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INITIAL ENVIRONMENTAL EXAMINATION OF PROPOSED PESTICIDE USE IN THE FARMING PRACTICES FOR PRODUCTIVITY PROJECT

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ACRONYMS

AID	United States Agency for International Development
EPA	United States Environmental Protection Agency
ETS	Extension and Training Specialist
FPP	Farming Practices for Productivity Project
GTZ	Deutsche Gesellschaft fur Technische Zusammenarbeit
HITS	Horticulture Improvement and Training Subproject
IPM	Integrated Pest Management
PC	Pesticide Solubility Partition Coefficients
PMS	Pest Management Specialist

Initial Environmental Examination of Pesticide Use in the High Value Crops Module of the Farming Practices for Productivity Project

GENERAL PROJECT DESCRIPTION

The United States Agency for International Development (AID) is planning and designing a Farming Practices for Productivity Project (FPP) in Yemen. The general purpose of this project is to increase farm productivity through the identification, testing, demonstration, dissemination, and adoption of improved farm technology packages and through the identification and promotion of associated and required market structures and policy reforms. The project is currently divided into 6 modules: Strategic Support, Fertilizer Utilization, Bubbler Irrigation, Irrigation Technologies, Fruit and Other High Value Crops, and Logistics Support.

Fruit and High Value Crops Module

The general purpose of the Fruit and High Value Crops module is to increase the productivity of selected deciduous fruit crops in Yemen: apples, peaches, pears, and plums. Productivity increases in these crops will be facilitated by a combination of adaptive research and testing of improved varieties, identification of an appropriate technology package for optimum fruit crop production and protection, and transfer of this technology to small Yemeni farmers through outreach and demonstration programs. In addition, the project will provide support to selected private sector nurseries so that farmers will be able to plant more deciduous fruit trees.

Initial Environmental Examination

As outlined in the section on Environmental Procedures according to AID's regulation 22 CFR Part 216, an Initial Environmental Examination is the first review of the reasonably foreseeable effects of a proposed action on the environment. The limited amount of pesticides

purchased and used in this project should generally be exempt from these prescribed procedures since those materials will be used according to the procedures outlined in 216.2 (c) (iii) "Research activities which may have an effect 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." However, since the results obtained from the adaptive research trials carried out in this project may eventually be used on a larger scale by Yemeni farmers, the following IEE will examine the projected environmental effects of the pesticides according to the procedures outlined in section 216.3 (b) for projects including the procurement or use of pesticides.

(a) The USEPA registration status of the requested pesticide

In the United States, pesticides are registered by the Environmental Protection Agency (EPSA) into one of two categories: (1) Restricted Use--A restricted use pesticide can only be purchased and applied by a certified applicator who has been properly trained in pesticide use and hazards. Pesticides are classified for "restricted use" because they are highly toxic or persistent and accumulative in the environment. (2) General Use--General use pesticides can be purchased and used by the general public.

All of the pesticides proposed for use in the FPP project in deciduous fruit are labeled for use by the EPA in the United States on the same deciduous fruit crops selected for emphasis in this project: apples, peaches, plums and pears (Table 1). None of the pesticides selected is classified by the EPA as a "restricted use" material, and, therefore, should be quite appropriate for widespread usage by Yemeni farmers if they are given the types of training and instruction in the proper use of pesticides outlined in this document.

None of the materials is currently on the EPA's list of intent to cancel or suspend, although several of the compounds have completed the special review process, which is utilized by the EPA to evaluate pesticides that may pose a specific risk or risks to human health and/or the environment. Benomyl was reviewed to determine its effect on wildlife and non-target species and oncogenic properties and neurotoxicity. Diazinon was reviewed to determine its effects on wildlife and non-target species. The registration of Dicofol was cancelled in 1987 because of contamination by DDT-like residues. Currently, a new formulation of this material that has an acceptable level of these residues is being marketed. Dimethoate has also been reviewed for its oncogenic and mutagenic properties and possible reproductive effects.

(b) Basis for selection of the requested pesticides

Although many pests have been reported to occur on deciduous fruits in Yemen, discussion with personnel experienced in crop protection indicated that the most common and damaging species are those listed in Table 1. In general, the pesticides selected for the project were chosen because they are labeled in the United States for these key pests of deciduous fruit in Yemen and they had relatively low mammalian toxicity (Table 1,2).

Several of the pesticides proposed for use in experimental efficacy trials at the Al Irra station in this project, although widely used on deciduous fruit crops in the United States and elsewhere, are not on the permitted list of pesticides (Appendix II) for Yemen: Phosmet, Dicofol, Propargite, Chlorothalonil, Copper Oxychloride Sulfate, Glyphosphate. and Norflurazon. Phosmet was chosen for testing because it is a broad spectrum organo-phosphate material providing good residual activity against a wide range of fruit pests. It is no more toxic than Dimethoate or Diazinon, which are currently widely used in Yemen, and is usually considered to be more compatible for use in United States IPM programs on fruit than these materials because it is relatively non-toxic to beneficials. Propargite and Dicofol were proposed for testing because they are selective miticides that have been used successfully in integrated mite control programs on deciduous fruit in the United States and elsewhere. These miticides along with Morestan will

provide an array of materials with different chemical structures that can be used alternately in rotation schemes to prevent the buildup of resistance of mites on deciduous fruits in IPM programs. Chlorothalonil and Copper Oxychloride Sulfate were chosen for evaluation because they are the only fungicides registered on peaches that will control both shot-hole disease and peach leaf curl. Glyphosphate was selected as an herbicide because it is a broad spectrum material, which is considered much safer for applicators than the most likely alternate material, Paraquat, which is currently banned in Yemen and classified as a restricted use pesticide in the United States. Norflurazon was chosen as a more selective herbicide that can be used as a tank mix with Glyphosphate to control certain grasses and broad-leafed weeds on sandy soils. The remaining materials were all chosen for use in this project as standard materials for comparative purposes in the research trials because they are all currently widely used on tree fruit crops in Yemen.

The importation and use of small quantities of these pesticides for research trials at the Al Irra station was discussed with Dr. Mohammed Al-Ghashm, the Director-General of Plant Protection. He considered that these trials were appropriate for the project and that the pesticides could be imported for research purposes as long as he is provided with information about the registration status and toxological data from the United States.

(c) Extent to which the proposed pesticide use is part of an integrated pest management program

Very little previous work has been done to develop integrated pest management (IPM) programs for deciduous fruit crops in Yemen. This project will support a long-term pest management specialist (PMS) who will work with Yemeni counterparts to conduct adaptive IPM research programs for fruit and to develop practical extension programs for farmer training. The proposed scope of work for the PMS in this project is presented in Appendix 1. The primary IPM components for deciduous fruit outlined in the scope of work are: biological control, varietal susceptibility, and sampling and monitoring techniques.

(d) Application methods and safety equipment

Most of the pesticides would be applied in the project in research orchards at the Al Irra station. This station has a relatively modern truck-mounted high pressure sprayer, which is similar to the equipment used for experimental pesticide research in the United States. Pesticides will only be applied at the station by technicians who have been trained by the PMS in proper safety precautions and correct application techniques. The applicators will wear full appropriate safety equipment when applying any of the pesticides recommended in the project: hats, rubber gloves, rubber boots, disposable coveralls and an approved respirator.

The project will also train farmers in the demonstration plots and surrounding farmers in the safe handling and use of pesticides and provide them with the previously mentioned safety equipment.

Pesticides will be stored in a building structurally separated from office, residential and laboratory spaces. The building will be locked and posted with a sign stating Danger, Pesticides. The floor of the storage building is a sealed, impervious surface. Pesticides will be segregated by function aand hazard. Whenever possible, pesticides should be stored on impermeable shelves, racks or pallets. Personal safety equipment appropriate for the pesticides stored and handled should be convenient to, but not within the pesticide storage area.

Used pesticide containers should be disposed of properly and never reused. Never abandon empty pesticide containers or allow them to accumulate where they may be encountered by children, pets, livestock, and wildlife. To prepare metal and plastic containers for disposal, they should be triple rinsed. This procedure will remove more than 99% of product residue

remaining in the empty containers. These containers should then be crushed or punctured to prevent reuse. Properly rinsed containers are not considered hazardous waste and can be disposed of in sanitary landfills. Paper, plastic and combustible pesticide containers can be burned. Burning must be done downwind from workers, occupied buildings or public roads.

(e) Acute, long-term toxicological hazards of products to humans and the environment and project mitigation measures

All pesticides, if misused, can be harmful to humans, non-target organisms, and the environment. The best way to mitigate these potential harmful effects from pesticides is to handle all materials safely according to the following general precautions. When dealing with chemical products, one should remember that Risk = Toxicity (hazard) X Exposure. The operator cannot change the toxicity of the product, but can reduce exposure and thereby minimize subsequent risks.

Exposure occurs via four routes (1) Oral (mouth), (2) dermal (skin), (3) eyes, and (4) inhalation. Each route of exposure can occur from accidents, spills, broken or faulty equipment or poor personal hygiene. Each route of exposure can be reduced by following basic principles for protection. For example, the most common type of applicator exposure--dermal exposure of the hands and forearms can be prevented by wearing chemical-resistant gloves with long cuffs. Inhalation exposure can be reduced by wearing respirators. Pesticide applicators should never eat, drink or smoke while applying pesticides and always wash hands, body and clothing following application operations.

Always read the pesticide label before applying the material and follow the directions for application and observe the precautions outlined on the label.

All of the pesticides selected for this project have a relatively low mammalian toxicity and should not be hazardous to applicators and field workers if they are used according to labeled directions and applicators follow the previously-described procedures to minimize exposure. However, some of the materials are, potentially, hazardous to bees: Pimethoate, Diazinon, Phosmet, Malathion and Carbaryl. Severe losses may be expected if bees are present at treatment time or within a day thereafter. Therefore, the following precautions should be followed when using these materials: Notify any beekeepers in the area before spraying; do not spray crops in bloom; when weeds are in bloom, mow them prior to treatment, or spray only when blossoms are closed. Avoid appplication during the day when field bees are most numerous. Apply very early in the morning or in the evening. Read the pesticide label.

Most of the pesticides selected for use in this project are relatively non-persistent with a half-life of less then 30 days. Therefore, if applied according to labeled directions, they should not be expected to cause excessive residues in the fruit at harvest, or to contaminate soil or groundwater. Glyphosphate is classified as a moderately-persistent chemical with a half-life of 30 to 99 days. The primary potential environmental danger from this material is contamination of soil groundwater. However, one of the most useful indices for quantifying pesticide adsorption on soil is the "solubility partition coefficient" (PC). The PC value is defined as the ratio of pesticide concentration in the adsorbed state and the solution phase. Thus, pesticides with a high PC value are tightly adsorbed to soil and unlikely to leak into groundwater. Glyphosphate has a relatively high PC value and has no biological activity when adsorbed to clay particles or organic matter. When bound to soil particles, it is very persistent, but biologically unavailable. Therefore, the potential environmental risk from this compound should be acceptable if it is used according to labeled directions.

(f) Effectiveness of the requested pesticide for the proposed use

Very few tests of the relative effectiveness of different pesticides against insects, diseases and weed pests of deciduous fruit trees have been conducted in Yemen. However, all of the pesticides recommended for use in this project have been extensively tested in the United States on the key pests listed in Table 1 and have provided effective control. Therefore, the pesticides should also be effective against these pests in Yemen, although the rates and timing may have to be adjusted to be appropriate for local conditions. Also, since most of the pesticides have somewhat broad spectrum acitvity, they should control some of the minor, more sporadic pests of deciduous fruit in Yemen not listed in Table 1.

Several of the key arthropod pests in Yemen, aphids and mites, have become resistant to pesticides in most commercial deciduous fruit orchards in the United States and elsewhere. Currently, according to local experts, mites can still be controlled on deciduous fruit trees in Yemen by insecticides. In the future, it is likely that mites will become resistant to these insecticides and will only be susceptible to the miticides recommended in the project, Dicofol, Propargite and Oxythioquinox. In order to prevent or delay the anticipated buildup of pesticide resistance in fruit orchards in Yemen, different pesticides should be used alternately in the control schedule whenever possible, and pests should also be sampled and monitored so that pesticide applications are minimized.

(g) Compatibility of the proposed pesticides with target and non-target ecosystems

All of the pesticides proposed for use in the project in Yemen have been widely used for various lengths of time in deciduous orchards in the United States and other fruit production areas throughout the world. Therefore, the proposed pesticides should be generally compatible with the orchard ecosystems in the San'a province in Yemen if they are properly applied.

The general orchard ecosystems at the Al Irra station and surrounding areas are semi-arid so foliar pesticide residues may not be as subject to degradation by rainfall as in some more rainy and humid fruit ecosystems. Vegetation within the orchards is sparse and most trees are grown under clean cultivation on a bare soil surface. The production system limits biological diversity within and around the orchards, and thereby reduces the chances of pesticides adversely affecting non-target species of arthropods, wildlife, and livestock. The immediate area round the Al Irra station and most other fruit orchards is sparsely populated so inadvertent exposure of humans and livestock from pesticide drift would be minimal.

The primary potential adverse effects of the proposed pesticides on the orchard ecosystems near Sana'a would be contamination of the ground and surface water. However, since rainfall is relatively low and no streams, canals or lakes are situated near the Al Irra station or the demonstration sites, it is unlikely that the pesticides could be transported into surface water supplies from runoff resulting from natural precipitation. Trees at the Al Irra station and demonstration sites will be irrigated with "bubbler irrigation systems." This irrigation technology uses a closed pipe and tubing system to distribute small amounts of water into a basin around the base of each tree. Therefore, contamination of irrigation water and transport of pesticides away from the target site by the flow of surface water should be minimal under such an irrigation system. Also, because of the general lack of persistence of the pesticides proposed for use in the system and their relatively low solubility Partiton Coefficients (see Section e), the potential for groundwater contamination from pesticides used in this project should be minimal.

A secondary potential adverse effect of insecticide use in some of the demonstration farmers' orchards would be bee poisoning since sometimes small patches of alfalfa, harboring natural populations of bees, may be grown near deciduous fruit orchards. In addition to following the general precautions to protect bees outlined in section (e), farmers should not apply any of the materials listed in section (e) as toxic to bees whenever the nearby alfalfa plantings are in bloom.

(h) Conditions under which the pesticides will be used, including climate, flora, fauna, geography, hydrology, and soils

The target area for the FPP project is comprised of the two ecological zones of the Central Highlands and the southern Uplands and includes most of the Sana'a, Dhamar, Ibb and Taiz Provinces. Physical conditions can change rapidly over very short distances. The Central Highlands ranges in elevation from 1,000 meters to 3,700 meters. The geology is predominantly volcanic, overlain in part by alluvium and intruded by volcanic outcrops and rock. Soils are generally sandy loam and well drained. These soils are fairly deep in the basins and valleys. Affected primarily by altitude, climate varies considerably from temperate on the high plains to subtropical in the lower lands and wadis. Annual rainfall varies from about 230 mm around Sana'a to about 450 mm around Dhamar. Day temperatures are well above 15 degrees C throughout the year, but night temperatures can fall below 0 degrees C in the winter months. Winds are steady most of the year. While rainfed cultivation of field crops predominates, on irrigated land, vegetables are the major crops. The Central Highlands are also an important and growing region for cultivation of deciduous fruit trees and qat.

Elevations for the Southern Uplands range from 500 meters to 3,000 meters above sea level. While the geology is similar to the Central Highlands, the landscape is cut by deep wadis and valleys where tropical to sub-tropical conditions exist. Soils are generally more fertile and have better water retention characteristics. Annual rainfall is as little as 250 mm in the south and southeast and approximately 1,000 mm around Ibb. In addition to field crops, sorghum, qat, coffee, vegetables and subtropical fruits such as citrus, quava, mangos and papaya are the major crops. Although the total planted area is relatively small, recently there have been rapid increases in the cultivation of deciduous fruit trees.

(i) The availability and effectiveness of other pesticides or non-chemical control methods

A wide range of synthetic pyrethroid insecticides are available in Yemen: Permethrin, Fenvalerate, Dekamethrin, Cypermethrin, and Fenpropathrin. Some of these materials are currently registered for use on deciduous fruits in the United States (Fenvalerate and Permethrin), and are very effective against a wide range of insects. However, these materials are toxic to beneficials and may cause outbreaks of secondary pests such as mites and woolly apple aphids in deciduous fruit trees. Because of these undesirable effects, synthetic pyrethroids are primarily used in the United States to control orchard pests that have become resistant to organophosphate and carbamate insecticides. These pyrethroid insecticides were not recommended for use in this project because of their potential adverse effects on natural biological control programs of mites and other insects, and also because insect pests in orchards in Yemen are still susceptible to other classes of insecticiees.

Very few studies have been conducted in Yemen on non-pesticidal control techniques. Currently, the GTZ crop protection program is conducting surveys of parasites and predators of vegetable insect pests, focusing primarily on potatoes and tomatoes. They are also developing a program for the mass rearing and release of parasites of the potato tuberworm. The HITS project has conducted studies of parasites of the California red scale. They found that a primary parasite, *Aphytis melinus*, was well established throughout most areas where citrus is grown in Yemen. They also found that a predator of armored scale on citrus (a coccinellid species in the genus *Scymnus*) was present in some locations.

(j) The requesting country's ability to regulate or control the distribution, storage, and disposal of the requested pesticide

The responsibility for pesticide licensing, registration, importation and regulation in Yemen resides in the General Directorate of Plant Protection. The Directorate has developed a list of permitted and a list of banned materials (Appendix II). The banned list of pesticides includes most materials which are prohibited in the United States because of harmful environmental effects and toxological problems. In addition, many pesticides classified for restricted use in the USA are also banned from Yemen. The list of permitted pesticiedes includes many materials widely used in the USA and some materials classified for "restricted use" for reasons other than acute toxicity, such as the synthetic pyrethroids.

The government, therefore, relies on these two lists to determine which materials can be legally imported. However, the government actually has very little legal control over the sale, storage, distribution and use of pesticides within the country. The importation and marketing of pesticides is largely within the hands of the private sector although the government and donor agencies also directly import pesticides. There is currently no formal legislation regulating pesticide use on crops within the country. Yemen also currently has no pesticide analysis laboratories to check pesticide formulations for adulteration or to monitor produce for excessive residues. The crop protection program of GTZ plans to work with the government of Yemen in drafting legislation to regulate the importation, storage, formulation, manufacture, labeling, packaging, distribution, transportation, sale, application and disposal of pesticides and to set up a pesticide analytical laboratory to monitor pesticide formulations.

The Director General of Plant Protection, Dr. Mohamed Al Ghashm, mentioned that unauthorized pesticides are often smuggled into the country, and there are problems with pesticide adulteration by some pesticide distributors. He also mentioned that more training in proper pesticide use and safety is needed within the country for pesticide distributors, extension personnel, and farmers.

Despite these reported problems with pesticides, the pesticide shops that were visited in Sana'a and Dhmar were generally clean and orderly. All of the pesticides displayed on the shelves were on the permitted list, pesticides appeared to be in their original containers, and most packages had at least some Arabic labeling and appropriate toxicity signal words. The pesticide dealers mentioned that they purchased some pesticides directly from the government, particularly materials distributed by Sumitomo. Obviously, the government was providing some subsidies for these Sumitomo products and certain other materials since the dealer prices were well below normal world market levels. Dealers also mentioned that certain permitted pesticides were often unavailable because of problems with government regulation of supply through import controls.

However, in subsequent discussions, Dr. Rolf Link, the director of the GTZ plant protection program, indicated that most of the problems with pesticide distribution and sales throughout Yemen occurred in about 1000 small shops which were part-time unauthorized pesticide dealers. He mentioned that these small dealers often sold banned materials or adulterated improper pesticides to farmers and were quite ignorant about making pesticide recommendations.

In summary, the government of Yemen has a very rudimentary system of regulating pesticide imports and only a limited ability to regulate pesticide usage within the country. However, mmost persistent and highly toxic materials are not sold generally within the country by authorized pesticide dealers. Future cooperative efforts between GTZ and the government of Yemen should help to strengthen the government's ability to regulate pesticides within the country and to prevent illegal sales by unauthorized, small, part-time sales outlets. There is an obvious need to provide more training in pesticide use and safety for both users and distributors throughout the country.

(k) The provisions made for training of users and applicators

The Extension and Training Specialist (ETS) of the FPP project will work cooperatively with the Pest Management Specialist (PMS) within the project to develop a practical training course in pesticide use and safety for technicians within the project and farmers. Since the HITS program has already developed a pesticidee training videotape and other materials, these can be used to develop future appropriate training courses.

This training course will first be given to technicians and other laborers working within the FPP project and then to cooperating farmers setting up demonstration plots. Then, this pesticide training course can be extended to extension workers within the project area and also to as many farmers as possible within the region, particularly those near demonstration trial areas.

(l) The provisions made for monitoring the use and effectiveness of the pesticide

The PMS will collect data in the chemical efficacy trials conducted at Al Irra on both the effectiveness of the materials against the target pests and, for insecticides and miticides, monitor the toxicity of the materials against predators and parasites. Also, the PMS and extension personnel within the project will frequently monitor demonstration plots in farmers' fields whenever pesticides are applied and record data to evaluate the effectiveness of pesticide applications made by cooperating farmers.

Sources of General Information Used in This Report

Dr. Mohammed Al-Ghashm, Director-General, Plant Protection, Ministry of Agriculture and Forestries, Yemen

Dr. Ahmad Askari, Team Leader, Horticulture Improvement and Training Subproject

Dr. Rolf Link, Yemeni-German Plant Protection Project

Mr. John T. Rifenbark, USAID, Yemen

General Reference Sources

Cornell Chemical Recommendations for Commercial Tree-Fruit Production. 1988. Cornell Cooperative Extension, NYS College of Agriculture and Life Sciences. Cornell University, New York.

Crop Protection Chemicals Reference. 1989. Chemical and Pharmaceutical Press. John Wiley and Sons. New York.

Farm Chemicals Handbook. 1989. Meister Publishing Company. Willoughby, Ohio.

TABLE 1. REGISTRATION STATUS AND ACTIVITY SPECTRUM OF PESTICIDES PROPOSED FOR USE IN THE FPP PROJECT.

Pesticides Common Name and (Brand Name)	EPA Registration Status				Insects				Diseases			Weeds			
	Apples	Peaches	Pears	Plums	Mites	Aphids	Cater-pillars	Woolly aphid	Powdery mildew	Peach Leaf curl	Shot hole disease	Pre-emer-gence	Post emer-gence	Broadleaf Weeds	Grasses
Insecticides															
Carbaryl (Sevin)	x	x	x	x		x	x	x							
Diazinon	x	x	x	x	x	x		x							
Dimethoate (Cygon, Perfekthion)	x		x			x	x	x							
Malathion (Cythion)	x	x	x	x	x	x	x	x							
Phosmet (Imidan)	x	x	x	x	x	x	x								
Miticides															
Dicofol (Kelthane)	x		x		x										
Oxythioquinox (Morestan)	x		x		x				x						
Propargite (Omite)	x	x	x	x	x										
Petroleum Oil	x	x	x	x	x										
Fungicides															
Benomyl (Benlate)	x	x	x	x	x				x						
Copper oxychloride Sulfate (COCS)		x								x	x				
Fenarimol (Rubigan)	x		x						x						
Sulfur	x	x	x	x					x						
Chlorothalonil (Bravo)		x		x						x	x				
Triadimefon (Bayleton)	x		x						x						
Herbicides															
Glyphosate (Roundup)	x	x	x	x									x	x	x
Norflurazon (Solicam)	x	x		x								x		x	x

TABLE 2. TOXICITY AND LABEL WARNINGS FOR THE PESTICIDES PROPOSED FOR USE IN THE FPP PROJECT.

Pesticides Common Name and (Brand Name)	Toxicity LD50 (Mg/Kg) Oral	Dermal	Toxicity Category1/	EPA Signal Word1/
Insecticides				
Carbaryl (Sevin)	500-850	400	III	Caution
Diazinon	300-400	455-900	II, III	Caution or warning
Dimethoate (Cygon or Perfekthion)	215	400-610	II	Warning
Malathion (Cythion)	1000-1375	>4,444	III	Caution
Phosmet (Imidan)	147-316	2,000	II	Warning
Miticides				
Dicofol (Kelthane)	820-960	1000-1230	II, III	Caution or warning
Oxythioquinox (Morestan)	1520-2070	>2,000	II	Caution
Propargite (Omite)	2,200	>900	I	Danger
Petroleum Oil	Exempt from residue tolerance			
Fungicides				
Benomyl (Benlate)	>10,000	>10,000	III	Caution
Copper oxychloride Sulfate (COCS)	Exempt from residue tolerance			
Fenarimol (Rubigan)	2,500	-	III, II	Caution or warning
Sulfur	Nontoxic, may irritate skin		III	Caution
Chlorothalonil (Bravo)	>10,000	>10,000	II	Warning
Triadimefon (Bayleton)	1020-1855	>5,000	II, III	Caution or warning
Herbicides				
Glyphosate (Roundup)	4,300	7,940	II	Warning
Norflurazon (Solicam)	>8,000	>20,000	III	Caution

1/ The explanation of the toxicity of proposed pesticides by category and signal word warning is presented in Table 3.

TABLE 3. TOXICITY CATEGORIES AND SIGNAL WORD WARNINGS FOR EPA REGISTERED PESTICIDES.

			Label Word required	LD50 (Mg/Kg) Oral	Dermal
Category	1	Highly toxic	Danger-Poison*	0-50	0-200
Category	2	Moderately toxic	Warning	50-5,000	200-2,000
Category	3	Slightly toxic	Caution	500-5,000	2,000-20,000
Category	4	Relatively nontoxic	Caution	over 5,000	over 20,000

*Labels of compounds in category 1 must also be marked with a skull and crossbones.

Scope of Work for a Long Term Pest Management Specialist in the FPP Project

BACKGROUND AND JUSTIFICATION

One of the primary objectives of the Farming Practices Productivity project (FPP) is to develop new technology to increase the production of deciduous fruit crops in Yemen. As a result of the government's decision in 1983 to ban importation of fruit from foreign countries to conserve scarce currency reserves, Yemeni farmers have become very interested in planting fruit trees in order to capitalize on the increased demand for consumption of locally-produced fruit.

Currently, only a relatively low percentage of Yemen's arable land is planted to deciduous fruits. Yields are very low because of a lack of suitable varieties, lack of technical knowledge and adoption of modern horticultural techniques, and low agricultural inputs. The USAID-financed Horticultural Improvement and Training Subproject (HITS) has tested different tree fruit varieties and rootstocks and has developed outreach programs designed to assist farmers in increasing fruit production. However, only a limited amount of work has been done in this project to develop effective pest management programs for controlling arthropods, diseases and weed pests of tree fruit. The FPP project will continue to conduct adaptive research trials in variety and rootstock testing and attempt to develop a more integrated fruit production package, utilizing new irrigation techniques, fertilizer inputs, cultural techniques, and improved pest management strategies that can be utilized by Yemeni farmers.

There are a relatively large number of potential insect, mite and disease pests of apples, plums, peaches and pears in Yemen. Yemeni farmers are currently relying on several protective applications of pesticides applied throughtout the season to control these pests. As the amount of fruit acreage increases and crop production inputs intensify, it is likely that the pest pressure will become increasingly severe. If farmers react to these intensified pest problems by increasing their use of pesticides, pests will become resistant to chemicals and all of the problems associated with pesticide misuse will develop: Environmental contamination, destruction of natural enemies of insect and mite pests, increased hazards to farmers and farm workers and excess pesticide levels in fruit at harvest. Therefore, the FPP project should attempt to prevent these potential problems arising from pesticide misuse by hiring a pest management specialist to design and test practical IPM programs that are appropriate for Yemeni farmers to use in the production of deciduous fruit crops.

SPECIFIC AREAS OF RESEARCH FOR THE PEST MANAGEMENT SPECIALIST

Relative Pest Severity and Crop Loss

Although a large number of insect and disease pests have been identified on various deciduous fruit crops grown in Yemen, very little information is available about the relative severity and potential crop loss caused by each species on the various crops. Detailed observations of fruit and foliar damage are needed throughout the season on blocks of the various kinds of fruit which are given optimum horticultural inputs but left untreated with pesticides. Yields and fruit quality in these untreated plots should be compared with those from comparable trees in which pests are eliminated or maintained at low levels with protective pesticide applications. This type of information will be particularly valuable in prioritizing the future pest management research among the various commodities and also in determining which pests might require detailed studies to define economic injury levels.

Pesticide Evaluation

Initially, the effectiveness of seasonal programs of insecticides should be compared in the various commodities. In addition, the relative toxicity of the different materials against beneficials should be compared and any undesirable effects on secondary pests i.e. resurgence of mites, should be recorded. Similar efficacy studies should be done with fungicides, except that these studies should probably focus primarily on activity against powdery mildew.

After the activity of seasonal programs has been compared, reduced schedules of the most effective materials can be evaluated based on the seasonal activity and monitoring of key pests.

Plant Resistance

Integrated research should be initiated in conjunction with horticultural studies to compare the susceptibility of different rootstocks and cultivars of each type of fruit to insects and diseases. These studies should probably focus primarily on indirect pests such as mites, aphids, and powdery mildew.

Biological Control

Initially, the species of beneficials (parasites and predators) attacking insect pests on the different types of fruit should be surveyed. Then the information obtained from this survey can be integrated with the study comparing the toxicity of different insecticides against the beneficials and used to develop insecticide management programs on each commodity that will facilitate the conservation of indigenous natural enemies and be compatible with natural biological control programs.

Sampling, Monitoring and ETL's

Although sampling and monitoring programs are crucial to maximizing pesticide usage in IPM programs, it may not be practical for the PMS to devote a large portion of time on research to develop unique sampling programs for most of the key pests observed in the various commodities. Therefore, the initial work should concentrate on evaluating of sampling and monitoring programs developed elsewhere for the same or closely related pests in Yemen orchards and modifying them to be applicable to local conditions, if necessary.

Control and Management of Nursery Pests

Normally the insect and disease damage should be reduced to minimum levels in nursery plants to insure maximum tree growth and prevent the spread of pests throughout the country when the trees are planted. The PMS should work in cooperation with the horticulture specialists to ensure that the current nursery control recommendations for insect and disease control are adequate.

Training and Outreach

The PMS should work with extension personnel and the project's extension training specialist to develop practical IPM training programs that can be delivered to farmers, nurserymen, and pesticide distributors.

Qualifications

The PMS should have a Ph.D in Entomology with training in integrated pest management and applied entomology from an agricultural university in the United States, another developed nation or some other third world country. The following criteria would be helpful but not

essential: experience in crop protection and IPM on horticultural crops, preferably tree fruits, experience in international agriculture, knowledge of Arabic.

Duration of Assignment

The PMS would work full time with the FPP in Yemen for 2-3 years. After that, either the PMS or another crop protection specialist should visit the project annually for two weeks during the next three years to work with the Yemeni counterpart PMS to review annual progress and develop a plan of work for the coming year.

APPENDIX I

Scope of Work for a Long Term Pest Management Specialist in the FPP Project

BACKGROUND AND JUSTIFICATION

One of the primary objectives of the Farming Practices Productivity project (FPP) is to develop new technology to increase the production of deciduous fruit crops in Yemen. As a result of the government's decision in 1983 to ban importation of fruit from foreign countries to conserve scarce currency reserves, Yemeni farmers have become very interested in planting fruit trees in order to capitalize on the increased demand for consumption of locally-produced fruit.

Currently, only a relatively low percentage of Yemen's arable land is planted to deciduous fruits. Yields are very low because of a lack of suitable varieties, lack of technical knowledge and adoption of modern horticultural techniques, and low agricultural inputs. The USAID-financed Horticultural Improvement and Training Subproject (HITS) has tested different tree fruit varieties and rootstocks and has developed outreach programs designed to assist farmers in increasing fruit production. However, only a limited amount of work has been done in this project to develop effective pest management programs for controlling arthropods, diseases and weed pests of tree fruit. The FPP project will continue to conduct adaptive research trials in variety and rootstock testing and attempt to develop a more integrated fruit production package, utilizing new irrigation techniques, fertilizer inputs, cultural techniques, and improved pest management strategies that can be utilized by Yemeni farmers.

There are a relatively large number of potential insect, mite and disease pests of apples, plums, peaches and pears in Yemen. Yemeni farmers are currently relying on several protective applications of pesticides applied throughtout the season to control these pests. As the amount of fruit acreage increases and crop production inputs intensify, it is likely that the pest pressure will become increasingly severe. If farmers react to these intensified pest problems by increasing their use of pesticides, pests will become resistant to chemicals and all of the problems associated with pesticide misuse will develop: Environmental contamination, destruction of natural enemies of insect and mite pests, increased hazards to farmers and farm workers and excess pesticide levels in fruit at harvest. Therefore, the FPP project should attempt to prevent these potential problems arising from pesticide misuse by hiring a pest management specialist to design and test practical IPM programs that are appropriate for Yemeni farmers to use in the production of deciduous fruit crops.

SPECIFIC AREAS OF RESEARCH FOR THE PEST MANAGEMENT SPECIALIST

Relative Pest Severity and Crop Loss

Although a large number of insect and disease pests have been identified on various deciduous fruit crops grown in Yemen, very little information is available about the relative severity and potential crop loss caused by each species on the various crops. Detailed observations of fruit and foliar damage are needed throughout the season on blocks of the various kinds of fruit which are given optimum horticultural inputs but left untreated with pesticides. Yields and fruit quality in these untreated plots should be compared with those from comparable trees in which pests are eliminated or maintained at low levels with protective pesticide applications. This type of information will be particularly valuable in prioritizing the future pest management research among the various commodities and also in determining which pests might require detailed studies to define economic injury levels.

Pesticide Evaluation

Initially, the effectiveness of seasonal programs of insecticides should be compared in the various commodities. In addition, the relative toxicity of the different materials against beneficials should be compared and any undesirable effects on secondary pests i.e. resurgence of mites, should be recorded. Similar efficacy studies should be done with fungicides, except that these studies should probably focus primarily on activity against powdery mildew.

After the activity of seasonal programs has been compared, reduced schedules of the most effective materials can be evaluated based on the seasonal activity and monitoring of key pests.

Plant Resistance

Integrated research should be initiated in conjunction with horticultural studies to compare the susceptibility of different rootstocks and cultivars of each type of fruit to insects and diseases. These studies should probably focus primarily on indirect pests such as mites, aphids, and powdery mildew.

Biological Control

Initially, the species of beneficials (parasites and predators) attacking insect pests on the different types of fruit should be surveyed. Then the information obtained from this survey can be integrated with the study comparing the toxicity of different insecticides against the beneficials and used to develop insecticide management programs on each commodity that will facilitate the conservation of indigenous natural enemies and be compatible with natural biological control programs.

Sampling, Monitoring and ETL's

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Appendix II

YEMEN-GERMAN PLANT PROTECTION PROJECT
PESTICIDE-LIST

Active Ingredient	Trade Name	Type	Allowed in Yemen
Acrolein	Acrylaldehyde	Herbicide	N
	Aqualin	Herbicide	N
Aldicarb	Brand	Insecticide	N
	OMS 771	Insecticide	N
	Temik	Insecticide	N
	UC 21149	Insecticide	N
Aldrin	Aldrex	Insecticide	N
	Aldrex 30	Insecticide	N
	Aldrine	Insecticide	N
	Aldrite	Insecticide	N
	Aldrosol	Insecticide	N
		Insecticide	N
	Altox	Insecticide	N
	Bangald	Insecticide	N
	Drinox	Insecticide	N
	HHDN	Insecticide	N
	Octalene	Insecticide	N
	Rasayaldrin	Insecticide	N
	Seedrin Liquide	Insecticide	N
Allyl Alcohol		Herbicide	
Aminocarb	A 363	Insecticide	N
	Aminocarbe	Insecticide	N
	Bay 44646	Insecticide	N
Aramite	88-R	Acaricide	N
	Aracide	Acaricide	N
	Niagaramite	Acaricide	N
Arsenious Oxide	Arsenic Trioxide	Rodenticides	N
Azinpblos - Ethyl	Azinos	Insecticide	N
	Bay 16259	Insecticide	N
	Bionex	Insecticide	N
	Cotnion-Ethyl	Insecticide	N
	Gusathion M.	Insecticide	N
	Triazotion	Insecticide	N
Azinphos - Methyl	Bay 17147	Insecticide	N
	Carfene	Insecticide	N
	Cotnion-Methyl	Insecticide	N
	Gusathion M.	Insecticide	N
	Guthion	Insecticide	N
	Metiltriazotion	Insecticide	N
	R 1582	Insecticide	N
Azocyclotin (Peropal)	Bay Bue 1452	Acaricide	N
Benomyl 50 % W.P.	Benlate *	Fungicide	Y
	Tersan 1991	Fungicide	Y
Blasticidin-S	Blasticidin S-3	Fungicides and Seed Dressings	N
	CLA-S	Fungicides and Seed Dressings	N
Bromophos-Ethyl	Cela S-2225	Insecticide	N
	ENT 27258	Insecticide	N
	formerly Filariol	Insecticide	N
	Nexagan	Insecticide	N

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YEMEN-GERMAN PLANT PROTECTION PROJECT
PESTICIDE-LIST

Active Ingredient	Trade Name	Type	Allowed in Yemen
Bromophos-Ethyl	OMS 659	Insecticide	N
Bupirimate 20 % E.C.	Nimrod *	Fungicide	Y
	PP 588	Fungicide	Y
Butocarboxim	Afilene	Insecticide	N
	Drawin 755	Insecticide	N
Butoxycarboxim	Plant pin.	Insecticide	N
Cadmium Compounds		Fungicide	N
Cadmium-Calcium Copper Zinc Chromate Complex	Crag Turf Fungicide 531	Fungicide	N
	Miller 531	Fungicide	N
Calcium Arsenate	Chip-Cal	Insecticide	N
	Pencal	Insecticide	N
	Spra-Cal	Insecticide	N
	Turf-Cal	Insecticide	N
Calcium Cyanide		Soil Fumigant	N
Carbaryl 85 % W.P.	Brand	Insecticide	Y
	Carbamine	Insecticide	Y
	Carbocid *	Insecticide	Y
	Cekubary	Insecticide	Y
	Denapon	Insecticide	Y
	Dicarbam *	Insecticide	Y
	Hexavin	Insecticide	Y
	Karbaspray	Insecticide	Y
	NAC	Insecticide	Y
	Ravyon	Insecticide	Y
	Septene	Insecticide	Y
	Sevin	Insecticide	Y
	Tercyl	Insecticide	Y
	Tricarnam	Insecticide	Y
	UC 7744	Insecticide	Y
Carbofos	Cythion	Insecticide	Y
	Detmol MA	Insecticide	Y
Carbofuran	Bay 70143	Insecticide	N
	Brifur	Insecticide	N
	Crisfuran	Insecticide	N
	Curater	Insecticide	N
	D 1221	Insecticide	N
	ENT 27164	Insecticide	N
	FMC 10242	Insecticide	N
	NIA 10242	Insecticide	N
	Yaltex	Insecticide	N
Carbofuran 50 % GR.	Bay 70143	Insecticide	Y, R
	Brifur	Insecticide	Y, R
	Crisfuran	Insecticide	Y, R
	Curaterr	Insecticide	Y, R
	D 1221	Insecticide	Y, R
	ENT 27164	Insecticide	Y, R
	FMC 10242	Insecticide	Y, R
	Furadan *	Insecticide	Y, R
	NIA 10242	Insecticide	Y, R
	Yaltax	Insecticide	Y, R

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YEMEN-GERMAN PLANT PROTECTION PROJECT
PESTICIDE-LIST

Active Ingredient	Trade Name	Type	Allowed in Yemen
Carbophenothion (Trithion)	Carrathion	Insecticide	N
	Dagadip	Insecticide	N
	Endyl	Insecticide	N
	Lethox	Insecticide	N
	R 1303	Insecticide	N
Carboxin (Seed Dressing)	Dcmo	Fungicide	Y
	Vitavax *	Fungicide	Y
Chlordane	Aspon Chlordane	Insecticide	N
	Belt	Insecticide	N
	Chlor	Insecticide	N
	Chlordan	Insecticide	N
	Chlordono	Insecticide	N
	Chlortox	Insecticide	N
	Corodane	Insecticide	N
	Gold Crest C-100	Insecticide	N
	Kil	Insecticide	N
	Kilex Lindane	Insecticide	N
	Kypchlor	Insecticide	N
	Niran	Insecticide	N
	Octa-Klor	Insecticide	N
	Octachlor	Insecticide	N
	Ortho-Klor	Insecticide	N
	Synklor	Insecticide	N
	Termided	Insecticide	N
	Topiclor 20	Insecticide	N
	Velsicol 1068	Insecticide	N
Chlordecone (Kepone)	GC 1189	Insecticide	N
Chlorfenvinphos	Apachlor	Insecticide	N
	Birlane	Insecticide	N
	Birlane 24	Insecticide	N
	C 8949	Insecticide	N
	CGA 26351	Insecticide	N
	Compound 4072	Insecticide	N
	Sapecron	Insecticide	N
	SD 7859	Insecticide	N
	Steladone	Insecticide	N
	Supona	Insecticide	N
	Vinylphate	Insecticide	N
Chlormephos	Dotan	Insecticide	N
	MC 2188	Insecticide	N
Chlorthiophos	Celathion	Insecticide	N
	CM-S 2957	Insecticide	N
	ENT 27635	Insecticide	N
	OMS 1342	Insecticide	N
	S 2957	Insecticide	N
Clorofos	Leivasom	Insecticide	Y
	Neguvon	Insecticide	Y
	Proxol	Insecticide	Y
	Trinex	Insecticide	Y
	Tugon	Insecticide	Y

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YEMEN-GERMAN PLANT PROTECTION PROJECT
PESTICIDE-LIST

Active Ingredient	Trade Name	Type	Allowed in Yemen
Copper Oxychloride 50 % W.P.	Biltox	Fungicide	Y
	Brascop	Fungicide	Y
	Cobox *	Fungicide	Y
	Cobox Blue	Fungicide	Y
	Coppersan	Fungicide	Y
	Coprantol	Fungicide	Y
	Coptox	Fungicide	Y
	Coxyson	Fungicide	Y
	Cupravit *	Fungicide	Y
	Cuprin	Fungicide	Y
	Cuprofaffaro	Fungicide	Y
	Cuprol	Fungicide	Y
	Fytolan	Fungicide	Y
	Kauritil	Fungicide	Y
Crimidine	Castnix	Rodenticides	N
	Cyimidine	Rodenticides	N
Crotoxyphos	Ciodrin	Insecticide	N
	Cypona	Insecticide	N
	Decrotox	Insecticide	N
	Duo-Kill	Insecticide	N
	E.C.	Insecticide	N
Cyanthoate	Taran	Acaricide	N
	Tartan	Insecticide	N
Cyclohexamide	Acti-Aid	Fungicides and Seed Dressings	N
	Acti-dione	Fungicides and Seed Dressings	N
	Actispray	Fungicides and Seed Dressings	N
	Hizarocin	Fungicides and Seed Dressings	N
	Naramycin	Fungicides and Seed Dressings	N
Cypermethrin 10 % E.C.	Ammo	Insecticide	Y
	Barricade	Insecticide	Y
	CCN 52	Insecticide	Y
	Cymbush *	Insecticide	Y
	Cymperator	Insecticide	Y
	Cyperkill	Insecticide	Y
	Cyrux	Insecticide	Y
	Flectron	Insecticide	Y
	Folcord	Insecticide	Y
	Kafil Super	Insecticide	Y
	NRDC 149	Insecticide	Y
	Polytrin	Insecticide	Y
	Ripcord	Insecticide	Y
	Siperin	Insecticide	Y
	Ustaad	Insecticide	Y
D.D.T.	Anofex	Insecticide	N
	Arkotine	Insecticide	N

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YEMEN-GERMAN PLANT PROTECTION PROJECT
PESTICIDE-LIST

Active Ingredient	Trade Name	Type	Allowed in Yemen
D.D.T.	DDT 75 % WDP	Insecticide	N
	Dedelo	Insecticide	N
	Diamekta 50 %	Insecticide	N
	Didimac	Insecticide	N
	Genitox	Insecticide	N
	Gesapon	Insecticide	N
	Gesarol	Insecticide	N
	Gexarex	Insecticide	N
	Gyron	Insecticide	N
	Hildit	Insecticide	N
	Ixodex	Insecticide	N
	Kopsol	Insecticide	N
	Micro DDT 75	Insecticide	N
	Neocid	Insecticide	N
	Pentachlorin	Insecticide	N
	PP Zeidane	Insecticide	N
	R 50	Insecticide	N
	Rukseam	Insecticide	N
	Zeidane	Insecticide	N
	Zerdane	Insecticide	N
DDVP	Apavap	Insecticide	N
	Benfos	Insecticide	N
	Cekusan	Insecticide	N
	Cypona	Insecticide	N
	DDVP Solutions	Insecticide	N
	Dedevap	Insecticide	N
	Derriban	Insecticide	N
	Derribante	Insecticide	N
	Devikol	Insecticide	N
	Dichlorvos	Insecticide	N
		Insecticide	N
	Divipan	Insecticide	N
	Duravos	Insecticide	N
	Fly Fighter	Insecticide	N
	Fly-die	Insecticide	N
	Herkol	Insecticide	N
	Mafu	Insecticide	N
	Marvex	Insecticide	N
	Mus-De-Kil	Insecticide	N
	No-Pest	Insecticide	N
	Nogos	Insecticide	N
	Nuvan	Insecticide	N
	OKO	Insecticide	N
	Phosphit	Insecticide	N
	Prentox	Insecticide	N
	UDVF	Insecticide	N
	Vapona	Insecticide	N
	Vaponite	Insecticide	N
	Vapora II	Insecticide	N
	Verdican	Insecticide	N
	Verdipor	Insecticide	N

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YEMEN-GERMAN PLANT PROTECTION PROJECT
PESTICIDE-LIST

Active Ingredient	Trade Name	Type	Allowed in Yemen
DDVP	Verdisol	Insecticide	N
DECA (Decamethrin)	NRDC 161	Insecticide	Y
Dekamethrin 2.5 % E.C.	Butoflin	Insecticide	Y
	Butox	Insecticide	Y
	Decis *	Insecticide	Y
	K-Othrin	Insecticide	Y
	RU 22974	Insecticide	Y
Demephion - O	Demephion - O.	Insecticide	N
Demephion - S	Demephion - S.	Insecticide	N
Diamidafos	Nellite	Insecticide	N
Diamidfos	Nellite	Nematicide	N
Diazinon 60 % E. C.	Basudin *	Insecticide	Y
	D - 264	Insecticide	Y
	D.Z.N.	Insecticide	Y
	Dazzel	Insecticide	Y
	Diagran	Insecticide	Y
	Dianon	Insecticide	Y
	Diaterrfos	Insecticide	Y
	Diazajet	Insecticide	Y
	Diazatol	Insecticide	Y
	Diazide	Insecticide	Y
	Diazol	Insecticide	Y
	Dyzol	Insecticide	Y
	Fezadin	Insecticide	Y
	G - 24480	Insecticide	Y
	Gardentox	Insecticide	Y
	Kayazinon	Insecticide	Y
	Kayazol	Insecticide	Y
	Nepcidol	Insecticide	Y
	Nipsan	Insecticide	Y
	Sarolex	Insecticide	Y
		Insecticide	Y
	Spectracide	Insecticide	Y
Dibromochloropropane	BBC 12	Soil Fumigant	N
	DBCP Fumazone	Soil Fumigant	N
	Nemafume	Soil Fumigant	N
	Nemagon	Soil Fumigant	N
	Nemanax	Soil Fumigant	N
	Nemaset	Soil Fumigant	N
	Nematocide	Soil Fumigant	N
	Oxy DBCP	Soil Fumigant	N
Dibromochloroprophane	BBC 12	Fungicides and Seed Dressings	N
	DBCP Fumazone Nemagon	Fungicides and Seed Dressings	N
	NemaFume	Fungicides and Seed Dressings	N
	Nemanax	Fungicides and Seed Dressings	N
	Nemaset	Fungicides and Seed Dressings	N

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YEMEN-GERMAN PLANT PROTECTION PROJECT
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Active Ingredient	Trade Name	Type	Allowed in Yemen
Dibromochloropropane	Nematocide	Fungicides and Seed Dressings	N
	Oxy DBCP Nematocide	Fungicides and Seed Dressings	N
Dicrotophos	Bidrin	Insecticide	N
		Insecticide	N
	C 709	Insecticide	N
		Insecticide	N
	Carbicron	Insecticide	N
		Insecticide	N
	Diapadrin	Insecticide	N
		Insecticide	N
	Ektafos	Insecticide	N
		Insecticide	N
	SD 3562	Insecticide	N
		Insecticide	N
Dieldrin	Alvit	Insecticide	N
	Dieldrex	Insecticide	N
	Dieldrite	Insecticide	N
	Octalox	Insecticide	
	Panoram D-31	Insecticide	N
Dimefox	Hanane	Acaricide	N
	Pestox XIV	Acaricide	N
	Terra-Sytam	Acaricide	N
	Wacker S 14/10	Acaricide	N
Dimethoate 40 % E. C.	AC - 12880	Insecticide	Y
	Bi 58	Insecticide	Y
	Cekuthoate	Insecticide	Y
	Chemathoate	Insecticide	Y
	Cygon	Insecticide	Y
	Daphene	Insecticide	Y
	De-Fend	Insecticide	Y
	Dimethoate *	Insecticide	Y
Dimetilan	Fly Bands	Insecticide	
	G-22870	Insecticide	N
Dinocap 25 % W.P.	Caprane	Fungicide	Y
	Cekucap	Fungicide	Y
	Crotothane	Fungicide	Y
	Ezenosan	Fungicide	Y
	Karathane *	Fungicide	Y
Dinoseb	Basanite	Herbicide	
	Caldon	Herbicide	N
	Chemox PE	Herbicide	N
	Chemox-General	Herbicide	N
	Chemsect	Herbicide	N
	Dinitro	Herbicide	N
	Dinitro General	Herbicide	N
	Dinitro-3	Herbicide	N
	DN-289	Herbicide	N
	DNBP	Herbicide	N
	Dynanyte	Herbicide	N

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YEMEN-GERMAN PLANT PROTECTION PROJECT
PESTICIDE-LIST

Active Ingredient	Trade Name	Type	Allowed in Yemen
Dinoseb	Elgetol 318	Herbicide	N
	Geoutox	Herbicide	N
	Hel-fire	Herbicide	N
	Kiloseb	Herbicide	N
	Nitrodone C	Herbicide	N
	Premerge 3	Herbicide	N
	Sinox General	Herbicide	N
	Subitex	Herbicide	N
	Unicrop-DNBP	Herbicide	N
	Vertac Dinitro weed killer 5	Herbicide	N
	Vertac Selective weed killer	Herbicide	N
	Wertac General weed killer	Herbicide	N
Dinoseb Acetate	Aretit	Herbicide	N
	Hoe 002904	Herbicide	N
	Ivosit	Herbicide	N
	Phenotan	Herbicide	N
Dinoterb Acetate	MC 1108	Herbicide	N
Dinoterb Salts	Dinoterb	Herbicide	N
	DNTBP	Herbicide	N
	Herbogil	Herbicide	N
Dioxathion	Delnav	Insecticide	N
	Deltic	Insecticide	N
	Hercules AC 528	Insecticide	N
	Navadel	Insecticide	N
	Ruphos	Insecticide	N
Disulfoton	Bay 19639	Insecticide	N
	Bay S 276	Insecticide	N
	Di-Syston	Insecticide	N
	Disyston	Insecticide	N
	Dithiodemeton	Insecticide	N
	Dithiosystox	Insecticide	N
	Ethylthiodemeton	Insecticide	N
	Frumin Al	Insecticide	N
	M-74	Insecticide	N
	Solvirex	Insecticide	N
	Thiodemeton	Insecticide	N
DNOC	Chemsect	Insecticide	N
	DNC	Herbicide	N
		Insecticide	N
	Elgetol 30	Herbicide	N
		Insecticide	N
	Nitrador	Herbicide	N
		Insecticide	N
	Selinon	Herbicide	N
		Insecticide	N
	Sinox	Herbicide	N
		Insecticide	N
	Trifocide	Herbicide	N

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YEMEN-GERMAN PLANT PROTECTION PROJECT
PESTICIDE-LIST

Active Ingredient	Trade Name	Type	Allowed in Yemen
DNOC	Trifocide	Insecticide	N
	Trifrina	Herbicide	N
		Insecticide	N
Edifenphos	Bay 78418	Fungicides and Seed Dressings	N
	Hinosan	Fungicides and Seed Dressings	N
	SRA 7847	Fungicides and Seed Dressings	N
Endothion	AC-18737	Insecticide	N
	Exothion	Insecticide	N
	NIA 5767	Insecticide	N
	Phosphopyron	Insecticide	N
Endrin	Endrex	Insecticide	N
	Hexadrin	Insecticide	N
	Nendrin	Insecticide	N
EPN	EPN	Acaricide	N
Fenarimol 14 % E.C.	Bloc	Fungicide	Y
	Ei-222 Rimidin	Fungicide	Y
	Rubigan *	Fungicide	Y
Fenitrothion 25 % E.C.	Sumicidin *	Insecticide	Y
	Sumicombi *	Insecticide	Y
	Sumithion *	Insecticide	Y
Fenitrothion 50 % or 100 % E.C.	Accothion	Insecticide	Y
	Agrothion	Insecticide	Y
	Bay 41831	Insecticide	Y
	Bay S 5660	Insecticide	Y
	Cekutrthion	Insecticide	Y
	Cytel	Insecticide	Y
	Fenitox	Insecticide	Y
	Folithion	Insecticide	Y
	Novathion	Insecticide	Y
	Nuvanol	Insecticide	Y
	S 5660	Insecticide	Y
	Sumithion *	Insecticide	Y
Fensulfothion	Bay 25141	Nematicide	N
	Dasanit	Nematicide	N
	Terracur P	Nematicide	N
Fenthion	Bay 29493	Insecticide	N
	Baycid	Insecticide	N
	Baytex	Insecticide	N
	Entex	Insecticide	N
	Lebaycid	Insecticide	N
	Mercaptophos	Insecticide	N
	S 1752	Insecticide	
	Tiguvon	Insecticide	N
Fenvalerate 20 % E.C.	Belmark	Insecticide	Y
	Fenkill	Insecticide	Y
	Pydrin	Insecticide	Y
	S - 5602	Insecticide	Y

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YEMEN-GERMAN PLANT PROTECTION PROJECT
PESTICIDE-LIST

Active Ingredient	Trade Name	Type	Allowed in Yemen
Fenvalerate 20 % E.C.	Sanmarton	Insecticide	Y
	Sumi powder	Insecticide	Y
	Sumicidin *	Insecticide	Y
	Sumiflay	Insecticide	Y
Fenvalerate 5 % E.C.		Insecticide	Y
Flucythrinate	024	Insecticide	N
	705	Insecticide	N
	AAstar	Insecticide	N
	AC 222	Insecticide	N
	AC 35	Insecticide	N
	Cybolt	Insecticide	N
	Pay off	Insecticide	N
	Phorate	Insecticide	N
Fluoracetamide	1081	Rodenticides	N
	Baran	Rodenticides	N
	Fluorakil 100	Rodenticides	N
	Fussol	Rodenticides	N
Fluoroacetamide	Navron	Rodenticides	N
	Rodex	Rodenticides	N
	Yanock	Rodenticides	N
Fonofos	Cyfonate	Insecticide	N
	N-2790	Insecticide	N
Formetanate	Carzol	Acaricide	N
	Dicarzol	Acaricide	N
	ENT 27566	Acaricide	N
	EP-332	Acaricide	N
	Formetanate Hydrochloride	Acaricide	N
	SN 36056	Acaricide	N
Fosfamid	Dimethoate *	Insecticide	Y
	Dimethogen	Insecticide	Y
	Perfekthion *	Insecticide	Y
	Rogodial	Insecticide	Y
	Rogor	Insecticide	Y
	Roxion *	Insecticide	Y
	Trimetion	Insecticide	Y
Fosthietan	475	Nematicide	N
	AC 64	Nematicide	N
	Acconam	Nematicide	N
	CL 64	Nematicide	N
	Geofos	Nematicide	N
	Nem-A-Tak	Nematicide	N
Gammexane (BHC)	666	Insecticide	N
	Benzahex	Insecticide	N
	Benzex	Insecticide	N
	Dol	Insecticide	N
	Dolmix	Insecticide	N
	FBHC	Insecticide	N
	Gaxane	Insecticide	N
	HCCH	Insecticide	N
	HCH	Insecticide	N
	Hexablanc	Insecticide	N

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Active Ingredient	Trade Name	Type	Allowed in Yemen
Gammexane (BHC)	Hexachlor	Insecticide	N
	Hexachloran	Insecticide	N
	Hexafor	Insecticide	N
	Hexamul	Insecticide	N
	Hexapoudre	Insecticide	N
	Hexyclan	Insecticide	N
	Hilbeech	Insecticide	N
	Kotol	Insecticide	N
	Lindacol	Insecticide	N
	Soprocide	Insecticide	N
	Submar	Insecticide	N
Gaphacide	Phorazetim Gay 38819	Rodenticides	N
Hepta-Chlor	Drinox	Insecticide	N
	Gold Crest H-60	Insecticide	N
	H-34	Insecticide	N
	H-60	Insecticide	N
	Heptachlore	Insecticide	N
	Heptamul	Insecticide	N
	Heptox	Insecticide	N
Heptenophos	Hoe 002982	Insecticide	N
	Hostaquick	Insecticide	N
	Ragadan	Insecticide	N
Hexachlorobenzene	Anticarie	Fungicides and Seed Dressings	N
	Ceku-C.B.	Fungicides and Seed Dressings	N
	HCB	Fungicides and Seed Dressings	N
	NO	Fungicides and Seed Dressings	N
IPSP	Aphidan	Insecticide	N
Isazophos	CGA 12223	Nematicide	N
	Miral	Nematicide	N
	Triumph	Nematicide	N
Isobenzan (Telodrin)	SD 4002	Insecticide	N
Isodrin	Isomer of Aldrin	Insecticide	N
Isofenphos	Bay 92114	Insecticide	N
	Bay SRA 12869	Insecticide	N
	Oftanol	Insecticide	N
Isothioate	Hosdon	Insecticide	N
Isoxathion	E-48	Insecticide	N
	Karphos	Insecticide	N
	SI-6711	Insecticide	N
Kepone	Chlordecone	Insecticide	N
	GC 1180	Insecticide	N
Lead Arsenate	Gypsine	Insecticide	N
	Soprabel	Insecticide	N
	Talbot	Insecticide	N
Leptophos (Phosrel)	MBCP	Insecticide	N
Lindane	Agronexit	Insecticide	N
	Exagama	Insecticide	N

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Active Ingredient	Trade Name	Type	Allowed in Yemen
Lindane	Forlin	Insecticide	N
	Gallogama	Insecticide	N
	Gamaphex	Insecticide	N
	Gammex	Insecticide	N
	Inexit	Insecticide	N
	Isotox	Insecticide	N
	Lacco Hi Lin	Insecticide	N
	Lacco Lin-O-Mulsion	Insecticide	N
	Lin-O-Sol	Insecticide	N
	Lindafor	Insecticide	N
	Lindagam	Insecticide	N
	Lindagrain	Insecticide	N
	Lindaterra	Insecticide	N
	Nexit	Insecticide	N
	Novigan	Insecticide	N
	Silvanol	Insecticide	N
Malathion 50 % E.C.	Calmathion	Insecticide	Y
	Celthion	Insecticide	Y
	Cythion	Insecticide	Y
Maneb 80 % W.P.	Dithane M-22	Fungicide	Y
	Kypman	Fungicide	Y
	Lonocol M	Fungicide	Y
	Maneba	Fungicide	Y
	Manebgan	Fungicide	Y
	Manessan	Fungicide	Y
	Manex	Fungicide	Y
	Manzati	Fungicide	Y
	Meb	Fungicide	Y
	Nespor	Fungicide	Y
	Polyram M *	Fungicide	Y
	Remasan	Fungicide	Y
	Tersan - LSR	Fungicide	Y
	Trimangol	Fungicide	Y
	Tubothane	Fungicide	Y
Mecarban	Afos	Insecticide	N
	MC 474	Insecticide	N
	Murfotox	Insecticide	N
	Pestan	Insecticide	N
Medinoterb Acetate	MC 1488 (Murphy chemical)	Herbicide	N
Mephosfolan	Cytroiane-Cytro-Lane	Insecticide	N
Mercuric Chloride	Bichloride of Morsodren	Fungicides and Seed Dressings	N
	Corrosive Sublimate	Fungicides and Seed Dressings	N
	Fungchex	Fungicides and Seed Dressings	N
Metalaxyl 5 % G.R.	Acylon	Fungicide	Y
	Apron	Fungicide	Y
	CGA - 48988	Fungicide	Y
	Ridomil *	Fungicide	Y
	Subdue	Fungicide	Y

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Active Ingredient	Trade Name	Type	Allowed in Yemen
Metasystox- (I)	Demeton-S-Methyl	Insecticide	N
	Duratox	Insecticide	N
	Methyl-Mercaptofos		
	Teolery		
Metasystox-R	Bay 21097	Insecticide	N
	Demeton-S-Methyl Sulfoxid	Insecticide	N
	Metasystemox	Insecticide	N
	Oxydemeton-Methyl	Insecticide	N
	Metilmercaptofosoks		
	R 2170	Insecticide	N
Metasystox-S	Bay 23635	Insecticide	N
	Estox	Insecticide	N
	Oxydeprofos	Insecticide	N
	S 410	Insecticide	
Methamidphos	Acephate-Met	Insecticide	N
	Bay 71628	Insecticide	N
	Estrella	Insecticide	N
	Filitux	Insecticide	N
	Metamidofos	Insecticide	N
	Monitor	Insecticide	N
	MTD	Insecticide	N
	MTD-608	Insecticide	N
	Patrole	Insecticide	N
	SRA 5172	Insecticide	N
	Tahmabon	Insecticide	N
	Tamanox	Insecticide	N
	Tamaron	Insecticide	N
Methidathion	GS 13005	Insecticide	N
	Somonil	Insecticide	N
	Supracide	Insecticide	N
	Suprathion	Insecticide	N
	Ultracide	Insecticide	N
Methomly	Lannate	Insecticide	N
	Lanox 216	Insecticide	N
	Lanox 90	Insecticide	N
	Nu-Bait 11	Insecticide	N
		Insecticide	N
	Nudrin	Insecticide	N
Methyl Mercury Dicyandiamide	Cyano (Methylmercuri)	Fungicides and Seed Dressings	N
	Guanidine	Fungicides and Seed Dressings	N
	Morsodren	Fungicides and Seed Dressings	N
	Panodrin A-13	Fungicides and Seed Dressings	N
	Panogen Turf Fungicide	Fungicides and Seed Dressings	N
Metiram 80 % W.P.	Carbatene	Fungicide	Y
	Metiram *	Fungicide	Y
	Petd	Fungicide	Y

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PESTICIDE-LIST

Active Ingredient	Trade Name	Type	Allowed in Yemen
Metiram 80 % W.P.	Polyram *	Fungicide	Y
	Polyram Combi *	Fungicide	Y
Mevinphos	Apavinphos	Insecticide	N
	Duraphos	Insecticide	N
	Gesfid	Insecticide	N
	Menite	Insecticide	N
	Mevinox	Insecticide	N
	OS 2046	Insecticide	N
	Phosdrin	Insecticide	N
	Phosfene	Insecticide	N
Mirex	Dechlorane	Insecticide	N
	GC-1283	Insecticide	N
MOCSP	Ethoprop	Nematicide	N
	Ethoprophos	Nematicide	N
	Jolt	Nematicide	N
	Prophos	Nematicide	N
Monocrotophos	Apadrin	Insecticide	N
	Azodrin	Insecticide	N
	Bilobran	Insecticide	
	C 1414	Insecticide	N
	Crisodrin	Insecticide	N
	Glore Phos 36	Insecticide	N
	Hazodrin	Insecticide	N
	Monocil	Insecticide	N
	Monocron	Insecticide	N
	Nuvacron	Insecticide	N
	Plantdrin	Insecticide	N
	SD 9129	Insecticide	N
	Susvin	Insecticide	N
	Ulrair	Insecticide	N
Monuron	Chlorfenidim	Herbicide	N
	Monurex	Herbicide	N
	Telvar	Herbicide	N
Napthyl-Thiourea	Antu	Rodenticides	N
	Krysid	Rodenticides	N
Nemacur	Bay 68138	Nematicide	N
	Bay SRA 3886	Nematicide	N
	Fenamiphos	Nematicide	N
Nicotine	Ulrair	Insecticide	
Nitrofen	Nip	Herbicide	N
	Nitrofene	Herbicide	N
	Nitrophen	Herbicide	N
	TOK	Herbicide	N
	TOK E-25	Herbicide	N
	TOK WP-50	Herbicide	N
	Trizilin 25	Herbicide	N
Omethoate	Bay 45432	Insecticide	N
	Dimethoate-Met	Insecticide	N
	Folimat	Insecticide	N
	S 6876	Insecticide	N
Organic and Inorganic		Fungicides and Seed	N

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Active Ingredient	Trade Name	Type	Allowed in Yemen
Mercury Compounds		Dressings	
Oxamyl	DPX 1410	Insecticide	N
	Vydate	Insecticide	N
Oxydemeton - Methyl (Metasystox)	Bay 15203	Insecticide	N
	Demeton Methyl	Insecticide	N
	Methyl demeton	Insecticide	N
Oxythioquinox 25 % W.P.	Chinomethionat	Fungicide	Y
	Morestan *	Fungicide	Y
	Quinomethionate	Fungicide	Y
Parathion	AC 3422	Insecticide	N
	Alkron	Insecticide	N
	Alleron	Insecticide	N
	Aphamite	Insecticide	N
	Bladan	Insecticide	N
	Corothion	Insecticide	N
	E-605	Insecticide	N
	ENT 15108	Insecticide	N
	Ethyl Parathion	Insecticide	N
	Etilon	Insecticide	N
	Folidol E-605	Insecticide	N
	Fosforno 50	Insecticide	N
	Niran	Insecticide	N
	Orthophos	Insecticide	N
	Panthion	Insecticide	N
	Paramar	Insecticide	N
	Paraphos	Insecticide	N
	Parathene	Insecticide	N
	Parawet	Insecticide	N
	Phoskil	Insecticide	N
	Rhodiatox	Insecticide	N
	Soorathion	Insecticide	N
	Stathion	Insecticide	N
	Thiophos	Insecticide	N
		Insecticide	N
Parathion-Methyl	Cekumethion	Insecticide	N
	Derithion	Insecticide	N
	Dimethyl Parathion	Insecticide	N
	Drexel Methyl Parathion 4-E	Insecticide	N
	E 601	Insecticide	N
	Folidol M	Insecticide	N
	Fosferno MSO	Insecticide	N
	Gearphos	Insecticide	N
	Mefacide	Insecticide	N
	Metafos	Insecticide	N
	Methaphos	Insecticide	N
	Methyl-parathion	Insecticide	N
	Metron	Insecticide	N
	Nitrox 80	Insecticide	N
	Parataf	Insecticide	N

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Active Ingredient	Trade Name	Type	Allowed in Yemen
Parathion-Methyl	Paratox	Insecticide	N
	Partron M	Insecticide	N
	Penncap-M	Insecticide	N
	Tekwaisa	Insecticide	N
	Wofatox	Insecticide	N
Paris Green	Copper Acetoarsenite	Insecticide	N
	Emerald Green	Insecticide	N
	French Green	Insecticide	N
	Mitis Green	Insecticide	N
	Schweinfurt Green	Insecticide	N
Penpropathrin 10 % E.C.	Danitol *	Insecticide	Y
	Herald	Insecticide	Y
	Meothrin	Insecticide	Y
	Ortho Danitol	Insecticide	Y
	Rody	Insecticide	Y
	S - 2206	Insecticide	Y
	S 2206	Insecticide	Y
	SD - 41706	Insecticide	Y
	WL - 41706	Insecticide	Y
	XE - 938	Insecticide	Y
Pentachlorophenol	Antimicrobial	Herbicide	N
	DOW Pentachlorophenol	Herbicide	N
	DP-2		
	Dowicide	Herbicide	N
	EC-7	Herbicide	N
	PCP	Herbicide	N
	Penchlorol	Herbicide	N
	Pentacon	Herbicide	N
	Penwar	Herbicide	N
	Priltox	Herbicide	N
	Santobrite	Herbicide	N
	Santophen	Herbicide	N
	Sinituho	Herbicide	N
	Weedone	Herbicide	
Permethrin 25 % E.C.	Ambush	Insecticide	Y
	BW-21-Z	Insecticide	Y
	Ectiban	Insecticide	Y
	Eksmin	Insecticide	Y
	FMC 33297	Insecticide	Y
	Indothrin	Insecticide	Y
	Kafil *	Insecticide	Y
	Outflank	Insecticide	Y
	Permasect	Insecticide	Y
	Perthrine	Insecticide	Y
	Pounce	Insecticide	Y
	PP 557	Insecticide	Y
	Pramex	Insecticide	Y
	Talacord	Insecticide	Y
Perthane	Ethylan	Insecticide	N
Petroleum Oils	90 - Par	Insecticide	Y
	Oils	Insecticide	Y

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Active Ingredient	Trade Name	Type	Allowed in Yemen
Petroleum Oils	Volck *	Insecticide	Y
	White Oils	Insecticide	Y
Phenylmercury Acetate	Gallotox	Fungicides and Seed Dressings	N
	PMAA	Fungicides and Seed Dressings	N
	Setrete	Fungicides and Seed Dressings	N
Phorate	Aastar	Insecticide	N
	AC 8911	Insecticide	N
	Agrimet	Insecticide	N
	Geomet	Insecticide	N
	Granutox	Insecticide	N
	Phorate	Insecticide	N
		Insecticide	N
	Phorate-10B	Insecticide	N
	Ramport	Insecticide	N
	Thimenox	Insecticide	N
	Thimet	Insecticide	N
	Timet	Insecticide	N
	Vegfru	Insecticide	N
	Vegfru Foratox	Insecticide	N
Phosfolan	Cylan	Insecticide	N
	Cyolane	Insecticide	N
Phosphamidon	Apamidon	Insecticide	N
	C 570	Insecticide	N
	Dimecron	Insecticide	N
	Dixon	Insecticide	N
Pirimicarb	Abol	Insecticide	Y
	Aficida	Insecticide	Y
	Aphox	Insecticide	Y
	Fernos	Insecticide	Y
	Pirimor *	Insecticide	Y
	Rapid	Insecticide	Y
Pirimiphos Methyl 50 % E. C.	Actellic *	Insecticide	Y
	Actellifog	Insecticide	Y
	Blex	Insecticide	Y
	Silosan	Insecticide	Y
Pirimiphos-Ethyl	Fernex	Insecticide	N
	PP 211	Insecticide	N
	Primicid	Insecticide	N
	Primotec	Insecticide	N
Propetemphos	Safrotin	Insecticide	N
	SAN 52 1391	Insecticide	N
		Insecticide	N
Propineb 70 % W.P.	Altone	Fungicide	Y
	Antracol *	Fungicide	Y
	Mezineb	Fungicide	Y
	Taifen	Fungicide	Y
Prothoate	Fac	Insecticide	N

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Active Ingredient	Trade Name	Type	Allowed in Yemen
Prothoate	Fac-20	Insecticide	N
	Fostion	Insecticide	N
Red Squill		Rodenticides	N
Schradan	OMPA	Insecticide	N
	Pestox 111	Insecticide	N
	Schradane	Insecticide	N
	Systam	Insecticide	N
Scilloriside	Silmurin	Rodenticides	N
Sodium Cyanide	Cymag	Rodenticides	N
	Hydrocyanic acid	Rodenticides	N
Sodium Fluoro Acetate	Compound 1080	Rodenticides	N
	Fratol	Rodenticides	N
	Yasoknock	Rodenticides	N
Sodium Pentachlorophenol	Dowicide G-ST	Herbicide	N
	Santobrite	Herbicide	N
	Weedbeads	Herbicide	N
Sodum Arsenite	Chem pels C	Rodenticides	N
	Chem-sen 56	Rodenticides	N
	Kill-All	Rodenticides	N
	Penite (pennwalt)	Rodenticides	N
	Prodalumnof Double	Rodenticides	N
Strobane	Terpene Polychlorinates	Insecticide	N
Strychnine		Rodenticides	N
Sulfor 80 % W.P.	Brimestone	Fungicide	Y
	Consul	Fungicide	Y
	Cosan	Fungicide	Y
	Electrosulph	Fungicide	Y
	Elosal	Fungicide	Y
	Golden	Fungicide	Y
	Hexasul	Fungicide	Y
	Kolofog	Fungicide	Y
	Kolospray	Fungicide	Y
	Kumulus *	Fungicide	Y
	Losan 80	Fungicide	Y
	Microflotox	Fungicide	Y
	Sofril	Fungicide	Y
	Sperlox S	Fungicide	Y
	Spersul	Fungicide	Y
	Suffa 80	Fungicide	Y
	Sulforon	Fungicide	Y
	Sulkul	Fungicide	Y
	Sulsol	Fungicide	Y
	Supercosan	Fungicide	Y
Sulfotep	Bladafum	Insecticide	N
	Dithio	Insecticide	N
	Dithione	Insecticide	N
	Thiotepp	Insecticide	N
Tepp	Kilmite 40	Insecticide	N
	Tetron	Insecticide	N
	Vapotone	Insecticide	N
Terbufos	Contraven	Soil Fumigant	N

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Active Ingredient	Trade Name	Type	Allowed in Yemen
Terbufos	Counter	Soil Fumigant	N
Thallium Sulphates		Rodenticides	N
Thiofanex	Benelux	Soil Fumigant	N
	Dacamox	Soil Fumigant	N
	DS-15647	Soil Fumigant	N
Thiometon	Dithiomethon	Insecticide	N
	Ekatin	Insecticide	N
	Ekatin ULV	Insecticide	N
	Luxistelm	Insecticide	N
	M-81	Insecticide	N
Thionazin	AC 18133	Soil Fumigant	N
	Cynem	Soil Fumigant	N
	Nemafos	Soil Fumigant	N
	Nemaphos	Soil Fumigant	N
	Zinophos	Soil Fumigant	N
Thiophanate Methyl 70 % W.P.	Cercobin M	Fungicide	Y
	Cercobin Methyl	Fungicide	Y
	Cycosin	Fungicide	Y
	Durosan	Fungicide	Y
	Easout	Fungicide	Y
	Enovit Super	Fungicide	Y
	Frumidor	Fungicide	Y
	Fungo	Fungicide	Y
	Labilite	Fungicide	Y
	Mildothane	Fungicide	Y
	Pelt 44	Fungicide	Y
	Sigma	Fungicide	Y
	Topsin M *	Fungicide	Y
Thiophos	AC 3422	Insecticide	N
	Alkron	Insecticide	N
	Alleron	Insecticide	N
	Aphamite	Insecticide	N
	Bladan	Insecticide	N
	Corothion	Insecticide	N
	E-605	Insecticide	N
	ENT 15108	Insecticide	N
	Ethyl Parathion	Insecticide	N
	Fasterno 50	Insecticide	N
	Folidol E-605	Insecticide	N
	Niran	Insecticide	N
	Ortnophos	Insecticide	N
	Panthion	Insecticide	N
	Paramar	Insecticide	N
	Paraphos	Insecticide	N
	Parathene	Insecticide	N
	Parathion	Insecticide	N
	Parawet	Insecticide	N
	Phoskil	Insecticide	N
	Rhodiatox	Insecticide	N
	Soprathion	Insecticide	N

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Active Ingredient	Trade Name	Type	Allowed in Yemen
Thiophos	Stathion	Insecticide	N
	Thiophos	Insecticide	N
Triadimefon 5 % W.P.	Amiral	Fungicide	Y
	BAY-MEB - 6447	Fungicide	Y
	Bayleton *	Fungicide	Y
Triamiphos	Wepsya 155	Fungicides and Seed Dressings	N
Trichlorfon 80 % S. P.	Bovinox	Insecticide	Y
	Cekufon	Insecticide	Y
	Danex	Insecticide	Y
	Dipterex *	Insecticide	Y
	Dylox	Insecticide	Y
	Equino Aid	Insecticide	Y
Trichloronate	Agrisil	Insecticide	N
	Agritox	Insecticide	N
	Bay 37289	Insecticide	N
	Fenophosphon	Insecticide	N
	Phytosol	Insecticide	N
	S 4400	Insecticide	N
	Trichloronat	Insecticide	N
Triforine 20 % E.C.	Cela W 524 Denarin	Fungicide	Y
	Funginex	Fungicide	Y
	Saprol *	Fungicide	Y
Vacor	DLP-87	Rodenticides	N
	Pyriminil	Rodenticides	N
	RH-787	Rodenticides	N
Vamidothion	10465 RP	Insecticide	N
	Kilval	Insecticide	N
	Trucidor	Insecticide	N
	Vamidoate	Insecticide	N
Zinc Phosphide	Phosvin	Rodenticides	N
	Ratol	Rodenticides	N
	Ridall-Zinc	Rodenticides	N
	Zinc-Tox	Rodenticides	N
	ZP	Rodenticides	N

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