

**REPORT  
ON  
REGIONAL FRUIT FLY PROJECT  
( RAS/93/300)**

Final Report on RAS/93/300

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## **FINAL REPORT**

**PROJECT:** Enhancement of production and export of fresh fruits by controlling fruit flies in the South Pacific

**SHORT TITLE:** Regional Fruit Fly Project (RFFP)

**PROJECT NO:** RAS/93/300

**FUNDING :** Cost-Shared: Australian Government (AusAID), UNDP  
US\$1,146,139

### **Background**

Phase 1 of the Regional Fruit Fly Project in the South Pacific (RFFP) commenced in September, 1990 in Tonga, Cook Islands, Fiji and Samoa. It was expanded in January, 1994 to include Solomon Islands, Vanuatu and Federated States of Micronesia (FSM) as Phase II. The RFFP was executed by the Plant Protection Service under the umbrella of the Agriculture Programme of the South Pacific Commission (SCP). The project was implemented by the Food and Agriculture Organization of the United Nations, which provide the services of a Chief Technical Advisor.

The primary funding was provided under a cost-sharing agreement between the United Nations Development Programme (UNDP) and the Australian Government, through AusAID. Additional funding was provided by the New Zealand Government. FAO provided funding under Technical Cooperation Projects during Phase 1 (September, 1990 to September, 1991) and Phase II (July - September, 1993).

The RFFP's Development Objective was to increase the level of production and quality of fresh fruits and fleshy vegetables, leading to enhanced availability for local consumption, increased exports and higher farmers' incomes in Cook Islands, Fiji, Tonga, Western Samoa, Solomon Islands, Vanuatu and FSM.

### **Outputs for Project (January, 1994 - April, 1994)**

Annex 1 summarizes the outputs or achievements of the RFFP against Immediate Objectives and Expected Outputs as contained in the Project Document.

The RFFP has resulted in increased knowledge on the fruit flies in all seven project countries and, consequently, vastly improved confidence in data on fruit flies that have been used in quarantine negotiations with trading partners. Environmentally sound, inexpensive field control systems have been developed and adopted by farmers to varying degrees in all countries. These systems are based on using protein bait sprays, bagging of fruits and sound crop hygiene.

The Project has assisted countries to develop quarantine treatments based on forced hot air and non-host status. As a result, export of papaya, chillies, mangoes, eggplant and squash is occurring from Fiji, Cook Islands and Vanuatu.

The RFFP has been instrumental in facilitating and encouraging all countries to establish and maintain, at government cost, quarantine surveillance or early warning systems. Also, the documentation of emergency response procedures have been initiated.

In the seven project countries, there is now a corps of staff whose technical capacity in understanding fruit flies, their identification and their management has been markedly improved due to training opportunities provided by the project. Also, the project countries have adequate laboratories and supplies to continue fruit fly activities.

The project has been very successful, with the exception of completing the compilation of a Manual on Fruit Flies for the Pacific. This is partially completed, but awaits high quality photographs of fruit flies and laboratory and field activities and some writing. It will be completed during the first twelve months of RAS/97/331.

On this basis, the major objectives have been achieved.

### **Financial Statement**

Attached (Annex 2) is a Draft Combined Delivery Report from UNDP, that shows that there is US\$4,312.63, remaining under UNDP. The latest report from SPC showed that there is F\$1,904.00 unexpended as at September, 1997.

UNDP and the Chief Technical Advisor has completed a Final Budget Review that will be processed by UNDP after referral to SPC.

**ANNEX 1****FINAL REPORT****PROJECT : ENHANCEMENT OF PRODUCTION AND EXPORT OF FRESH FRUIT S BY CONTROLLING FRUIT FLIES IN THE SOUTH PACIFIC****PROJECT NO: RAS/93/300 FUNDING SOURCE: COST-SHARED BY AusAID & UNDP Timeframe: January 1994 - April, 1997.**

Immediate Objective	Expected Outputs	Actual Outputs
<b>Immediate Objective 1</b> To upgrade technical knowledge and understanding of the impact of fruit flies on production and export of fresh fruits and fleshy vegetables	<b>Output 1.1</b> Updated information on fruit flies in 7 countries - species, seasonal abundance, distributions, host ranges, parasitoids	<ul style="list-style-type: none"> <li>Accurate knowledge of species in 6 of 7 countries - Fiji (5 species), Tonga (5 species), Samoa (7 species), Cook Islands (2 species), Vanuatu (14 species), FSM (1 species).</li> <li>More work needed in Solomon Islands, but already recorded 48 species of which 23 are new records.</li> <li>Detailed records of wild and commercial/edible hosts for most fruit fly species.</li> <li>Parasitoid fauna poorly represented in all countries, but data confirms releases made in 1950s. No significant effect on control.</li> <li>Publication of Proceedings of Regional Symposium on Management of Fruit Flies in the Pacific - contains 52 technical papers, of which 22 were written and presented by national staff.</li> <li>Data has been used for international discussions on quarantine protocols.</li> <li>Increased confidence in fruit fly data by trading partners.</li> </ul>
	<b>Output 1.2</b> Data on losses caused by fruit flies	<ul style="list-style-type: none"> <li>Data on levels of damage shows that food security could be markedly increased if fruit flies are controlled: e.g. capsicum/chilli in Tonga - 92-100% damaged mango in Fiji - 25% damaged guavas in FSM, Vanuatu - &gt; 90% damaged snake gourd in Solomon Islands - 87-90% damaged</li> <li>Prepared report 'An Economic Evaluation of the South Pacific Regional Fruit Fly Project (RFFP) to determine benefit: cost of research in August, 1996.</li> </ul>
	<b>Output 1.3</b> Quarantine surveillance system in all 7 countries	<ul style="list-style-type: none"> <li>All 7 countries have quarantine trapping system operational - Fiji (64 traps on 4 island groups), Cook Islands (27 on 6), Tonga (25 on 5), Samoa (36 on 2), FSM (54 on 6), Solomon Islands (64 on 23) and Vanuatu (38 on 11).</li> <li>Governments of Fiji, Tonga, Cook Islands, Samoa, Vanuatu fund quarantine surveillance. Solomon Islands and FSM to take over in 1999.</li> <li>Approximately 10,000 samples of fruit/vegetables taken as part of quarantine surveillance, equivalent to 7-8 tonnes of fruit/vegetables.</li> </ul>
	<b>Output 1.4</b> Development of Pacific Island Fruit Fly Database	<ul style="list-style-type: none"> <li>Database on species, hosts, distributions, seasonality, parasitoids compiled in conjunction with the ACIAR Fruit Fly Project and housed at Griffith University, Brisbane.</li> <li>Data being validated for transfer to SPC, FAO and countries.</li> </ul>
	<b>Output 1.5</b> Government and private sector awareness on fruit flies and their control.	<ul style="list-style-type: none"> <li>Three posters on fruit fly awareness for ports of entry distributed through SPC to all project countries.</li> <li>National workshop, seminars, training courses: 3 in Tonga, 1 in Samoa, 2 in Solomon Islands, 2 in Vanuatu, 1 in FSM.</li> <li>Regional Workshops, training courses - one in Cairns for 18</li> </ul>

		<p>countries, 2 in Fiji for 7 countries and 18 countries.</p> <ul style="list-style-type: none"> <li>• Placement training of national staff in Fiji or New Zealand or Vanuatu for 11 staff.</li> <li>• Field days and farmer demonstrations on bait spraying and trapping in Tonga (2) , Samoa (1), Fiji (3) , Vanuatu (2).</li> <li>• Major Regional Symposium on Management of Fruit Flies in the Pacific - 45 participants from 18 countries.</li> <li>• Pest Advisory Leaflets for Cook Island and FSM completed.</li> </ul>
<p><b>Immediate Objective 2</b> To reduce levels of damage caused by fruit flies during production</p>	<p><b>Output 2.1</b> Development and adoption of cheap, environmentally sound, effective strategies for fruit fly control</p>	<ul style="list-style-type: none"> <li>• Established, with ACIAR and USAID, prototype plant to modify waste yeast from brewery in Tonga into protein for bait spray.</li> <li>• Field tested 'Tongalure' (manufactured from brewery waste yeast) as a protein bait for fruit fly control in capsicum and chillies capsicum trial : treated plots 8-10%; untreated 97-100% fruit damage.</li> <li>• Mauris Pinnacle Protein Insect Lure tested in Fiji, FSM, Vanuatu, Samoa and Solomon Islands. Gave effective control.</li> <li>• Testing completed on mango and guava (Fiji), papaya (Samoa), chilli/capsicum (Tonga), guava (Vanuatu and Solomon Islands).</li> <li>• Bait spraying adopted as part of quarantine assurance for export pathway for papaya, eggplant and mango.</li> <li>• Modification of waste yeast at Fiji Bitter Brewery has commenced. Initial field tests look promising.</li> <li>• Area control at whole village level researched in Solomon Islands, FSM, Tonga, Fiji - limited success.</li> <li>• Assisted with importation and release of parasitoids for melon fly in Solomon Islands and for mango fruit fly in FSM in 1997.</li> </ul>
	<p><b>Output 2.2</b> Awareness of good crop hygiene by farmers</p>	<ul style="list-style-type: none"> <li>• Conducted field days/demonstrations of fruit fly control techniques in Tonga, Fiji, Vanuatu, Solomon Islands, FSM and Samoa for national staff and farmers. Sound crop hygiene and physical protection by bagging emphasised.</li> </ul>
	<p><b>Output 2.3</b> Trained government staff and farmers in field control techniques.</p>	<ul style="list-style-type: none"> <li>• Field demonstrations conducted in Tonga (Feb,1994 and Sept. 1995), Fiji (July, 1994, June, 1996 and July, 1997), Samoa (Nov. 1994), Vanuatu (June, 1995), Solomon Islands (March, 1995 and May 1996) and FSM (Mar, 1995 and Feb, 1996).</li> <li>• Pest Advisory Leaflets for Cook Islands and FSM completed.</li> <li>• Regional Pest Advisory Leaflet on protein bait spraying being drafted.</li> </ul>
<p><b>Immediate Objective 3</b> To strengthen capacity of quarantine services and private sector to overcome quarantine restrictions on export of fresh fruits and vegetables.</p>	<p><b>Output 3.1</b> Advice on formulating quarantine protocols and procedures for host status testings, disinfestation treatments, quality assurance schemes and contingency plans for eradication of exotic fruit flies.</p>	<ul style="list-style-type: none"> <li>• Provided advice on modifications to MAF Regulatory Authority Standard 155.02.02: Specification for Determination of Fruit Fly Host Status as a Treatment.</li> <li>• Assisted Tonga and Fiji in establishing quarantine pathways for export of papaya, mango, chilli, squash, and eggplant to New Zealand.</li> <li>• Assisted in developing a packaging system for transshipment of low risk fruit fly host commodities through Honolulu to Canada from Fiji.</li> <li>• Provided advice to project countries on technologies for host status testing and generating heat tolerance data for immature stages of fruit flies.</li> <li>• Technically cleared submissions to New Zealand, Australia and USA regarding quarantine treatments.</li> <li>• Conducted with ACIAR and Crawford Fund (Australia, Workshop on Papaya Fruit Fly: Identification, Surveillance and Emergency Response Planning in Cairns, Australia - 18 countries represented by 25 participants.</li> </ul>
	<p><b>Output 3.2</b> Development and adoption of new post-</p>	<ul style="list-style-type: none"> <li>• Maintained and/or established laboratory colonies of economically important fruit flies in Fiji (2 spp.), FSM (1 sp.), Tonga (4 spp.), Samoa (4 spp.), Vanuatu (4-5 spp.)</li> </ul>

	<p>harvest disinfestation treatments to replace ethylene dibromide.</p>	<p>Solomon Islands (4 spp.)</p> <ul style="list-style-type: none"> <li>• Developed new, or adapted existing, laboratory rearing methods for species in FSM, Vanuatu, Solomon Islands and Tonga, including new artificial diets.</li> <li>• Completed life history and rate of development studies on FSM, Solomon Islands and Vanuatu species of fruit flies.</li> <li>• Completed host status testing studies on a wide range of fresh fruit and vegetables in Cook Islands (6 commodities), Fiji (20 commodities), Tonga (14 commodities), Vanuatu (7 commodities) and Solomon Islands (3 commodities).</li> <li>• New Zealand approved for export, under non-host status, squash (Vanuatu), 2 chilli varieties (Fiji), pineapple at colour break (all countries).</li> <li>• Other commodities that are non-hosts and maybe exported are bitter gourd, spongy gourd, squash, papaya at colour break in Fiji, zucchini in Tonga, cucumber in Vanuatu.</li> <li>• Technology on generating heat tolerance data for immature stages of fruit flies transferred to FSM, Vanuatu, Solomon Islands. Equipment purchased.</li> <li>• Heat tolerance testing for immature stages completed in Fiji (2 spp.), Tonga (2 spp.), Samoa (1 spp. by NZ), Cook Islands (2 spp. by NZ) in 1996.</li> <li>• Heat tolerance testing of immature stages commenced in Vanuatu (1 spp.), Solomon Islands (2 spp.), and FSM (1 spp.) in 1996.</li> <li>• Quarantine treatments using forced hot air approved by NZ for papaya, all varieties of mangoes (fresh or pickling) and eggplants. Exports from Fiji to NZ about F1.0m in 1997.</li> <li>• Data on heat tolerances for fruit fly species from Fiji submitted to AQIS, Australia for assessment.</li> <li>• Improved appreciation of quality assurance and quarantine pathways in Fiji, Cook Islands, Samoa, Vanuatu and Tonga by national staff.</li> <li>• Commercial forced hot air units set up in Fiji and Tonga (Governments, USAID, Project) and in Cook Islands (NZ and government).</li> <li>• Initiated economic appraisal of benefits of establishing forced hot air unit in Vanuatu.</li> </ul>
	<p><b>Output 3.3</b> Increased confidence of country personnel in generating and collating data on post-harvest disinfestation treatment to negotiate quarantine agreements for export produce.</p>	<ul style="list-style-type: none"> <li>• Conducted Workshop on High Temperature Forced Air Quarantine Treatment in Rarotonga, Cook Islands (14 participants from 7 countries).</li> <li>• Publication of Proceedings of Regional Symposium on the Management of Fruit Flies in the Pacific.</li> <li>• Submissions on heat tolerance data and Non-host Status for commodities sent to NZ and Australia - Fiji (4 submissions), Tonga (1), Vanuatu (1), Solomon Islands (1), Cook Islands (1) - Produced by national staff.</li> <li>• National staff provided input to quarantine decision making nationally, regionally and internationally.</li> <li>• National staff from Tonga and Fiji to complete Masters Degree based on results from heat tolerance testing.</li> </ul>

