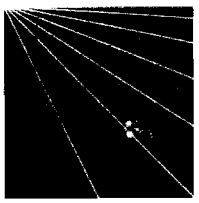
PN-ABJ-970



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FINAL DRAFT

Environmental Assessment of U.S.A.I.D./Ecuador Non-Traditional Agricultural Exports Project, Phase II (Project 518-0019, 518-T-058)

February 28, 1990

Prepared for:

United States Agency for International Development, Ecuador

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LIST OF ACRONYMS AND ABBREVIATIONS

AID/E	Agency for International Development in Ecuador
AID/W	Agency for International Development/Washington, D.C.
AID/LAC/DR/EST	AID Bureau for Latin America and the Caribbean/ Office of Development Resources/Education, Science, and Technology Division
AIFA	Associacion Impresorial de Importadores y Fabricantes de Insumos Agropequaria (Ecuadorian Agrichemical Association)
ANDE	National Association of Ecuadorian Businessmen
APROCICO	Association of Short Cycle Crop Producers
ASOFRUIT	Asociacion de Fruticultores de Tungurahua and Guayaquil
BCE	Banco Central de Ecuador (Central Bank of Ecuador)
CATIE	Centro Agronomico Tropical de Investigacion y Ensenanza (Tropical Agricultural Research and Training Center)
CEDENME	Centro de Nutricion y Medicina (Center for Nutrition and Medicine)
CFN	Corporacion Financiero Nacional (National Investment Corporation)
CFR	Code of Federal Regulations (USA)
CICP	Consortium for International Crop Protection
EA	Environmental Assessment
EAP	Escuela Agricola Panamericana (Panamerican Agriculture School at El Zamorano, Honduras)
EEC	European Economic Community
EPA	Environmental Protection Agency (USA)
ESF	Economic Support Funds
FAO	Food and Agriculture Organization of the United Nations
FDA	Food and Drug Administration (USA)
FEDEXPOR	National Federation of Exporters
FN	Fundacion Natura (Nature Foundation)
FUNDAGRO	Agricultural Development Foundation
GOE	Government of Ecuador
GU	General Use Pesticide (US/EPA designation for pesticides that can be applied without being a certified applicator)
IDB	Inter-American Development Bank
IEE	Initial Environmental Examination
IESS	Instituto Ecuatoriano de Seguridad Social (Ecudorian Social Security Institute of MOH)
IFI	Intermediate Financial Institution
IICA	Inter-American Institute for Cooperation on Agriculture (Instituto Interamericano de Cooperacion para la Agricultura)
INCCA	Instituto Nacional de Capacitacion de Campesinos (National Institute of Farmer Training)

INIAP	Instituto Nacional de Investigacion Agropecuaria (National Agricultural Research Institute)
IPM	Integrated Pest Management (Manejo Integrado de Plagas)
LD_{50}	Lethal dose, expressed in milligrams of pesticide per kilogram of body weight, required to kill 50% of the test population
LOP	Life of Project
MAG	Ministerio de Agricultura y Ganaderia (Ministry of Agriculture and Livestock)
MICIP	Ministry of Industry, Commerce, Investments, and Fishing
MIP	Manejo Integrado de Plagas (Integrated Pest Management)
MOS/MOH	Ministerio de Salud (Ministry of Health)
NTAE	Non-Traditional Agricultural Export Crops Project No. 518-0019 A.I.D./ANDE-FEDEXPOR
PCU	Project Coordination Unit
PIC	Produccion Integral de Cultivos
PID	Project Identification Document
PP	Project Paper
PPM	Parts Per Million
PROMECAFE	Programa Cooperativo para la Proteccion y Modernizacion de la Caficultura en Mexico, Centro America, Panama y El Caribe (Cooperative Program for the Protection and Modernization of Coffee Production in the area given)
PROTECA	Programa de Desarrollo Tecnologico Agropecuario (National Program for Technological Development of Agriculture)
RENARM	Regional Natural Resources Management Project (ROCAP/CATIE)
ROCAP	Regional Office for Central America and Panama (A.I.D.)
RPAR	Rebuttable Presumption Against Registration
RU	Restricted Use Pesticide (US/EPA designation for pesticides requiring user to be a certified applicator)
SV	Sanidad Vegetal - GOE/MAG (Plant Health Department - GOE/MAG)
TA	Technical Assistance
TAP	Technical Assistance Program of the U.S.A.I.D./NTAE Project
US (USA)	United States of America
U.S.A.I.D.	United States Agency for International Development
U.S.A.I.D./E	United States Agency for International Development in Ecuador
WHO/FAO	World Health Organization/Food and Agriculture Organization of the United Nations

Executive Summary

Phase I of the Non-Traditional Agricultural Export (NTAE) Project in Ecuador (Project 518-0019, Loan No. 518-T-058) was started in 1984 to promote non-traditional agricultural crops. Phase I assisted Ecuadorian agribusinesses gain access to external markets, technologies, and financing.

Project activities had a very limited impact on the environment, because, in part, Phase I dealt primarily with non-production activities; focusing on organizational and developmental activities with limited technology transfer. Thus, virtually no pesticides or field activities were introduced under Phase I activities.

Environmental impacts of Phase II will be minimal if the guidelines here are followed. Adherence to these guidelines should permit fulfillment of the Project objective of producing uniform high-quality agricultural commodities for export, while maintaining environmental integrity.

To assure compliance with Food and Agriculture Organization of the United Nations (FAO) and/or Food and Drug Administration (USA) (FDA) pesticide residue standards and Agency for International Development (A.I.D.) pesticide regulations, a pesticide residue testing program is outlined in Section 12 of this document. The program is an integral part of the quality assurance component of the project. An environmental monitoring program is outlined in Sections II.C.11 and IV.7. (Special Issues Section No. 7). Execution of these programs will be a requirement for the implementation of the Project.

The following suggestions, although not required, should also be strongly considered by the Mission and/or A.I.D./W.

SUGGESTIONS

1. To assure the availability of alternative integrated pest management (IPM) strategies and an effective pesticide arsenal, it is suggested that an IPM research component be established (Section II.C.3.). Part of the proposed studies are already planned as a part of the on-going research programs of the NTAE Project and the National Agricultural Research Institute (INIAP/MAG). To assure its execution, a portion of the NTAE project budget should be set aside to satisfy immediate IPM research needs. A careful analysis of the proposed crop production and protection data base should be conducted as soon as possible. Recommendations should be made in cooperation with other international donors and ROCAP/Regional Natural Resource Management (RENARM) Project

to seek support for a separate budget to address the IPM research needs identified.

2. A pesticide training program should be initiated prior to the initiation of any crop production technical assistance activities. The minimal subject matter to be covered in the pesticide training program is outlined in Section II.C.10. of the Environmental Assessment (EA) to assure project technical personnel are adequately trained in proper transport, handling, mixing, and use of pesticides. It is suggested that the training be of the same or higher quality as that required for a U.S. Commercial Certified Applicator. Farmers would then be trained at the same level as certified private applicators.

3. Approval should be sought from A.I.D./Washington (W) for the use of products not listed in Tables 1.1 and 1.2 (Section II.C.1.) that are not registered in the U.S., but do have established WHO/FAO residue tolerances. These approvals should be requested from A.I.D./W on an as needed basis.

4. To assure availability of current pesticide information and "shelf" IPM technology, a computer-supported technical information center should be developed and made available to project technicians as soon as possible. The center will require some additional computer hardware and could be developed with the Fundacion de Desarollo de Agricultura (FUNDAGRO) as they already have considerable holdings.

I. BACKGROUND AND RATIONALE (From PP 518-0019):

Until 1979 when the petroleum industry began its rapid expansion, agriculture was considered the strongest economic sector in Ecuador. From 1973 to 1985, petroleum accounted for 50-70 percent of the country's total exports, while agriculture's share, including seafood and wood products, ranged from 25 to 45 percent during most of these years. Exports other than petroleum, agriculture, seafood, and wood products have been of minor economic importance. With the recent worldwide fall in oil prices, however, petroleum exports plunged to $1.158 billion in 1987, allowing agriculture to recover a 57 percent share against all Ecuadorian exports.

The commodities of banana, cacao, and coffee, exported in both raw and processed forms, have historically dominated Ecuadorian agricultural exports, particularly up until 1970. In the early 1970s, shrimp and fish contributed to only a small percentage of agricultural exports. In 1980, however, the international market value of these products doubled. Since that time shrimp and fish have become increasingly important, growing from 19 percent of total agricultural exports in 1980 to 41 percent in 1987. Moreover, during the four year period of 1984-87, shrimp and fish was the most important category of agricultural exports -- exceeding bananas, coffee, or cacao. Shrimp accounted for most of this category, with deep-sea tuna fishing second and coastal day fishing third.

Other agricultural exports have not been a significant economic factor, with their relative economic value decreasing over the past twenty years. Except for the growth in shrimp and fish, Ecuador's export base has been narrowing, rather than expanding and diversifying. In this category of minor agricultural exports are wood products, rice, manila hemp, sugar, cut flowers, and fresh and processed fruits and vegetables.

The definition of Ecuadorian traditional and non-traditional agricultural exports is somewhat arbitrary. Coffee, cacao, banana, and sugar are usually classified as traditional. However, shrimp, fish, other seafood and wood products, and manila hemp have been part of mainstream of exports for some time, and are now relatively important in economic value. In addition, rice is another traditional crop which is sometimes exported.

Non-traditionals can be considered to include newer, less developed commodities, such as cut flowers, fresh fruits and vegetables, specialty crops, and processed fruits and vegetables.

This A.I.D./Ecuador "Non-Traditional Agricultural Export Crops Project Amendment" (NTAE) Number 518-0019 (Loan No. 518-T-

058) is focusing on four of the key components to the continued growth of this non-traditional crop sector. These are: 1) provide a technical assistance, research, education, and phytosanitary program to enable small farmers to renovate old traditional crop plantings into high-yielding non-traditional crops, 2) quality assurance and marketing, 3) policy analysis and dialogue, and 4) the establishment and operation, through the commercial Banking system and the Government of Ecuador (GOE) Central Bank (BCE), of a credit fund mechanism for expansion of target group non-traditional export producers. These components will alleviate constraints that limit the realization of the sector's employment and foreign exchange earning potential and limit the benefits to producers' agribusiness linkages.

The project's purpose is to increase the income of farmers by increasing production, productivity, and product quality. This will be accomplished through the establishment and implementation of a closely-linked, technical and financial assistance program for the target producers. This improved technology will be generated from existing and on-going, on-farm and experiment station research. The purpose will be achieved by:

1. Establishment, implementation, and support of a technical assistance program (TAP):

   a) Horticultural research and technology transfer,
   b) Provision of plants and seeds, and a
   c) Phytosanitary program for admission into U.S. markets.

2. Quality Assurance and Marketing:

   a) Post-harvest handling/processing,
   b) Quality assurance to differentiate products, thus helping gain a market competitive advantage,
   c) Promotion of fresh products in foreign markets,
   d) Promotion of processed products in foreign markets, and
   e) Market news and information services.

3. Policy Analysis and Dialogue:

   a) GOE policies related to increasing competition and profitability in the NTAE sector.

4. Resources for expansion of non-traditional agriculture exports:

   a) Financial resources for providing credit to the sector and
   b) Internal and external investment promotion and support.

In addition, it is suggested that a computer-supported technical information center be created to make available shelf IPM and other production technology and detailed pesticide information from both national and international sources. The Agricultural Development Foundation (FUNDAGRO) has already initiated some aspects of this.

A total of $14.67 million dollars is being provided under this project over the total life of the project (LOP). Only $4 million is being provided in this amendment over the next five years to accomplish these goals. Loan funds available are currently limited to carry-over loan funds from NTAE Phase I. More emphasis will be placed on internal and external investment promotion and support for a source of project loan funds after April 1990.

Pest control will be one of the inputs being extended in the TAP tech-pack. Pest control will also be one of the technologies to be investigated in the on-going research programs in NTAE-National Association of Ecuadorian Businessmen (ANDE)/Federation of Exporters (FEDEXPOR) and FUNDAGRO, as well as in the National Agricultural Research Institution (INIAP) funded projects and the German funded fruit fly control studies at the Ministry of Agriculture (MAG) Research Center at Tumbaco. Pesticides are one of the pest management tactics commonly used in crop production to achieve high production levels. To evaluate the potential environmental impact that pesticide use under the Non-Traditional Agricultural Export Crops Project Amendment may have, an Environmental Assessment was conducted. What follows is the result of that EA, along with the results and recommendations on related matters requested in the EA team's Scope of Work (Annex 1).

II. ENVIRONMENTAL ASSESSMENT OF PESTICIDE USE.

A. INTRODUCTION:

The purpose of Phase II of the NTAE Project is to expand Phase I activities. Phase II has proposed use of pesticides and other technologies. In its Initial Environmental Examination (IEE)(Annex 2), U.S.A.I.D./Ecuador concluded that the use of pesticides and other technologies in the Project has potential negative consequences. Thus, according to A.I.D. Environmental Procedures (22 Code of Federal Regulations (CFR) Part 216), an Environmental Assessment was required.

To meet its objectives, the activities under the NTAE Project will require some pesticide use in the technical assistance program (TAP) tech-packs, as well as in research plots, farmer demonstrations, and training in the on-going research phase. This project will propose operational pest control programs within which pesticides play a major or minor role. It is A.I.D. policy to try and use only pesticides that the U.S. Environmental Protection Agency (EPA) has registered for "general use" (GU) without restriction. In the US, pesticides in the general use category can be purchased and used without special permits. By contrast, "restricted use" (RU) pesticides present high risks to humans or the environment and can only be used by licensed applicators or persons under their direct supervision.

B. PROJECT SPECIFICATIONS:

Project Location	:	Ecuador
Name of A.I.D. Project	:	Non-Traditional Agricultural Export Project Amendment
Number of A.I.D. Project	:	518-0019
Project Implementor	:	U.S.A.I.D./Ecuador
Life of Project	:	5 years (FY 1989-94)
Funding	:	$4 million grant
IEE Prepared by	:	Fausto Maldonado and Howard L. Clark, A.I.D./E
PID Approved by	:	Richard Peters, Chief Agric. and Natural Resources Dev. Office, U.S.A.I.D./E

C. ENVIRONMENTAL ASSESSMENT OF PESTICIDE USE (Environmental Procedures - 22 CRF Part 216.3(b)(1)(i)a-l):

(1) The EPA registration status of pesticides for Phase II.

The U.S. EPA classifies pesticides in one of two general categories: "general use" and "restricted use." In the U.S., pesticides in EPA's restricted use category can be purchased only by pesticide applicators who have been certified by law. Restricted use pesticides may be so classified because of their innate toxicity, or for long persistence or excessive mobility in the environment (potential to contaminate ground water). As general A.I.D. policy, restricted use pesticides are not allowed for use in A.I.D. projects. On the other hand, EPA considers that pesticides in the general use category will cause minimal harm to humans and the environment if used according to the pesticide's label.

Tables 1.1 and 1.2 show pesticides that are available and are being tentatively approved (pending A.I.D./W approval) for use in the NTAE Project Phase II. All of these pesticides are in EPA's general use category. These products were selected from a list of pesticides requested for use in Phase II (Annex No. 3) and from U.S. Cooperative Extension Service Guides. Under the Miller Pesticide Residue Amendment to the Federal Food, Drug, and Cosmetic Act, a tolerance is the maximum amount of pesticide permitted by the Food and Drug Administration (FDA) in or on raw agricultural commodities. In A.I.D. projects, treated crops cannot be used for human or animal consumption unless appropriate tolerances have been established and the rates and frequency of application, together with the prescribed pre-harvest intervals, do not result in residues exceeding such tolerances. If the treated agricultural products are being exported to countries other than the US, permitted pesticide residue tolerances or WHO/FAO tolerances should be determined and appropriate pesticide uses adopted.

Table 1.3 shows pesticides restricted for use in the U.S. and/or Ecuador or those not registered in the U.S. but still available in Ecuador. None of the pesticides listed in Table 1.3 are considered suitable for use in crop production in the TAP component of the NTAE Project.

While Regulation 22 CFR Part 216 specifies that pesticides not registered by the EPA or in the RU category cannot be used, in some cases the A.I.D. mission and or the Government of Ecuador (GOE) may deem it necessary to use such pesticides. In the event this becomes necessary, the following guidelines are offered: 1) It must be determined that the proposed chemical cannot be replaced by a general use pesticide. 2) Failure to use the RU pesticide will result in significant yield losses. 3) Project

Table 1.1. List of Pesticides Tentatively Approved for Use in the U.S.A.I.D./E NTAE Project on Fresh Fruits and Vegetables.

Common Name of Pesticide	Status of EPA registration for use on requested crops[1/] asparagus	artichoke	avocado	snap beans	black/raspberries	blueberries	cantaloupe	mangoes	melons	papaya	pineapple	passion fruit	strawberries
INSECTICIDES/ACARICIDES/MOLLUSCICIDES													
acephate				X					X[2,3/]				
B.t.	X	X	X	X	X	X	X	X	X	X	X	X	X
carbaryl	X		X[9/]	X	X	X			X		X		X
carbofuran (RU,SR)[4,5/]		X							X				X
chlorpyrifos	X[9/]			X		X					X		X
diazinon				X	X	X	X		X		X		X
dimethoate				X					X				
horticultural oil									X				
malathion	X		X	X	X	X	X	X	X	X	X	X	X
metaldehyde (NR/E)[6/]													
methoxychlor (NR/E)	X			X	X	X			X		X		X
naled (NR/E)				X					X				X
pyrethrins (NR/E)				X	X	X		X	X[8/]		X		
rotenone (NR/E)	X			X	X		X		X				
sulfur (NR/E)				X	X								X
tetradifon (NR/E)									X				X
trichlorfon		X[7/]		X[7/]		X							
FUNGICIDES													
anilazine (NR/E)					X	X	X		X				X
benomyl			X	X	X	X	X	X	X	X	X		X
captan (SR)			X	X	X	X	X	X	X[8/]		X[12/]		X
captafol						X			X		X		
chlorothalonil				X					X			X	
copper hydroxide				X	X				X				X
copper oxysulfate									X				
copper resinate				X					X				
copper sulfate				X	X				X				X
DCNA (NR/E)				X									
dinocap					X[7/]	X[7/]	X[7/]		X[7/]				
folpet			X		X	X			X				X
fosethyl-AL	X[9/]		X[2/]								X		
iprodione				X	X[10/]	X							
mancozeb (SR)	X[7/]								X	X			
maneb (SR)				X					X	X			
metalaxyl	X		X		X[11/]	X[2/]				X[9/]	X		X[2/]
PCNB				X[12/]									
sulfur (NR/E)				X	X								X
thiram (NR/E)													X
thiophanate-methyl				X					X				X
triadimefon					X[9,11/]			X[2/]			X		X[2/]
triforine	X[9/]					X	X						X
vinclozolin				X[2/]	X[11/]								X
zineb (SR) Suspended													
ziram (SR) (NR/E)				X	X	X			X				X
NEMATICIDES													
metam-sodium (NR/E)	Registered for preplant use in all crops												

NOTE: See footnotes on next page.

Table 1.1. List of Pesticides Tentatively Approved for Use in the U.S.A.I.D./E NTAE Project on Fresh Fruits and Vegetables (Cont'd).

Common Name of Pesticide	Status of EPA registration for use on requested crops[1/]												
	aspar-agus	arti-choke	avo-cado	snap beans	black/ rasp-berries	blue ber-ries	canta-loupe	man-goes	melons	pa-paya	pine-apple	pas-sion fruit	straw-ber-ries
HERBICIDES													
diuron	X	X			X	X				X	X		
EPIC (NR/E)	X[7/]										X		X
fluzifop - butyl	X[9/]												
glyphysate[13/]	X		X					X		X	X	X	
linuron (SR)	X												
metalachlor				X									
metribuzin (NR/E)	X												
pendimethalin				X									
triflurilin	X			X									
sethoxydim (NR/E)		X[9/]		X[2/]	X[11/]	X							X
PLANT GROWTH REGULATORS													
naphthaleneacetic acid (NR/E)											X		
POST HARVEST TREATMENTS													
thiabendazole (NR/E)		X	X			X		X	X	X			X
RODENTICIDES													
Warfarin (NR/E)													

1/ An "X" in the crop column indicates EPA registration for that crop.
2/ Tolerance pending.
3/ Honeydew melon only.
4/ RU indicates all liquid and all granular carbofuran formulations greater than 5% are restricted use; the 5G granular formulation is proposed here.
5/ Carbofuran, captan, and mancozeb are still in the special review (SR) process. The current status of the special review process must be determined before using these products.
6/ Metaldehyde labels must bear the following: "This product may be fatal to children and dogs or other pets if eaten. Keep children and pets out of treated area". Use as a bait only, application not to be made to plants.
7/ Negligible residue tolerance.
8/ Muskmelon only.
9/ Regional registration.
10/ Boysenberries and raspberries.
11/ Raspberries only.
12/ Interim tolerance.
13/ Not for direct application to crop.
(NR/E) Not registered in Ecuador; must be registered before use.

Table 1.2. List of pesticides tentatively approved for use in the U.S.A.I.D./E NTAE Project on processed fruits and Vegetables.

Common Name of Pesticide	Status of EPA registration for use on requested crops[1/]															
	asparagus	broccoli	brussel sprouts	cauliflower	black/raspberries	snow peas	mangoes	melons	papaya	pineapple	passion fruit	strawberries	tomatoes	guava	okra	soursop
INSECTICIDES/ACARACIDES/MOLLUSCICIDES																
acephate			X	X				X[3,4/]					X[4/]			
B.t.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
cararyl	X	X	X	X	X	X		X		X		X	X		X	
carbofuran (RU,SR)[5/]								X				X				
chlorpyriphos	X[9/]											X	X			
diazinon					X	X		X		X		X	X			
dimethoate		X		X		X		X					X			
horticultural oil													X			
malathion	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
methaldehyde (NR/E)[11/]																
methoxychlor (NR/E)	X	X	X	X	X	X		X		X		X	X			
naled (NR/E)		X	X	X		X		X				X	X			
pyrethrins (NR/E)					X	X	X			X			X	X		
rotenone (NR/E)	X	X	X	X	X			X					X			
sulfur (NR/E)					X							X				
tetradifon (NR/E)								X				X	X			
trichlorfon			X[6/]										X[6/]			
FUNGICIDES																
anilazine (NR/E)					X			X				X	X			
benomyl		X	X	X	X		X	X	X	X		X	X			
captan (SR)		X	X	X	X	X	X	X[7/]		X[12/]		X	X			
captafol					X[8/]			X		X[6/]			X			
chlorothalonyl		X	X	X				X	X		X		X			
copper hydroxide		X	X	X	X			X				X	X			
copper oxychloride-S													X			
copper oxysulfate								X					X			
copper resinate		X	X	X				X					X			
copper sulfate		X	X	X	X			X				X	X			
dinocap					X[6/]			X[6/]								
folpet					X			X				X	X			
fosethyl-AL	X[9/]				X					X						
iprodione		X			X[10/]							X[4/]	X[4/]			
mancozeb (SR)	X							X	X				X			
maneb		X	X	X				X	X				X			
metalaxyl	X	X	X	X					X[9/]	X		X[4/]	X			
PCNB		X[12/]	[12/]	X[12/]									X[12/]			
streptomycin (NR/E)													X			
sulfur (NR/E)		X						X				X	X			
thiram (NR/E)												X	X			
thiophanate-methyl								X				X				
triadimefon					X[9,13/]		X[4/]			X		X[4/]	X[4/]			
triforine	X[9/]				X[9/]			X[14/]				X				
vinclozolin					X[13/]							X				
zineb (SR) Suspended																
ziram (SR) (NR/E)		X	X	X	X	X		X				X	X			
NEMATICIDES																
metam-sodium (NR/E)	Registered for preplant application for all crops.															

NOTE: See footnotes on next page.

Table 1.2. List of pesticides tentatively approved for use in the U.S.A.I.D./E NTAE Project on processed fruits and Vegetables (Cont'd).

Common Name of Pesticide	Status of EPA registration for use on requested crops[1/]														
	aspa-ragus	broc-coli	brussel sprouts	cauli-flower	black/ rasp ber-ries	snow peas	man-goes	mel-ons	pa-paya	pine-apple	pas-sion fruit	straw-ber-ries	toma-toes	guava	okra	sour-sop
HERBICIDES																
bensulide (NR/E)		X	X	X				X					X			
metribuzin (NR/E)	X					X							X			
linuron (SR)	X															
metalachlor						X										
diuron	X				X	X			X	X						
fluazifop-butyl	X[9/]															
glyphosate[15/]	X						X		X	X	X					
oxyflorfen		X	X	X									X[9/]	X[9/]		
triflurilin	X							X					X			
sethoxydim (NR/E)	X	X		X	X	X[4/]		X				X	X			
EPTC (NR/E)	X[6/]				X					X[6/]	X[6/]					
POST HARVEST TREATMENTS																
thiabendazole (NR/E)					X		X	X	X			X				

1/ An "X" in the crop column indicates EPA registration for that crop.
2/ Under "BOTTLED, CANNED AND DRIED FRUITS AND VEGETABLES" no tolerances were found. The speciality cases, such as spices and food coloring may fall under the "Tolerances for Minor Use Crops", as listed on page xviii, the Pesticide Chemical News Guide, August 1, 1988. No tolerances are shown.
3/ Honeydew melon and watermelon only.
4/ Tolerance pending.
5/ Carbofuran, captan, linuron, mancozeb, maneb, ziram, and zineb are still in the special review (SR) process. current status of the special review process must be determined before using these products. All uses of carbofuran liquid and granular formulation above 5% are in the EPA restricted use (RU) category. Carbofuran 5G is proposed for use here.
6/ Negligible residue tolerance.
7/ Muskmelon only.
8/ Blueberries only.
9/ Regional tolerance.
10/ Boyzenberries and raspberries only.
11/ Metaldehyde labels must bear the following: "This product may be fatal to children and dogs or other pets if eaten. Keep children and pets out of treated area". Use as a bait only, application not to be made to plants.
12/ Interim residue tolerance.
13/ Raspberries only.
14/ Cantaloupe only
15/ Not for direct application to crops.
(NR/E) Not registered in Ecuador; must be registered before use.

Table 1.3. Restricted and/or U.S. prohibited insecticides currently used in Ecuador.

1. Aldicarb (TEMIK); Insecticide, Nematocide
2. Amitraz (MITAC); Insecticide, Acaricide[4]
3. Azinphos methyl (GUTHION, GUSATION); Insecticide
4. Carbofuran (FURADAN); Insecticide[1]
5. Chlorothiophos (CELATHION); Insecticide, Acaricide[2]
6. Cyfluthrin (BAYTHROID, BAYTROID, SOLFAC); Insecticide
7. Cyhalothrin (KARATE); Insecticide
8. Cypermethrin (AMMO, ARRIVO, CYMBUSH, RIPCORD); Insecticide
9. Deltamethrin (DECIS, K-OBIOL); Insecticide
10. Dichlorvos (DDVP, VAPONA, NOGOS); Insecticide
11. Endosulfan (THIONEX, THIODAN); Insecticide
12. Fenvalerate (PYDRIN, BELMARK); Insecticide
13. Fluvalinate (MAVRIK); Insecticide
14. Fonofos (DYFONATE); Insecticide
15. Methamidophos (TAMARON); Insecticide
16. Methyl parathion (FOLIDOL, PARATION METILICO); Insecticide
17. Methidathion (SUPRACIDE); Insecticide
18. Methomyl (LANNATE); Insecticide
19. Monocrotophos (AZODRIN); Insecticide
20. Omethoate (FOLIMAT); Insecticide, Acaricide
21. Paraquat (GRAMOXONE, PILLARXONE); Herbicide
22. Permethrin (POUNCE, AMBUSH, TORPEDO); Insecticide
23. Phenthoate (CIDIAL); Insecticide, Acaricide
24. Phosphamidon (DIMECRON, SWAT); Insecticide
25. Profenofos (CURACRON, TAMBO, SELECRON); Insecticide
26. Proparqite (OMITE); Acaricide
27. Teflubenzuron (NOMOLTA, NOMOLT); Acaricide[2,5]
28. Thiocyclam-hydrogenoxalate (EVISECT); Insecticide[2]
29. Triazophos (HOSTATHION); Insecticide, Acaricide, Nematocide[2]

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[1]Only liquid formulations are restricted; granules 5% or under are not restricted use.

[2]This product is not permitted for use in U.S.

[3]Only formulations with 15% ai or greater are restricted.

[4]Only some uses of formulations are restricted.

[5]Insect growth regulator = IGR.

personnel that have undergone appropriate (U.S. equivalent) training and holding a "certification" must supervise the application of these selected RU pesticides. 4) The Ministry of Agriculture Department of Plant Sanitation (MAG/SV) must designate a person to formulate and administer the certification examination and issue a license to apply such pesticides.

Such training would allow use of RU pesticides on the fields of farmers in the TAP phase of the project as well as in research/demonstration plots. Growers already use most of these restricted use pesticides in Ecuador and substitutions may not be as effective (see Section II.C.6.). It will put TAP personnel and project growers with A.I.D. credit at a distinct disadvantage to growers without A.I.D. credit if they are not allowed to utilize these pesticides where required in emergency situations when proposed alternatives have failed to control a seriously damaging pest. A possible coordinating committee and appeals board structure is outlined in Section II.C.9. A minimum certification training program is outlined in detail in Section II.C.10.

ANDE-FEDEXPOR/NTAE and associated crop producer cooperatives and the MAG/SV plant protection and agromedical groups are aware of carbofuran, dimethoate, endosulfan, paraquat, and metaldehyde hazards. The NTAE Project does not plan to distribute these or any other pesticide to farmers. Use of these products would be for small-scale experimentation, training, demonstrating safe use to farmers, or small-scale control programs carried out by project staff. Metaldehyde can be used with the restriction that the label must bear the words "This pesticide may be fatal to children and dogs or other pets if eaten. Keep children and pets out of treated area". Carbofuran granular formulations containing 5% or less active ingredient are not RU and can be purchased and used on the project. For all cases, protective clothing will be worn.

The TAP phase of this project will feature an effective training component on pesticide safety and will provide protective equipment and clothing to project staff. In addition, the proposed research phase of the project will provide considerable technical assistance in pesticide management research to seek safe, cost-effective pesticide application techniques, and alternative control strategies. Initially this should focus on evaluation of the alternative pesticides proposed for controlling certain pests (See Section II.C.6.).

As indicated, all the pesticides in Tables 1.1 and 1.2 have been registered by EPA for use in the U.S. and all are in the EPA general use category. However, the FAO and WHO of the United Nations have recommended "residue tolerances" for additional materials. A residue tolerance is the amount (expressed in parts per million) of a pesticide that may legally and safely remain in or on any raw farm product at the time these products are sold

for consumption by humans or livestock. In some cases these pesticides have tolerances specifically established for certain crops, but for others only on "Average Daily Intake" or "ADI" level has been established. Another aspect of the proposed research project will be to provide assistance in seeking alternative, non-restricted use pesticides for use on project crops that meet A.I.D. and FAO criteria. This will be more difficult for products not having a specific tolerance due to an already heavy residue load of some products.

Several of the pesticides in Tables 1.1 and 1.2 are under "Special Review" (SR) by EPA: carbofuran (FURADAN), linuron, captan (CAPTAN), mancozeb, maneb, zineb, and ziram. The special review process was known previously as the RPAR or "Rebuttable Presumption Against Registration" process. The SR is designed to gather information and stimulate public debate about a pesticide being scrutinized because of adverse effects on human health or the environment. If at the end of the SR process the risks are found to outweigh the benefits, the pesticide may be cancelled (banned) or greatly restricted in its use in the U.S. Section II.C.5. discusses why a Special Review has been issued for carbofuran (FURADAN). As noted in Annex 3, several other pesticides requested by Ecuadorian farmers for use on proposed project crops are, or have been, subject to special review.

(2) Basis for selection of requested pesticides.

A large number of pesticides have been requested to permit "pesticide rotation" and thus reduce the frequency of use of any given pesticide. This may help in delaying the development of resistance by other pests while IPM alternatives are being sought. The approved pesticides in Section II.C.1. Tables 1.1 and 1.2 were selected on the basis of toxicity and other hazards to the users and the environment. As many as possible of the products requested by NTAE Phase I farmers and technicians (Annex 3) were approved, after application of A.I.D. Regulation 216.

Under Phase I, certain aphids and spider mites have developed resistance to some insecticides/acaricides that have been used with great frequency in flowers and melons. Control of these two pests has been strictly chemical. Aphids in melons are already reportedly resistant to Evisect (thiocyclam-hydrogenoxalate). Non-chemical alternatives for control of pests must be developed within the context of an IPM focus as outlined in Special Issues Section IV.6.

A list of pesticides currently available for purchase in Ecuador which are considered to be too toxic for use in the TAP extension phase of this project or which have been cancelled/ suspended by EPA is in Section II.C.1. Table 1.3. A list of pesticides that have been banned from use or have use restrictions in Ecuador are listed in Annex 4.

(3) The extent to which the proposed pesticide use is part of an integrated pest management program.

Reliance on pesticides alone is expensive and these rarely give lasting control. Pests often become physiologically or behaviorally resistant to pesticides used extensively. Such resistant pest strains offer serious consequences to both farmers and the general public. Resistance is most likely to occur in areas where sole reliance is placed on pesticides and use is heavy. The reliance on only one or a limited number of pesticides in the same chemical group can also hasten the development of resistance. Control failures and resistance problems have been suspected for several insects, especially in the melon and flower growing areas of Ecuador.

Experience worldwide has shown that the best way to avoid pest resistance and also to increase and sustain agricultural production is to employ a variety of control tactics, including biological (predator, parasite, and pathogenic natural enemies of pests), cultural, genetic, physical, and legislative. This multi-tactic, balanced approach is termed integrated pest management or "manejo integrado de plagas" (MIP).

Under IPM/MIP, crops are regularly monitored (called "scouting") for presence of pests, natural enemies, and other factors which may influence a decision concerning a control measure. Pesticides are applied only as pest populations have exceeded unacceptable density levels and there is reasonable assurance that pesticide use will be profitable and non-disturbing to the environment.

The IPM concept is currently playing a role in Ecuadorian agriculture. Multi-tactic approaches can now be found: for example, the soya and corn production packages being used in the Association of Short Cycle Crop Producers (APROCICO) IPM program in the Quevedo area include the use of Bacillus thuringiensis product for "worm" control. They are also collecting diseased larvae, blending them in a blender, diluting in water, and spraying the mixture on fields to increase disease incidence. However, much improvement can be made in monitoring programs and use of economic injury levels and thresholds in non-traditional crops. This A.I.D. project stresses training and technical assistance that can advance IPM concepts and techniques for non-traditional export crops in Ecuador. However, development and implementation of IPM will be a long-term undertaking. During the 5-year duration of this project, one should seek to firmly establish the movement toward IPM where pesticides are truly only used on an "as needed" basis in crops produced under this project. Although IPM strategies are already included in the TAP program for some pests, this will require IPM research on specific phases of pest management to provide alternative tactics for the full pest complex. The most critical immediate research need will be to test the alternative pesticides being proposed to

assure efficacy on the full pest complex under Ecuadorian conditions where these data do not already exist. One of the goals in the first year of the project should be to define these data gaps.

It is A.I.D. policy to stress IPM and make every effort to minimize the use of pesticides. As indicated above, the TAP phase of this project certainly fulfills this requirement for existing or "shelf" IPM technology they plan to extend to non-traditional crop producers. However, there is no provision made for set-aside funds to fulfill the research needs to be identified above and to test or develop new alternative IPM management strategies under Ecuadorian conditions except as a part of the on-going research program in INIAP and FUNDAGRO. Past experience in A.I.D. projects shows that this can only be accomplished by budgetary "set-asides" or concurrent complementary projects, so that within the term of the project there is assurance that needed testing and technical assistance will be accomplished. Short-term technical assistance from plant protection specialists in the U.S. in a collaborative effort with local plant protection scientists is considered to be a key part of this process. Only in this way can there be assurance of completion of successful field trials and studies in the short term and a trained, experienced team to continue IPM research after the project is terminated. Such a research program is outlined in Special Issues Section IV.6. of this document.

In summary, since non-chemical pest management alternatives have not been developed for the entire pest complex for all of the proposed NTAE crops, pesticides will have to be utilized while alternatives are being developed. Pesticide rotation is an important aspect of an IPM program, therefore the determination of the effectiveness of approved and alternative pesticides should be a major objective in the early years of the research project. As potential biotic control agents are identified, careful screening of each pesticide will be needed to eliminate those which may be incompatible with these agents. 2) Conduct farmer surveys to determine critical areas needing research. 3) Design on-station and on-farm research to answer the questions raised in the survey, giving emphasis to non-chemical alternatives. Several examples of possible research topics are given in Special Issues Section IV.6.

A minimal five-year budget that will allow the above pest management research needs to be partially addressed is presented in Special Issues Section IV.6. A total budget of $US 636,750 is suggested, of which about one-half could be financed with local currency funds such as Economic Support Funds (ESF) or Public Law 480 (PL 480). Primary funding of the IPM project should be considered under the NTAE project budget as a set-aside from existing funds or a project amendment or a new project should be considered to provide the needed funding.

If the proposed IPM research program and the TAP are to be successful, an on-going training program will be required. Perhaps this could be initiated by holding a "State of the Art" IPM Symposium with emphasis on the crops being considered for NTAE Phase II implementation the first year. Both on-and off-shore specialists could be invited to present research and extension IPM findings for these crops. Travel, living expenses, and, perhaps, honoraria should be provided for four or five "top notch" IPM Specialists to assure broad-based attendance from all surrounding countries in both the Central and South American regions. The Consortium for International Crop Protection (CICP) has extensive experience in the planning and execution of IPM training programs and could be contracted to assist with such a program.

(4) The proposed method or methods of application including availability of appropriate application and safety equipment.

Depending on the size and type of the individual operations, three basic types of pesticide application equipment will be used. Large flower producers favor motorized knapsack sprayers, or hand-held sprayers attached by long hoses to stationary pumps. Motorized knapsack sprayers will also be used in larger fields of vegetables and fruits. Some tractor mounted sprayers are also being used. Lever-operated knapsack sprayers are being used by growers with small areas.

One operator visited used a fogger for applying pesticides. He had a completely enclosed protective suit with an independent air supply, as recommended with foggers. However, the efficiency of fogging in open-sided plastic frame houses is greatly reduced, and can lead to contamination of non-target areas. Thus, foggers should be discouraged under the type of plastic frame houses presently being used.

These different types of application equipment, with reasonable parts and service, are available in Ecuador.

Adequate safety equipment is available in Ecuador for most general use pesticides. However, respirators adequate for organic vapors are quite expensive, and are carried by a limited number of distributors. ANDE/FEDEXPOR should consider coordination of supply and demand for good respirators to insure that proper safety measures are practiced.

The TAP phase of the project will require that financial institutions (Corporacion Financiero Nacional-CFN, CAF, etc.) include funds in the loans for the purchase and use of all appropriate protective devices and clothing if pesticides are included in the loan. Rubber boots and coveralls or long-sleeved shirts and full-length pants were observed by this EA team as being available in the market-place. However, approved

respirators and rubber gloves were not easily found, but were reported to be available at some establishments in some areas. If not currently available, these required items may need to be purchased by the project or distributors need to be encouraged to make them available for purchase. This should receive special consideration at the first scheduled project evaluation.

The research project will provide and enforce the use of all appropriate protective devices and clothing - respirators, gloves, boots, and coveralls - for project personnel who apply pesticides. Agreement must be reached with all project contractees or grantees that the highest safety standards are upheld, and costs for protective devices and clothing must be a part of contract/grant budgets let by this project if pesticide use is proposed. It is the ANDE/FEDEXPOR Project Manager's responsibility to see that proper training is given to assure that pesticides are transported, stored, mixed, applied, and disposed of properly as specified on the pesticide's label.

The project manager will see to it that the project follows the principles of safe pesticide management as outlined in "The World Bank Guidelines for Selection and Use of Pesticides". From time to time the Regional Bureau Environmental Officer will provide to the mission current A.I.D./W interpretations of these guidelines.

Based on appropriate label statements on the pesticide package, A.I.D./E will require ANDE-FEDEXPOR to see that loan recipients follow all recommendations, rates and frequency of application, time of application, and the number of days before harvest the pesticide may be applied. Failure to meet label standards will be grounds for the project manager's cancellation of specific grants, contracts or loans let by this project. Partial enforcement of these requirements in the TAP will be accomplished through periodic, random sampling of harvested crops and conducting residue analyses for the most likely pesticides to have been used. However, this will require that an Ecuadorian laboratory be available and have the capability, equipment, and supplies to test for the required pesticides. Preliminary contacts made with Ecuadorian residue laboratories, revealed heavy demand and would require long-term advance notice and special ordering of reagents to do the required analyses. In another case considerable hardware will be needed (Annex 5). Otherwise, an approved residue analysis laboratory outside the country will need to be located and arrangements made to conduct the required analyses (see Section II.C.12.).

Pesticides should be stored in their original containers in locked storage facilities with the key assigned only to authorized, qualified personnel. A sign in Spanish reading "Danger: Pesticide Storage Area" should be posted. When possible, separate storage areas should be provided for herbicides and planting seeds. Pesticides should not be stored near sleeping or work areas, food, animals, or drinking water.

Empty pesticide containers should not be reused for other purposes since no practical methods exist for removing all toxic residue. The "triple rinse method" should be used for all liquid pesticides. Empty the container's content into the spray tank, drain in vertical position for 30 seconds. Refill the container 1/3 to 1/4, rinse and pour into the spray tank, draining in vertical position for 30 seconds. Repeat this procedure three times. Punch several holes in the container, crush and bury in a designated site on high ground away from surface and ground water. Burial depth of 1/2 meter is recommended.

To help mitigate possible effects, the project will initiate an intensive training program in pesticide safety and management for project personnel, collaborators, and loan recipients. The minimum requirements for this training program are outlined below.

(5) Acute and long-term toxicological hazards either human or environmental, associated with the proposed use of pesticides and measures available to minimize such hazards.

All pesticides are potentially hazardous to humans and the environment and should be treated accordingly, regardless of their relative toxicity.

The potential immediate health hazards depend on the toxicity of the pesticide and the degree of exposure. The relative toxicity of pesticides is expressed as the LD_{50} value, which is the amount of toxicant required to kill 50% of the test animals. The LD_{50} value is expressed as milligrams of toxicant per kilogram of body weight of the test animal (mg/kg), when swallowed (oral exposure), absorbed through the skin (dermal toxicity), or inhaled. Inhalation toxicity is usually expressed in parts per million per unit volume of air. Acute oral toxicity results in serious poisoning from a single ingestion of the toxicant. The lower the LD_{50} value, the more toxic the pesticide.

Table 5.1 includes the "toxicity category" and "signal word" established by EPA, for selected pesticides including those recommended for the project. All pesticides that can be used (after approval by Agency for International Development/Bureau for Latin America and the Caribbean/Office of Development Resources/Education, Science, and Technology Division - A.I.D./LAC/DR/EST) on the project (Section II.C.1. Tables 1.1 & 1.2) are in toxicity category II (signal word: Warning), III or IV (signal word: Caution). Table 5.2 shows the hazard indicators and toxicity criteria used to establish the toxicity categories.

It is impossible to predict exactly what effects can result from long-term exposures to any pesticide. The most common

Table 5.1. Toxicity of selected pesticides.

Common name and (brand name)	Activity[1]	Acute LD_{50} Oral	Acute LD_{50} Dermal	EPA Signal Word[2]
Aldicarb (TEMIK)	I, N	0.9	>5	DANGER
Anilazine (DYRENE)	F	> 5,000	> 5,000	DANGER
Benomyl (BENLATE)	F	>10,000	>10,000	CAUTION
Bensulide (PREFAR)	H	271-1,470	-	CAUTION
Biphenyl (DIPHENYL)	F	3,280	-	-
Bitertanol (BAYCOR)	F	>5,000	>5,000	WARNING CAUTION
Bt (DIPEL)	I	-	-	CAUTION
Bupirimate (NIMROD)	F	>4,000	-	CAUTION
Captan (CAPTAN)	F	9,000	-	CAUTION
Carbaryl (SEVIN)	I	850	-	CAUTION
Captafol (DIFOLATAN)	F	5,000-6,200	-	WARNING
Carbendazim (BAVISTIN, DEROSAL)	F	>15,000	>2,000	CAUTION
Carbofuran (FURADAN)	I, N	11	10,200	WARNING/ DANGER[3]
Chloramben (AMIBEN)	H	5,620	-	CAUTION
Chlorothalonil (BRAVO)	F	>10,000	>10,000	DANGER/ WARNING
Copper hydroxide (KOCIDE)	F	1,000	-	CAUTION
Copper oxychloride (CUPRAVIT)	F	1,000	-	-
Coumatetralyl (RACUMIN)	R	-	-	-
Daconate (DCPA)	H	10,000	>10,000	CAUTION
Dalapon (DALAPON, REVENGE)	H	970	7,570	WARNING
DCNA (BOTEC, BOTRAN)	F	>5,000	-	CAUTION
Deltamethrin (DECIS)	I	128 >5,000	>2,000	-
Demeton Methyl (METASYSTOX)	I, F	170-300	260-410	WARNING
Diazinon (BASUDIN)	I, F	300-400	3,600	CAUTION
Dibromochloropropane (NEMAGON)	I, N	170-300	260-410	WARNING[4]
Dicofol (KELTHANE)	A, I	684-809	2,100	CAUTION[4]
Dienochlor (PENTAC)	A	3,160	3,160	WARNING
Dimethoate (ROGOR, CYGON)	A, I	215	>1,000	WARNING
Dinocap (KARATHANE)	A, F	980	-	CAUTION
Diuron (KARMEX, DYNEX)	H	3,400	5,000	WARNING
Fenamiphos (NEMACUR)	N	5	80-200	DANGER
Fenthion (FENTHION)	I	255-298	1,680-2,830	-
Fluazifop-butyl (FUSILADE)	H	1,490-3,328	>2,420	CAUTION/ WARNING
Fosethyl - Al (ALIETTE)	F	4,600	>2,000	DANGER

Note: See page 2 of 2 for footnotes.

Table 5.1. Toxicity of selected pesticides (cont'd).

Glyphosate (ROUNDUP)	H	4,300-4,900	-	CAUTION
Hexythiazole (SAVEY)	A	>5,000	>5,000	(PENDING)
Iprodione (ROVRAL)	F	>10,000	>5,000	CAUTION
Malathion (MALATHION)	I	1,000-1,375	4,100	CAUTION
Mancozeb (DITHANE F-45, MANZATE 200, MANCOZIN)	F	11,200	>15,000	CAUTION
Maneb (MANEB, MANEX)	F	7,990	-	CAUTION
MCPB (TOPOTOX, THISTROL)	H	680	-	CAUTION
Metalaxyl (RIDOMIL)	H	669	>3,100	D/WARNING
Metaldehyde (METALDEHYDE)	M	250-1,000	630	CAUTION/ WARNING
Methomyl (LANNATE)	I	17-24	5,880	DANGER
Mevinphos (PHOSDRIN)	I	4.15	57	DANGER
Monocrotophos (AZODRIN)	I	8-23	354	DANGER[4]
Oxamyl (VYDATE)	I, N	37	2,960	DANGER
Oxycarboxin (PLANTVAX)	F	2,000	>16,000	CAUTION
Paraquat (GRAMOXONE)	H	150	-	DANGER
Phosphamidon (DIMECRON, SWAT)	I	17-30	267	DANGER
Propineb (ANTRACOL)	F	5,000	>5,000	-
Sethoxydim (POAST)	H	3,200	>5,000	CAUTION
Spreader-Sticker (TRITON)		-	-	WARNING DANGER
Thiabendazole (MERTECT,TECTO)	F	3,100	-	CAUTION
Thiophanate (CARCOBEN, TOPSIN-E)	F	>15,000	-	(CANCELLED)
Thiram (THIRAM)	F	780	-	CAUTION
Triadimefon (BAYLETON)	F	1020-1855	>5,000	WARNING CAUTION
Trichlorfon (DIPTEREX)	I	150-400	>500	WARNING
Triflurilin (TREFLAN)	H	>10,000	3,700	WARNING CAUTION
Triforine (FUNGINEX)	F	>16,000	>10,000	DANGER/ CAUTION
Vinclozolin (ORNALIN, RONILAN)	F	>10,000	>2,000	CAUTION
Warfarin (WARFARIN)	R	3	-	WARNING/ CAUTION
Zineb (ZINEB)	F	5,200	>2,500	-

[1] Activity: A=acaricide, F=fungicide, H=herbicide, I=insecticide, M=molluscicide, N=nematicide, R=rodenticide.

[2] See Table 3 for explanation. More than one signal word indicates a difference in formulation (dry vs. liquid) or percentage active ingredient.

[3] WARNING = granules
DANGER = liquid (liquid formulations cannot be used in the project).

[4] All uses cancelled by EPA.

Table 5.2. Criteria Used to Establish Pesticide Toxicity Categories (EPA Signal Words Appear Below Category Numbers).

Hazard Indicators	Toxicity Categories I[1] "DANGER"	II "WARNING"	III "CAUTION"	IV "CAUTION"
Oral LD_{50} (mg/kg)	50 or less	50-500	500-5,000	>5,000
Inhalation LD_{50} (mg/liter)	0.2 or less	0.2-2	2.0-20	>20
Dermal LD_{50} (mg/kg)	200 or less	201-2,000	2,001-20,000	>20,000
Eye Effects	Corrosive; corneal opacity not reversible within 7 days	Corneal opacity reversible within 7 days; irritation persisting for 7 days	No corneal opacity; irritation reversible within 7 days	No irritation
Skin Effects	Corrosive	Severe irritation at 72 hours	Moderate irritation at 72 hours	Mild or slight irritation at 72 hrs.
EPA Signal Word	"DANGER"	"WARNING"	"CAUTION"	"CAUTION"
Spanish Signal Word	"PELIGRO"	"CUIDADO"	"PRE-CAUCION"	"PRE-CAUCION"
MAG/SV Label Color	Red-Yellow	Blue	Green	Green

[1] The word "POISON" and also a picture of a skull and crossbones appear on the labels of products registered in EPA Category I. The MAG/SV has designated an "extremely toxic" (Extremedamente Toxico) Category that has one-tenth the values listed for EPA Category I.

exposure occurs during mixing and loading and when applying or re-entering a recently sprayed field. During mixing and loading, concentrated products are being handled, which increases the hazard. Thus, it is important to reduce exposure through the use of adequate protective clothing and safety gear. The pesticides' label provides safety and emergency guidelines and therefore must be followed closely.

The proposed pesticides are generally nonpersistent and, if used in accordance with their labels, should not result in significant long-term environmental hazards. The environmental guidelines provided on the labels must be followed closely. However, the comments below provides additional discussion of possible human and environmental effects.

Possible Human Effects

Organophosphates and carbamates (see Table 5.3) are cholinesterase inhibitors causing symptomatology of varying severity from illness to death by paralysis depending on the dose (concentration) exposure. The LD_{50} (Table 5.1) is an indicator of human sensitivity (extrapolated from animal studies) to a particular pesticide. The mixer/loader/applicator group and laboratory workers handling technical grade pesticides have the greatest risk of exposure and, therefore, has the greatest risk of intoxication. Treatment is possible with atropine and 2-PAM, and the effect is reversible if treated before irreversible toxic effects have taken place. Care must be taken with the use of atropine as it is also toxic if given to patients not suffering from organophosphate or carbamate poisoning. No known long term effects are noted with the organophosphates available in Ecuador, with the exception of chlorpyrifos and dichlorvos which are lipophilic and can be stored in body fat.

Carbamate exposure can be treated with atropine (2-PAM is contra-indicated). Bisdithiocarbamate metabolites include ethylene dithio-urea (EDTU) which is a carcinogen. There is very little evidence of EDTU being found under actual field conditions.

If instructions on the label are followed for the use of these types of pesticides, there should not be any long term effects associated with organophosphate or carbamate residues on food. Organochlorinated pesticides are lipophilic and are stored in body fat. Since they are carcinogens, exposure should be minimized. Studies should be conducted in the IPM research project to determine the half-life of available pesticides as used on proposed project crops under Ecudorian conditions. Dicofol contains DDE, DDD, and DDT as impurities. Use of Dicofol will lead to residues of DDT and its metabolites.

Table 5.3. Example pesticides listed by common name according to categories.

ORGANOPHOSPHATES
Acephate, Chlorpyrifos, Bensulide, Dichlorvos, Dicrotophos, Disulfoton, Diazinon, Dimethoate, Ethoprop, Fenamiphos, Fenitrothion, Fenthion, Formothion, Glyphosate, Malathion, Mephosfolan, Methamidophos, Methidathion, Methyl Parathion, Monocrotophos, Oxydemeton-methyl, Oxydemeton-S, Parathion, Phosalone, Phoxim, Profenofos, Triazophos, Trichlorfon, and Vamidothion.

CARBAMATES
Aldicarb, Benomyl, Carbaryl, Carbofuran, Carbendazim, Hexythiazole, Methomyl, and Oxamyl.

BISDITHIOCARBAMATES
Mancozeb, Maneb, Propineb, Thiram, Zineb, and Ziram.

ORGANOCHLORINES
Captafol, Captan, Chloramben, Chlorothalonil, Dicofol, Dienochlor, Endosulfan, Oxyfluorfen, and Propanil.

TRIAZINES
Anilazine, Atrazine, and Metribuzin.

PYRETHROIDS
Cyfluthrin, Cyhalothrin, Cypermethrin, Deltamethrin, Esfenvalerate, Fenvalerate, Flucythrinate, and Permethrin.

MISCELLANEOUS
Biphenyl, Bitertanol, Bupirimate, Dalapon, DCNA, Diuron, Fentin Acetate, Iprodione, Linuron, Metalaxyl, Oxadiazon, Paraquat, Pendimethalin, Tetradifon, Thiabendazol, and Triadimefon.

NATURAL ORGANIC
Pyrethrum and Rotenone.

INORGANIC
Copper hydroxide, Copper oxychloride, Copper resinate, Copper sulfate, and Sulfur.

BIOTIC
Bacillus thuringiensis and streptomycin.

Use of the esters of chlorophenoxy acids instead of the salts is more dangerous because of respiratory exposure even though the oral LD_{50} of both are approximately the same. Chlorophenoxy acids and organochlorines are central nervous system stimulators. The organochlorines are also known for their persistence. Endosulfan is an organochlorine and has been the product of choice for several pests for many years, in part for this long-term effectiveness.

Pyrethroids have low mammalian toxicity and do not pose an acute poisoning threat to applicators. However, they are primary irritants and can cause dermal problems for applicators. Residues may build up in human tissue, but little is known of long term effects. Also, they are very toxic to aquatic life and can adversely impact on the shrimp industry. Pyrethroids should not be used near shrimp estuaries or aquiculture enterprises.

The proposed pesticides are generally non-persistent and, if used in accordance with their labels, should present no unusual hazards to the natural environment (see Section II.C.7). The project will share with the Plant Protection (MAG/SV) and other Agromedical Personnel information concerning toxicity of pesticides and procedures for mitigating hazards. Some of the possible environmental hazards are discussed below.

Possible Environmental Effects

Organophosphates, carbamates, and synthetic pyrethroids are less persistent than the organochlorines and, therefore, pose less of a danger to the environment than the more persistent organochlorines. The triazines and miscellaneous pesticides generally are the most water soluble. Usually, the higher the water solubility, the lower the soil sorption. The higher the water solubility, the greater the threat to water systems. As the soil sorption coefficient increases, the stronger the chemical is held in the soil, which lessens the chance of contaminating water systems. Table 5.4 gives comparative data for several products.

One of the other possible non-target effects is the hazard of pesticides to honeybees. The relative danger of selected insecticides is as follows:

HIGHLY TOXIC - CARBARYL, CARBOFURAN, CHLORPYRIFOS, DIAZINON, DIMETHOATE, MALATHION, and PERMETHRIN.
MODERATELY TOXIC - DISULFOTON and METHOMYL.
RELATIVELY NON-TOXIC - TRICHLORFON.

Beef cattle are raised mainly in areas where pesticide use is not concentrated. Cotton is grown in several areas. If chlorinated pesticides are used on cotton, and cattle are allowed to feed on cotton stalks and on the cotton seed cake left after

Table 5.4. Water solubility and sorption coefficients of selected pesticides.

Pesticide Common Name	Trade Name(s)*	Water Solubility ppm @ °C	Sorption Coefficient K_{oc}**
Oxamyl	Vydate, Vydate L, HA-2214	280,000 @ 25	6
Aldicarb	Temik, Temik 15G, OMS771	9,000 @ 30	10
Dicamba	Banvel D, Banex, Dianat, Weedmaster	4,500 @ 25	11
Picloram	Tordon, Amdon, Grazon	420 @ 25	26
Carbofuran	Furadan, Yaltox, Curateer	700 @ 25	29
2,4,D	Agrotect, Amidox, Weed-B-Gone, Weedtrol	900 @ 25	32
Terbacil	Sinbar	710 @ 25	46
Fonofos	Dyfonate, N-2790	13 @ 21	68
Bromocil	Hyvar XL, Borocil, Ureabor	815 @ 25	72
Simazine	Aquazine, Princep, Simadex, Sim-Trol	3.5 @ 20	158
Atrazine	AAtrex, Griffex, Atranex, Vectal SC	33 @ 25	163
Carbaryl	Sevin, Denapon, Tercyl, Septene	40 @ 25	229
Diuron	Karmex, Urox D, Direx 4L, Diurol	42 @ 25	389
Lindane	Gamma BHC, Isotox, Lintox, Silvanol	7.3 @ 25	1,081
Malathion	Mercapthothion, Calmathion, Carbofos Cythion	145 @ 25	1,778
Glyphosate***	Roundup	12,000 @ 26	2,640
Methyl Parathion	Metafox, Parathion-Methyl, Devithion, Nitrox 80	55-60 @ 25	7,079
Parathion	Thiophos, Bladan, Orthophos, Panthion	24 @ 25	7,079
Paraquat***	Ortho paraquat CL, Dexuron	1,000,000 @ 25	15,423
DDT	Tech DDT, Zerdane, Anofex, Gentox	<0.01 @ 25	243,000

*Trade names given for convenience and does not represent endorsement by CICP or A.I.D.
**The larger the K_{oc}, the more strongly the pesticide is held in the soil organic matter and less likely it will leach through soil.
***Note: These pesticides are ionic and are exceptions to the inverse solubility to K_{oc} relationship.

cottonseed oil extraction, beef cattle will bioaccumulate the organochlorines in their fat. This can lead to residue levels which exceed the tolerances of importing countries and impose an economic burden on Ecuador as well as a health hazard.

Similar dangers are present for the expansion of agriculture on this project and aquiculture enterprises on other projects. Extreme care must be taken to select these sites with both current and past pesticide use history in mind. Residues present in the soil from organochlorine pesticides used up to 25 years ago are possible. Special attention should be given to any project activities in the Pedro Carbo area where aldrin is reportedly still in use.

(6) The effectiveness of the requested pesticides for the proposed uses.

Extensive testing and confirmation of the effectiveness of the indicated use of these pesticides is required for EPA registration. If label directions are followed, these pesticides will be effective for the stated purpose.

The pesticides listed in Section II.C.1. Tables 1.1 and 1.2 have been evaluated under a variety of conditions, including those of the Central and South American regions and found to be effective for some of the pests attacking the crops listed. However, as previously indicated, published data are not available on the efficacy of these products for all pests in Ecuador. Few pesticides are registered in the U.S. for use on crops such as pineapple which is not grown in the continental U.S. Therefore, one of the objectives of the research phase of the project and/or the proposed IPM Research Project (see Sections II.C.3., 10, and Special Issue Section IV.6.) should be to collect the efficacy, residue dissipation, and cost/benefit data on products needed to control those pests where registered, non-restricted use pesticides are not available or where the product list is very limited. Where residue data are needed, consideration should be given to requesting A.I.D./W support for establishing a Regional IR-4 Project specifically designed for such studies. The work is generally conducted with the cooperation of the chemical company involved. The company would then contact the IR-4 Office at (201) 932-9575.

Another reason for initiating the research project is the pending loss of many of the "minor use" registrations of some of the general use pesticides during the re-registration process that is currently in progress in EPA. An example of the impact this can have is the case of diazinon. Use on "minor" crops such as asparagus, beans, coffee, and peas is being dropped. Additional crop registrations being dropped by CIBA-Geigy and other companies is included in Annex 6. The National Resources Defense Council (NRDC) law suit may lead to additional

legislation in this area and a copy of a summary of this suit is also being included in Annex 6. The impact of other pending legislation such as the Dingle Amendment could also critically impact the importance of this proposed research and TAP programs.

A sample of the pest management guides currently in use by PROTECA can be found in Annex 3, many of the products mentioned are in the EPA restricted use category and will be prohibited from use or mention in management guides for use under this project, if the regulations are followed. In some cases this will leave only one product, diazinon or malathion, for them to suggest as a control alternative for some pests listed. Routine posttreatment sampling should be conducted to monitor key pests to determine if these pests survive diazinon or malathion treatment or if target or secondary pests resurge to outbreak population levels and crop destruction is imminent. Use of restricted use, but highly effective and safe (with proper training) pesticide could save the crop and the grower's ability to repay the crop production loan if use can be approved under such "emergency" situations, if illegal residues will not result. If an emergency situation occurs, U.S.A.I.D./Ecuador may want to make special provisions to use selected restricted use pesticides such as the synthetic pyrethroids, if they are known to be effective, are registered for use on that crop, and will not threaten aquatic habitats. Guidelines for the development for such a program are outlined in Section II.C.1.

Since project TAP personnel must have extensive training in pesticide use and management, it is proposed that this training be made equivalent to that required for the commercial certified applicator license in the U.S. Consideration should then be given by A.I.D./E to encourage MAG/SV to develop an applicator certification program to allow the use of selected restricted use pesticides under an emergency situation as described above where general use pesticides are deemed ineffective and significant crop losses will occur if the RU pesticide is not used.

(7) Compatibility of the proposed pesticides with target and non-target organisms.

Ecuador has a wide species diversity of flora and fauna (20,000 know plants, 1,550 bird species, and thousands of vertebrates), and geography and climate (from sea level to more than 6000 meters with hot humid tropics to snowcapped mountains). Available information on possible endangered species is given in Annex 5. Project activities will concentrate in the Guayas basin lowlands (5 to 100 meters elevation) and the highland areas around Quito (1800 - 3000 meters). Land with a history of agricultural use will be utilized, thus avoiding contribution to reduction in the biodiversity of forested areas. A biological sampling program is outlined in Sections II.C.11. and IV.7. to provide baseline and interim data to measure possible project effects on biodiversity.

Lowland soils in the Guayas area are generally heavy clays with limited slopes. These change to finer textured loams as one begins to gain altitude. Despite heavy rainfall during certain periods, erosion is limited on the heavy soils. Water infiltration is also limited on these soils, reducing potential for groundwater contamination. Surface movement of pesticides in runoff will be minimal since project crops are not cultivated during the rainy season (annual precipitation of 1200 - 2500 mm).

Soils in the highlands are often of volcanic origin, subject to severe hydraulic erosion. Fortunately, most of Phase II production will take place on relatively flat areas. Annual rainfall varies from 500 to 1500 mm, distributed primarily from October to June. While these soils often have high percolation rates, groundwater is generally quite deep. This, combined with the widespread use of drip and sprinkler irrigation, will reduce the probability of groundwater contamination. However, bare soils are subject to aeolic erosion in some areas.

Organic fertilizer production should be considered by using the otherwise discarded material such as pulp, peelings, and culled fruits and vegetables. Pesticide residue levels in these materials should be determined to prevent crop and animal contamination. In Hawaii, an animal feed was developed from pineapple stock without consideration of residues of heptachlor which is used on pineapple. This led to contamination of milk (heptachlor epoxide) from cows fed this material.

As noted in Section II.C.1, EPA is making a Special Review of several of the proposed pesticides. Carbofuran granular formulations are under review for effects on avian populations. Captan (accused of causing tumors and toxic effects on the liver and kidney), linuron, mancozeb, maneb, zineb, and ziram are also under or have been the subjects of special review. The Selected or Special Review (formerly known as the RPAR process) is a continuing activity, and the EPA will not take final action on carbofuran or the other pesticides until the process is completed. Ultimately, the only valid source for information concerning legal use of EPA registered pesticides is the pesticide label. The label should always be followed carefully, as this best assures minimum hazard to users.

In those cases where pesticides are needed on crops where no U.S. or international tolerances have been established, residue sampling will be undertaken according to established FAO/WHO Codex procedures and arrangements for analysis and submission of data to the FAO Joint Meeting on Pesticide will be made. ST/AGR/AP can provide assistance to MAG/SV with sampling protocols, needed steps to obtain FAO/WHO review, and arrange for needed collaboration with pesticide manufacturers. Ultimately, this process should lead to the establishment of Ecuadorian tolerances by MAG/SV. Such procedures will be imperative for

export crops destined for foreign markets and for assuring the safety of products for internal consumption. The establishment and funding of a regional IR-4 project should also be considered in satisfying these needs. These efforts should be coordinated with other donors to avoid duplication.

In the interim, A.I.D./W needs to approve the use of those products listed in Section II.C.1. Tables 1.1 and 1.2 for use on proposed project crops. Some pesticides for which EPA has not established tolerances are anticipated to be required in the production of those crops on this project destined for non-U.S. markets. These additional pesticides for which FAO/WHO tolerances exist should be submitted on an as needed basis for approval to A.I.D./W.

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

Pesticides proposed for this project, as well as a wide array of other pesticides, are readily available throughout Ecuador. Table 8.1 shows the quantity of pesticides imported into Ecuador in 1986-1988.

Table 8.1. Pesticide importations (metric tons of formulated product) in Ecuador in 1986-88.

Year	Insecti-cide	Herbi-cide	Fungi-cide	Nemati-cide	Others
1986	436	2011	938	857	354
1987	372	2944	871	786	458
1988	363	1309	519	387	236
Ave.	390	2088	775	677	349

Banana and coffee growers use much of the fungicides and nematicides. Propanil in rice and paraquat for general nonselective weed control account for approximately half of all herbicides.

The project is emphasizing non-chemical methods, used in combination with and without pesticides. According to Fundacion Natura (FN), the Escuela Politecnia de Chimborazo has had and may have recently re-initiated efforts to rear and release insect parasites such as Tricogramma sp. for insect control. Ing. Grace de Cabanilla (FUNDAGRO) indicated that the agronomy faculty at the Universidad Tecnico de Machila has an IPM program also.

U.S.A.I.D. was involved in the Integrated Crop Production Project (PIC), 1983 - 1985, as a part of the outstanding IPM program under the Row Crop Improvement Subproject of the ongoing Rural Technology Transfer Project (RTTP). Much information and impetus will be drawn from this previous wealth of information. In fact, Ing. de Cabanilla has a list of the names and addresses of the current and former technicians from the PIC project so that they can be contacted for employment as IPM jobs open on the NTAE project.

An expansion of the research phase of the project is suggested to allow the inclusion of research on IPM technology for the proposed project crops. This research project is detailed in Special Issues Section IV.6.

(9) The requesting country's ability to regulate or control the distribution, storage, use, and disposal of the requested pesticides.

The inappropriate use of pesticides is a classic example of the existence of external costs (externalities in economic jargon). External costs are the detrimental effects arising from pest control action, which affect parties other than the pest control decision-maker, but for which no compensation is paid. Pesticide external costs may be monetary or can be expressed in terms of reduced human health, adverse effects on animals, loss of yield potential, or negative environmental spill-overs. Since these costs do not directly affect the pesticide user, they go unnoticed and do not enter the pesticide use decision making process, leading to potential overuse. Three common approaches are used to reduce these losses. They are:

1. Education - training farmers, manufacturers, business persons, and health personnel of the consequences of their actions.

2. Market intervention - increasing pesticide prices through taxes or other forms of governmental action to force the recognition of the external cost by the user and potentially, provide a method of compensation to the bearers of the external costs.

3. Governmental regulation - prohibition or control of pesticide use and manufacturing through the legal system.

Since the second approach requires valid estimates of the external costs, which are often difficult to obtain, education and/or regulation are commonly implemented by governments to reduce external costs.

Ecuador is no exception. The GOE has recognized the existence of pesticide externalities through the establishment of pesticide control regulations and through its desire for increased training for pesticide users. Ecuador's pesticide law (Reglamento para la Fabricacion, Forumalcion, Importacion, Comercializacion y Empleo de Plaguicidas y Productos Afines de Uso Agricola -- Law No. 2331) was established in 1983. It provides for the regulation of manufacturing, formulation, importation, commercialization, and use of pesticides. Certain sections of this law have been recently modified (Annex 4) and there is considerable concern that these changes may allow the importation of products that do not meet previous high standards. Also, there may be a lack of recourse by farmers if these products do not preform as expected. There also appears to be considerable contraband chemicals in the country that pose the same problems.

Responsibility for enforcement of these laws resides with the Ministry of Agriculture (MAG) through its Department of Plant Protection (SV). The present capacity of MAG/SV is inadequate, however, to monitor and enforce the laws, despite the presence of one or two enforcement agents in each province. However, they are attempting to enforce pesticide laws, being particularly concerned about the 20 products presenting extreme environmental and human health risks which were prohibited from Ecuador, by the Environmental Contamination Law, Decree No. 374, May 21, 1976 (Annex 4).

This project affords an opportunity to stimulate more active participation of the Ministry of Agriculture in pesticide use monitoring, enforcement, and training. The following activities are suggested to accomplish this increased participation and are as follows:

1. Development of a coordination committee composed of representatives from ANDE, FEDEXPOR, FUNDAGRO, MAG/SV, MAG/INIAP, MAG/PROTECA, Fundacion Natura (Nature Foundation) (FN), Associacion Impresorial de Importadores y Fabricantes de Insumos Agropequaria (AIFA), Instituto Ecuatoriano de Seguridad Social (Ecudorian Social Security Institute of MOH) (IESS), and FAO to assure enforcement of present and future Pesticide Laws which the group may find necessary to pass.

2. The coordinating committee formed in 1 (above) should seek additional legislation that would delegate the necessary authority and provide the infrastructure to enable MAG/SV to randomly sample and analyze for pesticide residues on foodstuffs proposed for export or import.

3. The coordinating committee should also formulate legislation to institute a national pesticide applicator certification program. Purchase and use of pesticides classified

by EPA as RU would require the purchaser to be a certified public or private applicator. Minimum training standards for certification are outlined in Section II.C.10. This committe could also serve as an appeals board for alleged violations.

4. Initiation of the proposed IPM Research Project as outlined in Item 3 above (and detailed in Special Section IV.6) with involvement of INIAP where appropriate.

5. Include MAG technicians in education and training programs as budgeted in this project for TAP technicians and paratechnicians located in the regions to improve pesticide safety and to give instruction on selection and preparation of crop and agrichemical samples at the producer level for testing under Item 2 above.

6. A pesticide residue surveillance program with emphasis on NTAE TAP farmers, who provide crops for exportation. This program is outlined in Section II.C.11 (below). The committe in Item 1 above, could serve as an appeals board for the residue program also.

(10) Provisions made for training of users and applicators of pesticides.

Project supervisors/agronomists are generally aware of the dangers associated with pesticides. However, they are often lax in enforcing proper pesticide use. Thus, Project supervisors/ agronomists must receive intensive training in pesticide management, and then take greater responsibility in assuring that workers use appropriate safety gear and practices at all times. All supervisors/agronomists should be required to attend an intensive three- to five-day pesticide management training session. Toxicology of pesticides, environmental problems, protection of workers, calibration of equipment and pesticide rate calculations, disposal of excess pesticides and empty containers, and equipment maintenance will be covered, as outlined below. It may be necessary to bring in a key outside consultant to give this event major emphasis. Thirty or thirty-five persons can be accommodated in a single course. All field personnel who work with pesticides should participate in one-day training sessions on pesticide management. These shorter sessions can be led by supervisors/agronomists who train in the first course, or local trainers from MAG/SV or Fundacion Natura. Supervisors must assume the responsibility of constant monitoring of the use and maintenance of safety gear.

Annual updates of project personnel should be planned. The assistance available through all those sources given above and the proposed IPM project should be utilized in this effort. The session could include a review of their latest findings from the new IPM Project and other IPM Projects such as the National Rice

Program and the new ROCAP-RENARM Project under the direction of Dr. Joseph Saunders at the Centro Agronomico Tropical de Investigacion y Ensenanza - CATIE (Turrialba, Costa Rica 71270), and the MIP Program of Dr. Keith Andrews at the Escuela Agricola Panamericana (EAP) in Zamorano (Apartado Postal 93, Tegucigalpa, Honduras) as they might apply directly or indirectly to this project.

If deemed necessary by the initial training team, a special course may need to be scheduled for health unit personnel and, perhaps, selected IESS personnel on diagnosis and treatment of pesticide poisoning. Need for such training was indicated by Dr. Marco Encalada, and others at FN and MAG/SV. The observation on the overuse of atropine should be confirmed or refuted in making this decision.

Annual follow-up training sessions for both project and medical personnel should be scheduled. This will assure technicians and medical personnel remain sensitized to pesticide issues. New NTAE technicians should receive training before they go to the field for TAP activities. Course content should be determined, in part, on the basis of supervisor observations of violations of good practices so those issues will be stressed.

Baseline pesticide intoxication data should be recorded for each project area prior to project initiation. Data from subsequent years will be evaluated at the first scheduled project evaluation to determine the effectiveness of these mitigative actions. Data from earlier years were obtained from FN (Annex 7), but they readily admit that the data are probably not accurate. During previous FN pesticide training sessions, many medical professionals were found to have inadequate training and equipment to determine actual cause of illnesses and death when pesticides were involved. Therefore, training of medical personnel may be a prerequisite to obtaining accurate baseline poisoning data.

PESTICIDE MANAGEMENT SHORT COURSE TOPICS

TOPIC	HOURS
The Pesticide Problem on a World Scale and in Ecuador.	0.5
Agroecosystem Concepts	1.0
Integrated Pest Management (IPM) Concepts	1.5
Pesticide Toxicology: Emphasis on Locally Used Pesticides	1.0
Pesticide Formulation	0.5
Elements of Chemical Control	1.0
Pesticide Poisoning and First Aid	1.0
Worker Protection	1.0
Pesticide Labels	1.0
Precautions in Preparing and Spraying Pesticides	1.0
Disposal of Excess Pesticides and Pesticide Containers	1.0
Pesticide Spill Cleanup	1.0
Pesticide Storage-Emphasis on "Planned Purchases" to Reduce Carry Over of Products.	1.0
Pesticide Application Equipment	1.0
Calculation of Pesticide Dosage	0.5
Calibration of Application Equipment; Field Calibration Exercise	8.0
Factors Affecting Foliar Applied Pesticides	1.0
Factors Affecting Soil Applied Pesticides	1.0
T O T A L	24.0

(11) Provisions made for monitoring the use and effectivness of pesticides

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The ANDE/FEDEXPOR-NTAE Project manager, and/or the long-term agronomist should develop and oversee implementation of a plan that includes monitoring of the following:

* Safe use practices of pesticides by project personnel and participating farmers. Special attention will be given to the observation of established thresholds prior to treatment.

* Pesticide efficacy.

* Potential environmental impacts resulting from pesticide use. Special attention will be given to population changes of natural enemies, honey bees, and other selected indicator species in treated areas.

* Potential environmental impacts resulting from the total NTAE Phase II activities. Baseline sampling should be conducted before any NTAE tech-pack recommended changes are made and resampled periodically after initiation to measure project caused changes. This should include, at a minimum, 1) Samples to determine possible changes in species diversity of both plants and animals; 2) Pesticide residues in soil and surface and ground water (see minimal sampling scheme in Special Section IV.7); and 3) Worker safety as determined by periodic cholinesterase sampling.

The monitoring program should include periodic sampling of water above and below project areas, residue analyses of edible produce, and cholinesterase sampling of workers subjected to frequent organophosphate and carbamate pesticide exposure. (Details of the environmental sampling program is outlined in Special Issues Section IV.7.) Mrs. Mercedes Bolanos de Moreno, head of the Pesticide Laboratory in the Centro de Nutricion y Medicina (CEDENME) of the MAG, in Tumbaco, can service these Project needs. This laboratory has several high quality apparatus, including a TLC, two HPLC's, two Infrared Spectrophotometers, and E.C.D and F.I.D detectors. The CEDENME laboratory has the responsibility for determining the quality of pesticide formulations used in the country, and for monitoring pesticide residues in food products, the environment, and for human health effects due to pesticide exposure. For practical reasons, monitoring should be kept to a minimum until the Guayaquil Laboratory is equipped to assist with the analyses. Four of the six staff members in the CEDENME laboratory have had advanced training in Germany and/or the University of Miami School of Medicine.

An arrangement needs to be worked out between ANDE/FEDEXPOR-NTAE and the Laboratory for direct payment of services or direct supply of the needed reagents. If payment goes to MAG headquarters, funds are often weeks late in reaching the laboratory, forcing suspension of operations for lack of reagents. Mrs. Bolanos presently has a successful working relationship with Mr. Bruce Mann at the University of Miami School of Medicine and duplicate samples could occasionally be sent to this or other labs for calibration and verification of techniques. Residue analyses for a single compound at the MAG/SV CEDENME lab currently cost $160 (U.S.), and pesticide quality analyses are $80.00. No price was obtained for a general screen that will be needed in the residue monitoring program.

The NTAE/ANDE-FEDEXPOR Project manager will be responsible for immediately correcting any unsafe practices detected by monitoring.

In regular A.I.D. projects, careful control can be exerted in the selection, purchase, extension, use, and disposal of pesticides. Particular attention is needed to assure that only general use pesticides are employed. Unless special measures are taken, little control can be assured in projects such as the one covered by this assessment since the farmers are provided with funds through Intermediate Financial Institution (IFI) or private credit institutions. All too frequently, highly toxic, persistent, and bio-accumulative, pesticides are used. In addition, products may be used that are without registration in the U.S. or Ecuador or which may not have a residue tolerance established for the specific crop. This could result in illegal residues being present in the crop, depending upon the regulations of the importing country. Some of the chemicals currently purchased are either severely restricted or banned for use in the U.S. A number of possible ways of controlling what a farmer purchases and uses have been explored. All but one seem unwieldy and unworkable. One method, however, has merit and a refined version of it will be required for incorporation into the project to avoid the problems associated with the exportation and internal utilization of fruit and vegetables with illegal or excessive pesticide residues. Such a program could also be used to assure that the activity is in compliance with A.I.D. Reg. 16. In essence, the following steps are required:

1. Place a condition into the A.I.D./bank loan agreement that the bank will agree to withhold future years loans to farmers whose crops have excessive or illegal residues or who use pesticides other than "approved pesticides". To ensure compliance, maintain a list of farmers who have failed to comply with this agreement. Enforcement would be subject to an appeals procedure as outlined below.

2. Provide training in safe use of the approved pesticides along with assurances during the training program that the approved pesticides will indeed be effective. Efficacy should be proven in the IPM research program (see Sections II.C.4 and Special Issues IV.6).

3. Establish an inspectorship within the Project Quality Assurance certification and marketing activity to sample farm produce, at random, and without prior notice, on farms who are loan recipients. Coordination with the ministries of Health and Agriculture and the committee in Section II.C.10 would help assure institutionalization of a quality assurance program for all crops.

4. Analyze samples in appropriate laboratory and notify the farmer, loan institution, NTAE technician, and proper enforcement officials of any farmer who has excess residues or has used non-approved pesticides. Ecuadorian laboratories are currently capable of performing such analyses but may need considerable advance notice if large numbers of samples will be submitted. One laboratory will need considerable financial assistance for both hardware and supplies. However, the first few year's monitoring should frequently have duplicate analyses conducted in collaborating US/FDA approved laboratories to assist in developing pre-inspection protocols for export.

5. All of the above is based on farmer consent, as a condition of the loan, to have their crops sampled.

In the operation of this monitoring program, an appeals system must be developed to allow affected farmers to obtain the results of a second analysis or show proof of purchase of approved chemicals, evidence of drift or sabotage, or other extenuating circumstances. The possibility of prior years pesticide carryover should also be considered. Soil samples should be taken and analyzed to confirm or refute this possibility. Consideration could be given to sanctions being enforced during the first three years only after a second offense, especially in the case of drift, residue carryover or sabotage. However, care must be taken to avoid letting illegal residues enter either domestic or export marketing channels.

The residue testing program should be reviewed at each planned project evaluation to determine cost effectiveness in achieving stated goals. However, a special four-year evaluation should be conducted with the involvement of CICP and A.I.D./W to evaluate this program as a means of enforcing A.I.D. Regulation 16 provisions on future projects and the proposed method for mitigating the effects of utilizing RU pesticides.

(12) Requirements for a Monitoring Program to Implement Control over Pesticide Loans to Farmers.

Number of Samples

Considering the number of farmers involved, a small number of samples (eg.10-20) may be insufficient and 1000 samples would be excessive due to costs. One hundred and fifty (150) samples per year (keeping duplicate samples) from randomly selected farmers would represent a reasonable effort and would be adequate to demonstrate the degree of farmer compliance.

Method of Analysis

Until Ecuadorian laboratory's capability for analysis can be developed in both project areas, some samples could be shipped to the MAG laboratory in Tumbaco or to a commercial laboratory in the U.S. whose credentials are recognized by the LAC/AG Bureau Environmental Officer. Multi-residue methodology, as used by FDA Regional surveillance laboratories, should be applied for all samples.

Location of Laboratories

Local Ecuadorian laboratory capabilities for conducting large numbers of chemical analyses should be developed and is strongly encouraged. However, for at least the first year, in the absence of demonstrated in-country capability to perform the large number of monitoring analyses in both areas, an illustrative budget is given below to allow sufficient funds so that samples could be shipped to a commercial laboratory in the U.S. whose credentials have been reviewed and approved by the LAC/AG Bureau Environmental Officer. (The MAG/SV laboratory in Guayaquil will require considerable hardware and reagents to function properly. A proposed list of materials needed for that lab is included in Annex 8).

Illustrative Budget (Exclusive of equipping the lab in Guayaquil or setting up a new lab in Ecuador):

	$ / Year
Inspectors Salary (NTAE)	0
Training of Inspectors	2,500
Transportation for Inspectors	0
Freezer for Sample Storage	500
Sample Shipping Containers	1,500
Shipping Charges	2,000
Chemical Analyses @ $200/Sample	30,000
Total	$36,500

D. REQUESTS FOR ADDITIONAL PESTICIDES AND/OR INFORMATION.

If project personnel determine a need for pesticides not in Tables 1.1 & 1.2 (Section II.C.1) or if they need additional information about the pesticides or EA procedures, they should notify U.S.A.I.D./W. The A.I.D./E office can contact A.I.D.'S Bureau of Science and Technology, Office of Agriculture for any needed assistance. Before any actual demonstrations to/with farmers of pesticides not in Section II.C.1. Tables 1.1 & 1.2, specific labels and compounds must be reviewed by the Bureau Environmental Officer. Also, CICP has purchased the "Silver Platter" pesticide database and will have the capability to rapidly respond to requests on the registration status of pesticides. (The address for CICP is: 4321 Hartwick Road, Suite 404, College Park, Maryland 20740, Phone 301-454-5147, FAX 301-454-6676.)

III. SUMMARY OF MITIGATIVE MEASURES.

Environmental impacts of Phase II will be minimal if the guidelines herein are followed. Adherence to these guidelines should permit fulfillment of the Project objective of producing uniform high-quality agricultural commodities for export, while maintaining environmental integrity.

A. To assure compliance with FAO and/or FDA pesticide residue standards and Agency for International Development (A.I.D.) pesticide regulations, a mandatory pesticide residue testing program as outlined in Section II.C.11 of this document must be instituted. The program is an integral part of the quality assurance component of the project.

B. The environmental monitoring program as outlined in Sections II.C.11 and IV.7. will also be a requirement for the implementation of the Project. Baseline sampling should be conducted before any NTAE tech-pack recommended changes are made and resampled periodically after initiation to measure project caused changes. This should include, at a minimum:

1. Samples to determine possible changes in species diversity of both plants and animals;

2. Tests for pesticide residues in soil and surface and ground water (see minimal sampling scheme in Section IV. 7); and

3. Worker safety as determined by periodic cholinesterase sampling.

C. The following suggestions, although not required, should also be strongly considered by the Mission and/or A.I.D./W.

1. To assure the availability of alternative integrated pest management (IPM) strategies and an effective pesticide arsenal, it is suggested that an IPM research component be established. A suggested list of research topics and a minimum budget is given in Section IV.6.

2. A pesticide training program should be initiated prior to the initiation of any crop production technical assistance activities. The minimal subject matter to be covered in the pesticide training program is outlined in Section II.C.11 to assure project technical personnel are adequately trained in proper transport, handling, mixing, and use of pesticides. It is suggested that the training be of the same or higher quality as that required for a U.S. Commercial

Certified Applicator. Farmers would then be trained at the same level as certified private applicators.

3. If the proposed IPM research program and the TAP are to be successful, an on-going training program will be required. Perhaps this could be initiated by holding a "State of the Art" IPM Symposium with emphasis on the crops being considered for NTAE Phase II implementation the first year. Both on-and off-shore specialists could be invited to present research and extension IPM findings for these crops.

4. The TAP phase of the project will require that financial institutions (Corporacion Financiero Nacional-CFN, CAF, etc.) include funds in the loan for the purchase and use of all appropriate protective devices and clothing if pesticides are included in the loan. The research project will furnish and require the use of these devices.

5. Pesticides should be stored in their original containers in locked storage facilities with the key assigned only to authorized, qualified personnel. A sign in Spanish reading "Danger: Pesticide Storage Area" should be posted. When possible, separate storage areas should be provided for herbicides and planting seeds. Pesticides should not be stored near sleeping or work areas, food, animals, or drinking water.

6. Empty pesticide containers should not be reused for other purposes since no practical methods exist for removing all toxic residues.

7. Organic fertilizer production should be considered by using the otherwise discarded material such as pulp, peelings, and culled fruits and vegetables.

8. The project should take advantage of the opportunity to stimulate more active participation of the Ministry of Agriculture in pesticide use monitoring, enforcement, and training. Several activities were suggested to accomplish this increased participation and should be followed.

9. To assure availability of current pesticide information and "shelf" IPM technology, a computer-supported technical information center should be developed and made available to project technicians as soon as possible.

10. Annual updates of research project personnel should be planned. The assistance available through a wide range of sources should be utilized in this effort. The session could include a review of the latest findings from the new IPM research project and other IPM Projects in the region.

11. Annual follow-up training sessions on pesticide safety should be scheduled for both project and medical personnel. This will assure technicians and medical personnel remain sensitized to pesticide issues. New NTAE technicians should receive training before they go to the field for TAP activities. Course content should be determined, in part, on the basis of supervisor observations of violations of good practices so those issues will be stressed.

12. Baseline pesticide intoxication data should be recorded for each project area prior to project initiation. Data from subsequent years will be evaluated at the first scheduled project evaluation to determine the effectiveness of these mitigative actions.

IV. Additional issues related to this EA which were requested in the Scope of Work. They will be dealt with in the order requested.

Issue No. I. Environmental Impacts of Phase I.

Phase I Project activities probably had a very limited impact on the environment because it focused largely on organizational and developmental activities with very limited emphasis on technology transfer (Chemonics 1988). Virtually no pesticides or other inputs were actually introduced into Phase I activities via Project 518-0019, Loan No. 518-T-058.

Interviews with administrators and supervisors of Phase I, and individual farmers revealed a very positive scene, when compared to non-participating neighbors. No serious poisoning cases were reported. The close supervision by ANDE technical personnel and direct hire agronomists employed by the flower and melon producers with larger land holdings contributed to the minimal negative environmental impacts. The semi-enclosed plastic houses, concomitant with the intensive production practices associated especially with the flower producers, also minimized negative impacts on the environment.

Nearly all participating farmers are utilizing fields with very little slope. Hydraulic soil erosion has, therefore, been nearly negligible. The widespread use of drip or sprinkler irrigation has also minimized the problem of soil erosion and movement of pesticides to non-target areas. Bare soils are, however, subject to aeolic soil erosion. Since production of new crops involved only a change in crops planted, no serious change in biodiversity was anticipated.

Issue No. 2: Pest and Pesticide Issues.

Flower growers reported a limited number of pests. The most common pests are aphids, spider mites, thrips, scales, mildew, and leaf spot diseases. Aphids and spider mites are the predominant pests in flowers. Melon growers on the coast also have serious aphid and virus transmission problems. Vegetable growers generally reported few pest problems. However, strawberry producers are applying fungicides with great frequency for Botrytis (fruit rots) and leaf spots. ANDE has recently published a manual on the cultivation of caneberries (Manual Practico Para el Cultivo de la Mora de Castilla). Some 13 disease and insect pests are listed, none of which are considered serious at this time. Non-chemical management practices are suggested for many of these pests. We visited one caneberry grower and found the publication to reflect what we observed. Only a couple of insecticide sprays had been applied in the two years the crop had been grown. The synthetic pyrethroid Mavrick

has been used for spider mites, diazinon for white grubs and cutworms, captan and Benlate for Botritis, and Terrachlor for seedling disease. He had used some foliar fertilizer, but primarily depends on chicken manure as the primary fertilizer source. He indicated the other growers (about 12) in the local caneberry grower's association has had about the same experience.

We visited only one tropical fruit operation. However, the Ministry of Agriculture has published an "Inventory of Pests of Ecuador" which includes some of the NTAE crops. Some information on potential pest problems in these crops is available for future participants.

We visited the "Los Mangos" farm being run by Sr. Jose Cobena. He had about 10 ha of older mango trees and another 10-15 ha of younger trees. They were at the end of the harvest season, but were boxing fruit from 5 varieties of mangos for air shipment to Europe. They had not sprayed for any insect or mite pests, but had noted an increase in scales and spider mites the last two years. They were using chicken manure as the primary fertilizer source. They irrigated by a hand-moved, plastic water line fed from a floating pump in a hand-dug well. The soil was somewhat sandy and the water rose to within 30-40 feet of the surface in the well. This could pose a pesticide contamination problem if pesticides become necessary in mango production. They were using rice hulls (afrecho) to provide a mulch around the trees to reduce water loss.

While most flower growers consider that their pest problems have not been serious, a trend is apparent in operations which have been active for two or more years: the development of resistance by aphids and spider mites to some of the insecticides/acaricides which have been used with great frequency. The same is true of aphids for melon growers. Consequently, these growers are using increased numbers of insecticides with greater frequency and at increased rates. Several of the pesticides being used in Phase I cannot be approved for use in U.S.A.I.D.-funded projects because of their toxicity or restricted use status.

Integrated Pest Management was not applied effectively in Phase I. Export markets demand a nearly perfect product. Thus, producers feel that they cannot risk non-chemical techniques which may result in increased imperfections. No institutions have been charged with the mandate to develop IPM techniques for the NTAE crops, and producers are too preoccupied in meeting market demands to consider "risky" alternative techniques. "Risky" is obviously a short-term view. It is urgent that alternatives which reduce chemical dependency for pest control in flowers in the highlands and melons on the coast be developed within the context of an IPM focus. The emphasis of the proposed NTAE Phase II project on IPM research and extension and pesticide

training will help move in this direction in the five year framework of the project.

Protective clothing and equipment for persons working with pesticides was quite good for most of the large growers, but deficient with many of the smaller growers. In some cases, dust masks were being used when carbon-filter respirators should have been used. One farmer argued strongly that his mask, a simple particle mask, was adequate for organic vapors. This is indicative of the inadequate knowledge of the dangers of pesticides.

Larger growers/enterprises have quite competent agronomists who are also responsible for pesticide safety. Generally, they are providing respirators, gloves, and coats, but are very lax in enforcing their use. It is difficult to verify if safety gear is adequately maintained and serviced. Unfortunately, persons actually mixing, loading and applying pesticides, often do not use the safety gear when it is available. Only a couple of the NTAE Project participants reported light pesticide poisonings (headaches). Non-project growers we visited reported frequent poisoning symptoms. The use of protective gear by non-participant farmers ranged from the full complement to a total absence of protection.

Disposal of empty containers definitely needs to be improved. We observed non-participating growers frequently using empty containers for other purposes. Workers occasional take empty containers for personal use.

Pesticides were frequently being stored under lock, or in separate buildings, a practice which should be encouraged for the NTAE project participants.

Practically no printed materials related to the safe use of pesticides, such as warnings and pictograms, were seen on any of the farms. However, they were readily available at Ecuaquimica, FN, and pesticide distributor's offices.

Project supervisors/agronomists must receive intensive training in pesticide management, and then take greater responsibility in assuring that workers use appropriate safety gear and practices at all times. All field personnel who will work with pesticides must also participate in training seminars on pesticide management.

Issue No. 3: Economic and Social Costs and Benefits:

Very little data have been produced on these issues under NTAE Phase I activities. However, on the A.I.D.-supported Row Crop Improvement Project with the Producers Association of Short Cycle Crops (APROCICO) in Quevedo, excellent benefit/cost data

have been generated. The adoption of IPM techniques in maize, soybean, rice, and sorghum resulted in a significant reduction in the use of pesticides and, consequently, reduced production costs and potential for environmental contamination. Yields in these treatments were equal to those with traditional high chemical use.

Another area of potential socioeconomic impact is the use of herbicides to replace hand weeding. Herbicides pose a greater potential to displace labor than other pesticides. Few of the participating farmers have been using herbicides. However, several indicated that hand labor for weeding vegetables is one of their most costly and problematic issues. Although we often suggested that great caution be exercised in using herbicides, several growers claimed that it is becoming a necessity if they are to remain competitive. Careful supervision is needed for the adoption of herbicides.

Farmers generally feel that the benefits of using pesticides are high. In the case of flowers and fresh vegetables, the "threshold of defects and imperfections" certainly justifies the judicious use of pesticides if these crops are to be exported to North American and European markets. Melon growers must control aphids during a critical three-week period starting when melons are about the size of an egg. Aphid attacks during this period result in significantly smaller melons, which greatly reduces size and quality.

The promotion of IPM under Phase I was minor. However, several project participants and some 25 leaders of individual grower groups of the "Tungurahua Project" in Ambato, which we met with, are anxious to learn more about IPM. They are anxious to reduce their dependence on pesticides. It was surprising how many growers are not only concerned about having exports rejected for excessive pesticide residues, but also about harmful effects from pesticide residues on the food they are eating.

The social benefits of this project can be high, both in terms of employment generated (an estimated 14,000 jobs) and in reduced pesticide contamination of humans and the environment. This project must promote safe pesticide management which will have the secondary effect on non-participating farmers of increasing their awareness on the need for safe pesticide use.

Issue No. 4: Environmental and Sustainable Production Impacts:

Most of the producers involved in Phase II will be using fields with little slope, or working in enclosed environments. Thus, it appears that soil erosion will be minimal. Furthermore, most melon, strawberry, and flower producers are using drip irrigation under plastic, which will reduce the potential for

ground water contamination and water loss. Melons and tomatoes will not be produced during the rainy season on the coast, also reducing the probability of groundwater pollution.

Flower producers are attempting to recycle stems and other wastes. However, when processed in a traditional composting system, these wastes remain very fibrous for 12 to 15 months, and have limited nutritional value. Project participants should be encouraged to tour a "Worm Farm" (Lombricultura SCIC) near Pifo. Some 2600 tons of flower stems, grass, animal wastes, and even municipal garbage are being converted into some 1200 tons of excellent humus, annually. Many fruits and vegetables are being produced here without the use of agrichemicals. Lombricultura is "selling their technology" and presently have more than 35 farmers in Ecuador who are involved with this program. Inorganic fertilizers have been used extensively in Phase I and will be in Phase II. There is a great need to promote the use of organic amendments for improving soil structure, fertility, and conservation. This technology should receive research under Phase II. Living mulches should be tested in the various systems. Considerable experience is available in Oregon and California through the cooperative living mulch program.

Issue No. 5: Institutional Capabilities/Constraints: (particularly in relation to sustainable use of natural resources and environmental protection).

ANDE. The ANDE agronomist is quite interested in sustainable agriculture and environmental protection, although she has limited experience. She needs to work with a more experienced person to improve her competency.

FEDEXPOR. No technical production oriented expertise was available in FEDEXPOR. They hired a long-term agronomist, Ing. Jaime Flores, to serve as the ANDE/FEDEXPOR-NTAE project manager. He will be a key person in meeting the overall objectives of minimizing negative environmental impacts. Hopefully he will give leadership in the sustainable use of natural resources and the environment in the Phase II activities, as well as pesticide management.

MAG/SANIDAD VEGETAL. Mr. Abram Oleas, pathologist with Sanidad Vegetal in Tumbaco, was deeply involved in the A.I.D.-supported PIC (Protection Integrado de Cultivos) Project, and still has great interest in this area. He is very willing to collaborate with Phase II in fostering IPM in non-traditional export crops (NTAE). Sanidad Vegetal does not have resources for such participation. An arrangement would have to be worked out between ANDE and SV to cover expenses. Transportation is a serious limitation for Mr. Oleas, and should be considered. Mr. Oleas said that two other persons involved in PIC are still

working in MAG, and they should be available to collaborate also. One of the most basic needs is to document the flora and fauna in the NTAE in an effort to identify potential biotic control agents and to monitor possible changes in biodiversity.

Ing. Jose G. Donoso Z., Entomologist, and other staff have a small amount of funding from Germany to do research on the fruit flies in the area. At least 6 species of fruit flies have been identified and he wants some additional support to determine if any of them attack several possible export crops including "tomate de arbol" (tree tomatoes), "babaco", "naranjillo", and "mora" (blackberries). Ing. Flores indicated that this type of project might be funded under the NTAE Phase II Project and would welcome a project proposal.

We visited the MAG/SV laboratory in Guayaquil and met with Chief, Ing. Marco Tapia and the pesticide residue laboratory supervisor, Ing. Teresa Garcia de Paladines. She indicated that their gas chromatograph was out of commission and that they were currently sending their samples to the Ministry of Health Laboratory at a cost of S/10,000 per ($19.00) sample. If they could get their GC repaired they could handle 12 samples/week in their lab without the purchase of additional glassware or hiring more people. A list of equipment, glassware, and reagents needed to get the lab going again was provided and is presented in Annex 8. A special project proposal for a residue program Ing. de Paladines wants to conduct is also included in Annex 8.

They will also require a direct payment to the lab arrangement if the lab is to do NTAE samples. Otherwise they would rapidly deplete their reagents and solvents.

They also have a nematode laboratory and, although all work is by hand, they can reportedly handle 15 samples/person/day at a cost of about S/600 per sample. If this is true, the nematode sampling equipment proposed for the IPM project may not be required. They can also handle some disease and insect samples at a cost of around S/900 ($1.40) per sample.

The MAG/INIAP and FERTISA laboratories can do the soil fertility samples. A recent A.I.D. study indicated that these labs were only working at about 10% capacity.

INIAP. Director Eduardo Calero and the Head of the INIAP Horticultural Department, Alvaro Yepez Regalado, expressed a willingness to collaborate in the identification of biotic control agents and agronomic production practices in the highlands for NTAE. Ing. Calero feels that INIAP entomologists are well qualified for this. Again, their collaboration would depend upon financing. Transportation, per diem, and direct research costs would have to be covered by the Project. They estimate the average cost of field experiments at S/200,000 (two

hundred thousand sucres). Oleas suggested S/150 - 200 thousand sucres.

Mr. Otto Ordenana, Regional Director of INIAP in Guayaquil, was very optimistic about cooperating in research in tropical fruit crops. In fact, some of their people were trained in IPM techniques under the APROCICO program. He feels that their agronomists and entomologists could make significant contributions to the project.

PROTECA. The richest source of local talent trained in IPM is within PROTECA, in Guayaquil. Carlos Elizalde Sanchez, Director Tecnico Regional - Costa, worked closely with the IPM program in APROCICO, and is committed to the promotion of this concept. He may be one of the best local leaders available to head up such an effort. He does not have formal technical training in plant protection, but has the vision for promoting IPM. There are at least 15 agronomists in PROTECA (on the coast), who were trained in the APROCICO project; many of them are promoting IPM in their present work with farmers. Ing. Grace de Cabanilla has a list of some of the other former APROCICO workers for possible employment on the NTAE project.

They reported that the effect of introducing IPM in corn and rice in the area has been a reduction in pesticide use by 20-25%. They have accomplished this through 1) demonstration plots, 2) simple (picture type) literature, 3) radio programs on IPM concepts, and 4) group meetings and field days. They have a large number of agents (around 100 ag and 6 veterinarians) with each assigned to a defined area with around 300 farmers. Each group of 10 agents has a supervisor. They are primarily responsible for the "canasta familiar" or family food basket crops - maiz, rice, soybeans, cotton, and tomatoes. Their goal is to work primarily with 50% small (1-10 ha), 39% medium (11-50 ha), and 11 % large (50+ ha) scale farmers.

Although the PROTECA program has recently received $U.S. 60 million in support, their mandate to work on the family food basket crops will make cooperation with NTAE difficult without a direct contract to provide special funds to cover expenses on these specialty crops. This is illustrated in their continued difficulty in obtaining needed equipment and transportation even for work on their mandated crops.

NATIONAL RICE PROGRAM. Mr. Hugo Herrera worked closely with the APROCICO IPM project and is very enthusiastic about the concept. He has been applying IPM principles for nearly three years and reports reduced production costs of 20 to 25% with IPM techniques. Carlos Elizalde said that Herrera and others, have been particularly active in working with farmers of all sizes, scattered over a wide area between Guayaquil and Quevedo.

FUNDAGRO. FUNDAGRO does not generally have technical people working in the field, except for special contracts for technical services. They see their role as that of facilitators, supporting selected projects. Mrs. Grace C. de Cabanilla, Coordinator of Special Projects, believes that they are the most logical organization to support IPM activities on the coast. She proposes that ANDE channel funds through her office to PROTECA personnel. Her office could provide supervision of research activities. Based on her enthusiasm and convictions of the importance of IPM, and her good working relationship with Carlos Elizalde, it appears that this could be a fruitful arrangement. The question may be raised, "why work through FUNDAGRO when FEDEXPOR has their own office in Guayaquil?" The answer now depends entirely on the working relationship of the long-term technical person ANDE/FEDEXPOR contracted, Ing. Jaime Flores. Ing. Flores indicated that he worked out an arrangement to have his office in the FEDEXPOR offices in Guayaquil which solves the question.

FUNDAGRO, Quito, should be an important resource for technical information and training. They are equipped with an audio-visual training room and have more than 200 training units on all phases of agricultural production and marketing. They have at least 12 units from the A.I.D.-supported IPM Project at the Panamerican School of Agriculture (El Zamorano) in Honduras. They plan to make these audio-visual materials available to any institutions requesting them.

Ing. Grace de Cabanilla, Director of Special Programs, is located in the FUNDAGRO Guayaquil Office. She is very enthusiastic about the project and the prospects of an IPM research project associated with NTAE. She is very supportive of IPM and wants to incorporate it into the NTAE tech-packs for her project growers. Her experience with the pre-inspection program developed with USDA/PPQ will be an asset to project activities in the coastal region.

UNIVERSITIES. Rather than relate directly to the universities, Phase II could finance specific thesis research activities through INIAP, PROTECA, or FUNDAGRO. Several theses have been completed in Guayaquil under this arrangement, with very satisfactory results. The experiences of the Escuela Politecnia de Chimborazo with their biological control lab should be taken advantage of if possible. They were rearing, or at least had reared, Tricogramma for release, but had not had much acceptance. Also, Ing. de Cabanilla indicated there was a MIP program at Universidad Tecnia de Machala, Facultad de Agronomia which may offer some special collaborative opportunities.

GROWERS ASSOCIATIONS. The technical personnel of the producer/exporter associations are generally traditional "high

technology" agronomists. It is doubtful that leadership for sustainable production and IPM will arise from these groups.

It is important that the long-term technical person that FEDEXPOR contracts, is strong in the area of sustainable use of natural resources and on IPM. Short-term consultants must be brought in to train selected project personnel in specific aspects of this overall focus. Experience in IPM in the tropical fruits is almost non-existent in Ecuador. The same is true for the NTAE in the highlands. Soil management experts with the "sustainable mentality" must also be brought in.

FUNDACION NATURA. This group has an active Environmental Educational Program, and was active in the pesticide management issue. Unfortunately, much of their literature has strong "anti-pesticide" overtones, which tends to alienate them from the people with whom they should have close cooperation. From three visits with Fundacion Natura, it seemed that they do not have a good scientific foundation, which makes some of their efforts suspect. We have no way of judging the relevancy of their pesticide training courses, and whether they should be utilized in Project training activities. Perhaps, with supervision they could be useful. Their publication "Peligro Plaguicidas; Normas de Seguridad Para Su Uso" is quite good; much superior to most of their literature. Future funding for the Environmental Education program is very doubtful at this time and most of their funding on pesticides has been lost. Any cooperation with the NTAE project, therefore, may require cost reimbursement.

Issue No. 6. Plans for IPM Program.

Under IPM/MIP, crops are regularly monitored (called "scouting") for presence of pests, natural enemies, and other factors which may influence a decision concerning a control measure. Pesticides are applied only as pest populations have exceeded unacceptable density levels and there is reasonable assurance that pesticide use will be profitable and non-disturbing to the environment.

The IPM concept is currently playing a role in Ecuadorian agriculture. Multi-tactic approaches can now be found: for example, the soya and corn production packages being used in the APROCICO IPM program in the Quevedo area include the use of Bacillus thuringiensis product for "worm" control. However, much improvement can be made in monitoring programs and use of economic injury levels and thresholds in non-traditional crops. This A.I.D. project stresses training and technical assistance to advance IPM concepts and techniques for non-traditional export crops in Ecuador. However, development and implementation of IPM will be a long-term undertaking. During the 5 year duration of this project, one should seek to firmly establish the movement toward IPM where pesticides are truly only used on an "as needed"

basis in crops produced under this project. Although IPM strategies are already included in the TAP program for some pests, this will require IPM research on specific phases of pest management to provide alternative tactics for the full pest complex. The most critical immediate research need will be to test the alternative pesticides being proposed to assure efficacy on the full pest complex under Ecuadorian conditions where these data do not already exist. One of the goals in the first year of the project should be to define these data gaps.

The proposed tech-pack to be extended in the TAP extension program should include several IPM strategies. The experiences of the APROCICO/PIC Program should be strongly modeled with appropriate changes for the crops being grown. Off-shore experienced IPM specialists in each of these crops could be brought in for reviews of the proposed IPM packages.

It is A.I.D. policy to stress IPM and make every effort to minimize the use of pesticides. As indicated above, this project certainly could fulfill this requirement for existing or "shelf" IPM technology they plan to extend to crop producers on this project. However, there is no provision made for set-aside funds to fulfill the research needs to be identified above and to test or develop new alternative IPM management strategies under Ecuadorian conditions except as a part of the on-going research program in INIAP (Instituto Nacional de Investigacion Agropecuaria) and, to some extent, in FUNDAGRO. Past experience in A.I.D. projects shows that this can only be accomplished by budgetary "set-asides" or concurrent complementary projects, so that within the term of the project there is assurance that needed testing and technical assistance will be accomplished. Short-term technical assistance from plant protection specialists in the U.S. in a collaborative effort with local plant protection scientists is considered to be a key part of this process. Only in this way can there be assurance of completion of successful field trials and studies in the short term and a trained, experienced team to continue IPM research after the project is terminated.

These pest management research activities should be coordinated with the Central American Regional ROCAP/MIP Project, being continued under the ROCAP/RENARM Project, to avoid duplication. This is suggested as most of these crops are important export crops in the entire region and research results should be applicable to all countries in the region and should receive regional financial support. However, a set-aside should be made within the NTAE budget to assure testing of the efficacy of pesticides being recommended as alternatives to those traditionally used, if these data do not already exist. Although other specific research needs are to be defined in the first year of the project, the research should focus, at a minimum, on the following:

a) identification of the nature and magnitude of existing pest management problems (especially fruit flies);

b) assistance in the design and identification of a testing/evaluation program on appropriate pesticide use and efficacy;

c) design of a system of pesticide and alternative technology field trials and evaluation which will include some form of crop insurance for participating farmers;

d) identification, training, and use of appropriate personnel to monitor and evaluate field testing programs;

e) training in the safe use, handling, application, and storage of pesticides; and

f) sensitization of farmers as to the advantages of an integrated pest management program.

These field testing programs should include one or more, as appropriate, studies related to:

a) use of parasites, predators, and biorational pesticides as alternate pest control agents;

b) investigation related to crop loss assessment and establishment of "protocol" treatment threshold recommendations;

c) use of crop varieties which show acceptable levels of resistance to local pests;

d) effectiveness of resistant rootstock to reduce nematodes, diseases, and soil pests;

e) maximized use of mechanical and/or cultural control based on availability of labor inputs; and/or

f) evaluation of the status of pesticide resistance and alternative control measures.

A minimal five-year budget that will allow the above pest management research needs to be partially addressed is presented below. The primary funding of this new project should be considered under the NTAE project budget as a set-aside from existing funds or (a) project amendment(s) or a new project should be considered to provide the needed funding.

As previously recognized, U.S.A.I.D./E has emphasized IPM in Ecuador under the Integrated Crop Production (PIC) Interagency Commission (PIC/IC) and Row Crop Improvement Program. These programs were created in 1984 and the PIC interagency commission promoted IPM practices for two years. In 1986, the Row Crop Improvement Program (part of the Rural Technology Transfer System Project - RTTSP) was initiated in APROCICO. This association emphasized development and extension of IPM practices in corn, soybean, rice, and sorghum.

It is proposed that the NTAE Project build from the experience of the IPM efforts of the PIC/IC, APROCICO, PROTECA, and the National Rice Programs. Each of these groups as well as the MAG/SV and MAG/INIAP programs have personnel with training and/or field experience in field crop IPM programs. It appears that people in each of these institutions should play a roll in the Phase II NTAE Project IPM research and technical assistance programs (TAP). As indicated in the previous section (Issue No. 5), whether funds are routed through FEDEXPOR or FUNDAGRO depends entirely on the quality of the long-term technical person FEDEXPOR contracts. If this person has a strong IPM background then FEDEXPOR would be the preferred choice.

If the proposed IPM research program and the TAP are to be successful, an on-going training program will be required. Perhaps this could be initiated by holding a "State of the Art" IPM Symposium with emphasis on the crops being considered for NTAE Phase II implementation the first year. Both on-and off-shore specialists could be invited to present research and extension IPM findings for these crops. Travel, living expense, and, perhaps, honoraria should be provided for four or five "top notch" IPM Specialists to assure broad-based attendance from all surrounding countries in both the Central and South American regions. CICP has extensive experience in the planning and execution of IPM training programs and could be contracted to assist with such a program.

PROPOSED IPM RESEARCH PROJECT BUDGET

	Costs paid in		
	Total	Dollars	Sucres[a]
Technical Assistance (from the U.S.) 3 person months/year over a 5 year period $250.00 per day	$112,500	112,500	-
Travel/per diem for above	65,000	65,000	-
Technical Assistance (Ecuador) To conduct field plot studies 12 person months/ yr for 5 yrs @ $25,000/yr	75,000	-	75,000
In Country Travel	10,000	-	10,000
Research Technicians (Ecuador) 3 persons/yr for 5 yrs @ $10,667/yr	160,000	-	160,000
Vehicles (2)	26,000	26,000	-
Transportation Expenses @ $1,000/yr	5,000	-	5,000
General Supplies @$5,500 1st yr & $3,500/yr	19,500	10,000	9,500
Computer Hardware and Software (inc. backup power supply, etc.)	5,000	5,000	-
Pesticide Application Equipment @ 1,500/yr	7,500	-	7,500
Nematode Laboratory Equipment	45,000	45,000	-
Maintenance and operation @ 3,000/yr.	15,000	10,000	5,000
Meteorological Monitoring Equipment	10,000	10,000	-
Test Plot Rental @ 1,500/yr	7,500	-	7,500
Maintenance and Operation (of equipment and vehicles) $2,000/yr	10,000	5,000	5,000
Laboratory Analyses (pesticide residues and other studies) $5,000/yr	25,000	-	25,000
Audiovisual equipment and microscopes (camera, projectors, video, etc)	15,000	10,000	5,000
Subtotal	$613,000	298,500	314,500
Institutional overhead (est. 30% of U.S. salaries)	33,750	33,750	-
Total	$646,750	332,250	314,500

[a]Indicates supplies and materials that can probably be purchased in Ecuador with local currency funds. The remainder will probably have to be ordered from the U.S.

Issue No. 7. Minimal-cost Environmental Monitoring Scheme.

J. B. Mann, Pesticide Specialist with the University of Miami School of Medicine suggests the following as a minimum addition to the environmental sampling already outlined in Section II.C.11.

In the region North of Chaduy, melon and tomato production practices can impact on the Zapotal River and possibly on the Mananial River which are in a natural water shed. Samples of water and riverbottom sediment should be taken from the Zapotal River at 5000 meters north of the co-juncture of the Zapotal and Mananial Rivers and also at the co-juncture of these rivers. Analyses of aquatic life would only yield data on lipophilic pesticides. Monitoring for a decline in abundance of aquatic life would be a better indicator of the impact of other agricultural chemicals which would include fertilizers. Baseline data should be collected as soon as possible and sampling repeated at least twice yearly at the same time of the year.

Project activities are also planned along the Duale River watershed. Samples should be taken from the Duale River near Palestina to determine the impact of melon and maracuya and near the city of Daule to measure the impact of mango production.

Potable water sources near other major agricultural centers should be monitored for possible pesticide impact - Manglaralto, Milagro, Roberto Astuchillo, Laurel, Pedro Carbo, and Balazar.

In summary the following samples are required:

R. Zapotal	R. Daule	Potable Water
2 water	2 water	6 water
2 sediment	2 sediment	
2 biological	2 biological	

These fourteen (14) pesticide residue samples should be collected in duplicate at least two times during the growing season. Collections should be made after heavy uses of pesticides, especially when this coincides with heavy rainfall in the area. This will give the worst case scenario. Results of the analyses will determine if additional sampling is necessary or if there are areas which need a more concentrated effort.

Any birds or small animals found dead of apparent natural causes in agricultural areas should be analyzed for pesticide residues. Samples from any large bird or fish kills should be checked for relationship to pesticide use in the area.

An illustrative minimum budget for this part of the environmental sampling program is as follows:

Illustrative Budget (Exclusive of equipping the lab in Guayaquil or setting up a new lab in Ecuador):

	$ / Year
Inspectors Salary (NTAE)	0
Training of Inspectors	2,500
Transportation for Inspectors	0
Freezer for Sample Storage (1 only)	500
Sample Shipping Containers	500
Shipping Charges (if needed)	1,000
Chemical Analyses (28@ $200/Sample)	5,600
Biological Samples (8@ $250/Sample)	2,000
Total	$12,100

V. Contributors:

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LIST OF ANNEXES

Annex 1.

Scope of Work for the U.S.A.I.D./E
Non-Traditional Agricultural Export Crops Project Amendment
Project No. 518-0019

Scope of Work

Environmental Assessment of U.S.A.I.D./Ecuador Non-Traditional Agricultural Exports Project, Phase II (Project 518-0019, 518-T-058)

A. BACKGROUND

Phase I of the Non-Traditional Agricultural Export (NTAE) Project in Ecuador was started in 1985 to promote non-traditional agricultural crops. Phase I assisted Ecuadorian agribusinesses gain access to external markets, technologies, and financing. Phase II of the Project will include assistance to producers and their associations to produce uniform high-quality agricultural commodities for export.

Phase II of the Project has proposed use of insecticides, herbicides, and other pesticides. U.S.A.I.D./Ecuador concluded in the Project's Initial Environmental Examination (IEE) that use of pesticides in the Project has potential negative consequences. The recommended Threshold Decision in the IEE was a "Positive Determination," meaning that an Environmental Assessment (EA) is required per A.I.D.'s Environmental Procedures, 22 CFR Part 216. The EA must meet all requirements of 22 CFR 216, §216.3(b)(1).

The EA will be conducted by the Consortium for International Crop Protection (CICP), 4321 Hartwick Road, College Park, Maryland/USA 20740 (telephone 301-454-5147; cable address CONSORTICP; telex 510 60 13963; EasyLink 62929197; Fax 301-454-6676). CICP has vast experience in conducting EAs for A.I.D. projects. Since 1978, the organization has conducted EAs in A.I.D. projects for nearly every A.I.D. mission including the Latin American A.I.D. missions.

B. PURPOSE OF SERVICES THROUGH PIO/T

The purpose of the CICP services, described in C. SCOPE OF WORK below, is to:

1. Identify significant environmental effects of NTAE Phase I Project activities, direct and indirect, to define the scope of Phase II activities to be critically reviewed in the EA.

2. Identify and evaluate critical pest management and pesticide use, handling and disposal issues by potential Project regions and by crop types.

3. Evaluate environmental, economic, and social costs and benefits of the current trends in pesticide use by potential Project regions and by crop types.

4. Identify and evaluate the environmental and sustainable-production impacts of intensified agricultural production, by soil, precipitation, slope, and other agroecosystem parameters, in the potential Project regions.

5. Evaluate institutional capabilities and constraints, particularly in Project-participant agricultural producer/exporter associations, in terms of requirements for technical assistance and training activities adequate to assure continuation (by these associations) of Project practices in sustainable use of natural resources and environmental protection.

6. Prepare draft plans for integrated pest management (IPM) programs and for sustainable agricultural practices to be introduced into the Project design, including:

   a. Personnel requirements
   b. Facilities
   c. Training needs
   d. Research needs/capabilities
   e. Estimated costs

7. Establish a minimal-cost sampling program to periodically monitor the environmental impacts of Project activities. This could include sampling of pesticide concentrations in soil, water, or farmers' blood, direct observations of pesticide handling practices or farming practices, sampling of sediment loads upstream and downstream from Project-advised farms, etc. This program should include the collection of necessary baseline data (required in 22 CFR Part 216) essential for future interpretation of impacts. Results of this monitoring program will be reviewed annually, preferably as part of the overall Project evaluations.

8. Produce a draft Environmental Assessment of the NTAE Project, Phase II, based on the findings and results of tasks 1-5 (above) and any other activities/studies determined necessary by the EA team during preparation of the draft. This document will follow the EA outline and structure recommended in 22 CFR Part 216.

9. After review and approval of the draft EA by U.S.A.I.D./Ecuador and LAC/DR/E, produce a final EA document including any revisions recommended during review of the draft.

C. SCOPE OF WORK

1. Nature of Technical Assistance

Procedures to complete the tasks and facilitate services in B. above will be as follows:

(a). Identify Significant Environmental Effects of Phase I of Project: To identify the direct and indirect effects of Phase I, the CICP team will examine documents (available at U.S.A.I.D./Ecuador and GOE) that describe Project activities and accomplishments during Phase I. Also, the team will interview Project personnel in charge of Phase I activities. From the document examinations and interviews, the CICP team will compile a list of direct or indirect environmental effects identified for Phase I that need to be considered in the EA for Phase II.

(b). Identify and Evaluate Pest/Pesticide Management Issues: The CICP team will determine the pest/pesticide management practices being carried out on the different crops in each of the proposed Project regions. The CICP team will determine the following for each crop in each region:

* Pesticides that present unwarranted risks to the farmers and the environment

* Unsafe pesticide storage, use, and disposal practices and needs to reduce the problem

* The farmers' access to information and training on pesticide safety

* Farmer use of IPM techniques and access to information and training on IPM

* Efforts to monitor unsafe pest/pesticide management practices and take action to correct the problems

These factors will be discussed in the EA.

(c). Evaluate Environmental, Economic, and Social Costs and Benefits: The CICP team will examine economic cost/benefit data available on proposed pesticide use in crops to be emphasized in Phase II of the Project. The data will be sought from whatever source is available. In addition, the CICP team will interview selected farmers to be targeted by the Project to get their views on pesticide use and to determine their capability for properly selecting, using, storing, and disposing of the materials. The CICP team will also interview selected Ecuadorian medical doctors

and environmentalists concerned with human health and environmental effects of pesticide use. In addition, the CICP team will examine toxicological data for the proposed pesticides.

The CICP team will then conduct an empirical cost/benefit assessment of proposed pesticide use. The assessment will consider not only economic costs and benefits but also social and environmental concerns. The cost/benefit analysis will be incorporated into the EA.

(d). Identify and Evaluate Environmental and Sustainable - Production Impacts: The CICP team will examine the proposed agricultural intensification measures of Phase II of the Project to determine:

* Impact on ground and surface water

* Impact of the measures on soil erosion, compaction, fertility, and moisture retention

* Ability of the measures to sustain long-term environmentally sound and economically efficient production

Potentially significant environmental impacts and needed measures to mitigate the effects for any of the Project regions will be identified and discussed in the EA.

(e). Evaluate Institutional Capabilities and Constraints: The CICP team will assess the capability of the relevant Ecuadorian institutions (Government of Ecuador institutions and agricultural producer and export associations) to ensure that the Project meets the objective of promoting sustainable agricultural production and environmental protection. The CICP team will determine specifically what the institutions can presently contribute in helping the Project meet this objective. The team will also determine needs for outside technical assistance and training in sustainable agricultural production and environmental protection. The team will indicate specific needs in technical assistance and training during the life of Phase II of the Project. Personnel, budgetary, and other requirements will be indicated by Project year. Terms of reference for technical assistance and training will be developed to show objective, duration, and target audience of each activity. The institutional analysis will be included in appropriate sections of the EA.

(f). Prepare Draft Plans for IPM Programs and Sustainable Agricultural Practices: U.S.A.I.D./Ecuador has emphasized IPM under the Integrated Crop Protection (PIC) Interagency Commission and Row Crop Improvement Program. Created in 1984 with support from U.S.A.I.D./Ecuador, the PIC Interagency Commission promoted IPM practices for two years. In 1986, the Row Crop Improvement Program (part of the Rural Technology Transfer System Project) was initiated in the grower's association APROCICO. This association emphasized development and extension of IPM practices in corn, soybean, rice, and sorghum.

The NTAE Project will build from experience of the IPM efforts through the PIC Interagency Commission and APROCICO. The CICP team will review the infrastructure and accomplishments of the previous IPM efforts to determine how they can be applied to Phase II of the NTAE Project. Also, the team will determine how the NTAE Project can build from previous or present efforts in other sustainable agricultural practices such as use of cover legume crops, crop rotations, and low-input use of artificial fertilizers. The team will prepare a plan for incorporating IPM and other appropriate sustainable practices into Phase II of the NTAE Project. The plan will include a description of the objectives and procedures and also the following:

* Roles and responsibilities of the various institutions
* Personnel needs
* Facility needs
* Training needs
* Research needs
* Estimated cost requirements

In addition, the CICP team will address all of the project actions required in IPM that the IEE indicated.

(g). Monitoring Environmental Impacts: The CICP team will develop a minimal cost sampling program to monitor the environmental impacts of Project activities. The sampling program will describe in detail in the appropriate section of the EA the procedures for the following sampling programs:

* Pesticide Sampling:

  - Monitoring acetylcholinesterase levels (which serve as an indicator of exposure to certain classes of pesticides) in blood of selected farmers working around pesticides in each Project region. This monitoring will involve use of WHO-approved kits that nurses/medical doctors can use.

  - Monitoring pesticide practices (kinds of pesticides used, storage, application, disposal) on selected farms in each Project region. This monitoring will involve direct observation of the pesticide use practices.

  - Monitoring pesticide residues on produce to be exported from each Project region. This monitoring will involve use of appropriate pesticide residue analysis equipment.

* Soil run-off sampling:

  - Sampling of soil sediments upstream and downstream from potential sources of soil run-off. This sampling will involve use of standard sediment detection techniques for water sampling.

* Other monitoring requirements that the CICP team, in consultation with U.S.A.I.D./Ecuador and Project personnel, may determine to be important.

The recommended CICP team sampling plan will include a description of needs for personnel, equipment, supplies, and facilities; frequency of each of sampling activity; estimated costs; and who should receive the results of the monitoring activity. Project management will use the results to make changes indicated to correct any problems that might be detected.

(h). Produce a Draft EA of Phase II of the NTAE Project: The CICP team will draft an EA document that incorporates the findings of tasks C.1 (a) - (e) and (g) above per 22 CFR 216, §216.3(b)(1). The document will use lay language and be short as possible but still meet the A.I.D. requirements.

(i). Produce the Final EA: The CICP team will revise the draft EA based on review comments by U.S.A.I.D./Ecuador and LAC/DR/E. The final EA submitted to U.S.A.I.D./Ecuador will consider all comments/recommendations of these two A.I.D. offices.

(j). Produce the Final Plans for IPM Programs and Sustainable Agricultural Practices: The CICP team will revise the draft plan based on comments from U.S.A.I.D./Ecuador and submit the final plan to U.S.A.I.D./Ecuador.

2. Implementation Plan and Outputs

CICP services will be provided during the periods indicated in the following table:

TASK	1989 OCT.	1989 NOV.	1989 DEC.	1990 JAN.	1990 FEB.	1990 MAR.
CICP Team in Ecuador						
Agricultural Specialist/Team Leader	22	18				
Pest Management Specialist				14	10	
CICP Team Leader to submit work plan to U.S.A.I.D./Ecuador		1				
CICP Team Leader to provide oral briefing and report of progress to U.S.A.I.D./Ecuador	30	6-13				
CICP Team Leader to submit English Draft of EA along with environmental monitoring plan to U.S.A.I.D./Ecuador (10 copies)		17				
CICP Team Leader to submit English Draft Plans for IPM programs and Sustainable Agricultural Practices to U.S.A.I.D./Ecuador (10 copies)		17				
CICP College Park to submit English final EA long with environmental monitoring plan to U.S.A.I.D./Ecuador (10 copies)						1
CICP/College Park to submit English final Plans for IPM Program and Sustainable Agricultural Practices to U.S.A.I.D./Ecuador (10 copies)						1

3. Reporting

The CICP team and CICP/College Park will be responsible for submitting all reports and other outputs in the table above.

The CICP Team Leader will provide regular oral briefings and program reports to U.S.A.I.D./Ecuador while the team is working on the Project.

The CICP team will cooperate and seek input from the U.S.A.I.D./ Ecuador Mission Environmental Officer and/or the A.I.D. Regional Environmental Advisor (REMS/EA).

The CICP team will carefully consider comments and recommendations of U.S.A.I.D./Ecuador and IAC/DR/E on the draft EA (including environmental monitoring plans) and Plans for IPM Programs and Sustainable Agricultural Project. The comments and recommendations will be incorporated into the final documents.

D. PERSONNEL

CICP proposes the following consultants to carry out the tasks in Ecuador:

	No. Consulting Days In Ecuador	Total
Agricultural Specialist/Team Leader Mr. Myron Shenk		
Pest Management Specialist Dr. Charles Ward		

Both consultants have FS-3+ proficiency in Spanish.

As Team Leader, the Agricultural Specialist/Team Leader will coordinate the work in Ecuador; serve as the principal contact with CICP, U.S.A.I.D./ Ecuador, and other organizations in Ecuador; and ensure timely implementation of all activities and delivery of outputs. In addition, this individual will serve as the team's Agricultural Specialist. Mr. Shenk, agronomist and weed scientist at Oregon State University/International Plant Protection Center, is well qualified to serve as the Team Leader and Agricultural Specialist. He has vast experience in designing and implementing U.S.A.I.D. projects and has worked and lived in several Latin American Countries, including Ecuador.

As Pest Management Specialist, Dr. Ward will have a major role in development of the EA sections pertaining to pest/pesticide management. He is Professor of Entomology at New Mexico State University. He has vast experience in designing and implementing U.S.A.I.D. projects and has worked and lived in Central and South America.

J. Bruce Mann, University of Miami, will provide technical guidance on pesticide monitoring and assist in developing the monitoring plan. As pesticide toxicologist, he has vast experience assessing pesticide problems (environmental fate, residue analysis, etc.) in Latin America. All of his back-up support to the CICP Team in Ecuador will be provided from Miami.

Dale G. Bottrell, entomologist/pest management specialist, will manage the U.S.A.I.D./Ecuador contract for CICP, provide technical guidance, and provide back-up support to the Team.

Annex 2

Initial IEE for the U.S.A.I.D./E
Non-Traditional Agricultural Export Crops Project Amendment
A.I.D. Project No. 518-0019

AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D.C. 20523

REPLY DUE 7-27-89
☐ NO REPLY NEEDED
☐ REPLY BY
ON LAC-IEE-89-55
DATE INITIALS
FILE

AMENDED ENVIRONMENTAL THRESHOLD DECISION

Project Location	:	Ecuador
Project Title	:	Non-Traditional Agricultural Exports (NTAE)
Project Number	:	518-0019, 518-T-058
Funding	:	$4,000,000 (G)
Life of Project	:	5 years
IEE Prepared by	:	Fausto Maldonado USAID/Ecuador Howard Clark REMS/SA
Recommended Threshold Decision	:	Deferred Positive Determination
Bureau Threshold Decision	:	Concur with Recommendation
Comments	:	None
Copy to	:	Frank Almaguer, Director USAID/Ecuador
Copy to	:	Fausto Maldonado, USAID/Ecuador
Copy to	:	Howard Clark, USAID/Ecuador
Copy to	:	Mark Silverman, LAC/DR/SA
Copy to	:	IEE File

ACTION: AMD
DIR
D/D
RLA
RCO
EXO
CONT
PPD
GDO/PSD
ARDO
RHUDO
[illegible]
[illegible]
EMB
WASH

JUL 20 1989 RECEIVED

James S. Hester Date JUL 20 1989

James S. Hester
Chief Environmental Officer
Bureau for Latin America
and the Caribbean

ANNEX C

INITIAL ENVIRONMENTAL EXAMINATION

Project Location:	Ecuador
Project Title:	Non-Traditional Agricultural Exports (NTAE)
Project Number:	518-0019, 518-T-058
Funding:	Grant $4,000,000
Life of Project:	5 years
IEE prepared by:	Fausto Maldonado, Ph.D., Soil Scientist USAID/Ecuador, Assistant Environmental Officer Howard L. Clark, Ph.D., Ecologist Regional Environmental Advisor (REMS/SA) 19 July 1989

Recommended Threshold Decision: Positive (potentially significant impacts)

Comments: An Environmental Assessment will be required before obligation of funds for, or implementation of, production-oriented activities. A Condition Precedent is required in the bilateral agreement with the GOE, stipulating the above, and that requirements/recommendations from the Environmental Assessment may result in changes in Project design and funding allocations. See attached Environmental Review for details.

Concurrence with Recommended Threshold Decision:

Frank Almaguer, Mission Director
USAID/Ecuador

LAC Bureau Threshold Decision: _____

James Hester, Chief Environmental Officer
AID/LAC/DR/E

INITIAL ENVIRONMENTAL EXAMINATION
ENVIRONMENTAL REVIEW

Non-Traditional Agricultural Exports (NTAE)
USAID/Ecuador
Project Number 518-0019, 518-T-058

I. PROJECT DESCRIPTION

The Non-Traditional Agricultural Export (NTAE) Project in Ecuador was authorized on September 13, 1984, with activities beginning in 1985. Project obligations to date total $7.5 million in loan and $2.76 million in grant funds. A final evaluation, in May 1988, pointed to several weaknesses in the design of the project, which had resulted in only a fraction of the estimated increase in non-traditional agricultural exports occurring during the project. Based on the project evaluation and the results of a recent NTAE sector assessment (which included a strategy for achieving increased export production and institutional benefits), a decision was made by USAID/Ecuador and the Government of Ecuador (GOE) to undertake a redesigned five-year project supplement (Phase II).

The proposed Project Supplement consists of a $4 million grant to provide support for project components of agricultural technology transfer (crops, production systems, pest management, etc.), quality assurance, market promotion, information dissemination, and policy dialogue and analyses. Another component, credit resources for the expansion of NTAE production, will be financed in part with the undisbursed credit resources from the original project (estimated at $2.0 million), and other sources of credit from existing or planned IBRD, IDB or CAF loans. A limited amount of ESF and other local-currency generations may be added to Project credit funds at a later date, if deemed necessary.

The overall goal of the project will remain the same, to increase the value of Ecuador's agricultural exports by broadening the base of exportable commodities.

The purpose of Phase II is to establish a healthy and growing NTAE industry supported by the provision of effective, self-sufficient services in all facets of the NTAE industry. To accomplish this, the project will strive to achieve the following major objectives: 1) increase the value and competitiveness of agricultural exports and replace imported raw-material inputs to Ecuadorian agroindustry: 2) diversify agricultural exports by increasing the number and viability of exportable commodities and their importance relative to traditional export crops; and, 3) increase the number of project beneficiaries, especially farmers and workers (both men and women), in the processing and post-harvest handling sectors in major producing regions of Ecuador.

II. ENVIRONMENTAL REVIEW

A. Previous Project Review

The NTAE project activities started in 1985, oriented to promote non-traditional agricultural exports by assisting Ecuadorian agribusinesses to gain access to external markets, technologies and financing to support the expansion and diversification of production for export.

The Initial Environmental Examination in the 1984 Project Paper (PP) concluded that "the activities financed under this project all fall within the actions listed in Section 216.2(c)2 of AID's Environmental Procedures (Handbook 3) and are therefore not subject to the General Procedures for further analysis of environmental impact included in Section 216.3." Activities as listed in the 1984 Project Paper were presumed not to cause significant, direct environmental impact, as project activities were not planned to involve agricultural production, but only marketing and export of commodities, which would not have foreseeable direct, measurable or predictible impacts on agroecosystems or natural systems.

In the course of project implementation, and in designing the Phase II project, it has become obvious that technical assistance in production, not only in marketing and export, will be necessary to have sustainable NTAE improvements. The proper use of pesticides, and the protection of crops through a system of integrated management of pests, will be an important component in production systems for these crops. Another important component will be the protection of non-renewable natural resources, particularly soils, which are the basis of these agricultural systems.

B. Potential Impacts of Phase II Project Activities

The Phase II project design includes assistance to producers and their associations in the agronomic practices and methods needed to produce uniformly high-quality agricultural commodities for the export market. This requires rigorous control of pests and pest damage and suppression or elimination of weeds which could affect crop uniformity and quality. This level of crop protection will encourage the excessive and indiscriminate use of insecticides, herbicides, and other pesticides, self-regulated only by the need to have minimal pesticide residues in the exportable commodities. Present practices in the use of pesticides in Ecuador are potentially disastrous in terms of negative environmental impacts, both direct and indirect, and impacts on human health. The need for clean tillage and use of herbicides for the suppression or elimination of weeds can significantly increase soil erosion, and have unknown persistence in soils, particularly in some of the fragile soils in Ecuador.

AID has been a pioneer in introducing Integrated Pest Management (IPM) to Ecuador, where it supported the creation of the Integrated Crop Protection (PIC) Interagency Commission in 1984, which promoted IPM practices in the country for two years. In 1986, the Row Crop Improvement Project (RTTS) was

initiated in the grower's association of APROCICO, which placed emphasis on developing and extending IPM practices in corn, soybean, rice and sorghum. A crop protection component for the NTAE project will help to alleviate and resolve pesticide use problems and will permit USAID/Ecuador and the GOE to continue activities in this area.

C. AID Environmental Procedures (22 CFR Part 216)

1. Environmental Assessment Requirement

Because of the potentially negative environmental impacts of crop production activities, with probable increases in pesticide use (including recommendations on the use of pesticides), the exemptions of Sec. 216.2(b)(1) and the categorical exclusions of Sec. 216.2(c)(2), as applied in the 1984 PP, are not applicable to the proposed phase II NTAE Project.

The finding of this IEE that proposed Project activities will have potentially significant effects on the environment requires the recommendation of a Positive Threshold Decision, per Sec. 216.3(a)(2)(iii). This Threshold Decision requires an Environmental Impact Statement (EIS) or an Environmental Assessment (EA). Because the proposed activities in agricultural production are relatively small scale, and will not involve substantial changes in existing ecosystems (i.e., changes in existing agricultural plots, not changes in land use), and the pest-control activities will primarily be training in integrated pest mangement for environmental and health protection (improving existing practices), we recommend an Environmental Assessment emphasizing these significant issues of the Project, not an EIS for the Project in its entirety.

2. Pesticides and Related Activities

Project activities involving pesticides will require special considerations, as required by the following sections of the AID Environmental Procedures.

Section 216.3(b) states, "(b) Pesticide Procedures -- (1) Project Assistance. Except as provided in section 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 section 216.3(b)(1)(i) through (v) below." . . .

"(i) In those cases where the evaluation of the proposed pesticide use in the Initial Environmental Examination indicates that the use will significantly effect 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."

Because the specific pesticides, and pesticide uses, to be recommended by the Project are not presently known, but are to be determined during the course of the Project (and will likely be changed due to changing conditions and crops), the special provisions of Sec. 216.3(b)(v) will apply. These are as follows:

"(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 Sec. 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 Administrateor (or in the case of projects authorized at the Mission level, the Mission Director) who approved the Project Paper."

3. Condition Precedent

Because the EA will not occur until after the Project Agreement is signed by AID and the GOE, and because some project activities in agricultural production may have significant impacts but the details of the activities are not presently identified, Sec. 216.3(a)(7) requires that a Condition Precendent (CP) be included in the Agreement. This CP will stipulate that an Environmental Assessment will be required before obligation of funds for, or implementation of, production-oriented activities, and that requirements and/or recommendations from the Environmental Assessment may result in changes in Project design and funding allocations.

The following parts of Sec. 216.3(a)(7) are relevant to design and future implementation of the NTAE Project:

"(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 convenants or conditions precedent to disbursement for unidentified subprojects or aspects of projects, programs or activities." [underlining added]

. . .

"(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 Sec. 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. [underlining added] 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 AID 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."

III. ENVIRONMENTAL ASSESSMENT ACTIONS REQUIRED

A. Condition Precedent

A Condition Precedent will be included in the Project Agreement, stipulating that an Environmental Assessment will be required before obligation of funds for, or implementation of, production-oriented activities (agricultural production in all aspects, including implementation of training or recommendations for use of pesticides or pest-management systems), and that requirements and/or recommendations from the Environmental Assessment may result in changes in Project design and funding allocations.

B. Environmental Assessment (Recommended Scope)

1. Significant Issues

The significant issues proposed in the NTAE Project involve primarily technical assistance (TA) in agricultural research and agricultural technology transfer.

This will include the introduction of new crop production systems, which can have negative impacts on soil erosion by changing traditional methods of

be to establish a continuing capacity within the producers' associations to undertake their own research and training in IPM, oriented to the production of high-quality NTAE crops, recognising the financial, environmental and health constraints to irrational use of pesticides.

1. The NTAE will contract a specialist to assess the current and potential problems of pesticide use and to propose an IPM plan, including training, for the life of the project. The plan must be ready by December 1989. This specialist can be either the long-term IPM advisor (Pest Management Coordinator) or (preferably) a short-term advisor contracted to prepare the IPM plan and assist in the selection of a long-term advisor.

2. The needs of the NTAE project require contracting a long-term specialist (Pest Management Coordinator) to coordinate pest management activities between growers, exporters, MAG extensionists, INIAP scientists and cooperating pesticide manufacturers/dealers interested in promoting their products and protecting them from irrational use, and in overseeing the analyses of pesticide residues in final commodities for export (in conformity with requirements of the countries receiving the commodities). The specialist must have experience in training and application of IPM principles and practices, procuring or monitoring analyses of pesticide residues in conformity with various national import standards, as well as the ability to communicate with diverse members of the agricultural community. The institutional location of this specialist should be determined by Project personnel; the need for this long-term specialist is obvious.

   The following observations from P. Stansly, IPM advisor for the RTTS Project, should be considered in contracting a long-term specialist (P. Stansly, Memo 099-A2, 5 July 1989) (paraphrased): The services of a highly-qualified, full-time, pest management specialist within the NTAE project may exceed the present needs or means of NTAE. However, an independent institution employing the specialist could offer training and coordinating services to various public and private organizations, such as PROTECA, MAG, grower's associations such as APROCICO, pesticide distributors, and NGO's such as Foundación Natura. In the case of PROTECA, a significant IPM training component has already been included in the work plan. FUNDAGRO is the appropriate organization to maintain such a "pest management coordination service," consistent with their mandate to act as liaison between public and private institutions. FUNDAGRO has the necessary infrastructure to offer administrative support to the Pest Management Coordinator.

3. An education and extension sub-component will be included in the project, to be based on IPM principles and the safe use of pesticides. In spite of existing laws on the use and bans of pesticide imports, their enforcement is very difficult in Ecuador; the lack of an efficient extension service on pesticide use and integrated pest management compounds the problem. These activities can be integrated (by the Pest Management Coordinator) with Fundación Natura's programs through PAN (Pesticide Action Network for Latin America) on pesticide use problems and the IPM approach. An agreement should be signed with Fundación Natura for this purpose.

4. The NTAE Project will support small research activities on IPM and on pests and diseases affecting crops included in the project, adapting the IPM plan to these results as appropriate. The Project will also support the existing interagency commission on Integrated Crop Protection (Comision PIC).

5. Project personnel, with the guidance of the Mission Environmental Officer and/or the Regional Environmental Management Specialist (REMS/SA), will monitor changes or improvements in the use of pesticides and the presence of residues in NTAE crops included within the project, submitting annual reports to USAID/Ecuador and LAC/DR/E.

B. Pesticide Approvals

Prior to implementation, all recommendations for the use of specific pesticides (in the preliminary list of recommended pesticides, in the IPM plan, or through any other Project-supported activities) must be approved by the AID/LAC Bureau Environmental Officer. This is required by the Foreign Assistance Act, per AID Regulation 22 CFR Part 216, Section 216.2(e).

The NTAE Project will not fund the procurement of any pesticides or related materials. If there is a future decision to change this policy, it cannot be implemented without the specific approval of the AID/LAC Bureau Environmental Officer.

C. Soil Conservation and Water Management

Agricultural systems or methods for cultivation of the selected NTA crops to be introduced through the NTAE project will include considerations of the possible environmental impacts of introducing these systems or methods. It is essential for sustainable production of any agricultural crops to ensure that the non-renewable natural resources on which production depends, particularly soil and water, are not lost through mismanagement of these resources. Especially critical will be protection from erosion of some of the fertile, but fragile, soils in Ecuador.

The Agricultural Technical Assistance to be contracted by the NTAE Project must have experience and/or training in soil conservation practices as applied to agricultural production systems. Soil conservation and water management will be integral parts of all NTAE project recommendations for improving crop production. The project will collaborate with, to the extent possible, existing USAID, GOE, or other projects involving soil conservation and water management for possible assistance in training or in provision of educational materials.

If basic principles of protection of essential natural resources for sustainable agricultural production are incorporated into project training and other activities, there is no need for specific technical assistance or funding in this area. Periodic review by the Mission Environmental Officer and/or the Regional Environmental Management Specialist (REMS/SA) will monitor compliance with these recommendations.

0504Z(4703F,p.24)

Annex 3.

a. List of Pesticides Requested For Use in Non-Traditional Agricultural Export Crops in Ecuador.

b. MAG/PROTECA Crop Pest Control Guide for Tomatoes.

Table 1. U.S. EPA registration/tolerance status for pesticides requested for fresh fruits and vegetables.

Common Name of Pesticide	Status of U.S. EPA pesticide registration and tolerances (ppm) on requested crops: asparagus	artichoke	avocado	snap bean	black/rasp berries	blue berries	mangoes	melons canteloupe honeydew	papaya	pineapple	passion fruit	strawberries
INSECTICIDES/ACARACIDES												
acephate				3				5[a,b]				
carbaryl	10		10[c]	10	12	10		10		2		10
carbofuran***		0.4[c]						0.4				0.5
oxydemeton-methyl-R**				0.5	2			0.3				2
deltamethrin**												
diazinon				0.5	0.5	0.5		0.75		0.5		0.5
dicofol				5	5			5				5
dienochlor***												
dimethoate				2				1				
formothion****												
hexythiazole***												
malathion	8		8	8	8	8	8	8	1	8	8	8
phoxim*****												
pyrethrins				1	1	1	1	1[g]		1		
sulfur												
tetradifon								1				5
FUNGICIDES												
benomyl			3	2	7	7	3	1	3	35		5
bitertanol*****												
bupirinate*****												
captan				25[e]	25	25	50	25[f]		25[e]		25
carbendazim***												
carboxin				0.2								
dinocap					0.15[d]	0.15[d]		0.1[d]				
kasugamycin****												
mancozeb*	0.1[d]			10[a]				4	10[h]			
maneb*				10				4	10			
propineb*****												
sulfur												
thiram												7
thiophanate-methyl				2				1				5
triadimefon					2[c]		0.07[a]			3		
triforine	0.1[c]					0.1		1[j]				2
vinclozolin				0.3[a]	10[i]							10
NEMATICIDES												
aldicarb**												
fenamiphos**												
carbofuran**												
HERBICIDES												
diuron	7	1			1	1			0.05	1		
POST HARVEST TREATMENTS												
acetic acid	Cleared for most uses											
sodium hypochlorite												
STS (silver thiosulfate)?												
thiabendazole			10				10	15[k]	5			5

NOTE: See footnotes on next page.

Table 1. U.S. EPA registration/tolerance status for pesticides registered for fresh fruits and vegetables. (Cont'd)

a/ Tolerance pending.
b/ Honeydew melons and watermelons only.
c/ Regional tolerance.
d/ Negligible residue tolerance.
e/ Interim tolerance.
f/ Cantaloupe and muskmelon only.
g/ Muskmelon only.
h/ Whole papaya fruit = 10; papaya edible pulp = 0.
i/ Raspberries only.
j/ Canteloupe only.
k/ Post harvest only.

*Carbofuran, captan, mancozeb, and maneb are in the special review (SR) process. The current status of the SR process must be determined before using these products. All uses of carbofuran liquid and granular formulations greater than 5% are in the EPA restricted use (RU) category. Carbofuran 5G is proposed for use here.

**Category I or Restricted Use Pesticides.

***Registered in U.S. but no tolerances established for project crops.

****No U.S. EPA registration found.

*****Not registered in U.S.

Table 2. U.S. EPA registration/tolerance status of pesticides requested for processed fruits and vegetables.

Common Name of Pesticide	Status of FDA tolerances (ppm) by requested crop: asparagus	broccoli	brussel sprouts	cauliflower	black/raspberries	snow peas	mangoes	melons	papaya	pineapple	passion fruit	strawberries	tomatoes	guava	okra	sour soup
INSECTICIDES/ACARICIDES																
acephate			3	2				5[b,c/]					4[c/]			
carbaryl	10	10	10	10	12	10		10		2		10	10		10	
carbofuran***								0.4				0.5				
oxydemeton-methyl-R**		1	1	1	2	0.3						2				
deltamethrin***																
diazinon					0.5	0.5		0.75		0.5		0.5	0.75			
dicofol					5			5					5		5	
dienochlor****																
dimethoate		2		2		2		1					2			
formothion****																
hexythiazole***																
malathion	8	5	8	8	8	8	8	8	1	8	8	8	8	8	8	
phoxim*****																
pyrethrins					1	1	1			1			1	1		
sulfur																
tetradifon								1				5	1			
FUNGICIDES																
benomyl		0.2	15	0.2	7		3	1	3	35		5	5			
bitertanol*****																
bupirimate*****																
captan*		2	2	2	25	2	50	25[d/]		25[e/]		25	25			
carbendazim***																
dinocap					.15[/f]			.15[/f]								
kasugamycin****																
mancozeb*	0.1[f/]	10[b/]	10[b/]	10[b/]				4	10				4			
maneb*		10	10	10				4	10[g/]				4			
oxycarboxin***																
propineb*****																
sulfur																
thiram												7	7			
thiophanate-methyl								1				5				
triadimefon							0.07[b/]			3		0.3[b/]	0.2[b/]			
triforine	0.1[h/]											2				
vinclozolin												10				
NEMATICIDES																
aldicarbII																
fenamiphos**																
carbofuran**																
HERBICIDES																
diuron	7				1	1			0.05	1						
POSTHARVEST TREATMENTS																
acetic acid																
sodium hypochlorite																
STS (silver thiosulfate)?																
thiabendazole							10	15[j/]	5			5				

NOTE: See footnotes on next page.

Table 2. U.S. EPA registration/tolerance status of pesticide requested for processed fruits and vegetables (Cont'd).

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a/ Under "BOTTLED, CANNED AND DRIED FRUITS AND VEGETABLES" no tolerances were found. These speciality cases such as spices and food coloring, may fall under the "Tolerances for Minor Use Crops", as listed on page xviii, the Pesticide Chemical News Guide, August 1, 1988. No tolerances are shown.
b/ Tolerance pending.
c/ Honeydew melon only.
d/ Cantaloupe and muskmelon only.
e/ Interim tolerance.
f/ Negligible residue tolerance.
g/ Whole papaya fruit = 10; papaya edible pulp = 0.
h/ Regional tolerance.
i/ Raspberries only.
j/ Canteloupe only.
*Carbofuran, captan, mancozeb and maneb are still in the special review (SR) process. The current status of the special review process must be determined before using these products. All uses of carbofuran liquid or granular formulation above 5% are in the EPA restricted use (RU) category. Carbofuran 5G is proposed for use here.
**Category I or Restricted Use (RU) pesticides.
***Registered in U.S. but no tolerances for project crops.
****Currently in EPA's Special Review (SR) category.
*****Not registered in U.S.

CULTIVO: TOMATE

P L A G A	PRODUCTO COMERCIAL/ GENERICO	DOSIS/ HA.
ENROLLADOR Scrobipalpula absoluta	EVISECT 50% PM (THIOCYCLAM) NUVACRON 40% EC (MONOCROTOFOS) LANNATE 90% PM (METOMYL) ARRIVO 30% CE (CYFERMETRINA)	200 gr. 500 cc. 200 grs. 200 cc.
MINADOR DEL FOLLAJE Melanagromyza sp.	EVISECT 50% PM (THIOCYCLAM) NUVACRON 40% EC (MONOCROTOFOS) LANNATE 90% PS (METOMYL)	250 gr. 500 cc. 200 gr.
GUSANO DEL FRUTO Heliothis zea	AMBUSH 50% EC (PERMETRINA) BACILLUS THURINGIENSIS (DIPEL) DECIS 2.5% EC (DELTAMETRINA)	200 grs. 600 grs. 250 cc.
GUSANO DEL FRUTO Spodoptera sunia	ORTHENE 50% PM (ACEFATO) AMBUSH 50% EC (PERMETRINA) MAVRIK 24% (FLUVALINATE)	700 grs. 200 cc. 300 cc.

CULTIVO: TOMATE

P L A G A	PRODUCTO COMERCIAL/ GENERICO	DOSIS/ HA.
ENROLLADOR Scrobipalpula absoluta	EVISECT 50% PM (THIOCYCLAM) NUVACRON 40% EC (MONOCROTOFOS) LANNATE 90% PM (METOMYL) ARRIVO 30% CE (CYFERMETRINA)	200 gr. 500 cc. 200 grs. 200 cc.
MINADOR DEL FOLLAJE Melanagromyza sp.	EVISECT 50% PM (THIOCYCLAM) NUVACRON 40% EC (MONOCROTOFOS) LANNATE 90% PS (METOMYL)	250 gr. 500 cc. 200 gr.
GUSANO DEL FRUTO Heliothis zea	AMBUSH 50% EC (PERMETRINA) BACILLUS THURINGIENSIS (DIPEL) DECIS 2.5% EC (DELTAMETRINA)	200 grs. 500 grs. 250 cc.
GUSANO DEL FRUTO Spodoptera sunia	ORTHENE 50% PM (ACEFATO) AMBUSH 50% EC (PERMETRINA) MAVRIK 24% (FLUVALINATE)	700 grs. 200 cc. 300 cc.

CULTIVO: TOMATE

ENFERMEDAD	NOMBRE COMERCIAL	DOSIS/ HECTAREA
TIZON TARDIO Phytophthora infestans	BENLATE	80 gramos
	RIDOMIL COMPLETO	600 gramos
	TRIMILTOX FORTE	1 kg.
	PATAFOL	2 kg.
	TRIZIMAN-D	1 kg.
	TOPSIN	1 kg.
	DITHANE M-45	300 gramos
TIZON TEMPRANO Alternaria solani	"	"
MOHO DE LAS HOJAS Cladosporium fulvum	POLIRAM	400 gramos
	TOPSIN	1 kg.
	BENLATE	80 gramos
	TRIMILTOX-FORTE	1 kg.
	DITHANE M45	300 gramos
MARCHITAMIENTO FUSARIUM Sp. PYTHIUM sp.	BAYER 5072	400 gramos
	KOCIDE 101	500 gramos
	BRASSICOL	1 kilo
	POLYRAM	400 gramos

T O M A T E

NOMBRE DEL NEMATODO	PRODUCTO RECOMENDADO	DOSIS HA.	SEMILLERO/ M2.
Nemátodo de las agallas (Meloidogyne sp)	Furadan 5%	15 kilos	2 cucharadas
" Lesionador (Pratylenchus sp)	Furadan 10%	8 "	1 "
" Espiral (Helicotylenchus sp.)	Nemacur 5%	20 kilos	3 cucharadas
" Daga (Xiphinema sp.)	Curater 5%	15 kilos	2 cucharadas.

CULTIVO: TOMATE

ENFERMEDAD	NOMBRE COMERCIAL	DOSIS/ HECTAREA
TIZON TARDIO Phytophthora infestans	BENLATE	80 gramos
	RIDOMIL COMPLETO	600 gramos
	TRIMILTOX FORTE	1 kg.
	PATAFOL	2 kg.
	TRIZIMAN-D	1 kg.
	TOPSIN	1 kg.
	DITHANE M-45	300 gramos
TIZON TEMPRANO Alternaria solani	"	"
MOHO DE LAS HOJAS Cladosporium fulvum	POLIRAM	400 gramos
	TOPSIN	1 kg.
	BENLATE	80 gramos
	TRIMILTOX-FORTE	1 kg.
	DITHANE M_{45}	300 gramos
MARCHITAMIENTO FUSARIUM Sp. PYTHIUM sp.	BAYER 5072	400 gramos
	KOCIDE 101	500 gramos
	BRASSICOL	1 kilo
	POLYRAM	400 gramos

CULTIVO: TOMATE

P L A G A	PRODUCTO COMERCIAL/ GENERICO	DOSIS/ HA.
ENROLLADOR Scrobipalpula absoluta	AVISECT 50% PM (THIOCYCLAM) NUVACRON 40% EC (MONOCROTOFOS) LANNATE 90% PM (METOMYL) ARRIVO 30% CE (CYFERMETRINA)	200 gr. 500 cc. 200 grs. 200 cc.
MINADOR DEL FOLLAJE Helanagromyza sp.	AVISECT 50% PM (THIOCYCLAM) NUVACRON 40% EC (MONOCROTOFOS) LANNATE 90% PS (METOMYL)	250 gr. 500 cc. 200 gr.
GUSANO DEL FRUTO Heliothis zea	AMBUSH 50% EC (PERMETRINA) BACILLUS THURINGIENSIS (DIPEL) DECIS 2.5% EC (DELTAMETRINA)	200 grs. 600 grs. 250 cc.
GUSANO DEL FRUTO Spodoptera sunia	ORTHENE 50% PM (ACEFATO) AMBUSH 50% EC (PERMETRINA) MAVRIK 24% (FLUVALINATE)	700 grs. 200 cc. 300 cc.

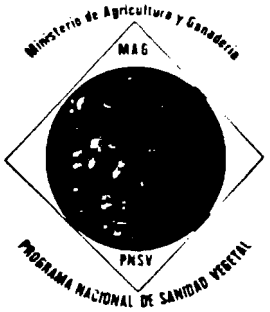
Annex 4.

Pesticide Laws and Banned and Restricted Pesticides in Ecuador (MAG/SV)

The following is a list of the Ecuadorian laws governing pesticides, fertilizers, and agricultural and forestry products.

	Law/Regulation	Date/Status
1.	Environmental Contamination Law (Decree No. 374)	21 May 1976
2.	Regulation on the Manufacturing Formulation, Importation, Sale, and Use of Pesticides and Related Products (Decree No. 2331)	21 December 1983
3.	Regulation Concerning the Importation, Manufacturing, Storage, Transportation, Sale, and Use of Pesticides (Decree No. 228)	30 Sept. 1986
4.	Presidential Decree No. 1111	7 December 1989

REGLAMENTO



para la Fabricación, Formulación, Importación, Comercialización y Empleo de Plaguicidas y Productos afines de uso Agrícola

212-564

No. 228

RODRIGO BORJA

PRESIDENTE CONSTITUCIONAL DE LA REPUBLICA

C O N S I D E R A N D O :

Que, mediante Decreto Ejecutivo No.2260, publicado en el R. O. No. 533 de Septiembre 30 de 1986, se introducen reformas tanto al Reglamento para la Fabricación, Formulación, Importación, Comercialización y Empleo de Plaguicidas y Productos afines de Uso Agrícola, cuanto al Reglamento Especial a la Producción y Comercialización de Productos Químicos-Biológicos y demás de Uso Veterinario;

Que, dichas reformas no posibilitan un control adecuado y exhaustivo de uso y manejo de tales productos, a fín de evitar la contaminación del medio ambiente; y,

En ejercicio de las atribuciones que le confiere el literal c), del Art. 78, de la Constitución Política,

D E C R E T A :

ART. 1°. DEROGASE el Decreto Ejecutivo No.2260, publicado en el R.O. No. 533, de Septiembre 30 de 1986.

ART.2°. En el Reglamento para la Fabricación, Formulación, Importación, Comercialización y Empleo de Plaguicidas y Productos Afines de Uso Agrícola, expedido mediante Decreto Ejecutivo No. 2331, de Diciembre 21 de 1983, promulgado en el R. O. No. 649, de 28 de esos mismos mes y año, añádase:

a) Mantiénese la expresión " Programa Nacional de Sanidad Vegetal;

b) Restitúyase la vigencia de los literales c) y k) del Art. 17 ;

c) Restitúyase la vigencia de los Artículos 35, 36, 37, 38, 44, 45 y 46;

d) El literal j), del Art. 17, sustitúyase por el siguiente:

" j) Los plaguicidas y productos afines que se hubieren introducido al país mediante contrabando, y los que se encontraren adulterados, serán decomisados por los Inspectores Provinciales de Sanidad Vegetal debidamente identificados, para ser puestos a disposición del Ministerio de Agricultura y Ganadería, sin perjuicio de poner en conocimiento de los Ministerios de Finanzas y de Crédito Público o de Salud, para que sean sancionados los responsables de dichos ilícitos ;

e) Inclúyase el siguiente inciso en el Art. 18:

" Si el producto a importarse ha sido registrado con anterioridad y está vigente, cualquier persona natural o jurídica podrá importarlo, previa autorización que será extendida obligatoriamente por el tenedor del Registro, debiendo el beneficiario dar cumplimiento a las demás disposiciones que se señalan en este Reglamento";

f) El literal c), del Art 19, dirá:

" c) porcentaje de materia activa en la formulación, mediante certificado extendido por el fabricante y debidamente autenticado;

g) Sustitúyase el Art. 30, por el siguiente:

"Art. 30 .- Igualmente el Registro de un Plaguicida podrá ser suspendido o cancelado, mediante Resolución motivada, por el Director Ejecutivo del Programa Nacional de Sanidad Vegetal, cuando se comprobare que ha sido prohibida su fabricación, comercialización, o uso en cualquier país, por ineficaz en el control de las pestes, por nocivo para la salud o por producir contaminación ambiental ";

h) Inclúyase el siguiente artículo:

" Art. 30-A .- Las personas naturales o jurídicas que registraren productos fitosanitarios o las empresas de Sanidad Vegetal, fabricantes, formuladores, e importadores, se sujetarán al pago de los siguientes derechos:

I. Registro de Plaguicidas: dos salarios mínimos vitales;

II. Renovación del Registro: un salario mínimo vital;

III. Mantenimiento anual de la vigencia del Registro: un salario mínimo vital;

IV. La inscripción de toda persona natural o jurídica, dedicada a la fabricación, formulación o importación, y las Empresas de Sanidad Vegetal, deberán pagar un derecho equivalente a un salario mínimo vital, al igual que para la renovación de la misma.

Los fondos que se recaudaren por estos conceptos, se depositarán en una cuenta especial, que se abrirá en el Banco Nacional de Fomento a nombre del Programa Nacional de Sanidad Vegetal; valores que se utilizarán, previo Acuerdo Ministerial, en el mejoramiento y dotación de materiales y equipos de los laboratorios del Programa

Nacional de Sanidad Vegetal ";

i) Agréguese el siguiente artículo:

" Art. 38 - A.- Todas las importaciones de plaguicidas,estarán sujetas a un análisis de control de calidad, en el que se determinarán si éstas cumplen con lo delcarado en el Registro, en relación con el porcentaje de materia activa de la formulación, corriendo los gastos que demandaren los mismos por cuenta del importador y, en caso de que no fuera aceptable el resultado, las importaciones podrán ser decomisadas por el Ministerio de Agricultura y Ganadería ";

j) Sustitúyase el Art. 42.por el siguiente:

" Art. 42.- Ninguna etiqueta, folleto o anuncio de propaganda en cualquier medio de comunicación social, relacionada con pesticidas o productos afines, contendrá términos que indiquen ser recomendados por cualquier dependencia del Ministerio de Agricultura y Ganadería, siendo prohibido hacer aseveraciones que induzcan a creer en la eficacia de un determinado producto para el control de pestes, contra las cuales no haya sido adecuadamente ensayado y registrado ";

Art. 3°.- En el Reglamento Especial a la Producción y Comercialización de Productos Químicos-Biológicos y demás de Uso Veterinario, expedido mediante Decreto No. 2213, de Noviembre 9 de 1983, publicado en el R. O. No.618 de 14 de esos mismos mes y año, incorpórese :

a) En el Art. 4°, añádase el siguiente inciso:

" Si el producto a importarse ha sido registrado con anterioridad y está vigente, cualquier personas natural o jurídica podrá importarlo, previa autorización que será extendida obligatoriamente por el tenedor del registro, debiendo el beneficiario dar cumplimiento a las demás disposiciones que se señalan en este Reglamento ";

b) Restitúyase la vigencia de los artículos 10, 11, 15,16, 26 y 32;

c) El inciso 2° del Art. 6°, sustitúyase por el siguiente:

" Recibido el Protocolo de análisis, el Programa Nacional de Sanidad Animal extenderá el certificado de inscripción del producto";

d) Añádase el siguiente artículo:

" Art. 28-A.- De las Clínicas Veterinarias.- Las Clínicas Veterinarias.- Las Clínicas Veterinarias que a más de la asistencia clínica, expendan productos veterinarios para su funcionamiento, deberán solicitar al Programa Nacional de Sanidad Animal, la autorización correspondiente :;

e) Sustitúyase el Art. 30, por el siguiente:

" Art. 30.- Pago de derechos: Los pagos de los derechos de registro, inscripción- reinscripción; pruebas y análisis de productos químicos, farmacéuticos, biológicos y más productos de uso veterinario; mantenimiento de los registros y, permisos de funcionamiento de clínicas veterinarias y almacenes de expendio, serán:

1. Registro sanitario (Inscripción- Reinscripción) de productos químicos, fármacos, biológicos y más productos veterinarios, sean nacionales o extranjeros, un salario mínimo vital.

2. Por pruebas y análisis de laboratorio, el 15 % de un salario mínimo vital por producto.

3. Mantenimiento del registro sanitario anual, el 15 % de un salario mínimo vital por producto inscrito.

4. Permiso de funcionamiento anual de clínicas veterinarias, el 23% de un salario mínimo vital.

5. Permiso anual para el funcionamiento de almacenes de expendio, el 46 % de un salario mínimo vital.

f) Añádase el siguiente artículo:

" Art. 30-A.- De las recaudaciones y pago: La recaudación de los valores contemplados en este reglamento estará a cargo del Programa Nacional de Sanidad Animal, los mismos que serán depositados en el Banco Nacional de Fomento, en la Cuenta No. 0103211-9, "Defensa Pecuaria"

g) Inclúyase el siguiente artículo:

" Art. 30-B .- Las autoridades del Programa Nacional de Sanidad Animal, previo el pago de los valores contemplados en este Reglamento, autorizarán:

I . El trámite de registro sanitario (inscripción-reinscripción) ;

II. Las pruebas y análisis de laboratorio;

III. El mantenimiento de los registros; y,

IV. El funcionamiento de Clínicas Veterinarias y Almacenes de Expendio de Productos Veterinarios.

Art. 4°.- De la ejecución del presente Decreto, que prevalecerá sobre las normas reglamentarias de igual o menor jerarquía que se le opongan, y que entrará en vigencia a partir de su publicación en el Registro Oficial, encárguese el Ministro de Agricultura y Ganadería.

DADO en el Palacio Nacional, en Quito, a 23 de noviembre de 1988.

Rodrigo Borja
PRESIDENTE CONSTITUCIONAL DE LA REPUBLICA

Enrique Delgado Coppiano
MINISTRO DE AGRICULTURA Y GANADERIA

ES COPIA.- CERTIFICO :

Washington Herrera,
SECRETARIO GENERAL DE LA ADMINISTRACION PUBLICA.

En uso de sus atribuciones,

Decreta:

Artículo Primero: Conformar la delegación ecuatoriana para que participe en la Reunión Regional Preparatoria de la Conferencia Mundial de la UNESCO sobre "EDUCACION PARA TODOS" a efectuarse en esta ciudad, entre el 28 de noviembre y el 1º de diciembre de 1989, con los siguientes miembros:

1. Arq. Alfredo Vera, Ministro de Educación y Cultura, quien la presidiría;
2. Ing. Raúl Baca Carbo, Ministro de Bienestar Social;
3. Econ. César Verduga, Ministro de Trabajo y Recursos Humanos;
4. Dr. Plutarco Naranjo, Ministro de Salud Pública;
5 Ing. Jorge Gallardo, Ministro de Finanzas y Crédito Público;
6. Econ. Cornelio Merchán, Secretario General de Planificación del CONADE.
7. Ab. Trajano Andrade, Subsecretario de Educación; y.
8. Dr. Eladio Proaño, Secretario Nacional de Comunicación Social.

Artículo Segundo: Encargar de la ejecución del presente Decreto al señor Secretario en la Cartera de Educación y Cultura.

Dado, en el Palacio Nacional, en Quito, a 23 de noviembre de 1989.

f.) Rodrigo Borja, Presidente Constitucional de la República.— f.) Trajano Andrade, Ministro de Educación y Cultura, Encargado.

Es copia.— Certifico:
f) Washington Herrera, Secretario General de la Administración Pública.

Nº 1111

RODRIGO BORJA,
Presidente Constitucional de la República,

Considerando:

Que mediante Decreto Nº 2331 de 31 de diciembre de 1983, promulgado en el Registro Oficial Nº 649 de 28 de los mismos mes y año se expidió el Reglamento para la Fabricación, Formulación, Importación, Comercialización y Empleo de Plaguicidas y Productos afines de uso agrícola, reformado mediante Decreto Ejecutivo 228, de 23 de noviembre de 1988.

Que es deber del Gobierno Nacional prestar las facilidades para la importación de plaguicidas y productos afines en beneficio de las organizaciones dedicadas al fomento de la producción agrícola; y,

En ejercicio de las atribuciones que le confiere el literal c). del Art. 78 de la Constitución Política,

Decreta:

Art. 1.— Sustitúyase el segundo inciso del Art. 18 del Reglamento para la Fabricación, Formulación, Importación, Comercialización y Empleo de Plaguicidas y productos afines de uso agrícola, constante en el Decreto 228, publicado en el Suplemento del R.O. 73 de 24 de noviembre de 1988, por el siguiente:

"Si el producto a importarse ha sido registrado con anterioridad y si el Registro está vigente, las Asociaciones de Productores, Cámaras de Agricultura, Centros Agrícolas, Cooperativas Agrícolas, Organizaciones Campesinas y Agricultores, como personas naturales, podrán importarlo, debiendo el beneficiario dar cumplimiento a las demás disposiciones del Reglamento".

Art. 2 — El Art. 37 sustitúyase por el siguiente:
"Todo importador cuya actividad sea el comercio de plaguicidas debe contar con los servicios de un Ingeniero Agrónomo en libre ejercicio profesional, debidamente colegiado y con una experiencia no menor a 3 años".

Art. 3.— De la ejecución de este Decreto que prevalecerá sobre las normas reglamentarias de igual o menor jerarquía que se le opongan, y que entrará en vigencia a partir de su publicación en el Registro Oficial, encárguense los señores Ministros de Agricultura y Ganadería y de Industrias, Comercio, Integración y Pesca.

Dado en el Palacio Nacional, en Quito, a 21 de noviembre de 1989.

f.) Rodrigo Borja, Presidente Constitucional de la República.— f.) Ing. Mario Jalil Rodríguez, Ministro de Agricultura y Ganadería.— f) Jacinto Jouvín Márquez de la Plata, Ministro de Industrias, Comercio, Integración y Pesca.

Es copia.— Certifico:
f) Washington Herrera, Secretario General de la Administración Pública.

Nº 1112

RODRIGO BORJA,
Presidente Constitucional de la República,

Considerando:

Que mediante Decreto Ejecutivo Nº 1055, de 8 de noviembre de 1989, se autorizó al Ministro de Obras Públicas para que, a nombre y en representación del Estado Ecuatoriano, intervenga en la constitución de la Compañía "Tren Metropolitano de Quito Sociedad Anónima".

LISTA DE PRODUCTOS FITOSANITARIOS PROHIBIDOS PARA SU USO EN LA AGRICULTURA EN VARIOS PAISES, PAR HABERSELES COMPROBADO SER CONTAMINANTES DEL MEDIO AMBIENTE O POR SU ACCION PERJUDICIAL A LA SALUD HUMANA Y DE LOS ANIMALES, DE ACUERDO - CON LA PUBLICACION "CONSOLIDATED LIST OF PRODUCTS WHOSE CONSUMPTION AND/OR - SALE HAVE BEEN BANNED, WITHDRAWN, SEVERELY RESTRICTED OR NOT APPROVED BY — GOVERNMENTS". EDITADO POR LAS NACIONES UNIDAS EN JULIO DE 1984.

P R O D U C T O	P A I S
ALDRIN	BULGARIA REPUBLICA FEDERAL DE ALEMANIA HUNGRIA ISRAEL NORUEGA UNION DE LAS REPUBLICAS SOCIALISTAS SOVIETICAS TURQUIA ESTADOS UNIDOS DE NORTEAMERICA
AMITROLE	FINLANDIA NORUEGA
B H C	ARGENTINA BULGARIA CHIPRE HUNGRIA ESTADOS UNIDOS DE NORTEAMERICA
CAMPHECHLOR (Toxafeno)	BULGARIA CANADA REPUBLICA FEDERAL DE ALEMANIA FINLANDIA PAKISTAN TAILANDIA
CAPTAN	FINLANDIA NORUEGA SUECIA
CLORDANO	REPUBLICA FEDERAL DE ALEMANIA FINLANDIA JAPON TURQUIA

2/

PRODUCTO	P A I S
CLOROBENZILATO	FINLANDIA ESTADOS UNIDOS DE NORTEAMERICA
COMPUESTOS DE PLOMO	REPUBLICA FEDERAL DE ALEMANIA
COMPUESTOS MERCURIALES	SUIZA CANADA COLOMBIA CHIPRE REPUBLICA FEDERAL DE ALEMANIA FILIPINAS TAILANDIA
CHLORDIMEFORM (Galecron y Fundal)	PAKISTAN UNION DE LAS REPUBLICAS SOCIALISTAS SOVIETICAS TAILANDIA
D D T	COMUNIDAD EUROPEA ARGENTINA BULGARIA CANADA COLOMBIA CHIPRE DINAMARCA FINLANDIA GUATEMALA HUNGRIA ISRAEL JAPON NORUEGA NUEVA ZELANDIA FILIPINAS UNION DE LAS REPUBLICAS SOCIALISTAS SOVIETICAS SUECIA TAILANDIA TURQUIA ESTADOS UNIDOS DE NORTEAMERICA
D B C P	COLOMBIA CHIPRE FINLANDIA ISRAEL PAKISTAN SUECIA ESTADOS UNIDOS DE NORTEAMERICA

3/

PRODUCTO	P A I S
DIELDRIN	REPUBLICA FEDERAL DE ALEMANIA
	FINLANDIA
	HUNGRIA
	ISRAEL
	JAPON
	NORUEGA
	UNION DE LAS REPUBLICAS SOCIALISTAS SOVIETICAS
	SUIZA
ENDRIN	REPUBLICA FEDERAL DE ALEMANIA
	FINLANDIA
	INDIA
	ISRAEL
	NORUEGA
	FILIPINAS
	TAILANDIA
	TURQUIA
ETHYL Y DIETHYL PARATHION	HUNGRIA
	UNION DE LAS REPUBLICAS SOCIALISTAS SOVIETICAS
	JAPON
	FILIPINAS
	TURQUIA
HEPTACLORO	COMUNIDAD EUROPEA
	REPUBLICA FEDERAL DE ALEMANIA
	SUECIA
	TURQUIA
	ESTADOS UNIDOS DE NORTEAMERICA
INSECTICIDAS ARSENICALES	SUIZA
	FINLANDIA
	HUNGRIA
LEPTOPHOS	COLOMBIA
	FINLANDIA
METHYL PARATHION	JAPON
MIREX	CANADA
	SUECIA
	ESTADOS UNIDOS DE NORTEAMERICA
TETRACLOROFENOL	SUECIA

Annex 5.

a. Copy of Letter from Ciba Geigy Indicating Pesticides and Registrations Being Withdrawn in Reregistration

b. IR-4 Red Alert - Reregistration Update Number 6 - August, 1989

c. EPA Letter Concerning NRDC Law Suit on Pesticide Tolerances

d. Article on the NRDC Law Suit

Agricultural Division
CIBA-GEIGY Corporation
P.O. Box 18300
Greensboro, North Carolina 27419
Telephone 919 292 7100

CIBA-GEIGY

August 3, 1989

Dear Cooperator:

SUBJECT: IMPACT OF REREGISTRATION ON THE CONTINUED AVAILABILITY OF CIBA-GEIGY PRODUCTS

Back in May, I hurriedly sent out a list of CIBA-GEIGY products and uses that have been discontinued as a result of the EPA's procedure for reregistration. Needless to say, I have received numerous phone calls from recipients who were seeking more information on when these reregistration actions take effect. I apologize for not providing this so, therefore, I am writing you again to be more explicit. The list of CIBA-GEIGY products and uses that have been discontinued is enclosed. Some revisions have been made to this list since it was last issued.

For chlorobenzilate (Acaraben®), terbutryn (Igran®), propazine (Milogard®), diprepetryn (Sancap®), and chloroxuron (Tenoran®) - CIBA-GEIGY has voluntarily requested that EPA cancel all registered uses for these products. The Agency will, at some point in the future, propose to withdraw the currently established residue tolerances for all uses of these products. Customarily, EPA permits end-users of products to continue to use the products for their intended use until the supply is exhausted. Therefore, any end-user who currently holds an inventory of the above-listed products may continue to use the inventory for the foreseeable future. It is advised that users expeditiously deplete their inventories since withdrawal of current tolerances would make residues on crops treated with these products illegal. We would expect that EPA would provide a notice of at least six months prior to official withdrawal of the tolerances for these products. With respect to chloroxuron, EPA has provided CIBA-GEIGY with a notice of cancellation which clearly states that end-users may continue to use inventories that they may hold in accordance with label directions included on the packaging. For the other products, EPA has yet to provide an official notice of cancellation but it is expected that the Agency will also provide for users to deplete inventories in accordance with label direttions.

CIBA-GEIGY has also asked for voluntary cancellation of chlordimeform products. In accordance with the terms of cancellation for this product, all use of the product must cease by October 1, 1989, irrespective of whether an end-user holds inventory after that date.

Occasionally, CIBA-GEIGY and other registrants will delete certain uses from a product while retaining other uses. It is entirely permissible for an end-user to use a material for a discontinued use for the foreseeable future provided the package from which the inventory is obtained bears the appropriate end-use directions for the site in question. Otherwise, the use would be considered a violation of FIFRA. It is important that users realize that the Agency will be withdrawing residue tolerances for discontinued products and uses at some point in the future. It is difficult to project with any degree of certainty exactly when this will occur. It is particularly important to be aware of this point because once the residue tolerances have been withdrawn, any commodity that has been treated, even though it may have been treated in accordance with the label of a previously registered product, could be considered in violation if it contains a residue of the pesticide in question.

If you have further questions, please give me a call at (919) 292-7100, extension 2171.

Sincerely yours,

John F. Ellis/mk

John F. Ellis, Ph.D.
Director
Biological Research

JFE/sh/0502

Enclosure

CIBA-GEIGY Products/Uses That Have Been Discontinued
as the Result of EPA Reregistration

Active Ingredient	Crops Dropped	Reason Why†
atrazine	perennial ryegrass	1,2,4
	orchardgrass	1,2,4
	pineapples	1,4
	proso millet	1,4
	rangeland	1,2,4
	bermudagrass (24c registrations)	1,2
chlordimeform (all uses)	cotton	1,4
chlorobenzilate (all uses)	grapefruit	1,4
	oranges	1,4
	lemons	1,4
	limes	1,4
	tangelos	1,4
	tangerines	1,4
	kumquats	1,4
chloroxuron (all uses)	onions	1,4
	strawberries	1,4
	soybeans	1,4
diazinon	asparagus	1
	citrus fruits	1,2
	dandelions	1
	olives	1
	coffee	1
	filberts	1
	figs	1
	pecans	1
	dried beans	1,2
	watercress	1
	dried peas	1
	alfalfa	2
	cotton	1,2
	peanuts	1
	clover	2
	cowpeas	2
	sorghum	2
	tobacco	1
	trefoil	2
	wheat	2
	lespedeza	2
	range grass	2
	bermudagrass	2
	grass forage	2
	field corn*	1,2
	caneberries (ex. in CA, OR, WA)	1
	walnuts (ex. in CA)	1
	almonds (ex. in CA)	1

*All uses dropped except seed treatment and aerial use of D·z·n® diazinon 14G.

Active Ingredient	Crops Dropped	Reason Why†
dipropetryn (all uses)	cotton	1,4
metolachlor	pod crops for dry and succulent varieties - 25G formulation only	1
phosphamidon	broccoli	1
	cantaloupes	1
	cauliflower	1
	cucumbers	1
	grapefruit	1
	lemons	1
	oranges	1
	peppers	1
	sugarcane	1
	tangerines	1
	tomatoes	1
	watermelons	1
propazine (all uses)	sorghum	1,4
simazine	drainage ditch banks	1,4
	cooling towers	1,4
	forage bermudagrass	1,4
	alfalfa	1,4
	grasses grown for seed	1,4
	tree plantations for timber	1,4
terbutryn (all uses)	winter wheat	1,4
	winter barley	1,4
	sorghum	1,4

NOTE: Field residue trials will not support any greenhouse use of diazinon. All current uses will be discontinued because of reasons number 1 and 4.

†Code for reason a product or use has been cancelled:
1. Cost of data development for reregistration not justified by sales.
2. ADI constraints.
3. Liability concerns.
4. Capacity to do the work to meet the EPA deadline.

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IR-4 RED ALERT

REREGISTRATION UPDATE NUMBER 6 - AUGUST, 1989

IR-4 PROJECT · COOK COLLEGE · NEW BRUNSWICK · NEW JERSEY 08903
201/932-9575

THIS ISSUE CONTAINS:

I. SURVEY OF CROPS DROPPED FROM PESTICIDE LABELS

In order to gain a better understanding of the impact of reregistration on food or feed uses of pesticides, IR-4 and the National Agricultural Chemicals Association (NACA) have surveyed the agricultural chemical industry regarding what food or feed crop uses from EPA's "List A" chemicals would be dropped because of the burden of data requirements for reregistration. Both surveys were conducted independently; IR-4 conducted the survey through phone contact with official IR-4 industry contacts for the agricultural chemical companies, where as the NACA survey involved a direct mailing to its membership. The responses from both surveys are presented here. Please note that status of these chemicals and their uses are always subject to change.

The trade names given are supplied with the understanding that no discrimination is intended and no endorsement is implied. In some instances, the same chemical may be sold under different trade names.

FOOD/FEED USES OF "LIST A" PESTICIDES WHICH HAVE OR WILL BE LOST DURING REREGISTRATION

CROP	CHEMICAL	(TRADE)	TYPE*	COMMENTS
Alfalfa	Diazinon	(D*Z*N)	I	
	Dichlobenil	(CASORON)	H	
	Dicofol	(KELTHANE)	I	
	Endosulfan	(THIODAN)	I	Seed use dropped
	Oryzalin	(SURFLAN)	H	
	PCNB	(TERRACLOR)	F	
	Phosmet	(IMIDAN)	I	
	Simazine	(PRINCEP)	H	
	Terbacil	(SINBAR)	H	Dropped in CA/AZ
Almond	Diazinon	(D*Z*N)	I	Retain in CA
	Endosulfan	(THIODAN)	I	
	Ethion	(ETHION)	I	
Apple	Daminozide	(ALAR)	PGR	May be re-est.
	Ethion	(ETHION)	I	
	Phosalone	(ZOLONE)	I	
	Terbacil	(SINBAR)	H	Dropped in CA/AZ
Apricot	Dicofol	(KELTHANE)	I	Mfg. may re-est.
	Phosalone	(ZOLONE)	I	
Artichoke	Ethyl Parathion	(MANY)	I	
	Methyl Parathion	(MANY)	I	
	Phosalone	(ZOLONE)	I	
	Trichlorfon	(DYLOX)	I	
Asparagus	Diazinon	(D*Z*N)	I	
	Terbacil	(SINBAR)	H	Dropped in CA/AZ
Avocado	Captan	(CAPTAN)	F	
	Dichlobenil	(CASORON)	H	
	Ethyl Parathion	(MANY)	I	
Banana	PCNB	(TERRACLOR)	F	
Barley	Oryzalin	(SURFLAN)	H	
	Trichlorfon	(DYLOX)	I	
Bean	Captan	(CAPTAN)	F	
	Diazinon	(D*Z*N)	I	Suc. bean retained
	Ethion	(ETHION)	I	
	Trichlorfon	(DYLOX)	I	
Beet	Captan	(CAPTAN)	F	
Blackberry	Anilazine	(DYRENE)	F	
	DCNA	(BOTRAN)	F	
	Dicofol	(KELTHANE)	I	May be re-est.
	Oxydemetonmethyl	(METASYSTOX-R)	I	

FOOD/FEED USES OF LIST A PESTICIDES WHICH HAVE OR WILL BE LOST DURING REREGISTRATION (CON'T)

CROP	CHEMICAL	(TRADE)	TYPE*	COMMENTS
Blueberry	Anilazine	(DYRENE)	F	
	Dicofol	(KELTHANE)	I	May be re-est.
	Ethephon	(ETHREL)	PGR	
	Terbacil	(SINBAR)	H	Dropped in CA/AZ
Bermudagrass	Diazinon	(D*Z*N)	I	
	Simazine	(PRINCEP)	H	
Boysenberry	DCNA	(BOTRAN)	F	
	Dicofol	(KELTHANE)	I	May be re-est.
Broccoli	Captan	(CAPTAN)	F	
	Phosphamidon	(SWAT)	I	
Brussels sprouts	Captan	(CAPTAN)	F	
	Daminozide	(ALAR)	PGR	
	Trichlorfon	(DYLOX)	I	
Cabbage	Captan	(CAPTAN)	F	
	Trichlorfon	(DYLOX)	I	
Caneberry[1]	Captan	(CAPTAN)	F	IR-4 will defend
	Diazinon	(D*Z*N)	I	
	Dicofol	(KELTHANE)	I	May be re-est.
	Terbacil	(SINBAR)	H	Dropped in CA/AZ
Cantaloupe	Captan	(CAPTAN)	F	
	Daminozide	(ALAR)	PGR	
	Metiram	(POLYRAM)	F	Mfg. may re-est.
	Phosphamidon	(SWAT)	I	
Carrot	Captan	(CAPTAN)	F	
	Trichlorfon	(DYLOX)	I	
Cauliflower	Captan	(CAPTAN)	F	
	Phosphamidon	(SWAT)	I	
	Trichlorfon	(DYLOX)	I	
Celery	Captan	(CAPTAN)	F	IR-4 will defend
	Metiram	(POLYRAM)	F	Mfg. may re-est.
Chard	Naled	(DIBROM)	I	
Chestnut	Dicofol	(KELTHANE)	I	
	Ethion	(ETHION)	I	
Cherry	Daminozide	(ALAR)	PGR	
	Dicofol	(KELTHANE)	I	Mfg. may re-est.
	Phosalone	(ZOLONE)	I	
Chicory	Methomyl	(LANNATE)	I	

FOOD/FEED USES OF [illegible] PESTICIDES WHICH HAVE [illegible]
DURING REREGISTRATION (CON'T)

CROP	CHEMICAL	(TRADE)	TYPE*	COMMENTS
Citrus Fruit[2]	Captan	(CAPTAN)	F	
	Diazinon	(D*Z*N)	I	
	Dichlobenil	(CASORON)	H	
	Methyl Parathion	(MANY)	I	
	Phosalone	(ZOLONE)	I	
	Phosmet	(IMIDAN)	I	
	Terbacil	(SINBAR)	H	Dropped in CA/AZ
	Trichlorfon	(DYLOX)	I	
Clover	Diazinon	(D*Z*N)	I	
	Dichlobenil	(CASORON)	H	
	Dicofol	(KELTHANE)	I	
	PCNB	(TERRACLOR)	F	
	2,4-DB	(BUTYRAC)	H	
Coffee	Diazinon	(D*Z*N)	I	
Collards	Captan	(CAPTAN)	F	
	Trichlorfon	(DYLOX)	I	
Corn	DCPA	(DACTHAL)	H	
	Diazinon	(D*Z*N)	I	Seed use retained
	Ethion	(ETHION)	H	
	Phosmet	(IMIDAN)	I	
	Prometryn	(CAPAROL)	H	
Cotton	Captan	(CAPTAN)	F	
	DCNA	(BOTRAN)	F	
	Diazinon	(D*Z*N)	I	
	Dicrotophos	(BIDRIN)	I	Dropped in CA/AZ
	Ethion	(ETHION)	I	
	Oryzalin	(SURFLAN)	H	
	Phosmet	(IMIDAN)	I	
Cowpea	Diazinon	(D*Z*N)	I	
	Trichlorfon	(DYLOX)	I	
Crabapple	Captan	(CAPTAN)	F	
Cranberry	Anilazine	(DYRENE)	F	
	Captan	(CAPTAN)	F	
	Ethephon	(ETHREL)	PGR	
	Maleic hydrazide	(MH)	PGR	
	Phosmet	(IMIDAN)	I	
Cucumber	Anilazine	(DYRENE)	F	
	Captan	(CAPTAN)	F	
	Ethion	(ETHION)	I	
	Metiram	(POLYRAM)	F	Mfg. may re-est.
	Naled	(DIBROM)	I	
	Phosphamidon	(SWAT)	I	

CROP	CHEMICAL	(TRADE)	TYPE*	COMMENTS
Cucurbit Vegetable[3]	Ethyl Parathion	(MANY)	I	
	Methyl Parathion	(MANY)	I	
Dandelion	Diazinon	(D*Z*N)	I	
Date	Ethyl Parathion	(MANY)	I	
Dewberry	Anilazine	(DYRENE)	F	
	Dicofol	(KELTHANE)	I	May be re-est.
Eggplant	Captan	(CAPTAN)	F	IR-4 will defend
	Ethion	(ETHION)	I	
	Naled	(DIBROM)	I	
Fig	Diazinon	(D*Z*N)	I	
	Dichlobenil	(CASORON)	H	
	Dicofol	(KELTHANE)	I	
	Ethephon	(ETHREL)	PGR	
	Ethyl Parathion	(MANY)	I	
Filbert	Diazinon	(D*Z*N)	I	
	Dicofol	(KELTHANE)	I	Mfg. may re-est.
	Ethephon	(ETHREL)	PGR	
	Ethion	(ETHION)	I	
Flax	Trichlorfon	(DYLOX)	I	
Fruiting Vegetable[4]	Methyl Parathion	(MANY)	I	
Gooseberry	Azinphosmethyl	(GUTHION)	I	
Grape	Daminozide	(ALAR)	PGR	May be re-est.
	Ethion	(ETHION)	I	
	Oxydemetonmethyl	(METASYSTOX-R)	I	
	Phosalone	(ZOLONE)	I	
	Phosmet	(IMIDAN)	I	
Grapefruit	Captan	(CAPTAN)	F	
	Phosphamidon	(SWAT)	I	
Grass	Diazinon	(D*Z*N)	I	
	Ethyl Parathion	(MANY)	I	
	Simazine	(PRINCEP)	H	
	Trichlorfon	(DYLOX)	I	
Guava	Ethephon	(ETHREL)	PGR	
Hickory Nut	Dicofol	(KELTHANE)	I	Mfg. may re-est.

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DURING REREGISTRATION (CON'T)

CROP	CHEMICAL	(TRADE)	TYPE*	COMMENTS
Hop	Disulfoton	(DISYSTON)	I	
	Ethyl Parathion	(MANY)	I	
	Methyl Parathion	(MANY)	I	
	Naled	(DIBROM)	I	
Huckleberry	Anilazine	(DYRENE)	F	
	Dicofol	(KELTHANE)	I	May be re-est.
Kale	Captan	(CAPTAN)	F	
	Benomyl	(BENLATE)	F	
Kiwifruit	Azinphosmethyl	(GUTHION)	I	
Leek	Captan	(CAPTAN)	F	
Lemon	Captan	(CAPTAN)	F	
	Ethephon	(ETHREL)	PGR	
	Phosphamidon	(SWAT)	I	
Lespedeza	Diazinon	(D*Z*N)	I	
Lettuce	Captan	(CAPTAN)	F	IR-4 will defend
	PCNB	(TERRACLOR)	F	
	Trichlorfon	(DYLOX)	I	
Lime	Captan	(CAPTAN)	F	
Loganberry	Anilazine	(DYRENE)	F	
	Dicofol	(KELTHANE)	I	May be re-est.
Macadamia Nut	Endosulfan	(THIODAN)	I	
	Ethephon	(ETHREL)	PGR	
Mango	Captan	(CAPTAN)	F	IR-4 will defend
	Dichlobenil	(CASORON)	H	
	Ethyl Parathion	(MANY)	I	
Melons[5]	Anilazine	(DYRENE)	F	
	Captan	(CAPTAN)	F	
	Naled	(DIBROM)	I	
Mint	Chlorothalonil	(BRAVO)	F	
	Fonofos	(DYFONATE)	I	
	Terbacil	(SINBAR)	H	Dropped in CA/AZ
	2,4-DB	(BUTYRAC)	H	
Mushroom	Naled	(DIBROM)	I	
Mustard Greens	Benomyl	(BENLATE)	F	
	Captan	(CAPTAN)	F	

CROP	CHEMICAL	(TRADE)	TYPE*	COMMENTS
Mustard Seed	Methyl Parathion	(MANY)	I	
Nectarine	Daminozide	(ALAR)	PGR	May be re-est.
	Dicofol	(KELTHANE)	I	May be re-est.
	Ethion	(ETHION)	I	
	Phosalone	(ZOLONE)	I	
Oat	Disulfoton	(DISYSTON)	I	
	Trichlorfon	(DYLOX)	I	
Okra	Ethyl Parathion	(MANY)	I	
Olive	Diazinon	(D*Z*N)	I	
Onion	Captan	(CAPTAN)	F	IR-4 will defend green onion use
Orange	Captan	(CAPTAN)	F	
	Phosphamidon	(SWAT)	I	
Orchardgrass	Atrazine	(AATREX)	H	
Papaya	Benomyl	(BENLATE)	F	IR-4 will defend
	Chlorothalonil	(BRAVO)	F	
Parsley	Azinphosmethyl	(GUTHION)	I	
Passion Fruit	Chlorothalonil	(BRAVO)	F	
Pea	Alachlor	(LASSO)	H	Use cancelled
	Captan	(CAPTAN)	F	
	Diazinon	(D*Z*N)	I	Suc. pea retained
	Endosulfan	(THIODAN)	I	
	Oryzalin	(SURFLAN)	H	
	Phosmet	(IMIDAN)	I	
Peach	Daminozide	(ALAR)	PGR	May be re-est.
	Dicofol	(KELTHANE)	I	May be re-est.
	Ethion	(ETHION)	I	
	Naled	(DIBROM)	I	
	Phosalone	(ZOLONE)	I	
	Terbacil	(SINBAR)	I	Dropped in CA/AZ
Peanut	Daminozide	(ALAR)	PGR	May be re-est.
	Diazinon	(D*Z*N)	I	
	Ethion Parathion	(MANY)	I	
	Methyl Parathion	(MANY)	I	
	Metiram	(POLYRAM)	F	Mfg. may re-est.
	Trichlorfon	(DYLOX)	I	
	Triphenyltin Hyd.	(DU-TER)	F	

CROP	CHEMICAL	(TRADE)	TYPE*	COMMENTS
Pear	Captan	(CAPTAN)	F	Pre-harvest use
	Daminozide	(ALAR)	PGR	May be re-est.
	Ethion	(ETHION)	I	
	Phosalone	(ZOLONE)	I	
Pecan	Diazinon	(D*Z*N)	I	
	Dicofol	(KELTHANE)	I	
	Ethion	(ETHION)	I	
	Metiram	(POLYRAM)	F	Mfg. may re-est.
	Terbacil	(SINBAR)	H	Dropped in CA/AZ
Pepper	Captan	(CAPTAN)	F	IR-4 will defend
	Dicofol	(KELTHANE)	I	Mfg. re-est. 1990
	Ethion	(ETHION)	I	
	Naled	(DIBROM)	I	
	Phosphamidon	(SWAT)	I	
	Trichlorfon	(DYLOX)	I	
Pimento	Captan	(CAPTAN)	F	
	Ethion	(ETHION)	I	
Peppermint	Oryzalin	(SURFLAN)	H	
Pineapple	Atrazine	(AATREX)	H	
	Captan	(CAPTAN)	F	
	Disulfoton	(DISYSTON)	I	
Plum	Dicofol	(KELTHANE)	I	Mfg. may re-est.
	Ethion	(ETHION)	I	
	Oxydemetonmethyl	(METASYSTOX-R)	I	
	Phosalone	(ZOLONE)	I	
Pome Fruit[6]	Methyl Parathion	(MANY)	I	
Potato	Alachlor	(LASSO)	H	Use cancelled
	Captan	(CAPTAN)	F	
	Oryzalin	(SURFLAN)	H	
	Oxydemetonmethyl	(METASYSTOX-R)	I	
	Phosalone	(ZOLONE)	I	
	Phosmet	(IMIDAN)	I	
Proso Millet	Atrazine	(AATREX)	H	
Pumpkin	Anilazine	(DYRENE)	F	
	Captan	(CAPTAN)	F	

FOOD/FEED USE OF "LIST A" PESTICIDES WHICH HAVE OR WILL BE USED DURING REREGISTRATION (CON'T)

CROP	CHEMICAL	(TRADE)	TYPE*	COMMENTS
Quince	Azinphosmethyl	(GUTHION)	I	
	Captan	(CAPTAN)	F	
Rapeseed	Ethyl Parathion	(MANY)	I	
	Methyl Parathion	(MANY)	I	
Raspberry	Anilazine	(DYRENE)	F	
	DCNA	(BOTRAN)	F	
	Dicofol	(KELTHANE)	I	May be re-est.
	Oxydemetonmethyl	(METASYSTOX-R)	I	
Rhubarb	Captan	(CAPTAN)	F	
Rice	Disulfoton	(DISYSTON)	I	
	Naled	(DIBROM)	I	
	Nitrapyrin	(N-SERVE)	H	
Rutabaga	Benomyl	(BENLATE)	F	
	Captan	(CAPTAN)	F	
Ryegrass	Atrazine	(AATREX)	H	
Safflower	Ethyl Parathion	(MANY)	I	
	Methyl Parathion	(MANY)	I	
	Naled	(DIBROM)	I	
	Trichlorfon	(DYLOX)	I	
Shallot	Anilazine	(DYRENE)	F	
	Captan	(CAPTAN)	F	
Small Fruit & Berry	Methyl Parathion	(MANY)	I	
Sorghum	Diazinon	(D*Z*N)	I	
	Ethion	(ETHION)	I	
Soybean	Captan	(CAPTAN)	F	
	DCPA	(DACTHAL)	H	
	Fenamiphos	(NEMACUR)	H	
	Oryzalin	(SURFLAN)	H	
Spearmint	Oryzalin	(SURFLAN)	H	
Spinach	Benomyl	(BENLATE)	F	Seed treatment use
	Captan	(CAPTAN)	F	IR-4 will defend
	Disulfoton	(DISYSTON)	H	
	Naled	(DIBROM)	I	

CROP	CHEMICAL	(TRADE)	TYPE*	COMMENTS
Squash	Anilazine	(DYRENE)	F	
	Captan	(CAPTAN)	F	
	Naled	(DIBROM)	I	
Stone Fruit[8]	Dicofol	(KELTHANE)	I	Mfg. may re-est.
	Metolachlor	(DUAL)	H	Plant injury
	Methyl Parathion	(MANY)	I	
Strawberry	Dodine	(CYPREX)	F	
	Ethion	(ETHION)	I	
	Fonofos	(DYFONATE)	I	
	PCNB	(TERRACLOR)	F	
Sugar Beet	Disulfoton	(DISYSTON)	I	
	Metiram	(POLYRAM)	F	Mfg. may re-est.
	Trichlorfon	(DYLOX)	I	
Sugarcane	Disulfoton	(DISYSTON)	I	
	Ethyl Parathion	(MANY)	I	
	Fluometuron	(COTORAN)	H	
	Phosphamidon	(SWAT)	I	
	Terbacil	(SINBAR)	H	Dropped in CA/AZ
Sweet Corn	Captan	(CAPTAN)	F	
	DCPA	(DACTHAL)	H	
	Metiram	(POLYRAM)	F	Mfg. may re-est.
	Prometryn	(CAPAROL)	H	
Sweet Potato	Phosmet	(IMIDAN)	I	IR-4 will defend
Tangerine	Captan	(CAPTAN)	F	
	Ethephon	(ETHREL)	PGR	
	Phosphamidon	(SWAT)	I	
Taro	Captan	(CAPTAN)	F	IR-4 will defend
Tobacco	Diazinon	(D*Z*N)	I	
	Methyl Parathion	(MANY)	I	
	Oryzalin	(SURFLAN)	I	
Tomato	Captan	(CAPTAN)	F	Drop foliar use
	Daminozole	(ALAR)	PGR	
	Dicofol	(KELTHANE)	I	Mfg. re-est. 1990
	Ethion	(ETHION)	I	
	Metiram	(POLYRAM)	F	Mfg. may re-est.
	Naled	(DIBROM)	I	
	Phosphamidon	(SWAT)	I	
	Phosmet	(IMIDAN)	I	

FOOD/FEED USE OF 'LIST A' PESTICIDES WHICH HAVE OR WILL BE LOST DURING REREGISTRATION (CON'T)

CROP	CHEMICAL	(TRADE)	TYPE*	COMMENTS
Tree Nut[9]	Dichlobenil	(CASORON)	H	Filbert retained
	Methyl Parathion	(MANY)	I	
	Phosmet	(IMIDAN)	I	Almond retained
Trefoil	Diazinon	(D*Z*N)	I	
Turnip	Benomyl	(BENLATE)	F	Seed uses
	Captan	(CAPTAN)	F	
Turnip Green	Naled	(DIBROM)	I	
Walnut	Diazinon	(D*Z*N)	I	Retain in CA
	Dicofol	(KELTHANE)	I	
	Ethion	(ETHION)	I	
Watercress	Diazinon	(D*Z*N)	I	
	Endosulfan	(THIODAN)	I	
	Methomyl	(LANNATE)	I	Mfg. may defend
Watermelon	Captan	(CAPTAN)	F	
	Phosphamidon	(SWAT)	I	
Wheat	Diazinon	(D*Z*N)	I	
	Oryzalin	(SURFLAN)	H	
	Trichlorfon	(DYLOX)	I	
All Uses	Allethrin	(PYNAMIN)	I	Post Harvest uses retained
	Ammonium sulfamate	(AMMATE)	H	Disc. 1988
	Captafol	(DIFOLATAN)	F	Disc. 1988
	Carbophenothion	(TRITHION)	I	Disc. 1987
	Chloramben	(AMIBEN)	H	
	Chlordimeform	(GALECRON)	I	
	Chlorobenzilate	(ACARABEN)	I	
	Chloroxuron	(TENORAN)	H	
	Chlorpropham	(FURLOE)	H	Post-harvest uses retained
	Cycloheximide	(ACTI-AID)	PGR	Disc. 1985
	Cyhexatin	(PLICTRAN)	I	Cancelled
	Dalapon	(DALAPON)	H	
	Demeton	(SYSTOX)	I	Disc. 1989
	Dialifor	(TORAK)	I	
	Diallate	(AVENGE)	H	Disc.
	Dichlone	(PHYGON)	F	Disc.
	Dioxathion	(DELTIC)	I	Disc. 1989
	Diphenamid	(ENIDE)	H	
	Dipropetryn	(SANCAP)	H	
	EPN	(EPN)	I	
	Fenaminosulf	(LESAN)	F	
	Fensulfothion	(DASANIT)	I	
	Fenthion	(BAYTEX)	I	Mosquito use retained

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FOOD/FEED USE OF "LIST A" PESTICIDES WHICH HAVE OR WILL BE LOST DURING REREGISTRATION (CON'T)

CROP	CHEMICAL	(TRADE)	TYPE*	COMMENTS
All Uses	Fluchloralin	(BASALIN)	H	Disc.
	Folpet	(PHALTAN)	F	Avocado use retained
	Formaldehyde	(FORMALDEHYDE)	F	
	Heliothis NPV	(ELCAR)	I	Disc. 1985
	Isopropalin	(PAARLAN)	H	
	Methiocarb	(MESUROL)	I	Non-food uses retained
	Monocrotophos	(AZODRIN)	I	
	Nabam	(CHEM-BAM)	F	
	Perfluidone	(DESTUN)	H	
	Propazine	(MILOGARD)	H	
	Propham	(CHEM-HOE)	H	
	Terbutryn	(IGRAN)	H	

*Type: F= Fungicide H= Herbicide I= Insecticide
PGR= Plant Growth Regulator

Footnotes:

[1]Caneberry = Rubus spp., including Blackberry, Raspberry, Youngberry, Loganberry, Boysenberry, Dewberry and varieties/ hybrids of these

[2]Citrus Fruit = Grapefruit, Lemon, Lime, Orange, Tangelo, Tangerine, Citrus Citron, Kumquat

[3]Cucurbit Veg. = Cucumber, Melon, (Cucumis melo), Summer and Winter Squash, Pumpkin, Edible Gourds, Watermelon

[4]Fruiting Veg. = Tomato, Pepper, Eggplant

[5]Melons = Cantaloupe, Casaba, Crenshaw, Honeydew, Muskmelon, Watermelon and their hybrids

[6]Pome Fruit = Apple, Crabapple, Loquat, Pear, Oriental Pear, Quince

[7]Small Fruit = Blackberry, Blueberry, Boysenberry, Cranberry, Currant, Elderberry, Gooseberry, Grape, Huckleberry, Loganberry, Olallie Berry, Raspberry, Strawberry, Youngberry

[8]Stone Fruit = Apricot, Cherry, Nectarine, Peach, Plum, Prune, Chickasaw Plum, Damson Plum, Japanese Plum

[9]Tree Nut = Almond, Beechnut, Brazil Nut, Butternut Cashew, Chestnut, Chinquapin, Filbert, Hickory, Macadamia, Pecan, Walnut

PESTICIDE CHEMICALS IN WHICH ALL USES WILL BE SUPPORTED DURING REREGISTRATION

CHEMICAL	(TRADE)	RESPONDENT
Acephate	(ORTHENE)	Valent
Aldicarb	(TEMIK)	Rhone-Poulenc
4-Aminopyridine	(AVITROL)	Avitrol
Aluminum Phosphide	(PHOSTOXIN)	DEGESCH
Asulam	(ASULOX)	Rhone-Poulenc
Bacillus thuringensis	(DIPEL/JAVELIN)	Abbott/Sandoz
Bentazon	(BASAGRAN)	BASF
Boric Acid	(BORAX)	Kerr-McGee
Bromacil	(HYVAR)	DuPont
Butylate	(SUTAN)	ICI
Carbaryl	(SEVIN)	Rhone-Poulenc
Carbofuran	(FURADAN)	FMC
Carboxin	(VITAVAX)	Uniroyal
Chloroneb	(TERRANEB)	Kincaid
Chlorpyrifos	(LORSBAN/DURSBAN)	Dow
Chlorsulfuron	(GLEAN)	DuPont
Cyanazine	(BLADEX)	DuPont
Dicamba	(BANVEL)	Sandoz
1,3-Dichloropropene	(TELONE)	Dow
Difenzoquat	(AVENGE)	American Cyanamid
Diquat	(DIQUAT)	Valent
Diuron	(KARMEX)	DuPont
EPTC	(EPTAM)	ICI
Ethoprop	(ETHOPROP)	Rhone-Poulenc
Formetanate HCL	(CARZOL)	NOR-AM
Glyphosate	(ROUNDUP)	Monsanto

PESTICIDE CHEMICALS IN WHICH ALL USES WILL BE SUPPORTED DURING REREGISTRATION (CON'T)

CHEMICAL	(TRADE)	RESPONDENT
Hexakis	(VENDEX)	DuPont
Hexazinone	(VELPAR)	DuPont
Linuron	(LOROX)	DuPont
Mancozeb	(DITHANE M-45/MANZATE-200)	Rohm & Haas/DuPont
MCPA	(RHOMENE/RHONOX)	Rhone-Poulenc
Metalaxyl	(RIDOMIL)	CIBA-GEIGY
Methamidophos	(MONITOR)	Valent/Mobay
Methoxychlor	(MARLATE)	Kincaid
Metribuzin	(LEXONE/SENCOR)	DuPont/Mobay
Magnesium Phosphide	(FUMISOL)	DEGESCH
Naphthaleneacetic Acid	(FRUITONE)	Rhone-Poulenc
Napropamide	(DEVRINOL)	ICI
Naptalam	(ALANAP)	Uniroyal
Norflurazon	(SOLICAM/ZORIAL)	Sandoz
Oxamyl	(VYDATE)	DuPont
Oxytetracycline	(TERRAMYCIN)	Pfizer
Paraquat	(GRAMOXONE)	ICI
Pendimethalin	(PROWL)	American Cyanamid
Phenmedipham	(SPIN-AID)	NOR-AM
Picloram	(TORDON)	Dow
Pronamide	(KERB)	Rohm & Haas
Propachlor	(RAMROD)	Monsanto
Propanil	(STAM)	Rohm & Haas
Streptomycin	(AGRI-STREP)	Pfizer
Sulfur	(MANY)	Task Force
Sulprofos	(BOLSTAR)	Mobay

PESTICIDE CHEMICALS IN WHICH ALL USES WILL BE SUPPORTED DURING REREGISTRATION (CON'T)

CHEMICAL	(TRADE)	PRESPONDENT
Tebuthiuron	(SPIKE)	Elanco
Terbufos	(COUNTER)	American Cyanamid
Terrazole	(TERRAZOLE)	Uniroyal
Thiophanate-methyl	(TOPSIN-M)	Pennwalt
Trifluralin	(TREFLAN)	Elanco

II. IR-4 REREGISTRATION WORKSHOP

An IR-4 Workshop to evaluate and prioritize minor use reregistration needs is planned for the week of Nov. 27, 1989. This workshop will consider all reregistration responses from the "IR-4 Red Alert", state reregistration surveys and state IR-4 liaison representatives. For further information, contact Dr. Richard Guest (201) 932-9575.

III. UPDATES/CORRECTIONS FROM IR-4 RED ALERT 5

1. Numerous chemicals were listed under crown vetch (page 14). The only chemical correctly listed is pronamide (#1329). The correct crop for entries 1330 to 1378 is cucumber.

2. Five chemicals were incorrectly listed under horseradish, entries 1783-1787. The correct crop for these entries is huckleberry.

3. Citrus-Pak Corporation, P.O. Box 590147, Orlando, FL 32859-0147 is the contact for issues concerning biphenyl.

4. Butralin may be reintroduced into United States markets by the French group, Compagnie Francaise de Produits Industriels (CFPI).

5. Most copper fungicides are being supported by the Copper Sulfate Task Force. The contact for this task force is A.F. Gohlke, Chair, Copper Sulfate Task Force, c/o Tennessee Chemical Company, 3400 Peachtree Rd., Suite 401, Atlanta, GA 30326.

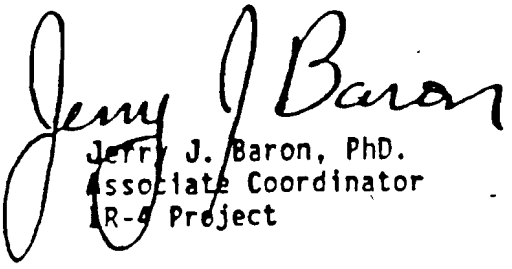
IV. MINOR USE PEREGISTRATION SYMPOSIUM

NACA, in conjunction with EPA, is planning on sponsoring a Pesticide Minor Use Reregistration Symposium on Wednesday, October 18, 1989 at Stouffer's Concourse Hotel, Arlington, VA. The tentative agenda includes a morning presentation by EPA, NACA, USDA and IR-4, regarding minor use reregistration issues. The proposed afternoon sessions include two workgroups; one for pesticide registrants, the other for grower and user organizations.

Space is limited, therefore, contact NACA for additional information and registration: (202) 296-1585.

V. EPA ISSUES "LIST C"

As scheduled, EPA on 24 July 1989 published in the Federal Register the third group of pesticide chemicals subject to reregistration. The majority of these pesticides are non-agricultural. However, "List C" includes such food-use chemicals as benzaldehyde (harvest aid), propiconazole (TILT), sabadilla (botanical insecticide), and ARSENAL (non-cropland herbicide which is chemically related to SCEPTOR and PURSUIT). If you are interested in a copy of this list send a #10 self addressed stamped envelope with (.45¢ postage) to IR-4 at the address printed on last page.



Jerry J. Baron, PhD.
Associate Coordinator
IR-4 Project

New Jersey Agricultural Experiment Station Publication No. P-27200-06-89, Supported by State, U.S. Hatch Act and other U.S. Department of Agriculture funds.

IR-4 RED ALERT REQUEST FORM

MAIL TO: Dr. Jerry J. Baron
Office of IR-4
McLean Research Lab.
P.O. Box 231
Cook College, Rutgers University
New Brunswick, NJ 08903-0231

FROM: _____
NAME

_____
ADDRESS

_____
CITY STATE ZIP CODE

☐ PLEASE ADD MY NAME TO YOUR MAILING LIST

☐ CHANGE OF ADDRESS (Please attach old mailing label)

☐ DELETE MY NAME ON YOUR MAILING LIST
(Please attach mailing label)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

MAY 30 1989

OFFICE OF
PESTICIDES AND TOXIC SUBSTANCES

May 26, 1989

6T-P

NOTE TO: Regional Pesticide and Toxic Substances Division
Directors
Regional Pesticide Branch Chiefs

RECEIVED
MAY 31 1989

FROM: Stephen L. Johnson, Director
Field Operations Division
Office of Pesticide Programs

NRDC LAW SUIT ON PESTICIDE TOLERANCES

Here are some materials to help answer questions you may receive about the law suit on pesticide tolerances filed yesterday by the Natural Resources Defense Council (NRDC):

May 25, 1989, Press Release from NRDC

May 26, 1989, EPA Fact Sheet

If you need additional information about the law suit, contact Al Heier of the EPA Press Office (FTS 382-4374), Bill Jordan, Chief of the OPP Policy and Special Projects Office (FTS 557-7102), Anne Lindsay, Director of the OPP Registration Division (FTS 557-7410), or Rick Tinsworth, Director of the OPP Special Review and Reregistration Division (FTS 557-7760).

You will be sent additional information about the law suit as we receive it. If you need copies of any materials or have questions about communications, please contact Therese Murtagh (FTS 557-4436) or Carol Stangel (FTS 557-0465) of the Field Operations Division.

Attachments

MAY 25 1989

NRDC LAW SUIT ON PESTICIDE TOLERANCES

A May 25 press release from the Natural Resources Defense Council (NRDC) states that EPA is not dealing with food residues of a number of pesticides in a timely manner. NRDC is suing the Agency to expedite the collection and review of data to evaluate tolerances in processed foods, and has also petitioned EPA to revoke the tolerances (maximum legal levels of pesticide residues) for certain pesticides in processed foods. Although EPA cannot comment on the details of the lawsuit at this time, the Agency is actively evaluating tolerances in the systematic way and according to deadlines provided by Congress in the 1988 amendments to the pesticide law, and that this approach is timely and protective of public health.

EPA re-evaluates tolerances for pesticides already on the market in two ways; (1) the systematic re-evaluation process required by law ("re-registration") - this is a review of all the data on a pesticide, imposing additional requirements for testing on the manufacturers, and reassessing the tolerances to see if they are adequate to protect public health; and (2) Special Review, which is an intensive analysis of a pesticide's risks and benefits, when there is evidence that it may be posing unreasonable risks. EPA believes these are appropriate means for resolving questions of safety for "old" pesticides (those registered before the current stringent standards for testing were in place).

Most of the pesticides named in NRDC's press release and petition are currently in, or have already been through the Special Review process; a summary of the status of these chemicals is attached.

EBDC's (mancozeb and maneb) - now in Special Review - tolerances will be reassessed during this review (proposed decision to be issued in the near future).

Chlordimeform - voluntarily cancelled effective February 1989; tolerances are being revoked.

DDVP - now in Special Review (the independent Scientific Advisory Panel will review classification of this chemical as a carcinogen in its August meeting).

Alachlor - Special Review completed in 1987; found dietary risk to be negligible; some food processing data needs to be evaluated to complete tolerance reassessment.

Diccfol, benomyl and trifluralin have been through Special Review and there is no evidence these pesticides pose unreasonable dietary risk. Some additional data on benomyl and trifluralin are expected before final reassessment of their tolerances.

Phosmet - this compound poses no known dietary risk; additional cancer studies are in progress.

NRDC Natural Resources Defense Council

PUBLIC CITIZEN
Public Citizen Congress Watch • Critical Mass • Health Research Group • Litigation Group

For Immediate Release
Thursday, May 25

Contact:
Bob Dreyfuss 202/293-9142
Jeanne Whalen 202/783-7800

EPA SUED BY STATE OF CALIFORNIA, AFL-CIO, PUBLIC CITIZEN, NRDC ON CANCER-CAUSING PESTICIDES IN PROCESSED FOODS

Carcinogens in Baby Foods, Juices, Cereals, Oils at Issue

WASHINGTON – The California attorney-general, the AFL-CIO, Public Citizen, and the Natural Resources Defense Council today filed a federal lawsuit and a petition to EPA challenging the agency's failure to safeguard the nation's food supply from cancer-causing pesticide residues.

The coalition charged that processed foods – such as baby foods, juices, cereals, oils, and tomato paste – are permitted to be sold with concentrated amounts of pesticide residues, in a clear violation of the law.

The lawsuit and petition together make clear that there are at least 20 pesticides now present in processed foods at levels requiring government regulation and for which the EPA itself has evidence of carcinogenicity, including alachlor, the EBDC's (maneb and mancozeb), DDVP, and chlordimeform. But the sweeping litigation may address a far greater number of toxic chemicals for which cancer testing by their manufacturers is underway.

The lawsuit, filed in the U.S. District Court in Sacramento, California, also challenges the failure of EPA to obtain the necessary data on pesticides that leave residues in processed foods. This data is needed to enforce federal food and drug laws. EPA lacks data on more than three-quarters of the pesticides currently in use.

"The law requires EPA to identify cancer-causing pesticides in processed foods and to apply the Delaney anti-cancer clause," said William B. Schultz, an attorney with Public Citizen. "By refusing to collect the data and to apply the law, EPA jeopardizes the public health and violates the public trust."

In addition, while EPA strictly guards against so-called 'new' pesticides entering the market, it has refused to apply the law to scores of 'old' pesticides that have been linked to cancer.

1350 New York Ave., N.W.

"The problem of the American food supply is not just apples or Alar; it's a failed public policy," said Al Meyerhoff, senior attorney with NRDC. The case demonstrates the absurdity of a regulatory system that prohibits 'new' cancer but ignores 'old' cancer. Dozens of potentially cancer-causing chemicals are now being permitted in the American food supply because of this ill-advised regulatory schizophrenia by EPA."

Peg Semenario, the AFL-CIO's Director of Health and Safety, said, "Action is needed now to get carcinogens out of our food and to control other unnecessary exposure to dangerous pesticides. EPA's policy of allowing high levels of cancer-causing older pesticides in foods is another example of the agency's failure to protect consumers and workers from harmful pesticides. EPA seems to be saying that cancers caused by older pesticides aren't as bad as those caused by newer products."

Additional plaintiffs in the suit include several individuals represented by California Rural Legal Assistance.

Annex 6.

Lists of Endangered Animal Species Known in Ecuador

Fundación Natura

EXTINCION DE ANIMALES EN EL ECUADOR

DESCRIPCION DE 60 ESPECIES AMENAZADAS

LUIS SUAREZ
MARIO GARCIA

Quito, 1986

Julio de 1986

Diseño y Producción:
Juan Lorenzo Barragán y Luz Elena Coloma
IMPRENTA MARISCAL

CONTENIDO

ECUADOR

AN ASSESSMENT OF BIOLOGICAL DIVERSITY AND TROPICAL FORESTS FOR ECUADOR

Prepared for USAID/Ecuador
as an Annex to the
Country Development Strategy Statement
for FY 1989 -1990

Prepared by:

Bruce J. Cabarle, Team leader
Muriel Crespi, Cultural Anthropologist
Calaway H. Dodson, Botanist
Carlos Luzuriaga C., Natural Resource Economist
Dietmar Rose, Natural Resource Economist
John N. Shores, Wildland Management Planner

Ad Honorem:

Nora L. Berwick, USAID/S&T/FENR
Howard L. Clark, USAID/LAC/REMS
Maria Magdalena del Pozo, DIGEMA
Kate Clark, Editor

The Center for International
Development and Environment
of
The World Resources Institute

1717 Massachusetts Avenue NW, Suite 302
Washington DC 20036

January 1989

flat region with meandering rivers, many of which are quite large. Biodiversity is lower in this region than on the flanks of the Sierra or on the lower slopes, and the flora has many species in common with the rest of the Amazon Basin.

It is only with the recent advent of oil exploration and exploitation that the forests of this region have suffered significant alteration. The easy access granted by the road networks associated with petroleum activities and a massive governmental colonization effort have resulted in a significant reduction of forest cover. We estimate that about 30% of the forests have been converted to other uses, leaving about 30,000 km2 still in primary forest.

The region at the base of the Andes, with premontane dry, humid, wet, and pluvial forests, and lower montane humid and pluvial forests are extremely biologically diverse. This area of approximately 39,000 km2 has been heavily converted to agriculture, mostly pasture and coffee. We estimate that about 30% (11,700 km2) of these forests remain undisturbed.

About 51%, or 41,700 km2 of the total Oriente region (81,000 km2) remains forested, of which a large portion is relatively homogenous lowland forest with lower biodiversity than the forests of the Andean slopes.

Nationwide (273,000 km2), we estimate that only 26%, or (72,000 km2) is still clothed in primary forest, with more than half (41,700 km2) occurring in the lowlands of the Oriente.

3.2. Definition of "Species at Risk"

Various international treaties (e.g. CITES) offer definitions for different classifications of endangerment: rare, threatened, endangered, etc. We have chosen the broader label "Species at Risk" to cover all of these categories, including rare, threatened, endangered, reduced population and endemic, that signal a need for special attention. In this way, we can focus on the problem of endangerment even though the information base does not allow us to determine the exact category for a particular species or population.

Under this system, a species is at risk when its habitat is under threat. We consider any species endemic to Ecuador to be subject to at least moderate risk of extinction considering the current protection status of primary natural forests. Obviously, an indeterminate number of species have already gone extinct since only 26% of the original forest cover is still extant. Other reasons that contribute to the endangerment of particular species are over-hunting, natural pathological epidemics and disease spreading from domestic animals.

3.2.1. Analysis of Species at Risk Following a Regional Focus

In Appendix 3.2, we present a discussion of biological endemism in Ecuador. Based on numbers generated in the discussion of Appendix 3.1, we are able to estimate the risk situation for vascular plants in the three regions of Ecuador. Animal species, dependent on the presence of undisturbed vegetation, can be expected to suffer the same risk factors.

Western Ecuador.

In Tables 3.2 and 3.3, we present accumulated data (Dodson & Gentry, in prep.) concerning the species of vascular plants at risk at four intensively studied sites in western Ecuador (Rio Palenque Science Center, Jauneche, Capeira, and Centinela). Extrapolation from these data indicates that, of the 6,300 species estimated to occur in western Ecuador, 1,260 (20%) are at risk.

Andean Highlands.

Extrapolation based on data in Appendices 3.1 and 3.2 indicates that about 10,500 species of vascular plants occur in the Sierra and that 2,625 of those species (25%) are endemic and therefore at risk.

Amazon Region.

Similar extrapolation indicates that about 8,200 species of vascular plants occur in the Oriente and, of those, 1,230 species (15%) are endemic and at risk.

Galápagos Islands.

The Galápagos have a native flora of 702 species of which 228 are considered to be endemic (Wiggins and Porter, 1971). Thus 32.5% of the plant species are endemic vs. 20% in mainland Ecuador. The basic difference between the risk situation on the Galápagos Islands and that of mainland Ecuador is an international awareness (partially due to ecotourism) of the precarious situation of the Galápagos. This awareness has resulted in the application of far stronger control measures that, along with the distance from the mainland, lead to more effective conservation measures. Similar awareness of the risk situation on the mainland must be developed if the alarming rate of biodiversity loss is to be thwarted.

Table 3.2: Comparison of the status of vascular plant species at four sites in Western Ecuador.

	RPSC	Jauneche	Capeira	Centinela
Vascular plant species reported:	1289	728	772	1164
Cultivated plant species:	215	136	141	177
Native plants:	1074	592	631	987
Species now extirpated at site:	25		1	84
Remaining native plants:	1049	592	630	903

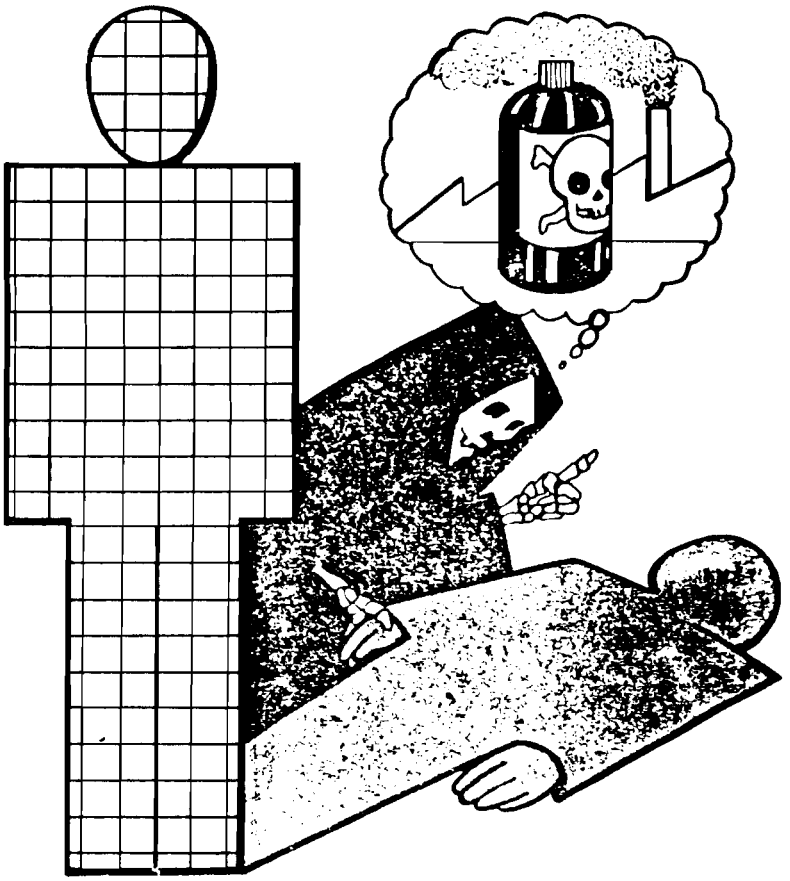
Table 3.3: Risk situation at 4 sites in western Ecuador (Species at extreme risk due to small populations)

	RPSC	Jauneche	Capeira	Centinela
Endemic to site	18	5	0	± 84
Found at other sites in region. .	49	12	18	17
Species of broad distribution . .	39	33	63	?
Species with short-term sustainable populations at site	942	542	559	?
Species at risk on a long term basis	312	73	187	?
Species not at risk, primarily due to wide distribution . . .	670	469	372	300

Annex. 7

Pesticide Poisonings in Ecuador
1984-1988

PLAGUICIDAS Y SALUD



Serie: Información Técnica sobre plaguicidas Nº 3

Fundación Natura

PROYECTO EDUCACION
AMBIENTAL SOBRE PLAGUICIDAS

ANEXO A

TABLA NO. 1

NUMERO TOTAL DE CASOS DE INTOXICACION POR PLAGUICIDAS DESDE 1984 A 1988 - ECUADOR

AÑO	1984	1985	1986	1987	1988	TOTAL
No. de casos de intox. por plaguicidas.	75	222	275	351	360	1.283

FUENTE : M.S.P. - División Epidemiológica - 1989

ELABORACION: Fundación Enfermera - 1989

ANEXO B

TABLA NO. 2

NUMERO DE CASOS DE INTOXICACION POR PLAGUICIDAS POR PROVINCIAS

DESDE 1984 A 1988 - ECUADOR

PROVINCIA	1984	1985	1986	1987	1988	TOTAL
Carchi	27	24	40	22	30	143
Imbabura	8	9	3	4	6	30
Pichincha	19	11	17	71	44	162
Cotopaxi	--	--	--	--	--	---
Tungurahua	--	6	21	6	20	53
Bolivar	6	6	8	5	--	25
Chimborazo	--	--	--	--	--	--
Cañar	--	11	16	23	33	83
Azuay	--	3	14	27	45	89
Loja	--	1	--	8	11	20
Esmeraldas	3	1	12	2	8	26
Manabi	--	44	49	95	72	260
Guayas	3	15	5	7	27	57
El Oro	--	64	39	16	18	137
Napo	--	--	13	7	6	26
Pastaza	--	--	--	--	5	5
Morona Santiago	--	4	12	30	17	63
Zamora Chinchipe	6	--	2	3	--	11
Galápagos	1	--	--	--	--	1
TOTAL	75	222	275	351	360	1.28

FUENTE: M.S.P. - División de Epidemiología - 1989

ELABORACION: Fundación Enfermera - 1989

ANEXO C

TABLA No3

DISTRIBUCION DE TASAS DE INCIDENCIA DE INTOXICACIONES POR PLAGUICIDAS SEGUN PROVINCIAS (1984-1988)
QUITO-ABRIL 1989

PROVINCIA	TASAS DE INCIDENCIA/ 100.000 hbs
CARCHI	99,8
IMBABURA	10,67
PICHCINCHA	9,46
COTOPAXI	------
TUNGURAHUA	14,95
BOLIVAR	15,17
CHIMBORAZO	------
CAÑAR	41,83
AZUAY	17,32
LOJA	4,94
ESMERALDAS	8,73
MANABI	25,00
LOS RIOS	17,22
GUAYAS	2,29
EL ORO	33,65
NAPO	17,08
PASTAZA	12,96
MORONA SANTIAGO	73,48
ZAMORA CHINCHIPE	18,56
GALAPAGOS	12,54

FUENTE: Ministerio de Salud Pública, División de Epidemiología
ELABORACION: Fundación Enfermera Abril 1989

Annex 8.

a. List of Material Needed for the MAG/SV Laboratory in Guayaquil and Estimated Costs

b. Project Proposal for the MAG/SV Laboratory in Guayaquil

MINISTERIO DE AGRICULTURA
Y GANADERIA
SUBSECRETARIA DE LA COSTA
Y REGION INSULAR
AVENIDA QUITO 402 Y PADRE SOLANO
TELEFONOS: 280540 - 397789 - 395200
GUAYAQUIL - ECUADOR

NECESIDADES DEL LABORATORIO DE ANALISIS DE RESIDUOS DE PESTICIDAS

MUESTRAS A ANALIZAR

FRUTAS, VEGETALES, GRANOS

MUESTRAS DE ACEITE.

LECHE, LECHE CONDENSADA, LECHE EN POLVO.

HUEVOS, PESCADO, CARNE, CANGREJO.

MANTEQUILLA, MARGARINA, QUESOS, GRASAS.

SUELOS, AGUAS, SEDIMENTOS.

ALIMENTO BALANCEADO Y A BASE DE CEREALES.

SANGRE HUMANA.

CANTIDAD DE MUESTRAS POR SEMANA.

- LO MAS QUE SE PUEDA DE ACUERDO AL MATERIAL QUE EXISTA, POR LO PRONTO DE 12 a 15 SEMANALES.

1.- EQUIPOS

1.a. 1 CROMATOGRAFO DE GASES CON DETECTORES VARIOS ESPECIALMENTE CAPTURA DE ELECTRONES Y LLAMA ALCALINA PARA ANALISIS CUANTITATIVA DE PESTICIDAS (GCD)

1.b. 1 ESPECTOFOTOMETRO ULTRAVIOLETA DEL MAYOR RANGO POSIBLE PARA DETERMINAR LA CALIDAD DE LOS PESTICIDAS.

1.c. UN AGITADOR MECANICO.

2.- REACTIVOS (CANTIDAD POR MUESTRA).

2.a.	ACETONITRILO p.a. DE RESIDUOS	200 cc.
2.b.	ETER DE PETROLEO p.a. DE RESIDUOS	450 cc.
2.c.	SILICA GEL 60 0.063 - 0.200 mm. (70-230 mesh) 1 ----	20 gr.
2.d.	SULFATO DE SODIO, ANHIDRO	20 gr.
2.e.	CLORURO DE SODIO, ANHIDRO	10 gr.
2.f.	LANA DE VIDRIO	1 gr.
2.g.	ACETONA p.a.	400 cc.
2.h.	N-HEXANO	20 ml (12 y 14)
2.i.	ARENA DE MAR PURIFICADA	25 gr.

MINISTERIO DE AGRICULTURA
Y GANADERIA
SUBSECRETARIA DE LA COSTA
Y REGION INSULAR
AVENIDA QUITO 402 Y PADRE SOLANO
TELEFONOS: 280540 - 287789 - 295200
GUAYAQUIL - ECUADOR

2.j. DICLOROMETANO..... 200 cc.

2.k. CLOROFORMO..... 100 cc.

2.l. METANOL..... 50 cc.

2.n. FLORISIL 60- 100 MESH 25 gr.

3.- MATERIALES

3.a. LICUADORA CON VASO DE VIDRIO

3.b. ERLENMEYER DE FILTRACION A VACIO DE 1.000 mls.

3.c. EMBUDO DE BUCHNER DE 12.5 cm. DE DIAMETRO

3.d. PAPEL FILTRO DE 12.5 CM. DE DIAMETRO

3.e. EMBUDO DE SEPARACION DE 1.000 y 500 mls. con TAPON Y LLAVE DE TEFLON.

3.f. PROBETA GRADUADA DE 100 mls. CON TAPON ESMERILADO.

3.g. PROBETA DE 100 mls.

3.h. PROBETA DE 1.000 mls.

3.i. PROBETA DE 10 mls.

3.j. EMBUDO DE VIDRIO DE 10 cm. de DIAMETRO.

3.k. BALONES DE 10-20-100-250 y 500 mls (PREFERIBLE FONDO REDONDO)

3.l. COLUMNAS DE CROMATOGRAFIA DE 2 cm. DE DIAMETRO x 40 de LONGITUD CON LLAVE DE TEFLON CON UN VASO DE 500 ml. INCORPORADO.

3.m. MATRAZ AFORADO DE 10 - 25 y 100 mls CON TAPON ESMERILADO.

3.n. PIPETA DE DIFERENTES VOLUMENES.

3.o. PIPETAS DE SEGURIDAD DE 5 ml.
MORTERO DE PORCELANA CON PISTILO.

3.p. EXTRACTOR SOXHLET.

3.q. BAÑO DE MARIA A 60°c.

3.r. PAPEL FILTRO DE 24 y 12.5 cm.

3.s. PEAMER DE VARIAS MEDIDAS.

3.t. CINTAS PARA DETERMINAR COLINESTERASA.

Ing. Eugenio Salazar

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GUAYAQUIL - ECUADOR

IDENTIFICACION Y DETERMINACION CUANTITATIVA DE PESTICIDAS EN SUS FORMULACIONES.

1. INTRODUCCION.

Para hacer un análisis cuantitativo de un pesticida, es decir, para determinar la cantidad de ingrediente activo que tiene una formulación, es necesario, hacerlo por el método de Espectofotometría ultravioleta.

Mediante este proceso se especifican las longitudes de onda, el rango para una buena cuantificación de éstos compuestos y el ámbito de aplicación.

De esta manera se indican las condiciones de análisis de las formulaciones de productos fitosanitarios para determinar la riqueza del principio activo de los formulados. Este método es rápido, específico y preciso.

2. ANTECEDENTES:

Desde hace ya algún tiempo, especialmente desde que el Gobierno anterior decretó la libre importación de pesticidas, este mercado se prostituyó y diariamente vienen denuncias de esta falsificación habiendo comprobado muchas veces con análisis hechos en laboratorios ajenos esta anomalía, tal es el caso de la falsificación del FURADAN por arena de mar pintada; PROMTO por sal cocinada coloreada; ATRANEX por harina, BAYGON por Korex; EVISECT por harina, HERBICIDAS por ácidos diferentes o petróleo etc., en fin es largo nombrar la cantidad de productos que han caído en las redes de los falsificadores los cuales se enriquecen ilícitamente a costa del bolsillo del incauto agricultor.

3. OBJETIVOS:

El objetivo específico de la adquisición de un Espectofotómetro ultravioleta es la de detectar la adulteración de los pesticidas a todo nivel, para de esta manera evitar la estafa que vienen siendo objeto los agricultores al adquirir en el mercado los productos

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químicos para el control de plagas, enfermedades, los cuales además de tener un alto costo, en muchas ocasiones no les sirve de nada por tratarse de una falsificación.

4. QUE SE PUEDE ANALIZAR CON EL ESPECTROFOTOMETRO ULTRAVIOLETA.

Con este equipo se pueden analizar:

Insecticidas y Acaricidas organoclorados:

ALDRIN
DDT
DICOFOL
ENDOSULFAN
ENDRIN
HEC
HCH
HEPTACLORO
LINDANO
TETRADIFON
DICOFOL

Insecticidas y acaricidas organo fosforados:

CARBAFENOTION
CLORFENVINFOS
DIAZINON
DICLORVOS
DIMETOATO
ETIL AZINFOS
ETIL PARATION
ETION
MALATHION
METIL TETRACLORVINFOS
TRICLORFON

Insecticidas y acaricidas carbamatos:

ALDICARB, PIRIMICARB , etc.
CARBARIL, METOMILO.

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Herbicidas carbamatos.

CLORPROFAM
MOLINATO
CLOROXURON
DIURON
FIRAZONA
TRIFLURALINA

Herbicidas Fenopracélticos.

2,4 - D, MCPA.

Derivados de úrea:

CLORTOLURON
METABENZOTIAZURON

Triazinas:

ATRAZINA
ISOMETIOZIN
METRIBUZIN
SIMAZINA
TERBUTRINA

Otros Herbicidas:

DACTAL
DIFENZOQUAT
DIQUAT
FLUROXOL BUTIL
PARAQUAT
PIRAZONA
TRIFLURALINA

Fungicidas:

Carbamatos
Benomilo.

...///

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-Thiocarbamatos:

TIIRAM

Organoclorados:

FOLSET
HEXACLORODIENCENO

Otros:

DINITIRIMOL
OXIQUINOLEINA SULFATO
TIABENDAZOL
OXICLORURO DE COBRE

Nematicidas:

ALDICARB
FURADAN
FENAMIFOS

Rodenticidas:

CLOROFACINONA
WARFARINA

REPELENTES:

ANTRAQUINONA, etc.

Ing. [illegible]
Ing. Teresa García de Paladines
RESPONSABLE DEL DEPTO. DE PESTICIDAS

TGdP/hdes
14-IX-89.

Annex 9.

LABORATORY LIST - YEAR 1

LABORATORY LIST - YEAR 1

	Est. Cost
GAS chromatograph W/E.C.D. & F.P.D.	$30,000
HPLC (carbamates, glyphosates, etc.) UV & florescent det.	50,000
Hamilton syringes 701N (6)	150
Dual pen recorder w/extra pen cartridges	2,000
Extra columns (5) prepacked	400
Septums, ferrules, etc.	500
Recorder chart paper	400
Gases for G.L.C.	
Nitrogen (24 tanks) zero grade	2,400
Air commercial grade (12 tanks)	600
Hydrogen generator	4,000
2-stage gas regulators (2) for air & N2	300
Supelco gas purifier for N2	400
Refills for purifier (6)	300
U.S.A.	91,450
Developing Country + 20%	109,740
Solvents (nanograde or pesticide quality)	
Acetone (24 gallons)	900
Pet. ether (24 gallons)	900
Hexane (12 gallons)	500
Dichloromethane (4 gallons)	200
Acetonitrile (12 gallons)	500
Benzene (2 gallons)	100
Methanol (2 gallons)	60
Ethanol (2 gallons)	60
Diethyl ether (8 gallons)	400
U.S.A.	3,620
Developing Country + 50%	5,430

Chemicals

Potassium or sodium hydroxyde pellets (500 gm)	10
Florisil (25 lbs. PR grade-Floridin Co.)	250
Celite 545 (500 gm)	40
Magnesium oxide (1 kg)	30
Sulfuric acid (1/2 gallon)	15
Fuming Sulfuric (1/2 gallon) 27-33%	45
Sodium sulfate, anhydrous, granular (10 lbs)	50
Sodium chloride (1 kg)	15
U.S.A.	455
Developing Country + 50%	685

Equipment

Water bath - capable of 100°C	1,500
Oven capable of 130°C	1,500
Analytical balance (± 0.1 mg)	4,000
Explosion proof blender	1,800
Rotavap	1,000
Timer	50
Water distillation device	2,500
Stopwatch	50
Centrifuge	5,000
Pipette washer	250
Rotary extractor	700
N-evap	100
Test tube rack (2)	40
Calculator	100
Lab stand and clamps, O-rings	400
U.S.A.	18,990
Developing Country + 20%	22,788

Glassware

Florisil columns 24 mm 0.0. x 300 mm w/stockcock	(10)	260
Separatory funnels		
1 l	(6)	150
500 ml	(6)	180
250 ml	(6)	200
125 ml	(6)	160
60 ml	(6)	160
Graduated cylinders		
100 ml	(6)	60
50 ml	(6)	45
25 ml	(6)	45
10 ml	(6)	30
Pipettes, volumetric		
1 ml	(12)	38
2 ml	(12)	38
3 ml	(12)	38
4 ml	(12)	38
5 ml	(12)	38
10 ml	(12)	42
Pipettes, delivery		
0.5 ml	(12)	45
1 ml	(12)	45
2 ml	(12)	45
5 ml	(12)	50
10 ml	(12)	55

Glassware (Cont'd)

Buchner funnel (2) 152 mm I.D.	110
Vacuum flask (2) 2 liter	70
Volumetric flasks	
200 ml (12)	105
100 ml (12)	90
50 ml (12)	85
10 ml (12)	75
Funnels, short stem, filering, 100 mm diameter (6)	21
Funnels, long stem, paper filter, 100 mm diameter (6)	37
Funnels, powder 75 mm diameter (12)	32
Beakers	
10 ml (12)	16
30 ml (12)	14
100 ml (12)	15
250 ml (12)	14
400 ml (12)	16
1 liter (6)	20
Kiderna-danish flasks, 500 ml (6)	500
3-ball Snyder columns (6)	
Mills tubes, graduated, 10 ml (24)	360
19/22 t stoppers (24)	60
Glass beads box	5
Rubber bands box	5
Micro snyder columns, modified	100
Columns, 24 mm I.D. x 300 mm, plain (6)	90

Glassware (Cont'd)

Glass wool 2 pkgs	50
Aluminum foil 10 boxes of 25 sq. ft.	10
Soxhlet extraction tube w/condernser (2) & thimbles	300
Culture tubes, 16 mm x 125 mm, teflon lined screw cap (144)	106
U.S.A.	4,030
Developing Country + 50%	6,000
TOTAL	