

SAMOA QUARANTINE
IMPROVEMENT PROJECT

Emergency Response Plan

Prepared for

AusAID

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Prepared by

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CONTENTS

Introduction	iii
Glossary of Acronyms	iv
Guide to the Emergency Response Plan	v

Part A: Response Management

1.1	Management Structure for an Emergency Pest Response	1
1.2	Outline of Responsibilities for each Management Position.....	2

Part B: Technical Advice and Actions

1	Initial Response	1
1.1	Notifications Required upon Detection of Pest	1
1.2	Precautionary Containment and Control Measures	2
1.3	Confirm Identification/Diagnosis.....	2
1.4	Delimiting Survey.....	6
1.5	Pest Information.....	8
1.6	Response Decision to be Made by the ERMCC.....	9
2	The Emergency Response	11
2.1	Operational Control Centre	11
2.2	Response Monitoring	11
2.3	Eradication.....	13
2.4	Movement Control.....	15
2.5	Public Awareness Plan	17
2.6	Stand-Down Procedure.....	19

APPENDICES

- Appendix 1: Sampling and Shipment of Insects for Identification
- Appendix 2: Sampling and Shipment of Plant Disease Specimens for Identification
- Appendix 3: Instructions for the Sampling and Shipment of Weed Specimens for Identification
- Appendix 4: International Contacts for Pest Identification



Government of Samoa

MINISTRY OF AGRICULTURE, FORESTS, FISHERIES AND METEOROLOGY

EMERGENCY RESPONSE PLAN FOR ANIMAL & PLANT PESTS

May 2003

Introduction

As we experienced with the Taro Leaf Blight outbreak in the 1990's the introduction of exotic pests or diseases into Samoa can have disastrous effects on our people and on our economy.

We learned much from the Taro Leaf Blight outbreak, not the least being that It is important that we are better prepared to manage such an exotic pest incursion to prevent it spreading, and to eradicate it before it it has time to become established anywhere on our islands.

The Emergency Response Plan outlined in this document has been prepared as a part of the Ministry of Agriculture, Forestry, Fisheries and Meteorology's efforts to strengthen our overall biosecurity, from our border control, to our surveillance capability, and on to our ability to respond quickly in effectively eradicating an exotic pest.

This Plan is a guide for us to carry out an Emergency Response, outlining the management structures and operational steps we need to take to implement a successful eradication or control programme.

By planning our response and ensuring that the people involved are aware and trained for the tasks for which they are responsible we will be in a better position in the future to successfully combat an exotic pest incursion into Samoa.

Seumanutafa A.M.Iakopo

Chief Executive Officer

Ministry of Agriculture, Forests, Fisheries and Meteorology

Glossary of Acronyms

ACEO	Assistant Chief Executive Officer
APH	Animal Production and Health
CBA	Cost-benefit Analysis
CEO	Chief Executive Officer
ER	Emergency Response
ERMC	Emergency Response Management Committee
ERP	Emergency Response Plan
GIS	Geographic Information System
GPS	Global Positioning System
MAFFM	Ministry of Agriculture, Forests, Fisheries and Meteorology
NDMC	National Disaster Management Committee
OCC	Operational Control Centre
OIE	Office International des Epizooties
QD	Quarantine Division
SPC	Secretariat of the Pacific Community
TA	Technical Advisor

Guide to the Emergency Response Plan

The Emergency Response Plan (ERP) outlined in this document has been designed as a guide to help identify the key components of a response to a suspected exotic plant or animal pest, plus the management structure that would best support the successful implementation of a response. The document is designed to be a guide to plan a response to a specific pest and to provide the framework for training personnel in an emergency response. It is also designed to be a working document during a response to help personnel respond quickly and in an organised way in which personnel with various responsibilities know what it is they are supposed to be doing. The appropriate pages from the **Management Responsibilities** section of the document can be handed to personnel in management positions to act as a guide in the tasks that they need to implement. Likewise the appropriate sections from the **Initial Response** and the **Emergency Response** can be handed to personnel in technical and operational positions, such as the Technical Advisor, the Response Manager and the Field Team Leaders. The process involved in ending a response is also described in 'Stand-down procedures'.

The ERP is actioned once the Technical Advisor confirms that the suspected pest warrants a response. The plan is constructed around the two key stages of a response to the introduction of a suspected exotic pest listed below and includes an overall management structure that would support the implementation of the steps required at each stage.

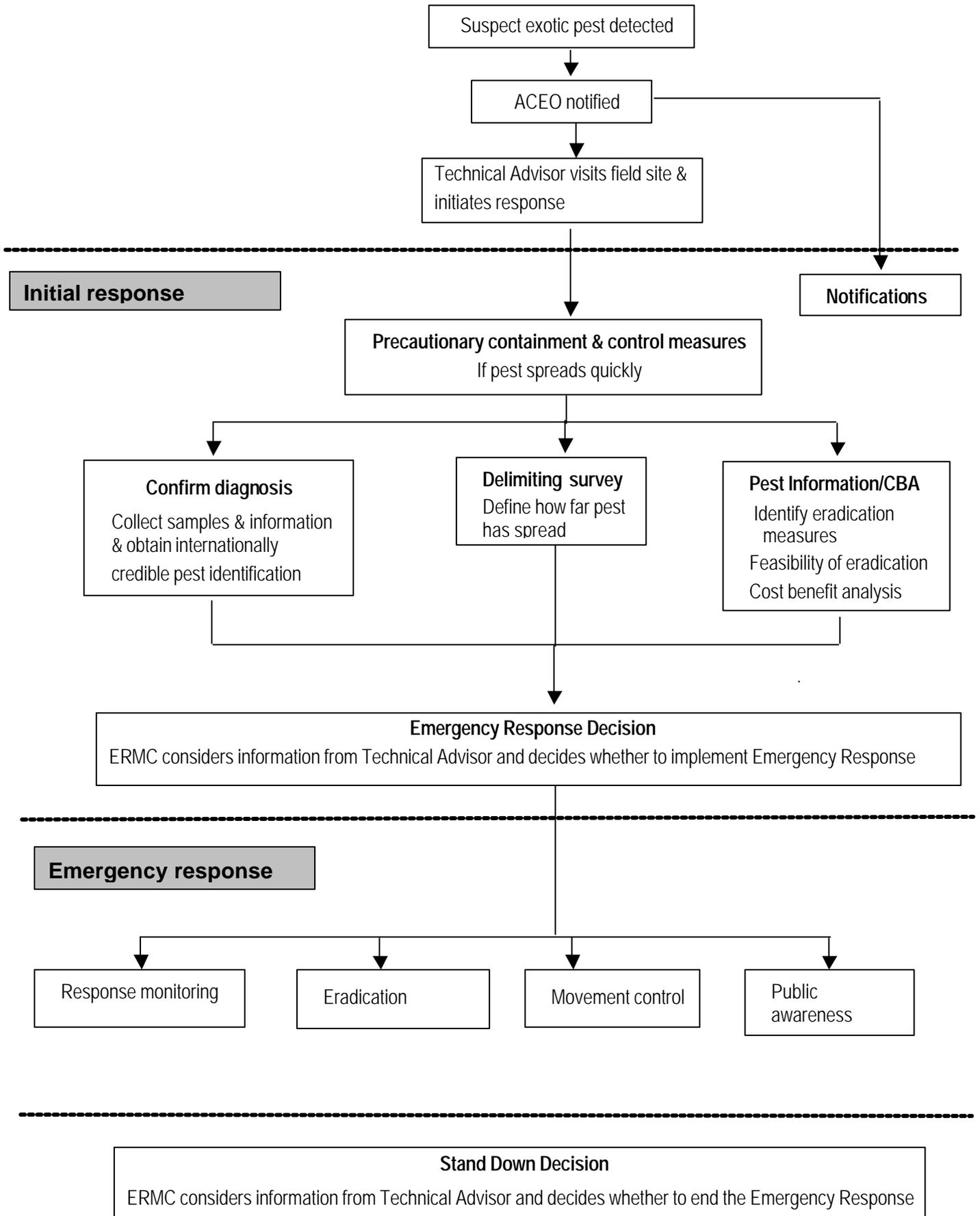
1. The initial response

Collecting information on the pest, determining how widespread it is and deciding whether to implement an emergency response or not.

2. The emergency response

Implementing the emergency response including measures to contain spread and eradicate the pest, plus deciding when it is appropriate to 'stand-down' the emergency response.

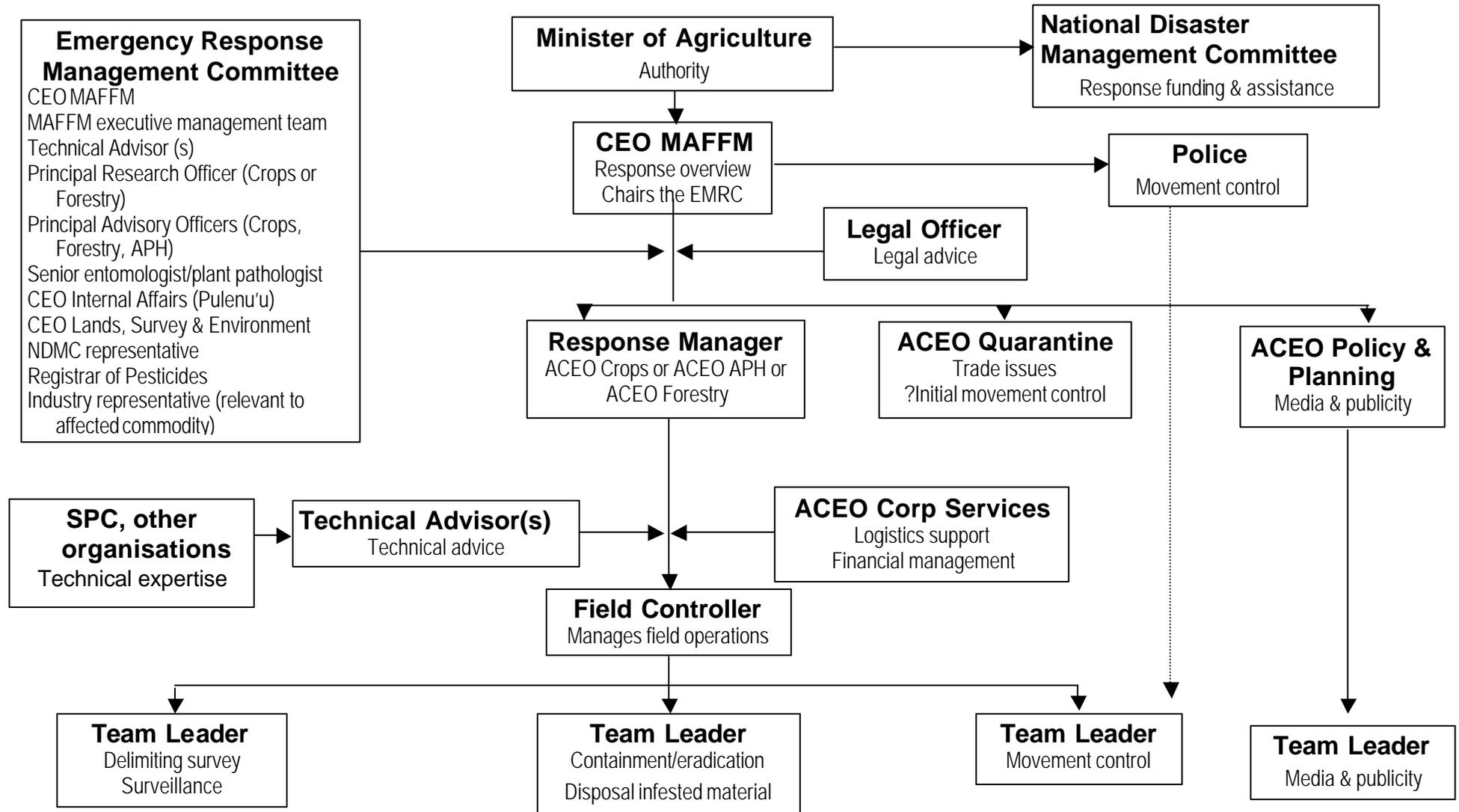
Guide to the Emergency Response Plan



Part A

Response Management

1.1 Management Structure for an Emergency Pest Response



1.2 Outline of Responsibilities for each Management Position

Position	Functions and Responsibilities
Minister of Agriculture	<ul style="list-style-type: none"> - Legally declares an Emergency Response (ER) - Notifies the National Disaster Management Committee of the ER and requests them to mobilise government funding for the response
Director National Disaster Management Committee (NDMC)	<ul style="list-style-type: none"> - Mobilises government funding for the ER - Mobilises other disaster management resources as necessary
CEO MAFFM	<ul style="list-style-type: none"> - Requests the Minister of Agriculture to legally declare an ER - Ensures that all resources required for the ER are available to the operational team - Obtains the support of the Police Department and other government departments that need to be involved - Convenes and chairs the ERMCM - Reports regularly to the Minister on progress of the ER
Emergency Response Management Committee (ERMCM)	<ul style="list-style-type: none"> - Discusses recommendations from the Technical Advisor, arising from the initial response and decides whether to initiate an ER or not - Discusses any modification to the ER as recommended by the Technical Advisor during the implementation stage - Reports to the Minister of Agriculture on progress of the response - Decides when it is appropriate to stop the ER
Legal Officer MAFFM's senior legal officer	<ul style="list-style-type: none"> - Ensures that all pest management plans conform to relevant legislation - Ensures emergency declaration is legally sound
Response Manager ACEO Crops or ACEO APH or ACEO Forestry (whichever relevant)	<ul style="list-style-type: none"> - Alerts CEO MAFFM to a suspected pest incursion - Organises initial response - Selects Field Controller (if one is used) and oversees appointment of the Field Teams - Briefs Field Controller and Field Teams and organises training if needed - Manages the operational aspects of the outbreak via the Field Controller - Reports to ERMCM on progress of the ER - Notifies SPC of suspected exotic pest
Technical Advisor In-country person with technical skills most relevant to the suspected pest e.g. entomologist, plant pathologist, veterinarian Appointed by and reporting to ACEO Crops or ACEO APH or ACEO Forestry	<ul style="list-style-type: none"> - Collects samples and organises identification/diagnosis of pest - Sends samples to overseas laboratory if necessary - Obtains assistance of SPC and/or overseas technical specialist if necessary - Prepares a dossier of information on the pest - Obtains information on options for eradicating suspected pest - Designs and oversees delimiting survey, providing training if necessary - Liaises with CEO Planning & Policy to conduct a CBA

Position	Functions and Responsibilities
If need be this role can be undertaken by more than one person. For example, additional specialist expertise may be brought in from SPC or other overseas organisation.	<ul style="list-style-type: none"> - Submits report to ERMC including response options, recommendations and tentative cost benefit analysis - Briefs Response Manager regarding necessary response procedures - Trains response team(s) and Field Controller if necessary to increase number of staff with appropriate skills - Provides technical advice to CEO MAFFM, ERMC, Response Manager, Field Controller, Field Teams - Monitors progress of response and recommends to ERMC any changes in response procedures
ACEO Quarantine	<ul style="list-style-type: none"> - Manages trade issues associated with pest incursion - May assist initial containment before ER declared (existing legal powers)
ACEO Corporate Services	<ul style="list-style-type: none"> - Appoints a Financial Officer and an Administration Officer to support the Response Manager
ACEO Policy & Planning	<ul style="list-style-type: none"> - Appoints a Publicity Officer to support the Response Manager - Manages the budget - Conducts a cost-benefit analysis
Publicity Officer	<ul style="list-style-type: none"> - Responsible for organising a publicity programme to support the operational aspects of the emergency response - Manage the media and provide them with press releases and interviews
Financial Officer	<ul style="list-style-type: none"> - Supports Response Manager in financial management of ER
Administration Officer	<ul style="list-style-type: none"> - Supports Response Manager in administration of ER
Police Support Officer	<ul style="list-style-type: none"> - Organises area control (road blocks, inter-island blocks, etc) - Provides authority and manpower for area control - Provides communication facilities for area control
Field Controller	<ul style="list-style-type: none"> - Together with Response Manager selects Field Team Leaders and members of Field Teams - Checks resource requirements and liaises with the Administration Officer to obtain necessary resources - Briefs Field Teams - Manages operational activities of Field Teams
Field Team Leaders	<ul style="list-style-type: none"> - Manage the activities for each Field Team

Minister of Agriculture

Role: The Minister of Agriculture is responsible for providing the legal authority to implement an emergency response and for obtaining funding for the response.

Responsibilities:

- Declaring a state of pest or disease emergency.
- Notifying the National Disaster Management Committee of the emergency and obtaining funding for the response.

- International liaison
- Reporting progress to the Government

Responsible to: Prime Minister

National Disaster Management Committee (NDMC)

Role: The NDMC is responsible for mobilising funding and support systems that are available for disaster management.

Responsibilities:

- Mobilising government funding for the ER.
- Mobilising other disaster management resources as appropriate.

Responsible to: Prime Minister

CEO MAFFM

Role: The CEO MAFFM is responsible for communicating with the Minister of Agriculture during all stages of the outbreak, for overseeing the emergency response, and for activating the involvement of other government departments.

Responsibilities:

- Notifies the Minister of Agriculture when notified of a suspect pest incursion.
- Forms an ERMC when notified of a suspect pest incursion.
- Notifies the Minister of Agriculture of the agreed response to the pest incursion as recommended by the EMRC.
- Requests that the Minister declare an Emergency Response to eradicate the pest if this is the outcome recommended by the EMRC.
- Once an outbreak has been declared:
 - Obtains the support of the Police Department.
 - Obtains the support of any other government departments whose assistance is required.
 - Ensures that all resources required for the emergency response are available to the operational team.
 - Organises and chairs regular meetings of the ERMC – maybe daily in the initial phase, reducing to a lesser frequency with time.
 - Keeps the Minister up-to-date with progress of the response.
 - Appoints officers with the delegated authority to implement designated measures in the response.

Responsible to: Minister of Agriculture

Emergency Response Management Committee (ERMC)

Role: The ERMC is the key group responsible for deciding whether to proceed with an emergency response and for approving, or recommending modifications to, advice from the Technical Advisor with respect to the methods that will be used to eradicate the pest.

Structure: CEO MAFFM (Chair person)
MAFFM Executive Management Team
Technical Advisor(s)
Head of Research (plants)
Heads of Extension for animals & plants
Head of entomology/plant pathology (whichever is relevant to pest)
CEO Internal Affairs (responsible for Pulenu'u)
CEO Lands, Survey and Environment
Industry representative relevant to affected commodity
NDMC representative
Registrar of Pesticides (as a representative of the Pesticide Technical Committee)
Any other representative(s) of organisations that need to be involved eg organisations with responsibility for environment, health

Responsibilities:

- Consider information provided by the Technical Advisor and decide whether an emergency response should proceed or whether one of the lesser options should be taken.
The information to be considered is:
 - Confirmed pest diagnosis
 - Results of delimiting survey which indicates how far the pest has already spread
 - Assessment of impact of the pest
 - The feasibility of eradication given available treatment & control methods
 - Cost-benefit analysisThe levels of response to a pest incursion are:
 - No further action
 - Long-term management
 - Eradication
- Meet regularly during the ER to receive updates on progress and to make any decisions about changes in the approach being used to eradicate the pest, upon the advice the Technical Advisor(s).
- Report to the Minister, via the CEO MAFFM, on progress of the response.
- Determination of Stand-down

Responsible to: Minister of Agriculture

Legal Officer

Role: Provides advice on legal aspects of the ER.

Responsibilities:

- Ensures that the ER is declared in accordance with legislation.
- Ensures that containment and eradication measures are supported by appropriate legislation.
- Ensures that compensation arrangements meet legal requirements.

Responsible to: CEO MAFFM

Response Manager

Who: ACEO Crops or ACEO Animal Production and Health (APH) or ACEO Forestry

Role: The Response Manager is responsible for overall management of the emergency response.

Responsibilities:

Initial response

- Alerts CEO MAFFM to a suspected pest incursion.
- Organises initial response and ensures that resources are available to confirm the diagnosis, to do a delimiting survey and to obtain the information required to decide whether to proceed with an emergency response or not.
- Participates in the ERMC meeting to decide whether to declare an emergency response or not.

Declared emergency response

- Manages the operational aspects of the emergency response via the Field Controller.
- Liases with Technical Advisor to identify the key operational components of the emergency response.
- If necessary, organises the establishment of an Operational Control Centre
- Selects Field Controller and Field Team Leaders and oversees the process of selecting Field Team members.
- Briefs Field Controller and Team Leaders and organises training if required to increase the number of people with appropriate skills to implement the response.
- Provides names of Field Team Members to the CEO MAFFM who appoints officers with the delegated authority to implement response measures
- Works together with ACEO Corporate Services to ensure the Field Teams have the resources that they require (equipment, vehicles, protective clothing, maps, data sheets, safety and first aid equipment, GPS, etc).
- Works together with ACEO Corporate Services to obtain financial management support, and to manage the day-to-day finances of the field response.
- Reports to the CEO MAFFM and the ERMC on progress of the response.
- Provides advice to the CEO MAFFM and the ERMC on aspects of the response as required.
- Ensures that the necessary international organisations are notified of the pest outbreak.

Technical advisor

Role: Provide specialist technical advice relating to the diagnosis, containment and eradication of the pest.

Responsibilities:

Initial response

- Collects samples and organises identification/diagnosis of pest
- Sends samples to overseas laboratory if necessary
- Obtains assistance of SPC and/or overseas technical specialist(s) if necessary
- Compiles dossier of information on the pest, including
 - Ecology (speed and mode of dispersal, hosts, etc)
 - Financial and social impact
 - Trade implications
 - Control/eradication options
 - Picture of the pest and its signs or symptoms
- Recommends precautionary measures to contain the spread of the pest from the initial site(s).
- Attempts to trace the source of the incursion, and provides advice to the Response Manager and the ACEO Quarantine, on measures to reduce the risk of further introductions by the same pathway.
- Designs and oversees delimiting survey, monitoring plan, eradication plan and advises on movement control measures to prevent spread of the pest.
- Submits report to ERMC including response options, recommendations and indicative budgets.
- Provides training to the Field Controller and Response Teams if necessary.
- Operates and maintains any laboratory facilities required.
- Assesses feasibility of eradicating pest.
- Considers the need for registration of any pesticides that are not already registered.

Declared emergency response

- Briefs Response Manager regarding necessary response procedures.
- Trains response team(s) and Field Controller if necessary to increase number of staff with appropriate skills.
- Provides technical advice to CEO MAFFM, ACEO Crops/APH/Forestry, ERMC, Response Manager, Field Controller, Field Teams
 - Maintains a record of progress of the response.
 - Monitors progress of response and recommends to ERMC any changes in response procedures.
 - Communicates to Response Manager any key technical issues which may have an effect on the success of the response strategy.

Responsible to: Response Manager

ACEO Quarantine

Role: The ACEO Quarantine is responsible for managing the trade issues affected by the pest incursion.

Responsibilities:

- Notifying trading partners of the pest incursion.

- Negotiating revised import agreements for those commodities affected by pest incursion.
- Updating trading partners and industry on significant response issues as they arise
- Implementing measures to reduce the risk of further introductions by the same pathway, in response to tracing information obtained by the Technical Advisor

Responsible to: CEO MAFFM

ACEO Corporate Services

Role: Ensures financial, logistical and administrative support is available to the Response Manager during an emergency response.

Responsibilities:

- Provides a Financial Officer to assist Response Manager with financial management of the response.
- Provides an Administration Officer to assist Response manager with ensuring Field Teams have all the equipment they need to operate.
- Provides administrative support to the Response Manager.

Responsible to: CEO MAFFM

ACEO Policy and Planning

Role: Ensures public awareness and media management support is available to the Response Manager during an emergency response and provides economic expertise.

Responsibilities:

- Makes the Senior Publicity Officer available to assist the Response Manager with the publicity and media aspects of the response.
- Conducts the cost-benefit analysis
- Compiles and manages the budget
- Addresses compensation issues

Responsible to: CEO MAFFM

Publicity Officer

Role: Works together with the Technical Advisor and Response Manager to prepare a publicity programme to support the response and manages the media.

Responsibilities:

- Organises a publicity programme to support the operational aspects of the emergency response e.g. enlists support of Pulenu'u and Church Ministers and provides them with information to present at village level.
- Manages the local media and provides them with information that supports the ER.
- Manages the international media such that there is minimal interference with field-based activities and to minimise negative trade or tourism impacts.

- Provides ongoing response information for the general public. May organise a hotline if appropriate.
- Prepares material for the publicity programme, such as leaflets, posters, signboards.
- Organises someone with appropriate skills to set up a web page with details of the pest and the ER.
- Prepares media information for the Minister.

Responsible to: Response Manager

Financial Officer

Role: The Financial Officer is responsible for managing the day-to-day finances of the operational aspects of the emergency response.

Responsibilities:

- Support the Response Manager by managing accounts, payments and other expenditure associated with the response.
- Liases with Policy and Planning over the budget
- Maintains response expenditure log

Responsible to: ACEO Corporate Services

Administration Officer

Role: Ensures the effective management of all administrative functions during an ERP.

Responsibilities:

- Provides administrative support to the Response Manager
- Organises staff rostering systems
- Co-ordinates provision of all supplies and services for the response, including an effective communication system between the OCC and Field Teams.
- Maintains response expenditure log.

Responsible to: Response Manager

Field Controller

Role: The Field Controller is responsible for managing the operational activities of the Field Teams.

Responsibilities:

Declared emergency response

- Together with the Response Manager, selects Field Team Leaders and members of the Field Teams.
- Ensures an adequate number of staff with appropriate skills is available to implement the field tasks required to eradicate the pest.
- Ensures that all Field Team Members have the delegated authority to implement response measures

- Ensures that local public awareness has been put in place in the infected area to enlist the co-operation of the community.
- Works with the Field Team Leaders to identify the resources that they require (equipment, vehicles, safety and first aid equipment, datasheets, maps, GPS etc) and ensures these resources are obtained.
- Manages the operational activities of the Field Teams, including:
 - Making sure equipment is available where and when needed
 - Organising transport and accommodation
 - Maintaining an inventory of issued equipment.

Responsible to: Response manager

Comments:

- There may not be a need for a separate Field Controller; the Response Manager may undertake this role.
- Located in the emergency headquarters that are at the location(s) of the outbreak. This will be either Apia or Salelologa or both.

Field Team Leaders

Role: Responsible for the field teams carrying out the response activities.

Responsibilities:

- Follow the procedures outlined in the Monitoring Plan and Eradication Plan and carry out Movement Control measures
- Manage Field Teams.
- Communicate key field issues to Field Controller.
- Determine staff and resources required for designated field activities.
- Liase with the Field Controller and Administration Officer to ensure field team members have the equipment that they need to implement their tasks.
- Ensure safe and effective application of treatments.
- Provide assurance regarding accuracy of field surveys/monitoring.
- Ensure safe disposal of infested/affected material.
- Responsible for the storage and security of stores, vehicles and equipment.
- Maintain a record of the activity of their field team members e.g. locations treated, number of plants/animals disposed of, etc.

Responsible to: Field Controller.

Field Team Members

Role: Ensure provision of field activities as specified by the Response Manager, through the Field Team Leader.

Responsibilities:

- The Field Teams are formed to implement the following key components of the ERP:
 - Monitoring
 - Pest control and eradication measures
 - Movement control measures

- The type of activities carried out by the Field Team members include:
 - Treat and if necessary destroy pests or host materials
 - Dispose of affected products
 - Clean affected sites
 - Carry out trapping and destruction of insects or other pests
 - Examine collected samples in a secure laboratory to observe pest infestation or rear larvae
 - Keep records of inspected, treated, destroyed or released materials

Responsible to: Field Team Leader

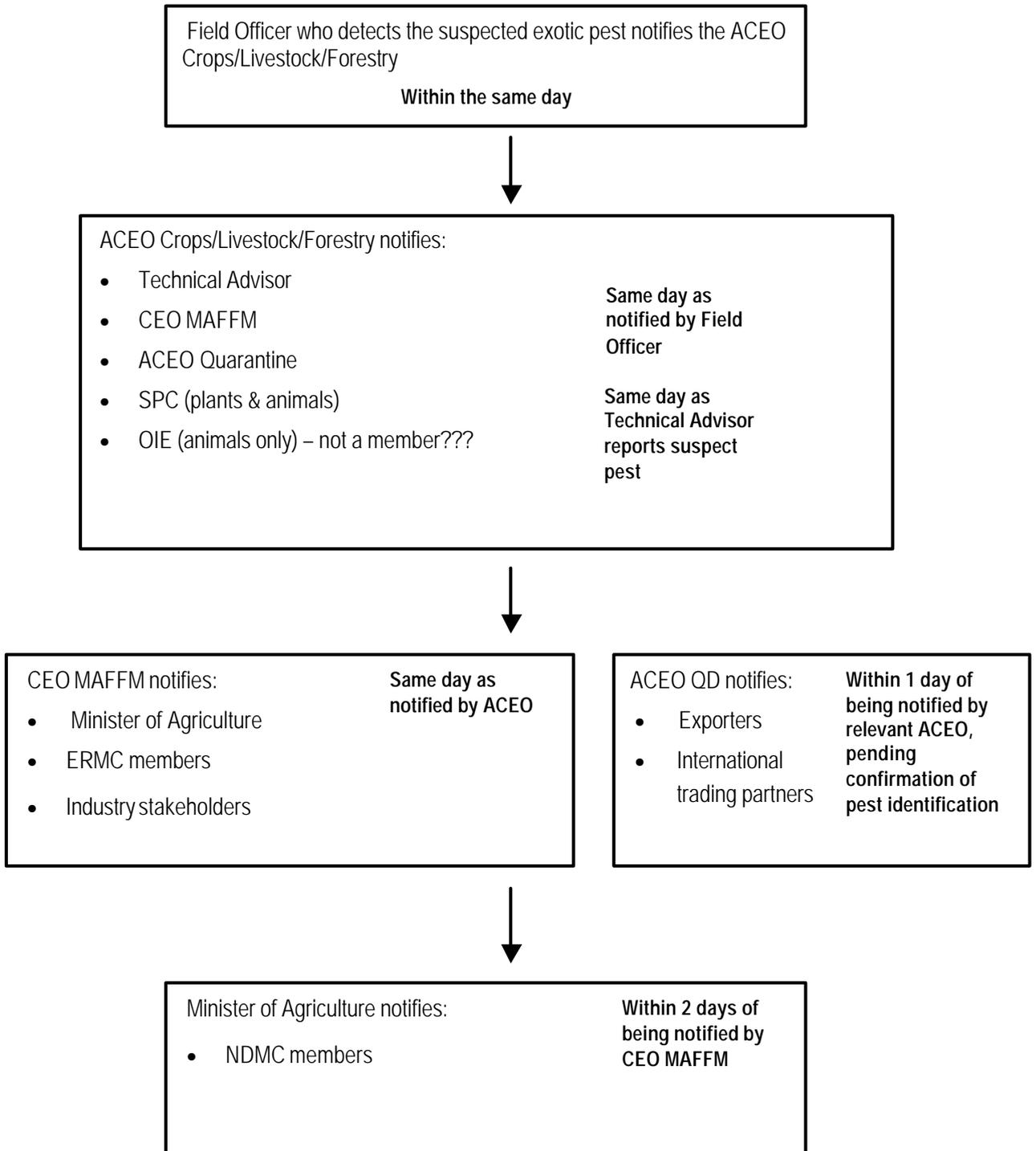
Part B

Technical Advice and Actions

1 Initial Response

1.1 Notifications Required upon Detection of Pest

When a Field Officer suspects an exotic pest the following chain of people must be notified as a part of the Initial Response:



1.2 Precautionary Containment and Control Measures

If the suspected pest has the potential to spread rapidly, it will be necessary to put some initial precautionary measures in place to limit the spread while information is being gathered to decide whether to mount an Emergency Response (ER) or not. These may be carried out in conjunction with collecting samples to confirm the identification of the pest and the delimiting survey.

Objective

To restrict the spread of a pest before an ER is declared, if the suspected pest is capable of spreading rapidly.

Implementation

Stop spread from the initial site using measures such as:

- Preventing the movement of host material out of the infested site.
- Restricting the movement of people and vehicles into and out of the site
- Destroying and disposing of infested host material at the infested site

Protect larger geographic areas which appear to be uninfested; for example, putting a barrier between the two islands, using measures such as:

- Banning or restricting the movement of host material (or conveyors of infection) from the infested to the uninfested island by having an inspection point at the wharf

It is essential that advice is sought from an appropriately trained Technical Advisor before beginning any initial field precautionary measures, to avoid inadvertent spread of the pest.

These activities must conform to the legislation. This will require using personnel who have existing legal authority to undertake the measures before an ER has been declared; for example, Quarantine Officers or Police depending on the powers required.

To achieve cooperation from the community, it is essential that a local community awareness programme involving local extension staff accompanies these activities. If restrictions on the movement of potentially infested materials from an infested to an uninfested island were to be implemented this would need to be preceded by a public awareness campaign including signage at the wharf and on the ferry and involving the mass media.

1.3 Confirm Identification/Diagnosis

The Technical Advisor visits the site of detection of the suspected pest to investigate whether the report justifies further investigation.

The Technical Advisor decides whether to continue with the initial response or to advise that no response is needed. If there is any doubt regarding the identity of the pest, the initial response should proceed.

If the response is to continue, the Technical Advisor collects information from the site as follows:

Information from Detection Site

Plants

- What the pest looks like
- What damage or symptoms it causes
- On what crop(s) the pest is found
- When and where it was first noticed
- How the pest may have reached the area
- The size of the infested area
- Surveillance system in place in the area

Animals

- Clinical signs of disease (what the sick animals look like)
- Description of gross lesions found from post mortem examination
- When were sick animals first noticed
- How many animals have become sick
- Details of the sick animals
 - age (young, immature, adults)
 - sex (male, female)
 - other differences
- How many animals have died and over what period
- Details of the dead animals
 - age (young, immature, adults)
 - sex (male, female)
 - other differences
- Whether any people have felt sick (zoonoses)
- If possible, get number of animals that were noticed to be sick on each day or each week (depending on the time frame) from the time the first sick animals were noticed.

Tracing Possible Sources of the Pest

The Technical Advisor investigates:

- What host plants/animals have been brought to the location

- What other potentially infested materials have been brought in to the location
- Whether anyone living at or visiting the location has returned from overseas recently

This will give an initial indication of the particular pest that is causing the reported problem and a possible source of the problem.

If it is possible to trace the source of the pest, the information must be conveyed to the relevant ACEO (Crops, Forestry, Livestock) and to the ACEO Quarantine and measures put in place to address the risk of further introductions via the same pathway.

Collection of Samples

The Technical Advisor collects samples or specimens from the detection site for identification or diagnosis of the pest.

The following aspects must be considered.

Hygiene

Depending on the pest, it may be necessary for all personnel involved in collection of samples to wear protective clothing, including rubber boots, overalls and gloves.

Biosecurity precautions must be put in place to avoid accidental introduction into other areas.

For example, in the case of fruit flies, all potentially infested fruit removed from the infested area must be securely contained, for example in 20 litre buckets with secure lids, perforated and securely sealed with gauze mesh. Trap catches should be killed before being removed from the infested site. Potentially infested host fruits should not be moved from one island to another unless it is clear that the fly has already established there.

In the case of soil-borne plant pathogens (for example fusarium wilt of bananas), measures to prevent movement of soil and plant material from the infested area must be put in place as follows:

- Any vehicles and equipment leaving the infested area must first be thoroughly washed to remove all traces of soil and plant material.
- Boots and shoes of any person leaving the infested area must be thoroughly cleaned of soil and disinfected (using a foot bath with sodium hypochlorite or other suitable disinfectant).
- Any person who has come into contact with potentially infested plants or soil must wash their hands before leaving the infested area.
- Any equipment which has come into contact with plants or soil (eg cutting tools) should preferably not be moved out of the infested area, or if it is, must be thoroughly disinfected beforehand.
- No host plant material should leave the infested area, unless as samples for the purpose of disease diagnosis. All samples of infested plant material taken for diagnosis must be placed in leak-proof containers to the place of examination, and destroyed or kept under security after examination.

- If samples are to be sent overseas, they should be placed in the containers in which they will be shipped at the site of sample collection to minimise the risk of spread of infection.

If the pest is suspected of being highly contagious then ***strict hygiene measures*** must be implemented as follows:

- The minimum number of people required to collect samples should be involved to reduce the risk of these individuals spreading the pest further.
- Vehicles must not enter the premises or general area where the suspected infestation/infection is located.
- Boots must be thoroughly disinfected at the point where personnel leave the infested/infested area.
- Overalls and gloves must be removed at the point where personnel leave the infested/infested area, and put in separate plastic bags.
- Overalls must be washed in disinfectant when returning to base.
- Gloves must be disposed of in a special container that is kept solely for disposal of clothing and equipment used on infested premises or when handling infested specimens.
- All samples must be placed in leak-proof containers so that infection isn't introduced into other areas.
- If samples are to be sent overseas, they should be placed in the containers in which they will be shipped at the site of sample collection to minimise the risk of spread of infection.

Details for Sampling

Instructions for sampling and handling a plant pest are given in Appendices 1-3.

Photographs

Where possible photographs of the pest and signs or symptoms should be taken with a digital camera. Likewise, photographs should be taken of sick animals and gross pathological signs from affected animals during post mortem examination. If a digital camera is not available, photographs should be taken with a regular camera, the film processed immediately and the photographs scanned if they need to be emailed to support a diagnosis being made at an overseas laboratory.

Identification of Pest

- The Technical Advisor undertakes the initial identification.
- The Technical Advisor may need to refer samples to an internationally recognised institute for confirmation in order that the result can withstand scientific or legal challenge.
- Contact details of international experts for plant pest identification are listed in Appendix 4.
- SPC can be contacted to assist with finding an appropriate Technical Advisor or institution and to cover identification charges.

Handling & dispatching samples

The Technical Advisor:

- Contacts the identifying institution immediately by the fastest means of communication.
- Seeks advice on import permits, packaging, shipping and any other requirements additional to Appendixes 1– 3.
- Clarifies the mode of payment for identification charges.
- Forwards his/her phone and fax numbers and email address to the institution.
- Asks to be informed when the specimen arrives.
- Asks the institution to fax the result of the identification, specifying if this identification would be a new record for a country, information on the pest's distribution in the region, ecology and control, and to send a hard copy of the fax by airmail.
- The Technical Advisor immediately makes arrangements to obtain an import permit if required and to obtain a phytosanitary certificate and/or export permit from the national quarantine service.
- The Technical Advisor immediately prepares the specimen(s) in accordance with the requirements of the identifying institution and the guidelines in Appendixes 1 - 3.
- Unless covered by SPC, the costs of identification and shipping charges are covered by MAFFM. The Technical Advisor needs to inform the Finance Officer of this institution accordingly.
- The Technical Advisor sends the sample by courier service to save time.
 - In the Pacific, 'EMS' is the fastest courier service (e.g. one week from Fiji to England).
 - If EMS is not available, DHL should be the next choice.
 - If DHL is not an option, express airmail should be used.
 - The Technical Advisor explains the urgency and importance of this shipment to the courier service and ensures that the shipment is traceable.
- The Technical Advisor informs the identifying institution that the sample is on its way and forwards the details of shipping arrangements.
- The Technical Advisor directs all invoices to the finance officer.

1.4 Delimiting Survey

Objective

To determine how far the pest has spread in order to decide the appropriate level of response.

Implementation

- Conduct the survey in and around the area where the incursion was reported.
- If necessary collect samples for identification/diagnosis (making sure to avoid spreading the pest further)
- Items that may be needed include:
 - information on the pest, including pictures
 - emergency response plan, including current quarantine law
 - a GPS
 - a map of the area
 - notebooks, pens, markers
 - equipment to collect specimens or samples or to examine hosts for symptoms of the pest (e.g. traps, containers [such as for collecting and transporting host fruit], paper bags, pocket knife, spade, hand lens, specimen bottles, plastic bags in various sizes, 70% alcohol solution, torch, gloves, camera)
 - first aid kit
 - bag to carry the equipment
- If possible use GPS to record the geographic coordinates of the sites that are visited during the survey.
- Map the locations of the infested sites and the uninfested sites that were visited, so that the boundary of the infested area can be determined.
- Keep records with the following information from each site that was visited:
 - Date & time visited
 - Site identification number as recorded in the GPS
 - Coordinates from the GPS (if available)
 - Property owner or occupier
 - Address of the property
 - Pest details (not present, present)
 - Were fruit or samples collected (yes, no)
 - If yes, what samples were collected?
 - Who was in the survey team at this site?
- Make a note of local staff and key people in the community who would need to be part of further actions recording names, titles, telephone and fax numbers of local contacts.
- If necessary, the Response Manager, on the advice of the Technical Advisor, organises the establishment of an Operational Control Center (refer Section 2.1), including laboratory facilities for examination of pest specimens.
- It is essential to make sure that any live pests removed from the site of infestation to the laboratory do not escape during transit to the laboratory

for examination. For example, in the case of exotic fruit flies, host fruit collected from the infestation site for rearing of larvae must be placed in secure containers such as plastic buckets with gauze mesh firmly fixed to perforated lids.

1.5 Pest Information

The Technical Advisor compiles a dossier of information to assist the ERMC in deciding the appropriate level of response. The Technical Advisor may need to contact appropriate national, regional or international experts to obtain the information and may request support to meet all the information requirements, if required:

The dossier includes the following information.

Ecology of the pest

Speed and mode of dispersal, hosts, etc.

Means of identifying/diagnosing the pest/disease

Information such as diagnostic keys, pictures of the pest and its signs or symptoms, isolation methods, diagnostic tests.

Available control measures & likelihood of successful application

Options may include:

Plants

- trapping, lures or other physical control methods
- host destruction – possibly by burning or burying
- disinfestation of equipment and facilities
- chemical or biological pesticide treatment

Animals

- vaccination
- test and quarantine
- test and slaughter
- disinfection of equipment and facilities

The Technical Advisor determines those measures most likely to be successful.

The Technical Advisor identifies sources, availability and costs of materials needed for the various control options e.g. traps and baits, insecticide, vaccine, test kits, disinfectant.

How far has the pest already spread

Information obtained from the delimiting survey.

The feasibility of eradicating the pest

Combine the following information to assess the feasibility of eradicating the pest:

- how far the disease has already spread
- an assessment of the effectiveness of control measures in preventing further spread and eradicating the existing infection

Likely impact of the pest on industry, the economy and the environment

In conjunction with the ACEO Policy and Planning, the Technical Advisor assesses the effect of the pest on:

- production
- food supply
- trade
- human health
- environment
- quality of life

Estimate the costs of these impacts for use in a cost-benefit analysis.

Cost-Benefit Analysis

The ACEO Policy and Planning makes an assessment of the costs versus benefits of eradication based on the available information, to assist the ERM in deciding the appropriate level of response.

Legal Provisions

With the assistance of MAFFM's Legal Advisor, the Technical Advisor investigates legal provisions for the control/eradication responses.

1.6 Response Decision to be Made by the ERM

The ERM considers the information provided by the Technical Advisor, information from the pest dossier and the delimiting survey), the ACEO Policy and Planning (cost benefit analysis) and the Legal Officer, and decides on the appropriate level of response.

Response options

No further action

If the organism is not likely to cause any significant economic, environmental or social impact, no further action is necessary.

Long-term management

If the organism will cause a significant economic, environmental or social impact, but cannot be contained or is already too widespread, the pest is considered to be established.

In this case a long-term management approach is required.

The Crops Division or the Animal Production & Health Division needs to consider the new pest in future pest management or treatment operations.

The Quarantine Division may need to consider treatments or restriction of exports due to the presence of the pest.

Eradication

If the organism will cause social, financial or environmental loss and can be eradicated at a cost lower than the expected cost of doing nothing, the Technical Advisor recommends an emergency response be initiated to contain and eradicate the pest.

If the ERMC favours attempting eradication, then the CEO MAFFM is responsible for requesting the Minister of Agriculture to declare an Infected Area and, if appropriate, to declare an Emergency. After this the operational aspects of the ER are put into action.

- The ERMC appoints the appropriate managers to fill key management functions as indicated in the management structure.
- The CEO MAFFM may need to invoke appropriate provisions of the biosecurity legislation as legal justification for future action.
- The ERMC needs to advise the Minister if, and under what conditions compensation is to be paid. As alternatives to compensation, the ERMC may consider food support, the promotion of non-host crops or stock replacement.
- The Technical Advisor develops the final action plan in consultation with the Response Manager. The ACEO Policy and Planning and the Financial Officer develop the budget for the Emergency Response for approval by the CEO MAFFM.
- The CEO MAFFM checks if the required funds are available from local resources and informs the Minister of Agriculture accordingly. The Minister arranges for these funds to be made available. If local funds are not sufficient, the Minister can contact SPC and other potential donor agencies that may have funds available.
- If necessary, the CEO MAFFM, via the NDMC, requests the allocation of personnel from national institutions such as police, army, public works and NGOs. The inclusion of army and police personnel is important when operations require the quick mobilisation of large numbers of people. Assistance by public works becomes important when machinery is needed.
- The CEO MAFFM ensures that the required regulations, funds and human resources are in place for as long as the operations run.
- The Minister of Agriculture informs all stakeholders and sets a date for the start of the operation as soon as possible.

2 The Emergency Response

2.1 Operational Control Centre

The location of the Operational Control Centre (OCC) will depend on the location of the initial detection:

- If the detection is on Upolu the OCC will be established at an appropriate site on Upolu, for example the most relevant MAFFM Research Station.
- If the initial detection is on Savaii and the outbreak appears to be confined to Savaii then the OCC may need to be established at an appropriate site on that island, for example the most relevant MAFFM Station on Savaii.

The following activities will be conducted from the OCC:

- Management of response monitoring, containment and eradication activities
- Mapping
- Record keeping
- Examination of samples, specimens, trap catches etc

The OCC may need to include both office space and laboratory space and appropriate measures need to be put in place to ensure the pest or pathogen cannot escape. For example for insect pests it may be necessary to screen windows and doors and to restrict access to laboratory staff and selected field team members.

The Field Controller, field team leaders and the field team members will be based at the OCC.

2.2 Response Monitoring

Objectives

- To monitor the area defined in the delimiting survey and detect new incursions and spread into new areas
- To assess the effectiveness of the eradication effort
- To confirm freedom of infestation of previously infested sites.

The Monitoring Plan

The Monitoring Plan should include the following:

- Methods to determine if site is infested or not. These may include:
 - Trapping
 - Collection of host plants or plant material and examination in laboratory
 - Collection of samples or specimens for testing e.g. blood samples from animals
 - Collection of information on whether any signs of the pest have been seen, plus details (as in section on Confirm diagnosis)

- List of plants, animals, plant/animal products, or other articles that could be hosts or carry the pest
- List of sites to be visited. These will be based on:
 - Tracing contacts from known infested sites i.e. determine if any possibly infested material was moved from the infested site before controls were put in place, and investigate the site(s) to which that infested material was moved
 - Sites to which the pest could have spread through natural movement (eg wind, flight, water etc)
- Other high-risk sites to be visited such as:
 - Fruit and vegetable market
 - Locations where host material is being destroyed, if this is outside the infested area
 - The base from which field personnel involved in implementing the ER are operating (and where they are staying?)
- A monitoring schedule with frequency of re-visits to uninfested properties, depending on the life cycle or incubation period of the pest
- Instructions for the monitoring teams on how to:
 - Set traps and/or collect and examine host plants or animals and/or collect samples or specimens
 - Treat or destroy infested host plants or animals or plant/animal products or other articles (if necessary)
 - Record data
 - Collect and preserve specimens for identification by a local specialist (probably the Technical Advisor), and contact details of the specialist (Appendixes 1-3)
 - Conduct laboratory procedures such as examination of trap catches, larval rearing etc
- Further action if suspicious specimens are found. Options are cleaning, treatment, containment or destruction, followed by immediate notification of the Field Controller
- List of equipment and record forms required (including safety equipment and first aid)
- Instructions for mapping sites visited and infested areas
- Audit plan to check that the monitoring program is being conducted as instructed

Implementation

- Follow the procedures set out in the Monitoring Plan
- Ensure legislation supports monitoring measures i.e. officers have been given the appropriate authority to enter properties and collect samples.
 - For example, the Team Leader may need to provide names of team members to the CEO MAFFM, who will gazette them as Authorised Officers for the duration of the ER.

- Ensure that local public awareness has been put in place in the infested area to enlist the co-operation of owners of possibly infested host material, growers' associations, traders, local extension officers and local authorities.
- Brief, train and equip the monitoring team.
- Ensure there are sufficient teams or individuals and sufficient equipment so that monitoring personnel can be restricted to certain areas if necessary to limit the possibility of spreading the pest.
 - For example, in the case of some infectious animal diseases, the personnel doing surveillance within the infested area should not conduct surveillance outside this area until a specified period of time has passed and/or they have followed strict hygiene such as disinfecting boots and clothing and equipment.
- Ensure that there are sufficient teams or individuals allocated to laboratory functions if required, as set out in the Monitoring Plan.

2.3 Eradication

Objective

To have operations in place that eliminate the pest from the infested area.

Preparation

The Technical Advisor determines the best technical options to inspect, treat or destroy infested products. Options include:

- Traps, lures or other physical control methods
- Host destruction – possibly by burning or burying or slaughter of animals
- Processing or consumption of infested crop
- Disinfestation of equipment and facilities
- Chemical or biological pesticide treatment
- Vaccination
- Fumigation
- Soil sterilisation
- Leaving land fallow
- The use of pest resistant cultivars
- Restriction of subsequent cropping or animal husbandry

The Eradication Plan

The Eradication Plan addresses the following points:

- Definition of the infested area

- Specification of which plants, animals, plant/animal products, or other articles need to be treated, destroyed or disinfested
- Instructions on how to treat, disinfest or destroy plants, animals, plant/animal products or other articles
- List of required equipment (preferably locally available), including equipment, protective clothing, vehicles, safety and first aid, datasheets, maps, pens, GPS, etc. Stockpiles of pesticides that can be used and replaced may be available with SPC or other organisations. Consideration should be given at an early stage to the registration of any pesticides that are not already registered
- Availability and use of firearms to destroy animals
- Maintenance and processing of record sheets and assignment of responsibility for this task
- Procedures for the release of plants, plant/animal products, or other articles from the quarantine area after clearance by appointed officers
- Specify how much and under what conditions compensation needs to be paid to affected farmers when plants, animals or plant/animal products need to be destroyed
- Identify and contact growers of the affected crop or animal (and growers association [if any]) in the quarantine area
- Specify the period of time without finds of the pest and its damage that has to elapse before the pest can be declared eradicated depending on the biology of the pest, quality of detection methods, climate, and efficacy of treatment. It may be necessary to discuss this point with trading partners and relevant Technical Advisor(s)
- Site of Operational Control Centre (Section 12)

Implementation

- Follow the procedures set out in the Eradication Plan
- Ensure legislation supports eradication measures i.e. officers have been given the appropriate authority to enter properties and control the pest, including if necessary, destruction of plants, animals and plant/animal products
 - For example, the Team Leader may need to provide names of team members to the CEO MAFFM, who will gazette them as Authorised Officers for the duration of the ER
- Ensure that local public awareness has been put in place in the infested area to enlist the co-operation of owners of possibly infested host material, growers' associations, traders, local extension officers and local authorities
- Brief, train and equip the eradication team
- Ensure there are sufficient teams or individuals and sufficient equipment so that eradication personnel can be restricted to certain areas if necessary to limit the possibility of spreading the pest

- For example, in the case of some infectious animal diseases, the personnel conducting eradication measures within the infested area should not conduct eradication measures outside this area until a specified period of time has passed and/or they have followed strict hygiene such as disinfecting boots and clothing and equipment.

2.4 Movement Control

Objectives

- To stop local spread i.e. movement of infested material out of the immediate infected area.
- To keep larger uninfested geographic areas free of infestation. The most feasible action at this level is preventing inter-island spread, but it may be feasible to stop spread within an island.

Preventing local spread out of the infected area

Definition of the infected area

The Technical Advisor needs to prepare the criteria that define an infected area. This will include the following:

- Known infested sites that were identified through the delimiting survey and subsequent monitoring.
- A larger area around known infested sites, with the size of the area depending on the method(s) of local spread of the pest
 - For example, if it is a wind-borne pest, the area will be large enough to allow for spread via this mechanism and may be in the direction of the prevailing wind
- In other cases it may allow for the distance that the particular pest will fly.
- In the case of an animal disease that is spread by contact between animals, it will depend on the likely area over which animals are most likely to have come into contact with known infected animals – this will depend if they are fenced or free ranging.

Declaration of an infected area

- The area that is declared an infected area initially will be determined through the delimiting survey.
- The infected area will be marked on a map.
- The area should be marked on the ground as much as possible using signboards and/or tape or paint or marker posts. This is important to reinforce the restrictions to people living and working in the area.
- The area will be legally declared by public declaration (refer Article 31 Biosecurity Bill 2003).

Movement restrictions

The Technical Advisor produces a list of materials that can potentially carry the pest out of the infested area. The particular objects will vary with the pest. They will include:

- Host species such as fruit, plants, animals
- Equipment used for control/eradication
- People (residents, visitors, staff implementing surveillance and control measures)
- Vehicles
- Food – prepared from infested host material e.g. meat
- The Technical Advisor advises appropriate movement restrictions to prevent the pest being carried out of the infested area. This may include:
- Host material movement
 - Ensure that no host material is moved from the area. All people leaving the infested area should have their bags inspected to ensure they are not carrying any potentially infested material.
 - Farmers are advised that they cannot take host material to the market.
 - Meat from animals in infested locations. The Technical Advisor needs to determine if it is safe for people to eat the meat of infected animals. If it is this may be allowed, but must be cooked and consumed within the infested area, to avoid the risk of spreading infection. Meat from uninfected animals that have been slaughtered within the infested area may be allowed to be consumed within the infested area provided it has been cooked according to certain specifications (if necessary).
- People movement
 - Banning the movement of visitors into the area, except authorised personnel who are involved in the ER.
 - Relocating any large gatherings such as fa'alavelave to an uninfested area.
 - Ensuring that all ER personnel use strict hygiene measures as they enter and leave the infested area i.e their boots, clothes and equipment are clean when they arrive and that boots are cleaned, and boots and overalls are removed and put in plastic bags as they leave the infested area. Hands are washed. Equipment is washed and disinfected.
 - Limiting the movement of residents out of the area. This may involve a complete ban on movement for high-risk personnel, such as those who are directly contacting the infested animals or plants e.g. feeding the animals, working in the gardens (with the exception of emergencies).
 - It may involve ensuring that lower-risk residents who leave the area wash their feet/shoes in footbaths, and are questioned to identify if they have been in contact with potentially infested host material.

- Vehicle movement
 - If it is possible for the pest to be spread on vehicles e.g. contaminated tyres or snails getting into or on the body of the car, then access of vehicles should be prohibited or severely restricted to movements that are essential for implementing the ER (maybe to collect host material for disposal, or maybe to prepare disposal sites). In this case strict hygiene measures should be applied to the vehicles e.g. cleaning, spraying, disinfecting tyres, etc.
 - It may be appropriate to restrict the movement of vehicles within the infected area e.g. they may enter the area but they may not enter an infected site.
 - If vehicles are a potential risk, the Technical Advisor needs to consider how to manage an infested site that has a well-used road running through it, particularly around Apia or the area to the west. (Buses, trucks, cars, etc). What is the risk and how should this be minimized.
 - e.g. If possible re-direct traffic to an alternate route

High risk areas

- There may be areas where infestation has not been detected but which are high-risk because of other reasons; for example:
 - Fruit and vegetable market
 - Locations where host material is being destroyed, if this is outside the infested area.
 - The OCC.
- These areas should be targeted for surveillance.

Preventing introduction of the pest into a free zone

The geographic areas of the country which are not yet infested and which it is feasible to protect need to be identified. The most likely candidate in Samoa is protecting the spread of infestation from one island to the other. If infestation is limited to a small location and the pest does not spread easily, it may also be feasible to protect other parts of the island on which the infestation has occurred by means of movement restrictions.

2.5 Public Awareness Plan

The Publicity Officer in consultation with the Technical Advisor and the Response Manager organises a publicity programme to support the emergency response. Due to the sensitive nature of some of the information, media releases and other public awareness measures must be subject to the appropriate authorisation from the Minister or the CEO MAFFM.

This will include:

- Providing information to the media such as radio, television and newspapers on:

- Objective of the operation
- Benefits in terms of crops/herds saved versus cost and difficulties for affected farmers and general public
- Estimated chances of success versus estimated chances of failure
- Details of the pest and of how it spreads
- The potential impact of the pest in Samoa if it isn't eradicated
- The immediate impact of the pest, such as restrictions on trade, extra inspections associated with international travel
- What measures are being implemented to contain and eradicate the pest
- What the public can do to support these
- Discussing the proposed action with the local authorities, and utilising the Extension service to inform the owners of possibly infested plants, animals, plant/animal products, or other material of proposed action
- Using communication channels for providing information to the public, such as:
 - Church Ministers
 - Pulenu'u
 - Youth groups
 - schools
- Managing the international media if present (press releases and interviews)

The international media should be managed in such a way that they do not get in the way of implementing the ER. Preferably, they should be restricted to Apia or Salelologa and provided with information and photographs by the Publicity Officer.

Information provided to international media should be such as to minimise adverse effects on trade or tourism.
- Ideally, appoint a person with appropriate skills to establish a web site that provides information to the international public on the ER, including details of:
 - Details of the pest
 - The measures that are being implemented
 - Progress on containment and eradication
 - Photographs of the pest and/or the infested host
 - Maps showing the distribution of the pest in Samoa and progress with the ER.
- Preparing support material for the ER, such as:
 - Posters
 - Leaflets
 - Signboards

- Provide ongoing response information for the general public. It may be possible to set up a hot-line to answer public enquiries.

Budget aspects

The Publicity Officer would prepare a budget for the proposed activities and provide this to the Financial Officer.

2.6 Stand-down procedure

The stand-down comes into effect when

- An eradication is successfully completed
- Containment or eradication is unsuccessful and the programme is stopped.

Actions

The stand-down is implemented under either of the following conditions:

- The eradication is successfully completed. (In the case of a successful eradication it might be essential for an outside expert body to audit or verify the success of eradication as per eradication guidelines set at the beginning of the campaign. This verification report can be annexed to the final campaign report or would be made available to the stakeholders once the verification process is completed).
- Eradication or containment is unsuccessful and the programme is stopped.

Report

The CEO-MAFFM will instruct the Field Controller, Technical Advisor and the Response Manager to prepare a report on the whole operation within a week after the field operation ceases for the ERMC to consider a stand-down of the emergency response operations. The report will include:

- Overview
- Operational procedures
- Decisions made
- Results
- Costs
- Problems encountered
- Recommendations

The CEO Policy and Planning will ensure that the issue of compensation has been fully addressed and compensation paid to those entitled to it.

The CEO MAFFM will discuss the report with the authors and finalise the report before submitting it to the ERMC. This report will be submitted to the Minister of MAFFM after deliberation and approval by the ERMC.

The Principal legal officer will prepare necessary legal instruments (on behalf of the Chairperson of ERMC) to revoke the existing emergency regulation. The Minister effects this through the national gazette and public notice in the newspaper and other mass media.

Notification of stand-down

The CEO as chairperson ERMC shall inform the funding agency(ies) and other stakeholders on the stand-down. The CEO will authorise the ACEO Quarantine to inform trading partners, SPC and other relevant international (regional) institutions of the stand-down.

The CEO as chairperson of ERMC briefs the media about the emergency response operation outlining:

- Objective of the operations
- Costs and benefits
- Further action (eradication verification, long-term management options, no further actions, etc..)

ACEO of the relevant advisory section informs the local authorities.

The Publicity Officer arranges for public release of information about the ending of the Emergency Response.

Copies of the final report are distributed to all stakeholders, funding agencies and SPC.

Disbandment of Response Team(s)

The Response Manager arranges for seconded officers and volunteers to return to their respective institutions and all outstanding entitlements to be settled. The Response Manager and Field Controller convene a meeting with their staff, labourers to debrief, review their work and thank them for their efforts.

The Response Manager in consultation with the Field Controller and Administration Officer make arrangements for return and disposal of specifically acquired equipment during the time of operation. The Field Controller returns all field records sheets to the relevant ACEO for filing and future reference. The Financial Controller settles all payments and accounts.

The relevant ACEO reviews and updates certain sections of the ERP based on the experience gained from the ER.

Avoiding the same problem in the future

After the stand-down, the relevant ACEO reviews the outcome of tracing procedures as presented in the final report, and puts measures in place to prevent a similar problem occurring again. This could involve instituting measures to address the entry pathway and/or setting up a programme of long-term surveillance and monitoring.

Appendix 1

Sampling and Shipment of Insects for Identification

Appendix 1: Sampling and Shipment of Insects for Identification

Selection of specimens

Generally, specimens of adult insects are required for identification purposes, but there are exceptions, which are indicated in the section on preservation. Specimens need to be in good condition with all appendages (wings, legs, and antennae) intact, as identification of broken or incomplete specimens is difficult or impossible.

Specimens could be killed by leaving them in a freezer for half an hour or longer depending on their size. Many smaller insects can be directly killed and preserved in ethyl alcohol.

They should be preserved and sent with other stages (eggs, larvae, nymphs, pupae, and pupal cases), as the immature stages of many species are still not well known. In the case of whiteflies, pupal stages are essential.

A sample that is sent for identification should consist of about five specimens to allow a sure identification.

Some specimens should be kept for reference and possible future use as samples.

Preservation

All specimens should be handled with great care to avoid distortion, breakage and loss of antennae, legs, wings, heads, scales, setae or other parts that may be essential for identification.

Specimens should be as clean as possible. The preferred killing agent for adult insects is the vapour of ethyl acetate as this leaves the specimen relaxed. If adult insects and other arthropods are to be preserved in 70% or 80% ethyl alcohol (not formalin) they can be killed in this fluid also.

Many immature insects, because of their softer structure, are normally killed and preserved in alcohol. However, larvae and pupae should be killed in boiling water (for one minute).

Adult stages of small insects like aphids, whiteflies, thrips, scale insects, mealybugs, ants and mites and larvae and pupae should be preserved in ethyl alcohol (70-80%) or in other fluid preservatives (but not formalin) in glass or plastic tubes. These tubes should not be too large as this makes searching for very small specimens, like mites, very difficult. The tubes should be completely filled with fluid, to exclude air bubbles (moving air bubbles can do a bit of damage during transit), and should be securely sealed, preferably with screw-on caps, but not with corks as these may soon deteriorate.

Adult stages of larger insects may be preserved on dry pins, preferably stainless steel pins that do not rust and damage the specimen. Do not stack specimens on the same pin with one data label because the weight may become too heavy for the pin and you may include several species under one label. Do not put lepidoptera and other insects in the same box because the scales of the wings from the lepidoptera will stick to small insects and hide their taxonomic characters.

It is also possible to preserve larger adult insects dry in paper envelopes or packets, or loosely packed between layers of cellulose wadding or tissue paper (but not cotton wool) in boxes, but these methods should only be used when there is no alternative. It is essential to dry specimens thoroughly before storage; this is especially important in the Pacific to prevent the growth of moulds and the development of mites and other organisms that will rapidly destroy specimens.

Labelling

All specimens submitted for identification should be clearly labelled with basic information on:

- country;

- locality (including the nearest place likely to be recorded on maps);
- altitude (if appropriate);
- English and preferably scientific names of host plant(s);
- other relevant information e.g. feeding on leaf or on fruit;
- result of problem – e.g. plant dying, fruit or tuber inedible, leaves fall off or lose colour; and
- date collected; name of collector and organisation; reference number.

Labels should not be too large, and should be neatly written with a pencil or permanent ink (but not with a ballpoint pen whose ink will dissolve).

Packing

Specimens must be packed carefully before dispatch because inadequate packing may result in severe damage or total loss.

Pinned specimens should be sent in strong but light cardboard boxes with secure bases of cork or Plastazote into which the pins are deeply and firmly inserted. Expanded polystyrene should not be used as a base because it has insufficient grip to hold pins in place.

Large specimens should be secured with several long pins to prevent any movement of the specimen or their labels and placed in a box for shipment.

Tubes containing specimens in alcohol or other fluids should be checked for leaks, and if necessary sealed with molten candle wax, then be carefully packed in cellulose wadding, tissue paper, cotton wool, newspaper or other packing material and placed in a box for shipment.

Boxes containing pinned specimens, slides or tubes should be sealed with tape and packed in strong cardboard cartons with a thick layer (at least 5cm) of polystyrene chips, crumpled paper, or other resilient packing material surrounding them on all sides to absorb any shocks or vibrations that might otherwise cause damage in transit.

Posting

The Australian Customs Service no longer allows the shipment of specimens in alcohol solutions for safety reasons. Other countries may follow. Therefore, the sender needs to enquire about such or similar restrictions in the country of destination prior to shipment and then prepare the specimens so that they conform to both the national and international safety requirements.

Specimens should be sent by the fastest and most reliable method.

Specimens are to be accompanied by a phytosanitary certificate and an import permit if required.

A covering letter stating the sender's name and address and what information is required must be included in the package and sent with the specimen. The box needs to be wrapped in brown paper. The package needs to show the sender's address and the correct address of the Technical Advisor who identifies the sample. The package should also state the following: 'Dead Insects Preserved for Scientific Use, of No Commercial Value' and the wording 'Fragile' or 'Handle with Care'.

ENSURE THAT YOU HAVE THE CORRECT IMPORT PERMITS AND CONTACTS IF YOU ARE SENDING THE SAMPLES OVERSEAS.

Appendix 2

Sampling and Shipment of Insects for Identification

Appendix 2: Sampling and Shipment of Plant Disease Specimens for Identification

Care should be taken when packing disease specimens. When collecting, the specimen should not be kept in the heat, especially in direct sunlight. Plastic bags should be AVOIDED at all costs, as they cause the specimen to “sweat” and this encourages the growth of other organisms that may hide the real disease-causing organism. Try not to collect disease specimens that are wet. Ensure that, with each specimen, some diseased and some healthy tissue is included; the two should be packed separately. If you know whether the disease is fungal, bacterial or viral, the following instructions can be used:

Fungal

Specimens can be collected and wrapped in newspaper. The sheets of newspaper can then be put into a paper envelope and placed in a cardboard box with polystyrene or other packaging material that will protect the specimen from damage.

Bacterial

Bacterial disease specimens often deteriorate rapidly, leaving the plant bacteriologist receiving the sample with an oozing mess. If the specimen dries out, the bacteria will die and it will not be possible to identify the disease. Ideally, specimens should reach the plant bacteriologist within 12 – 24 hours of collection to be of use.

Slope cultures in miniature vials of fungal and bacterial pathogens may be prepared and sent instead of fresh samples. This method has been shown to be very successful.

Viral

Filter papers or thick tissue paper should be soaked in 50% glycerol so they are totally wet but not dripping. The specimens should be placed between the papers and the whole sample placed in a plastic bag.

Nematodes

Specimens collected from plants suspected of attack by nematodes must include both roots and soil, packed separately in plastic bags. Nematodes can also be extracted and placed in 25% glycerol or 5% formaldehyde in miniature vials and sent for identification. Alternatively, nematode extracts may be embedded in glycerine and the cover slip sealed with nail polish on a slide and sent.

Unknown

Follow fungal specimen instructions.

Collection details to include with specimen:

- a) Common name and preferably scientific name of host plant(s);
- b) affected part of plant;
- c) country, state, locality;
- d) map references and altitude (if possible);
- e) collection date (very important if isolations from the tissue are to be attempted);

- f) collector's name;
- g) tentative identification by symptoms and morphology of organisms;
- h) disease severity, e.g. number of plants affected (is it one plant on the edge of a field or is the whole area affected; this will help to identify the importance of the problem);
and
- i) reference number.

Posting

Specimens should be sent by the fastest and most reliable way.

A covering letter stating the sender's name and address and what information is required must be included in the package and sent with the specimen.

Pack the container with brown paper.

A declaration form obtainable at Post Offices must be completed and stuck on the parcel containing the samples.

Samples should be sent to their destination as soon as possible. Label the box clearly and state:

"Perishable biological material. Keep material cool but DO NOT refrigerate - no commercial value."

"Fragile" or "Handle with care".

<p>ENSURE THAT YOU HAVE THE CORRECT IMPORT PERMITS AND CONTACTS IF YOU ARE SENDING THE SAMPLES OVERSEAS.</p>

Appendix 3

Instructions for the Sampling and Shipment of Weed Specimens for Identification

Appendix 3: Instructions for the Sampling and Shipment of Weed Specimens for Identification

Weed specimens must be pressed and dried, and accompanied by appropriate information. There are weeds that have similar characteristics and correct preparation of appropriate specimens will ensure that the identification received is accurate.

Collection

It is not often possible to identify a weed specimen from leaves alone, so other representative portions must be collected. What constitutes an adequate specimen varies with the type of weed concerned:

Grasses and small herbaceous plants

Grasses and small herbaceous plants should be collected, complete with roots, basal leaves, stems and flowers and/or seed heads. Bulky plants may be divided and a portion sent, provided this portion includes the basal shoots and a complete flowering stem. Long stems can be folded back and forth before pressing. Plants that have underground runners, tubers, bulbs or stems should be sent with at least some of these portions still attached.

- Shrubs, trees and other larger herbaceous plants. Specimen of these plants should consist of a portion of branch or stem up to 30 cm long. Leaves, flowers and/or fruits (both flowers and fruit if possible) should be provided still attached to the stem.
- Vines. Appropriate vine samples include buds, fruit and mature leaves. A description of the vine is also necessary. A photograph of the vine showing the growth characteristics can be very useful if buds or fruits are scarce.
- Others. When collecting ferns, make sure the rhizome (root-like structure) is attached to the frond. With tree ferns, include the scales or hairs at the base of the frond stalk. These are essential for identification.

When plants have large flowers or leaves, it is important to describe the dimensions of the whole flower or leaf and collect the tips and base of each. Photographs should also be taken in the field.

Preparation of specimens

Before being sent for identification, weed specimens should be pressed between sheets of newspapers and dried, if possible in a drying oven, under moderate pressure. During humid weather and when pressing succulent or water plants, the paper should be changed each day. In dry areas, there is less urgency to change papers although specimens should be checked daily. Fresh plant material should not be sent for identification in plastic bags without first wetting the newspaper with alcohol. Such specimens deteriorate quickly, become mouldy and make identification impossible. When sending fresh specimens pressed in newspaper, they should be sprinkled with 70% alcohol, with as much air removed as possible, and sealed with sticky tape to prevent evaporation. Specimens sent as dried specimens each in a sheet of newspaper, and packed flat between cardboard are preferred, because with certain plants, the alcohol can destroy some characteristics.

Always collect at least three specimens of the weed sample. Make sure they are labelled correctly. Information to accompany the sample should include:

- Collector's name, date of collection, country, province, personalised collection number,
- Location: longitude and latitude, distance and direction from the nearest town or property and local name of the site of collection.
- Habitat type: type of area, soil type and associated dominant vegetation.
- Plant description. It is useful to describe anything which cannot be seen from the pressed specimen such as the weed's growth habit (tree, grass, vine, herb) and approximate height, flower colour (flowers often fade or change colour when dried), growth description of the weed.

Posting

Specimens should be sent by the fastest and most reliable method. A covering letter stating the sender's name and address and what information is required must be included in the package and sent with the specimen. Pack the container with brown paper. Specimens should be sent to their destination as soon as possible and the recipient informed by telephone, fax or e-mail to expect the samples. Label the box clearly and write: 'Perishable biological material. No commercial value. Handle with care.'

ENSURE THAT YOU HAVE THE CORRECT IMPORT PERMITS AND CONTACTS IF YOU ARE SENDING THE SAMPLES OVERSEAS.

Appendix 4

International Contacts for Pest Identification

Appendix 4: International Contacts for Pest Identification

Insect identification

- Sada Nand Lal, Plant Protection Service, SPC, Private Mail Bag, Suva, Fiji, Phone: (679) 370 733 Ext. 224, Fax: (679) 370 021, E-mail sadanl@spc.int
- Mr. Paul D. Hillyard, Department of Entomology, The Natural History Museum, Cromwell Road, London SW7 5BD, U.K , Phone: (44) (0) 207 942 5127, Fax: (44) (0) 207 942 5190, E-mail: pdh@nhm.ac.uk, <http://www.nhm.ac.uk/science/>, Costs/sample: GBP 58 + 17% VAT
- Mr. Kimberi R. Pullen, Identification & Advice Officer CSIRO Entomology, GPO Box 1700, Canberra, ACT 2601, Australia, Phone: (61) 2 6246 4263, Fax: (61) 2 6246 4364, E-mail: ident@ento.csiro.au, Web: <http://www.ento.csiro.au/research/natres/id.htm>, Costs/sample: +- A\$ 85
- Dr. Trevor K. Crosby, Landcare Research, Private Bag 92170, Auckland, New Zealand, Phone: (64) 9 8493660, Fax: (64) 9 849 7093, E-mail: crosbyt@landcare.cri.nz

Diseases

- Dr. Jacqui Wright, Plant Protection Service, SPC, Private Mail Bag, Suva, Fiji, Phone: (679) 370 733 Ext. 223, Fax: (679) 370 021, E-mail: JacquiW@spc.int
- Dr Richard Davis, Plant Protection Service, SPC Private Mail Bag, Suva, Fiji, Phone: (679) 370 733; Fax (679) 370 021; E-mail: RichardD@spc.int
- Dr. Eric McKenzie, Plant Pathologist, Landcare Research, Private Bag 92170, Auckland, New Zealand, Phone: (64) 9 815 4200, Fax: (64) 9 849 7093, E-mail: MckenzieE@landcare.cri.nz
- Ms. Barbara Ritchie, Plant Clinician, Diagnostic & Advisery Laboratory, CABI Bioscience, Bakeham Lane, Egham, Surrey TW20 9TY, United Kingdom, Phone: (44) 1491 829 069, Fax: (44) 1491 829100, E-mail: plant.clinic@cabi.org, Costs/sample: possibly free.

Weeds

- Dr Warea Orapa, Plant Protection Service, SPC, Private Mail Bag, Suva, Fiji, Phone: (679) 370 733; Fax: (679) 370 021, E-mail: wareao@spc.int.
- Mr. Marika Vuli Tuiwawa, Acting Curator South Pacific Regional Herbarium, Institute of Applied Sciences, P O Box 1168, Suva, Fiji. Phone: (679) 212 874, Fax: (679) 300 373, E-mail: Tuiwawa.M@usp.ac.fj, Costs/sample: common weeds free, less common depending on overseas charges.
- Mr. Tim Flynn, Curator of the Herbarium, National Tropical Botanical Garden, 3530 Papalina Road, Kalaheo, Hawaii HI 96741, USA, Phone: (1) 808 332 7324 Ext. 137, Fax: (1) 808 332 9765, E-mail: tflynn@ntbg.org, Costs/sample 0\$ or possibly small fee.
- Plant Identification Service, Landcare Research, Canterbury Agriculture & Science Centre, PO Box 69, Lincoln 8152, New Zealand, Phone: (64) 3 325 6700, Fax: (64) 3 325 2418, E-mail: breitwieseri@landcare.cri.nz, Costs/sample NZD 100.
- Mrs. Lynn Raulerson, Biology Program DNS UOG Station Mangilao, Guam, Phone: (1) 671 735 2791 Fax: (1) 671 7341299 E-mail: lraulerson@netpci.com, Costs/sample 0\$ or 50USD/hour with large numbers of samples.

Biosecurity

- Mr Sidney Suma, Biosecurity Officer, Plant Protection Service, SPC, Private Mail Bag, Suva, Fiji, Phone: (679) 370 733, Fax: (679) 370 021, E-mial: sidneys@spc.int