chronic eye and inhalation

Cuprous (copper) oxide—F-fish toxicity

Cyanizine-H—terato. feto

Cycloheximide-F—acute toxicity, *registration canceled*

Cyfluthrin(baythroid)-I—acute toxicity to applicators, fish and other aquatic, see Lambda

Cyhalothrin(Karate)-I—needs data, fish and aquatic

Cypermethrin-I—oncogenic, hazard to non-target

DBCP-N—*registration canceled*

Deltamethrin-I—high toxicity to aquatic

Demeton-I acute toxicity, residue effects on mammalian and avian. *Registration canceled*

Diallate-H—oncogenic and mutagenicity, *registration canceled*

Diazinon-I—avian and aquatic toxicity.

Dichloenil-H—conditional?

Dichloropropene-F,N—probably carcinogen, oncogenic, acute oral and inhalation

Diclofop methyl-H—oncogenicity

Dicrotophos-I—acute dermal, residue on avian

Diiflubenzuron-I—Hazard to wildlife

Dioxathion-I-A—acute dermal

Diphacinone-R—toxic to birds and mammals

Disulfoton-I—Disyston-acute dermal and inhalation

Dodemorph-F—corrosive to eye tissue, *registration canceled*

Endrin-I—acute dermal, hazard to non-targets

EPN-I—acute dermal and inhalation, avian and aquatics, *registration canceled*

EPTC-H—toxic to fish

Esfenvalerate-Asana-I—highly toxic to fish

Ethion-I—acute toxicity

Ethoprop(mocap)-I—acute dermal

Ethyl parathion-I—inhalation hazard, acute dermal, residue effects on mammal, aquatic, avian, human inhalation, accident history

Ethylene dibromide—fumigant, *registration canceled*

Ethylene dichloride-I—*registration canceled*

Fenamiphos-I-N—acute dermal, avian acute oral, acute inhalation

Fenbutatin (vendex)-A-oxide-A—very high toxicity for aquatic

Fenitrothion-I—potential adverse on aquatic and avian

Fenpropathrin-IA—toxic fish and aquatic

Fensulfothion-N—acute dermal inhalation, *registration canceled*

Fenthion-I—very high acute birds, fish and aquatics.

Fenvalerate-I—possible adverse on aquatics

Fipronil-I—conditional registration, mammalian toxicity

Flucythrinate-I—possible adverse aquatics

Fluoroacetamide-R—acute oral toxicity

Fluvalinate-I—highly toxic to aquatics

Fonofos-(Dyfonate)-I—acute dermal

Fortresse (chlorethoxyfos)-I—acute human, avian, and aquatic invertebrate toxicity

Hydrogen cyanamide-H—corrosive effects eyes and skin

Hydrogen phosphide (phosphine)-F—acute inhalation toxicity

Imazaquin-H—(see alachlor)

Isazofos-I—avian, fish, and aquatics

Isofenphos-I—acute toxicity, registration canceled

Lambda-cyhalothrin-I—toxic to fish and aquatic inverts.

Lindane-I—possibly oncogenic, *all uses canceled, banned in U.S.*

Magnesium phosphide-(Phostoxin)-I-F—inhalation hazard

Methamidophos (monitor) I—acute dermal, residue avian

Methidathion (supracide)-I—residue on avian

Methiocarb-M—(mesural)-possible avian, fish and aquatic

Methomyl-(Lannate)-I—high acute toxicity to humans, other hazards, accident history

Methyl bromide-F—acute toxicity and accident history-

Methyl isothiocyanate-F—wood

Methyl parathion-I—Residue effects on mammal, avian. toxic to bees, acute dermal

Metolachlor-H—some products may be RUP

Mevinphos (phosdrin)-I—acute dermal, residue effects mammal and avian)

Monocrotophos-I—residue on mammal and avian, acute dermal, *registration canceled*

Niclosamide-M—acute inhalation, effects on aquatics

Nicotine-I—acute inhalation, aquatics

Oxamyl (vydate)-I,N—acute oral, inhalation avian and mammal toxicity

Oxidemeton methyl (metasystox)-I—reproductive effects

Paraquat (gramoxne)-H—human toxicity, other hazards, use and accident history

Pentachlorophenol Sodium-wood preservative—possible. oncogenic, mutagenic, reproductive, and fetal effects

Permethrin-I—aquatics

Phorate (thimet)-I—acute oral and dermal, residue on avian and mammal, effects on aquatics

Phosacetim-R—hazard-on-non target, registration canceled

Phosalone-I—aquatic toxicity, *registration canceled*

Phosphamidon-I—acute dermal residues on mammal and avian, *registration canceled*

Phostebupirin-I—under dietary review

Picloram(tordon)-H—hazard non target plants

Picloram, isooctyl ester (tordon)-H—hazard non target plants

Picloram, potassium salt (tordon)-H—hazard to non target plants

Picloram, triisopropanolami (tordon)-H—hazard to non target plants

Piperonyl butoxide-I—synergist, fish toxicity

Potassium pentachlorophenate—preservative—possible oncogenic, mutagenic, reproductive, and fetal hazard, *registration canceled*

Profenophos-IA—corrosive to eyes

Pronamide(Kerb)-H—fish toxicity

Propanoic acid-H—*not registered in U.S.*

Pyrethrins-I—chronic eye effects

Resmethrin-I—acute fish toxicity

Rotenone—fish toxicant, chronic eye effects

S-Fenvalerate-I—poss adverse aquatic

Simazine-H—fish toxicity, buffer zones required

Sodium arsenate-wood preservative—possible oncogenic, mutagenic, reproductive, and fetal, *registration canceled*

Sodium cyanide-R—inhalation, hazard non target, acute toxicity

Sodium dichromate—oncogenic, mutagenic, reproductive, and fetal

Sodium fluoroacetate-R—oncogenic, mutagenic, reproductive, and fetal, acute oral, hazard non target, use and accident history

Sodium hydroxide—acute toxicity

Sodium methyldithiocarbamate-Fumigant—dermal toxicity, terato.

Sodium pyroarsenate-wood preservative—registration canceled

Starlicide—avicide, hazard to non target

Strychnine-R—acute oral non target, use and accident history

Sulfotepp-I—inhalation hazard

Sulfuryl fluoride—acute inhalation, acute in humans

Sulprofos-I—wildlife hazard

Tefluthrin-I—environmental concerns

TEPP-I—inhalation hazard, dermal hazard, residue on mammal and avian; registration canceled

Terbufos-I,N—residue avian, acute oral and dermal

Tergitol—Avicide, eye and skin irritant, needs special knowledge

TFM—complex use

Toxaphene-I—hazard to non-target, oncogenic, acute toxicity to aquatics, chronic wildlife effects, *registration cancelled*

Tralomethrin-I—aquatic

Tributyltin fluoride—toxic to aquatics and fish

Tributyltin methacrylate—toxic to aquatics and fish

Trifluralin-H—fish toxicity, *registration canceled*

Triisopropranolamine-H—hazard to non-target plants

Tripnyltin hydroxide-F—possible mutagenic

Zeta-cypermthrin(Fury) -I—fish toxicity

Zinc phosphide-R—hazard to non target, acute oral, acute inhalation

Appendix D: Trade Names of Pesticides Currently Registered for Use in Uganda

Abate 50% (Temephos)	Basta 14 SL (Glutosinate ammonium)	Cuprous Oxide (Copper)
Acrobat-Mz (Dimethomorph)	Bayticol Pour-on (flumethrin)	Curateerr 10% GR (Carbofuran)
Actellic Super (Pirimiphos methyl + permethrin)	Bayticol 6 EC (flumethrin)	Cybercal 360 EC (Cypermethrin)
Actril D.S (2,4-D Amine + Ioxynil)	Benlate 50 WP (Benomyl)	Cybercal P 220 EC (Profenofos + cypermethrin)
Adonis (Fipronil)	Biamatraz (Amitraz)	Cybercal P 720 (Profenofos + Cypermethrin)
Agrichlordi 500 EC (Chlorpyrifos + dimethoate)	Bimatraz (Amitraz)	Cyperdim 50EC (Cypermethrin + Dimethoate)
Agrocytrin 5 EC (Cypermethrin)	Blidz Dip pour On (Cypermethrin)	Cypersan (Cypermethrin)
Agromyl 50 WP (Benomyl)	Bombard (Amitraz)	Cyrux (Cypermethrin)
Agrosate 360 (Glyphosate)	Bovitraz (Amitraz)	Decatix (Deltamethrin)
Agrothoate 40EC (dimethoate)	Buctril MC (Mepa Bromoxynil)	Decis 2.5 EC (Deltamethrin)
Agrotrothion 50EC (fenitrothion)	Bulldock 025 EC (Beta Cyfluthrin)	Decitab (Deltamethrin)
Agrozeb 80 WP (Mancozeb)	Cascade 10% DC (Flufenoxuron)	Delan (Dithianon)
Ambush Super (Karate) (Lamda cyhalothrin)	Chlorban 20 EC (Chlorpyrifos)	Dinron 80 SC (Diuron)
Antracol 70 WP (Propineb)	Confidor 200 SC (Imidacloprid)	Dithane M45 (Mancozeb)
Aqua Reslin Super (Permethrin + S-Bioallethrin + Piperonyl Butxide)	Contraz 500-50 EC (Chlorpyrifos + cypermethrin)	Dominex TB (alphacypermethrin)
Azofas (Cypermethrin + Monocrotophos)	Cooper Smoke generators (Permethrin)	Dragnet (FT) (Permethrin)
Basamid Granular (Dazomet)	Cooper 25 wp (Permethrin)	Dual 960 EC (Metolanchlor)
	Coopers Spot-on (Deltamethrin)	Dula Gold 960 EC (Metolachlor +
	Cupravit 50 WP (Copper oxychloride)	

Chloroacetamide)	Grenade 5 EC	Norotraz
Dursban 4 EC	(Cyhalothrin)	(Amitraz)
(Chlorpyrifos ethyl)	Hero 50 EC	Nugor 40EC
Ecotopor SA 20	(Chlorpyrifos +	(dimethoate)
(Cypermethrin)	dimethoate)	Nutelle D20/200 Ec
Ectomin	Hostathion 40 EC	(Cypermethrin +
(Cypermethrin Cis)	(Traizophos)	Chlorpyrifos Ethyl)
Elsan 50 EC	Indofil M45	Orthene
(Phenoate)	(Mancozeb)	(Acephate)
Endotaf	K-Obiol DP 2	Orthene 75 sp
(endosulfan)	(Deltamethrin)	(Acephate)
Fastac	K-Othrine-15 E.C	Padan 50SP
(Cypermethrin)	(Deltamethrin)	(Cartap hydrochloride)
Fendona	Kalachi 360SC	Paraquat–Paz 20 LC
(alphacypermethrin)	(Glyphosate)	(Paraquat)
Fenkil	Karate	Peripel-20
(fenvalerate)	(Lamda cyhalothrin)	(Permethrin)
Fenom P	Karmex 80 Wp	Peripel-55
(Profenfos +	(Diruron)	(Permethrin)
cypermethrin)	Kocide 101	Perkill 10 EC
FenPaz 50 EC	(Cupric hydroxide)	(Permethrin)
(fenitrothion)	LassoAtrazine	Phoskill
Furadan 5 G	(Flowerable)	(monocrotophos)
(Furadan)	(Triazine)	Phostoxin
Fury 10 EC	LassoEC	(aluminum phosphide)
(Zeta-Cypermethrin)	(Alachlor)	Primagram 500 FW
Fury 10 EC+Marshal	Lebaycid 500 EC	(Atrazine + Metalanchlor)
25EC	(fenthion)	Pyrinex 48 EC
Gaicho	LpDiuron	(Chlorpyrifos)
(Imidacloprid)	(Diruron)	quick Phos
Gesaparin 500 FW	Mamba	(aluminum phosphide)
(Atrazine)	(Glyphosate)	Ratol
Gesapax Combi 500 FW	Marshal 25EC	(zinc phosphide)
(Ametryn +atrazine)	(Carbosulfan)	Reldan 40EC
Gesapax 80 WG	Marshal 5 G	(Chlorpyrifos methyl)
(Ametryn)	(Carbosulfan)	Renegade pour-on
Gesatop 500 FW	Maytril	(alphamethrin)
(Ametryn + simazine)	(Oxynil-Bromoxynil)	Renegade Dip
Glossinex 200 S	Milbtraz	(alphamethrin)
(Deltamethrin)	(Amitraz)	Reward
Glyphogan 360 LC	Nemacur 5 GR	(Diquat Dibromide)
(Glyphosate)	(Fenamiphos)	Ridomil M4 63.5 WP
Goliath	Nexa Bait	(Mancozeb + Metalaxyl)
(Fipronil)	(Fipronil)	Ripcord EC
Gramaxone	NordoxSD-45	(Cypermethrin)
(Paraquat)	(Cuprous oxide)	Rodeo

(Glyphosate)	Dicofol)	Touch Down
Rogan 40 EC	Steladone 300 EC	(Glyphosate –Trimesium)
(dimethoate)	(Chlorfenvinphos)	Trebon
Ronstar PL	Stomp 500E	(Etofenprox)
(Oxadizon + Propanil)	(Pendimethalin)	Trintix, Taktic
Ronstar 25Ec	Sumicidin 10 EC	(Amitraz)
(Oxadizon)	(fenvalerate)	Tstest Tick pour-on
Roundup	Sumithion 50EC	(Deltamethrin)
(Glyphosate)	(fenitrothion)	Tsetse Tick
Rovral 50WP	Supadip DFF	(Cypermethrin Hicis)
(Iprodione)	(Chlorfenvinphos)	Ustaad 10 EC
Salut	Super Neemol	(Cypermethrin)
(chlorpyrifos +	(Azadirachtin)	Uthane M45 WP
dimethoate)	Superdoom Powder	(Mancozeb)
Sancozeb	(Permethrin)	Velpar DF
(Mancozeb)	Superdoom Aerosol	(Hexazinone)
Sanoxyphen	(Permethrin + Dichlorvos	Vyadat 10G
(2,4-D)	+ Piperonyl butoxide	(Oxamyl)
Sanphos	+	Weedar 64 SL
(aluminum phosphide)	Pyrethrum)	(2,4_D)
Sanvalerate	Supona Extra	Yasodion
(fenvalerate)	(Chlorfenvinphos)	(Diphacinone)
Saprol 20% EC	Sweep W.S	
(Triforine)	(Glyphosate)	
Sarsulfan	Tafetion	
(endosulfan)	(ethion)	
Satunil 60EC	Tafgor	
(Thiobencarb +	(dimethoate)	
Propanil)	Talstar 2.5 EC	
Satunil	(Bifenthrin)	
(Thiobencarb +	Tempo 12.5 SC	
Propanil)	(Beta Cyfluthrin)	
Scradix (1, 2,3)	Thiodan 35%	
(B-indolbutyric acid)	(endoulfan)	
Select	Thiofla	
(Clethodium)	(endosulfan)	
Semevin 375	Thiokill 35 EG	
(fenvalerate)	(endosulfan)	
Sencor 70 WP	Thionex 35 EC	
(Metribuzin)	(endosulfan)	
Sevin 5DP	Tickpon 100	
(Carbaryl)	(Chlorfenvinphos)	
Sevin 5G	Topsin-M	
(Carbaryl)	(Thiophanate methyl)	
Sherpa DL	Torque 550SC	
(Cypermethrin +	(Fenbutatin oxide)	