

Project Title Code: 1.2	Expanding fruit fly treatment development quarantine training capability in Vietnam
Australian Personnel	Mr. R. A. Jordan, DPI
Australian Institution	Department of Primary Industries, Queensland
Vietnam Institute	Plant Protection Department (PPD) MARD
Project Duration	July 2000 – June 2002

Project Description

The objectives of the project are to expand plant quarantine activities in Vietnam through provision of facilities and equipment, and training to staff to standards required for participation in international trade. The project will also develop training materials to provide ongoing training and reference ensuring self-sufficiency. On completion of the project, staff will be competent in the current methods used in disinfestation research, familiar with equipment and technology and able to prepare submissions for international quarantine authorities. Research on a priority commodity will also be conducted during the project to form the basis for a treatment protocol to access a new export market.

Training material in the form of video and CD ROM will be developed in conjunction with Vietnamese scientists and provided to Vietnam. This material will be able to be maintained and updated by staff in Vietnam after the project's completion using equipment supplied in the project.

The major inputs are treatment and training resources equipment and the expertise provided by the Australian personnel. Three permanent officers of DPI and two consultants will conduct training workshops, and provide specialised training and one officer employed full time by the project will coordinate the training, conduct the remainder of the workshops and develop the training resources in conjunction with a consultant.

Objectives

- a) Expand the existing activities in Vietnam, through building quarantine treatment knowledge and expertise and facilities, in the southern region.
- b) Raise the expertise in plant quarantine to internationally accepted standards, particularly with regards to fruit flies and disinfestation treatments for fresh horticultural produce.
- c) Develop quarantine resource material, in a low cost and easily maintained format, to provide ongoing access for training and for reference.

Outputs and Performance indicators

Outputs	Performance Indicators
<ul style="list-style-type: none"> ◆ Existing rooms at the PPD site in Ho Chi Minh City will be converted to a disinfestation laboratory and insect rearing rooms. ◆ Additional equipment will be provided to the PPD office in Ho chi Minh City to supplement the existing equipment, for developing quarantine treatments. 	<ul style="list-style-type: none"> i) All required equipment purchased and installed in PPD laboratory and laboratory functioning by December 2000
<ul style="list-style-type: none"> ◆ Current staff of PPD working in quarantine will be trained in all facets of disinfestation research to an international standard. Staff will be familiar with the requirements and standards of countries with quarantine barriers for horticultural produce on fruit flies and will be able to conduct research projects and make submissions to international quarantine authorities, thus opening new export markets for fresh horticultural products. ◆ Workshops will be conducted which will cover all the components of quarantine disinfestation research. ◆ Data will be generated during and between training workshops which will be used to develop a treatment protocol for the export of a priority commodity, to a country with quarantine barriers for that commodity, based on fruit flies. 	<ul style="list-style-type: none"> i) Eight workshops will be conducted at PPD by the end of November 2001 ii) On completion of these workshops, 8 staff will be competent in the current methods used in disinfestation research and able to operate the required equipment and technology iii) A submission will be in an advanced stage of preparation for an importing country as the basis for a treatment protocol
<ul style="list-style-type: none"> ◆ Training resources in the form of a video and CD ROM depicting and describing techniques taught in the training workshops will be developed and provided to PPD ◆ A small workshop to trail training material will be conducted 	<ul style="list-style-type: none"> i) Training material in the form of a video and CD ROM will be developed by October 2001 ii) The material will be evaluated in Australia and Vietnam by October 2001 iii) A workshop will be conducted in Vietnam in October 2001 to trial some of the material in a training situation. Course participants will provide an evaluation of this material also.

PROJECT COMPLETION REPORT

Executive Summary

The project has been completed within budget and quality targets. The final trip encompassing the final workshop occurred in April 2002. The CDROM was finished and trialled during this workshop. All the research data was collated and a draft report of this research data was prepared. This has been further modified by email since the visit.

Twelve trips to Vietnam (including several jointly with ACIAR travel) have been completed and the achievements include:

- Eight workshops (10 weeks total) were successfully conducted in Vietnam. During these workshops the training progressed smoothly and effectively. Using the newly acquired knowledge and skills the Plant Protection Department (PPD) staff have:
 - established and are continuing to maintain colonies of two fruit fly species.
 - conducted comparative testing of fruit fly thermal tolerance using hot water immersion.
 - completed a range of replicated in-fruit trials as required by international quarantine authorities, using the Australian designed, Vietnamese built heat treatment unit provided by this project.
- Using project funds supplemented by PPD funds, a four-room building was refurbished and converted to fruit fly rearing rooms, a laboratory, fruit holding room and treatment room. This facility is operating effectively.
- A heat treatment unit designed in Australia and comprising the Australian built control system and Australian developed measurement and control software and Vietnamese built chamber, is operational and has been used extensively to conduct experiments.
- The CDROM has been developed and was evaluated during the last workshop. This CD contains comprehensive information on fruit fly species, detailed methods of insect culturing, and full details of developing quarantine treatments. A multimedia workshop was conducted during the final project visit to Vietnam to train staff, in modifying the CD to include new procedures as they are developed. Multimedia equipment necessary to maintain or upgrade the CDROM have been provided by the project including video camera, scanner, computer, CDROM burner.

1. Project Description

1.1 Background and preparation

Trade in food products has increased substantially in recent years, particularly between and from the APEC countries. World Trade Organisation (WTO) negotiations will open additional markets for a wider variety of products. However, the movement of plant products between countries is accompanied by the risks of introducing unwanted diseases or insects to importing countries.

For Vietnam, as for most SE Asian countries, fruit flies are a major pest of most tropical and sub-tropical fruit. Their presence is a major impediment to trade with the many countries, which have quarantine barriers against their entry. Most importing countries require a

postharvest disinfestation treatment to overcome the quarantine barrier. A full understanding of requirements to enable appropriate management of exported and imported produce. Within this, the ability to develop and apply approved treatments is crucial to the expansion of trade opportunities in fresh fruit.

In addition, expanding trade, while reaching international levels of expertise requires extensive training and expanded facilities. DPI is the Commissioned Organisation for the ACIAR project PHT93/877 “*Development of heat systems for quarantine disinfestation in tropical fruit*“, which is providing Vietnam with the infrastructure and expertise to undertake the development of quarantine treatment, using heat as the preferred method. The ACIAR project is based in Hanoi, although it has always been recognised that a large proportion of the fruit production occurred in the southern part of Vietnam. It was a priority of PPD to expand the work being done in the north to the southern region when the opportunity occurred. This CARD project provided that opportunity.

Project implementation commenced with a project planning visit prior to formal project start, in conjunction with an ACIAR project visit. All CARD project travel was scheduled to coincide with ACIAR visits to minimise travel commitments of staff and maximise efficiency. Early planning allowed building renovation work to be completed rapidly.

The primary stakeholder in the project is the Plant Protection Department of the Ministry of Agriculture and Rural Development. This department is also the primary beneficiary, gaining the facilities and the expertise to undertake the development of quarantine treatments to gain access to many high return markets for many of the fruit produced in Vietnam. Indirect beneficiaries will ultimately be fruit producers as the value of their crops increases with the development of new export opportunities.

1.2 Context and rationale

The Ministry of Agriculture and Rural Development (MARD) has placed a high priority on the development of exports of horticultural produce from Vietnam. Overcoming the quarantine barriers of high value importing countries is rightly seen as a necessary part of export development. ACIAR Project PHT 93/877 has provided the initial impetus but has been entirely located in the north because it was originally judged that progress would be enhanced by positioning the project at the centre of administrative decision making. The ACIAR project has an entomology component focusing on treatment from an insect perspective being run by PPD. The other project collaborating institution, the Research Institute for Fruit and Vegetables is developing expertise in postharvest quality research particularly studying responses of fruit to quarantine treatments.

Prior to the start of the CARD Program, regular discussions had occurred with the PPD project leader and the PPD management in Ho Chi Minh City exploring possible options for expansion of the project.

About two years into the ACIAR project, New Zealand offered PPD a project opportunity also based around the development of heat treatments. This project was funded by NZAid Asia development Assistance Facility (ADAF). The project titled ‘The Development of Protocols to Overcome Quarantine Barriers for Vietnamese Exports’ was based at the Southern Fruit Research Institute, with some input from PDD in Ho Chi Minh City. This project had very much narrower focus, and was to provide less comprehensive training and limited by the fact that it was only providing heat treatment equipment on loan. It did however provide some training in fruit quality aspects.

There was no formal interface between the ACIAR, CARD and the ADAF projects. However a long-standing personal relationship between the project leaders Australian and New Zealand provided opportunities for useful technical interaction and some adjustments of projects to minimise any overlap.

1.3 Project objectives and scope at design

The objectives of the project were to expand plant quarantine treatment development activities in Vietnam through provision of facilities and equipment, and training of staff to standards required for participation in international trade. The project also aimed to develop materials to provide ongoing training and reference information to assist with self-sufficiency.

MARD sees export development as very important, although there is some indication from observations at a superficial level, that the issues may not be well understood.

This project was designed to provide some broad training as well as detailed training on specific protocol development based on using heat as the treatment process. Other methods of treatment such as cold treatment, fumigation, and irradiation are also possible options under certain circumstances. Some broad training in understanding the principles was envisaged within the project, with this training and resource development at least providing the a starting point for PPD tackle alternative approaches by themselves. Clearly more broadly based training would have been desirable but would have expanded the scope (cost and duration) of the project considerably.

The stakeholder and beneficiaries are the Vietnamese quarantine staff and mango growers and exporters. The quarantine staff received the training and the equipment. The only interaction with growers and exporters was a workshop to discuss priorities and the beginning of the project. The expertise gained by the quarantine staff, however, will facilitate the export of commodities thus benefiting growers and exporters.

1.4 Implementation arrangements

The Australian project and the Vietnamese project leader are the leaders of ACIAR Project PHT 93/877. With the benefits of working together for three years, product development and implementation proceeded smoothly. Administrative and technical responsibility devolved to Ho Chi Minh City at an early stage. DPI has an Overseas Project Officer providing administrative support and liaison with the Australian aid agencies. The DPI project leader maintained oversight of technical and administrative issues and administrative contact with liaison with Vietnam. The full time project scientist employed by the project, provided the training and much of the technical communication with PPD through the technical leader in Ho Chi Minh City. Routine financial management was performed by the project scientist and project leader, although this was complicated initially by the unfamiliar budget format, and later by the change in DPI to accrual accounting.

2. Appropriateness of Project Design and Objectives

2.1 Appropriateness of Objectives

Objective No./Ref.	Objective Description	Appropriateness Rating
1	Expand the existing activities in Vietnam, through building quarantine treatment knowledge and expertise and facilities, in the southern region.	4
2	Raise the expertise in plant quarantine to internationally	4

	accepted standards, particularly with regards to fruit flies and disinfestation treatments for fresh horticultural produce.	
3	Develop quarantine resource material, in a low cost and easily maintained format, to provide ongoing access for training and for reference.	4

5- Best Practice; 4- Fully Satisfactory; 3- Satisfactory overall; 2- Marginally Satisfactory; 1- Weak

For Vietnam, as for most SE Asian countries, fruit flies are a major pest of most tropical and sub-tropical fruit. Most importing countries require a postharvest disinfestation treatment to overcome the quarantine barriers

Vietnam is currently unable to export fresh fruits to many of the most valuable international markets. In order to achieve access to these markets Vietnam must develop quarantine treatments against fruit flies. This project was designed to provide the capability and scientific expertise to develop export protocols for fresh fruit and vegetables. Some training was provided in general aspects of protocol development, but most emphasis was placed on heat treatment as the preferred method.

Heat treatment technology was chosen as the basis for this project because, while not as fast or cheap to develop or apply as chemically-based methods, it is widely regarded as a technology suitable for the longer term. Heat is currently the most modern technology available and is the basis for most fruit fly treatments being developed or in use commercially around the world by countries including Australia, New Zealand, USA, Japan, Thailand, Philippines, India, China, Taiwan, Chile, Mexico and some Pacific Nations.

This project was designed to provide training in fruit fly disinfestation to raise the expertise to internationally accepted standards. By also providing the facilities and equipment, research can be continued after the project is completed to develop quarantine protocols to open export markets.

The training, while directed towards fruit fly quarantine training, will also provide a good basis to use in developing treatments against other pests and diseases, meeting differing importing country requirements and preparation of technical submissions to importing countries.

2.2 Appropriateness of Design

This project design used four key features to develop technical capacity:

This approach is based on a concept developed and effected through ACIAR projects and incorporates a process of collaborative work and the development of ongoing relationships between the research organisations which has been used by the project team in projects in Philippines, Malaysia and Thailand.

- *Providing a full set of specialised equipment, and building modifications in which to conduct the experiments*

The project provided funds for renovation and modifications to an existing building to provide two fruit fly rearing rooms (temperature and humidity controlled), a fruit holding room, a laboratory, a treatment room and an experimental heat treatment chamber.

The heat treatment chamber was fabricated in Vietnam by an engineering unit of a local university. This approach was chosen to provide a technical organisation which would be available for on-going support. Early but unsuccessful attempts were made to source the electrical and electronic components for the monitoring and control system in Vietnam. In

the short term there is some risk that, in the event of equipment failure, repair may be very difficult. Informal advice will be available from the project team in Australia but may be insufficient unless appropriately skilled people can be identified in Vietnam.

The heat treatment equipment being supplied is based on concepts developed by the project leader. These will eventually be available in low-cost commercial equipment which should contribute to Vietnam's ability to access the technology at affordable prices.

- *Providing intensive regular laboratory based training with active participation by the technical expert, generating real experimental data.*

A total of ten weeks of on-site training at the laboratory of PPD in Ho Chi Minh City was run by the Australian project scientist, working with the full Vietnamese project team. Each participant received the same training in all aspects of fruit fly treatment development, from identification, culturing, treatment application and statistical analysis. The approach has been used for ten years in four countries. This approach allows the collaborators to work on their own problems in their own facilities. While this approach is initially slowed by equipping and facility set up issues, it has been the most effective strategy.

The technical leader also received additional training when he attended a Tropical Fruit Conference in Cairns, followed by training at the DPI laboratory in Cairns.

Training courses based around existing facilities and staff within DPI or third countries (eg Thailand) are relatively straightforward to run, and to some extent the quality of training is superior. However in-country training with the overseas scientists working directly with trainees on their own problems eventually provides the best outcome. This type of work also provides the environment for close relationship development.

- *Building a set of resources for ongoing technical support*

For each of the workshops held, a hard copy manual was produced and provided to each workshop participant. This manual contained background information, references and experimental detail for fruit fly culturing and research. A total of eight manuals have been completed. The material in the manuals has been incorporated into the CDROM and enhanced by the addition of colour photographs and video clips and soundtracks of demonstration of experimental methods. This is a powerful interactive learning tool for both the Vietnamese and Australian groups.

- *Proving capability to continue to train staff*

Using CDROM as the basis of delivering training information are that it is simple to use and to look up required information, it can include coloured material including video while being very cheap and relatively simple to modify. Updating, adding or deleting content becomes a less onerous task than with hard copy.

PPD have been supplied with multimedia equipment to produce additional content for the CDROM. They have also been given training in modifying the CDROM to suit their particular needs.

Description of Design Features	Appropriateness Rating
Providing specialised equipment and conditions	4
Intensive hands-on training with technical experts	4
Building resources for ongoing support	4
Providing the capability of on-going training and skills maintenance	4

3. Implementation Performance

3.1 Project Components and Outputs

As noted in the previous progress report there was some slippage in the schedule for performance indicators for objectives 2 and 3. This was addressed and all components are now complete and achieved quality targets within budget constraints.

Component No./Ref.	Component Description	Outputs	Performance Indicators	Performance Rating
Objective 1	Expand existing activities in Vietnam, through building quarantine treatment knowledge and expertise and facilities, in the southern region.	Conversion of existing rooms at the PPD site in Ho Chi Minh City to a disinfestation laboratory, 2 rearing rooms, fruit holding room and treatment room.	Renovations completed and 5 rooms were fully functioning by December 2000. Rooms in routine use.	4
		Additional equipment provided to the PPD office in Ho Chi Minh city to supplement the existing equipment, for developing quarantine treatments.	Heat treatment and laboratory equipment was purchased in Australia and sent to Vietnam by December 2000.	4
Objective. 2	Enhanced expertise in quarantine, particularly with regards to fruit flies and disinfestation treatments for fresh horticultural produce.	Workshops conducted which covered all the components of quarantine disinfestation research.	Eight workshops were conducted at PPD by the end of April 2002. Final workshop was delayed (see section 5.0)	4
		Current staff of PPD working in quarantine trained in all facets of disinfestation research to an international standard and able to conduct research projects and make submissions to international quarantine authorities.	Seven staff are competent in the current methods used in disinfestation research and able to: <ul style="list-style-type: none"> - operate the required equipment and technology - complete the required experiments - statistically analyse the data - draw appropriate conclusions. 	4

		Data generated during and between training workshops used to develop a treatment protocol for the export of a priority commodity, to a country with quarantine barriers for that commodity, based on fruit flies.	All components of disinfestation research experimentation have been completed for <i>Bactrocera dorsalis</i> in mango. A submission is in an advanced stage of preparation for an importing country as the basis for a treatment protocol.	4
Objective 3	Develop training resources to ensure ongoing access to required material in training format.	Training resources in the form of a video and CDROM depicting and describing techniques taught in the training workshops developed and provided to PPD	A CDROM containing an extensive video component was provided to PPD staff during the final workshop in April 2002.	4
		A short workshop to trial training material conducted.	The CDROM was evaluated in Vietnam during the last workshop. A multimedia workshop was conducted and staff trained to modify the CD and maintain or upgrade CDROM. Multimedia equipment has been purchased by the project including video camera, scanner, computer and CDROM burner	4

3.2 Project Outcomes

It is clear that the project has already reached a stage where its effectiveness is demonstrated. The target group of PPD is using the newly acquired knowledge and skills on a daily basis, continuing the work on quarantine treatment development. They have already moved well ahead of where they were expected to be at the conclusion of the project.

The facilities and equipment supplied by and for the project are in routine use by PPD staff.

It is highly desirable that some support mechanism be established to deal with the problems expected to arise. They will very quickly outgrow their current level of knowledge and experience. While they may be able to move ahead on their own, the risks are great that without guidance they could venture into undertaking unsoundly based activities.

3.3 Sectoral Impact

This project does not specifically target any disadvantaged group. The staff of PPD which were trained were existing staff with good English skills. The core workshop participants were three females and four males, although gender was not at all relevant.

3.4 Costs and Financing

Changes in the exchange rate and other cost fluctuations has resulted in a negative impact on the Vietnamese organisation of approximately AUD 1000. This primarily impacted on the equipment that could be purchased. Adjustments to the equipment list were negotiated with the PPD technical leader to achieve the desired output within budgetary constraints.

Some funds remain unspent in the Australian component of the project. This occurred mostly as savings in travel with some scheduled travel occurring in conjunction with ACIAR travel and some consolidation of activities into single visits. There was no reduction of outcomes delivered.

In both technical and financial terms, Vietnam received in excess of what was proposed in the project.

3.5 Monitoring of project

The project was based on regular visits by the project leader and other project staff. During each visit meetings were held with the project leader or the technical leader in Vietnam to discuss budgets, schedules and training workshops. Each visit also involved a training workshop, which built on each other. The same staff were involved with each workshop and their expertise increased as the project was implemented. In between workshops Vietnamese staff conducted more experiments using the techniques developed. Exchange of information via email between workshops also facilitated learning.

Building on the expertise of the group through training the same staff each visit by a small number of Australian personnel was a major strength.

3.6 Technical Assistance, Training and Capacity Building

The Australian project team consisted of existing DPI staff with extensive knowledge and experience in the field covered by the project. They were also highly experienced in running aid projects in SE Asia. The project employed a former DPI scientist as the person to provide the training and to develop the CDROM resource material. This scientist was the ideal choice as she not only has extensive technical experience in all aspects of fruit fly management and treatment but is an experienced and highly effective trainer.

Other scientists used in the project were also chosen on the basis of their extensive experience in their particular fields. The quarantine consultant is a former DPI staff member with twenty years experience in treatment development, as well as an international reputation in quarantine treatment application and regulation. The breadth and depth of information supplied to the Vietnamese was very highly praised, and was rated very much superior to information supplied by another country some weeks earlier.

The particular multimedia consultant used was selected on the basis of his experience in developing training packages for Asian countries in ACIAR and AusAID projects. His input was in line with expectations and enabled the delivery of very high quality material.

The success of the training provided is clearly demonstrated by both the quantity and quality of the work done by the PPD group in the periods between the training visits. The group has

been able to develop the ability to operate independently, however some oversight of the activities will be desirable for a few years to ensure the many aspects of the work remain at an acceptable standard.

The CDROM resource material will remain a valuable source of training and reference information for many years, and will greatly benefit Vietnamese and Australian scientists and support staff in the working in the area.

The relationship of the project team and the staff of PPD was extremely good at both a personal and professional level. This relationship should continue to contribute to success by PPD in the future.

3.7 Management of Constraints, Issues, Risks and Change

No significant difficulties were experienced in the project. The members of the Australian project team have had considerable experience working on aid projects in Asia. Their experience in Asia and some understanding of the cultural issues, enhanced by the cultural awareness training provided by DPI under the ACIAR projects has contributed to the problem-free project.

Expectations of success are very high in Vietnam, with apparently some belief that the CARD and ACIAR projects will in some way expedite access to Australian markets for fruit from Vietnam. This presents some potential problems, as the normal Australian Quarantine Inspection Service requirements for entry of fruit from Vietnam to Australia will still apply, and no special concessions will be available. This situation has been discussed several times with the Vietnamese project leadership and this information has reportedly been passed to higher levels in MARD.

3.8 Project Management

The benefits of a four year relationship with the Vietnam project collaborator (through the ACIAR project) have been very evident. Discussions have been open and effective and decisions made and communicated quickly.

Technical progress has been excellent as a result of strong management support. The attendance of staff at the workshops has been given high priority and the technical leader has also attended most of the workshops demonstrating their commitment. The group have sourced their own funds to expand on the facilities provided by this project. They have also spent a lot of time between workshops gathering more experimental data and refining their techniques.

Rating: 4- Fully satisfactory.

4. Performance and Outcomes

4.1 Assessment of Performance Against Objectives and Design

Expanding existing activities in Vietnam

This project is complementary to an ACIAR project based in Hanoi incorporating the same institution. This project is providing expansion of quarantine activities to the south and is also providing some extra training for staff from the north. It is also providing the means to coordinate activity of researchers in the north and south, and meetings with growers and potential exporters. The building of knowledge, expertise and facilities is already occurring through the provision of technical equipment and training, which will develop expertise that is more than capable of achieving fruit fly treatment development. One area of expertise that

is not being addressed in this project is expanding the fruit quality expertise. While this is occurring in the ACIAR project in the north, there was insufficient time to organise that part of the project with an appropriate Vietnamese Institution. PPD are attempting to rectify this deficiency by building the capacity in that organisation. However they do not currently have sufficient expertise to properly deal with the issues. Some suitable expertise exists in Vietnam through recent ACIAR and AusAID projects but is in other organisations.

Raise expertise to internationally accepted standards

The staff training has been successful with staff using their newly acquired skills to maintain colonies and records to international standards. Training in experimental methodologies was also successful with hot water immersion tests have been completed against all immature stages to international standards and seven in-fruit experiments have been completed using the new heat treatment system. The organisation has a strong desire to achieve project objectives and staff attendance at training and conduct of experiments outside workshops is given a high priority.

Develop quarantine resource material

A version of the CDROM was used in the final training workshop in Vietnam. A large amount of video has been edited, but audio tracks have not been added in final form. The scope of the information compiled into the CD is very considerably greater than was envisaged at the outset of the project. Some additional work is being done to achieve the desired high quality outcome. Since DPI is a beneficiary of this work, it is being done outside the project. The final version will be sent to Vietnam when it is complete.

Ultimately real success will only be achieved when significant export markets open as a result of the work done. There are many other steps in the process of export development and it would be desirable if assistance was given to integrate some of the other training being provided and address those areas of need where critical gaps still exist.

4.2 Sustainability

There is apparently strong support for the project within the Plant Protection Department and at Ministry level. The level of resources provided to the project appears to well exceed that shown in the budget.

PPD have committed an annex building with 5 large rooms as facilities for the project. The project has provided some of the funding for required modifications, including partitioning, air conditioning control upgrade and humidification. This was supplemented by PPD funds. PPD are also funding and have commenced building work to provide additional facilities for future work.

PPD have also maintained the staff commitment to the project. The strong training focus and the development of training resources for future use are in themselves directed at sustainability.

The training CD has been developed which contains images and video of the techniques in the Vietnamese laboratory with Vietnamese staff. The CD will be used for ongoing training of new staff. As methods are improved the staff have the ability to update the training CD. They have been supplied with multimedia equipment and training in its use. Development of new pages in the CD was incorporated in the final workshop.

The group is now sourcing funds from own government to continue the work. It is fairly unlikely that they will be able to continue totally on their own based on training received in a

project that lasted only two years. And they may need assistance to resolve all problems that they will encounter in future export development

Two particular areas will require additional support. One of these is experimental design. Expertise in such areas comes only with experience, is not easily able to be self-taught. The training up to the current level has been detailed and comprehensive but of necessity has been structured as generally 'recipe' based. Higher level training would have to be the subject of more intensive additional training.

The other area of deficiency is in fruit quality response assessment. Quarantine treatments, particularly heat treatments, generally require the demonstration that fruit quality of treated product is commercially satisfactory. This work requires product quality expertise that currently is not incorporated in the project. This deficiency was recognised in the original project submission, but although a suitable collaborator was known, they could not easily be included in the project within the time constraints for project submission, project completion and within the budget limitations. While an entomology-focused team can deal with the simple issues, a full multidisciplinary team is required to deal with the difficult quality related issues that invariably arise in this type of work. The development of this discipline area is important to ensure sustainability

Rating: 3.5

4.3 Development Impact

The ability to develop quarantine treatments, positions Vietnam to attempt access to high value markets for fruit such as Japan and the United States. However this is only one step in a complex multi-step process. Discussions in Vietnam through the course of the ACIAR and CARD projects with government administrators, individual members of the fruit and vegetable wholesale trade and trade officials suggests that there is only a limited understanding of how to mobilise resources to bring about an expansion of exports. There is also only a small amount of technical expertise available in packaging, handling and transport to support export development. Until these deficiencies are addressed, progress will be slow.

5. Conclusions

5.1. Overall assessment

The benefits of a 4 year relationship with the Vietnam project collaborator have been very evident. Discussions have been open and effective and decisions made and communicated quickly. The earlier work in the ACIAR project allowed a demanding but realistic project to be developed with an expected completion in only 18 months. The project completion was delayed partly by the need to adjust ACIAR and CARD project travel to take account of fruit availability in northern and southern Vietnam.

Technical progress has been excellent as a result of strong commitment within the Vietnamese organisation. All objectives have been achieved, or exceeded. PPD have achieved progress faster than expected, actually reaching the point of preparing a draft of a submission to an importing country to achieve market access. In addition, critical fruit fly rearing consumable materials were supplied to Vietnam using savings from the Australian component which were identified towards the end of the project.

The CDROM containing the technical reference and resource information has substantially exceeded expectations in both quantity and quality of information. This has been tested in Vietnam and will be available in the future for skills maintenance of the scientists and to assist in training new staff. This should play a significant part in sustainability. However, additional training and support will be required for PPD to achieve the full level of expertise

and performance necessary to deal with the full range of issues arising in the international market access area.

The effectiveness of the project and the sustainability of the discipline area would be substantially enhanced by maintaining low level project activity by the Australian organisation for up to two years. This low level activity would be limited to short technical visits for review of activities, technical advice and planning discussions.

Management performance of DPI in the project has been satisfactory, although the amount of time required in financial management has been considerably greater than anticipated. This largely is the result of a budget format considerably different from any previously encountered, and the absence of accounting templates to deal with it. The development of spreadsheets has now overcome the problem.

Rating: 4

5.2. Lessons learned

Most lessons learned were of a minor operational nature and not of any value for documentation.

The experience reinforced the view that, the professional and personal relationships developed are the foundation for success of projects such as this. Without these, effectiveness and efficiency may be substantially diminished.