Linking Farmers to Plant Protection Networks
(Solomon Islands)

Project #1222 infoDev The World Bank

Monitoring mission to project sites
North Malaita

Mission Report 6
18 November – 4 December 2004

Sydney
December 2004
Introduction

The Linking farmers project is entering its second and final year. The email station has been built, PRAs and surveys for pests carried out, and a programme of farmer trials established at three sites. Awareness visits to nearby communities informing them about the email station and its use has begun, albeit far behind schedule. The first CFO has left the project and a second recruited.

This is the 6th mission to the project site since the beginning of the project in July 2003. The purpose was to assess progress since August and to plan for the last 6 months of the project together with the Baetolau Farmers Network committee that oversees the project activities.

The report represents the opinions of those members of PestNet (Grahame Jackson), Kastom Gaden Association (Roselyn Kabu and Tony Jansen) and provincial DAL (John Faleka) that took part in the Mission.

Project review

KGA and Pestnet held a review of the project prior to the BFN Committee meeting on 21 November (Annex 1). This provides a detailed view of progress to dates, with successes and failures.

Meeting with the BFN

The committee met on the 25 November and reviewed the project progress. There were a number of issues of concern, and these are detailed below together with proposed remedies.

Awareness program

It was acknowledged that this is behind schedule. It should have been completed long ago, soon after the recruitment of the CFO. So far only the villages west of Silolo have been visited. These visits, which concentrated on schools, were a great success. Members of the email committee took part as well as the station operator, the CFO and the DAL field officer at Malu’u. They generated much interest, although whether or not that interest will translate into email use remains to be seen.

Visits to other areas will be made in January. Villages to the east of Silolo will be visited, followed by those in the interior of the island.

Community Field Officer

Time is short to train the replacement CFO and so changes in the management of the project at Silolo were agreed. The CFO will work closely with the DAL field officer. At the end of each month, a plan for the next 4 weeks will be defined. The CFO will work on his own for the first two weeks of
each month, and then together with the field officer for the remainder of the month. The CFO has signed a contract with KGA until end June 2005

The second change is the employment of Johnson Ladota, a lead farmer from Masilana, an inland village, to undertake trials using natural sprays against *Nisotra*, the beetle attacking *sliperi kabis*, and *Tarophagus*, the insect vector of the virus causing alomae – a lethal disease of taro. He will continue until the end of the project. A program of trials has been outlined (Annex 2).

*Leaflets and radio messages*

With the help of DSAP, the Development of Sustainable Agriculture in the Pacific project, implemented by SPC, a leaflet on alomae is being prepared. Johnson Laudota and the DAL field officer will test it with growers, as soon as it is ready.

The project Team Leader, Roselyn Kabu, will give a talk about the project on the Vois Blong Mere Solomon Islands weekly programme on women’s issues broadcast on SIBC in December.

*Communication*

The Chair of the BFN, also a watermelon grower from Takwa, mentioned that it was difficult to provide information on the farmers’ trials as the radio at the clinic charges for use of the HF radio. It was agreed that messages would be passed through the radio provided to the farmer field school at Suluigata by KGA, about 40 minutes walk from Takwa.

*Evaluation*

An evaluation of the project is scheduled for May. However, the project does not have the funds to hold it, unless SPC assists. If it does, the project intends to invite government and NGO personnel from Solomon Islands, Papua New Guinea and Vanatu to take part. Participants will be trained in evaluation methodologies in Honiara, then visit Malaita to evaluate the project, later returning to Honiara to write a report. SPC has been reminded of its commitment to try to find the funds for this evaluation.

*The farmer-led field trials*

The committee reviewed the progress to date, and noted that the project had been too ambitious in taking on several complex problems in three dispersed villages. There was no ready answer to the beetle attacking *sliperi kabis*, and research into its lifecycle on control was needed, and the control of the fungus attacking watermelons was complicated by a general lack of proper equipment, available pesticides and knowledge on how to apply them. By contrast, the solution for alomae, a lethal disease of taro, was known, but the village chosen for the trials was far inland. These factors combined to make progress slow.
It was agreed that the trials would go ahead until the end of the project, and to facilitate progress assistance would be obtained from lead farmers as described above.

**Progress on farmer-led trials**

Overall, progress has been acceptable. However, there has been some loss of interest among farmers as sprays against *Nisotra* and *Tarophagus* are not effective. This supports the premise that when carrying out trials with farmers, under a PTD programme, a basket of proven technologies is needed. In the case of the Linking Farmer project technologies were not available, and the project was forced into research, for which it was not equipped.

**Watermelon at Takwa**

The fungus attacking the watermelons has been identified by CABI as gummy stem blight, a well-known disease of watermelons the world over. Seed of four new varieties was obtained by SPC and distributed to farmers by DAL in October. These new varieties are being compared with the standard varieties, Flower Mountain and Empire No. 2. In order to assist farmers in understanding the fungus and how to control it with fungicides, a 1-day demonstration in each of the four watermelon-growing villages of the area has been arranged from 6-10 December. A sprayer has been purchased by the project to assist in the training.

The partners put together training notes and tested them (Annex 2) during the Mission. The field officer, Malu'u, will carry out the demonstration, with assistance from the CFO.

There has been some confusion about whether the new varieties should be sprayed with fungicide. Some people thought they were resistant to gummy stem blight. That is not so, and they should be treated in the same way as the control varieties., that is they should be sprayed with fungicide

**Sliperi kabis at Gwou’ulu**

**Collecting the beetles**

There has been no further attempt to control *Nisotra* with botanical sprays at Gwou’ulu. However, Chief Samson Nokia and others have attempted to reduce the damage by regular collecting. This started in late October and continued for 3 weeks, using an aspirator. During this time nearly 2000 insects were collected from 300 kabis bushes in the garden. At the beginning of November, the plants suffered a severe attack of the peach leaf scale and cuttings were taken for replanting, ending the trial.

The numbers of beetles decreased during the trial and new, healthy, leaves developed. For this reason, Samson Nokia and a women’s group formed after the project’s January workshop, will test the method further. The drawback of the method is that an aspirator is required. However, it might be possible to
make one from local materials as long as the plastic hose is purchased. If it can be obtained in Honiara, it will be sent to Gwou'ulu.

The CFO will make fortnightly visits to see if progress is being made.

*Nisotra* collected from 300 *sliperi kabis* with an aspirator at Gwou'ulu over 20 days in October and November 2004

<table>
<thead>
<tr>
<th>Date</th>
<th>No. of plants with <em>Nisotra</em></th>
<th>No. of insects collected</th>
<th>Time taken (hours)</th>
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<td>86</td>
<td>358</td>
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<td>266</td>
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<td>14</td>
<td>70</td>
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<td>28</td>
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<td><strong>Total</strong></td>
<td></td>
<td><strong>1981</strong></td>
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*Tests with Derris*

In order to better understand the failure of the sprays made from *Derris* species growing at Silolo, a commercial preparation was purchased in Australia (Hortico (Aust). Pty. Ltd., 0.75% rotenone). This was tried at Silolo on the 27 November. *Sliperi kabis* bushes were dusted with Derris, shoots were taken and placed in plastic fruit fly cages and *Nisotra* added. A control cage contained untreated shoots. After 24 h, 13 of 17 *Nisotra* place on the Derris-dusted leaves were dead, two were dying and a further two appeared healthy. The latter had become entangled in the muslin used to seal the entrance to the cage. All 18 control insects were alive.

The trial was repeated at Gwaiau with similar results. In the cage where leaves were dusted with Derris, all 21 were dead after 20 hours, whereas 18 of 20 on untreated leaves were alive (two had escaped). Observations showed that where leaves were dusted with Derris powder, 10 *Nisotra* were dead after 2 hours.

Dusting bushes in the field showed that four remained free of *Nisotra* after 24 hours. Observations for longer periods were not possible, but will be made at Masilana by Johnson Ladota.

Contact has been made with NARI, Papua New Guinea where local Derris species are being used successfully against insect pests of *sliperi kabis*. However, in PNG, *Nisotra* is not a serious pest in all parts of the country; it is ranked third after a leafhopper and shoot borer in New Britain Province. The project has asked NARI if it will test the *D. elliptica* (the species promoted as a
PDP) against the beetle. It is thought to have been introduced to Pacific Island countries, as a fish poison.

Meanwhile, an inventory will be made in Solomon Islands to see what species of Derris are present. Tests will also be made with Derris extract and chilli.

**Taro at Gwaiau**

The visit was beset with problems, due to torrential rain and a bi-election. The result was that no meeting of the Alomae Committee was held. However, gardens were inspected, concentrating on those in the middle of the village, and a map was made. This will be helpful in convincing the farmers of the importance of cleaning up these gardens of disease before it is spread to the larger gardens at the village periphery.

The small gardens in the centre of the village were of interest, as some are owned by children, 8 to 10 years old. The children receive planting material from their parents to practice taro cultivation in small plots not far from their houses. Unfortunately, disease control is poor in these plots and they serve to perpetuate the disease. In some cases, the parents inadvertently provide their children with diseased setts.

Fig. 1 Map of the central part Gwaiau village to show the gardens owned by children (Crystol, Vickson and John) and the number of plants showing symptoms of alomae of the number planted

The commercial formulation of Derris dust (0.75 per cent rotenone) was applied to the base of taro plants but did not kill *Tarophagus* planthoppers. Similar results were obtained when planthoppers were caged on leaves
dusted with Derris for 24 h. In a trial set up on 29 November, 38 of 40 were still alive when examined the next day.

A further visit will be made to Gwaiau by Johnson Ladota and the CFO in the first half of December. They will meet with the Alomae Committee, together with Chief Feni, and discuss eradication of alomae from the centre of the village, transmission by *Tarophagus* and planting material, and ways that the community can work together to solve the disease problem.

**Acknowledgement**

We thank the communities of Gwaiau, Gwou'ulu ahd Talwa for their hospitality in hosting the visits of Grahame Jackson and those that accompanied him during the Mission. Thanks also to Lucina Konata and family at Silolo for hospitality, kindness, advice and transport arrangements. The Field Officer, Malu’u accompanied the Mission to Takwa and assisted in preparations for training of watermelon growers. We thank infoDev World Bank and the Secretariat of the Pacific Community for funding.
Annex 1

In-house evaluation of Linking Farmers project

The objective is to provide farmers with timely information and advice on the management of agricultural pests and diseases through an e-mail network.

Output 1: Email station established

- Purchase equipment through PFnet Honiara (computer, printer, modem, digital camera, etc)
- Provide training to KGA staff, including sending and receiving e-mails
- Provide technical backstopping through PFNet
- Establish office, enlarging building used by the Community Peace and Restoration Fund (CPRF)

PFNet set up the email station at the KGA office, Silolo in September 2002. A committee was established, and it recruited operators who were trained by PFNet and KGA. Accommodation was built for the CFO.

Email station

Positive outcomes

The email station has resulted in several positive benefits. It has given the communities nearby the chance of accessing a new communication technology to be used for a variety of reasons, not only those concerned with agriculture. KGA and CPRF have used the station daily to facilitate contact with their head offices and others in their organizations. The station has provided employment for two email office staff. The Linking Farmer project has used the facility for keeping all the partners informed of project progress, for sending photos of pest and diseases to plant protection networks, for the purchase and repair of equipment, and for sending reports and press releases.

The experience of the past two years has shown the station to be reliable with only a few days when it was offline. When faults occurred these have been solved with assistance from PFNet headquarters in Honiara.

The training of the PFNet operator has been good. Neither had previous experience of computers, or knew how to type, but have operated the facility for more than two years with dedication and without major problems.

A rural email committee was established to oversee the workings of the station. A treasurer (volunteer) has made a substantial contribution by checking the finances each month, making payments to the staff at Silolo and paying the balance to PFNet. The amount of money taken each month varies but is mostly over Sb400. Silolo is not the highest in terms of revenue
collection of all the stations in the country, but PFNet considers it well run and sustainable. An unforeseen outcome of the link between PFNet and PetNet saw collaboration between PFNet and the University of California to trial software (TEK) that makes keyword searches of the Internet, compressing the information retrieved such that it can be sent by email.

Negative outcomes

The email committee has not been as active as anticipated, and has only met twice since the station was established. This has impacted on awareness raising in villages around the station.

There were problems among the PestNet /KGA staff in using the computer and camera. Both CFOs found the task too much for them, especially downloading and sending images attached to emails. The project should have trained the station operators to do these tasks from the outset. Instead it tried to train the CFOs and this was never satisfactory. The station operator has now been trained and is responsible for the camera.

Output 2: Community awareness

- Reassign and train Community Field Officer
- Village meetings, awareness workshops and PRAs
- Production of leaflets (by KGA desktop publishing centre, Honiara), pest management manual and radio announcements, and their dissemination

PRAs, pest surveys, and recruitment of the CFO

Positive outcomes

KGA worked hard to get a suitable CFO, and travelled from Honiara to help with the selection. The panel consisted of the Chair of the BFN, the CPRF representative in the area, the Field Officer, Malu'u and KGA Advisor. Preference was to recruit a woman because of the role of women on Malaita in food crop production.

PRA workshops generated much interest in the selected villages, and they were well attended. People were willing to talk about their pest and disease problems and to participate in discussions on how to manage them. There was good participation, too, from the project partners, with representatives from KGA, PestNet and DAL. The field officer, Malu’u, took an active interest in the PRAs and later the workshops. Needs were identified and information obtained for input into the crop/pest workshops (Output 3).

The PRAs and surveys were carried out well. A lot of information was generated during discussions and experiences were exchanged between the farmers, extensionists (DAL and NGO) and researchers. There was a good gender balance at all workshops reflecting the traditional involvement of men
and women in the production of the selected crops. For example, at Gwaiau men dominated as taro is mostly their responsibility, whereas at Gwou’ulu, the majority of the participants were women.

Negative outcomes

The recruitment of the CFO was problematic. The candidate nominated in the project design was no longer available, and the first attempt to recruit a replacement in September 2003 was not successful. The position was re-advertised in October, but only one woman applied.

The CFO who was recruited was found to be less than satisfactory. She had a background in participatory approaches to agriculture extension having worked for DAL in the Women in Agriculture Programme financed by NZAID. However, with the Linking Farmer project she was unwilling to learn new skills, to do field work that required her to be away from Silolo for several days, to learn how to use a computer and digital camera, and she failed to keep in contact with the Team Leader and project partners as expected. When visiting the project sites she failed to follow up on agreed activities by going to gardens, providing refresher courses and encouraging farmers to form groups so that they could share experiences and generally assist each other.

Creating awareness about the email station has been difficult. Some meetings were held at the inception of the station by PFNet, but these were not follow up, although it is the duty of the station operators to go out to the communities and tell them about email and its uses. Awareness raising in villages along the coast, west of the station, was only carried out in October 2004, 16 months after the start of the project. Meetings in other areas have yet to be done, and there is a need to revisit the first area to include villages where the communities were not ready to receive the awareness-raising team as they were not given notice of the visit.

Although the PRAs were done well overall, and provided much information, one site (Takwa) was not given notice of the meeting. Nevertheless, the PRA went ahead, and went well.

Leaflets have not been published and radio broadcasts about the project have not been made.

Output 3: Farmer-monitored pest control strategies

- Baseline surveys of pests and diseases in North Malaita by PestNet moderators, and PMN members
- PMN farmers rank pests and diseases, and at least three chosen in consultations with PMN coordinating committee, and strategies defined
- Training provided by PestNet to KGA and Government extension staff
- Farmer field trials established that combine local knowledge and innovations in pest management with expertise provided by PestNet
Farmer field trials monitored and results disseminated through PMN and PestNet networks

Positive outcomes

The results of the PRAs and surveys (done at the same time) were discussed by the Baetolau Farmers’ Network and the pests prioritised in terms of their effect on food production. Villages were nominated for further workshops and trials with farmers. For the most part, those chosen were the villages that hosted the PRAs. The pests selected were the major problems in the area as recorded from the surveys.

At all the sites, some farmers carried out experiments, although at Takwa efforts to control watermelon blight are only just beginning. At the other sites, PDPs were investigated as the problems were due to insects and there was some evidence from growers and KGA that they worked.

At Takwa, and villages nearby where watermelons are grown, the workshop and follow up visits showed why the farmers are finding it difficult to control pests and diseases. They do not understand the life-cycle of insects and pathogens; they find it difficult to differentiate between symptoms caused by insects and diseases; they do not know the difference between insecticides and fungicides; they cannot read a pesticide label to apply recommended amounts; and they have little idea of spray application.

Without the intervention of the project, these problems would have gone unnoticed by government and NGO authorities. Although the project has limited resources to deal with a problem of this magnitude, it has provided the DAL field officer with some resources to assist the farmers. Seed of varieties that have done well in other Pacific Island countries has been given to growers to test, a sprayer has been provided for training purposes, and training provided on the pests and diseases of concern. More benign pesticides, in keeping with an ‘organic’ approach, have been suggested by the project, for instance, Bt instead of Othene (acephate) as an insecticide, and copper oxychloride rather than Bravo (chlorthalonil), as a fungicides.

Extension staff have made considerable use of the email facility. The result is that there is no longer the feeling of isolation that existed before. There is now a sense of purpose that comes from being able to help farmers, and of being part of a team. Staff are connected to Honiara, and on technical matters – plant protection and crop production – to the outside world, to PestNet and Kastom Gaden, and through them to CABI, SPC and FAO. With the digital camera provided, extension staff can send images of pests for rapid identification or of crops and livestock for instant advice. There is now no aspect of agricultural information out of their reach.

Negative outcomes

There were a number of deficiencies noted from the pest workshops, some of a minor nature, others more important. A minor difficulty was that at some
workshops, Malothawa in particular, there were too many resource persons, and this caused misunderstanding, as the contribution of each was not well coordinated. By contrast, there were two more serious problems. First, the workshops did not spend sufficient time in targeting the next activity, the experimentation with farmers. More time should have been given to the trials that farmers had agreed to do and how to record the results. Second, and perhaps of greater importance, the workshops made no attempt to develop structures at the village level to organize and encourage farmers to carry out the trials. Without this social organization, and with a CFO who visited only rarely and briefly, the trials were not done or were abandoned when initial efforts did not bring immediate results.

Four villages were nominated by the BFN, each with separate problems. This was found to be too ambitious in relation to the resources that the project had to offer. An attempt was made to scale-back activities, and sweet potato pests were dropped in favour of *sliperi kabis*, but still the workload proved too much. First, there was no easy solution to *Nisotra* a chrysomelid beetle attacking leaves of *sliperi kabis*, or to gummy stem blight, a fungus infecting watermelons. Preferably, the project should have chosen pest problems that had already been researched and where solutions had been found. Instead it embarked on research. This would have been fine if the trials had produced useful results, but they did not. Tests by farmers, and later by PestNet and DAL extension staff, found that none of the PDPs were effective against *Nisotra* or *Tarophagus* (the taro planthopper). For *Tarophagus*, the failure to find a chemical control was of little consequence as rouging diseased plants is the main strategy, but for *Nisotra*, failure to find a chemical solution was important.

Second, the project sites were several kilometres apart, along poorly maintained coastal roads where vehicles were few and expensive to hire, or by precipitous footpaths to distant, mountainous, inland villages. One site could only be reached by canoe. The difficulty of access of the sites made monitoring especially difficult.

Third, the project made a mistake in trying to conduct trials with farmers, rather than providing them with information and advice. It did not have the capacity to undertake trials into complex pest problems; this was especially so against the watermelon pest problems at Takwa where insects and diseases were causing major problems and where marketing difficulties were discouraging farmers from continuing production.

Forth, although the involvement of DAL at the district level was good, collaboration from the headquarters was less so. Visits to project sites were not coordinated between DAL and the other partners, KGA and PestNet, with DAL making independent visits. Reports were not written or were late, so it was difficult to know what had been done, what follow up was necessary, and by whom; and only some sites were visited, mostly the villages growing watermelons.
The project did not involve **farmer field schools**, and this was a lost opportunity. It would have been useful if the project had given a contract to the FFS near Silolo to test the PDPs, *Derris*, tobacco, *Barringtonia*, tobacco etc against *Nisotra* at the start of the trials programme, to get an early indication whether some were effective.

It was apparent that many of the farmers quickly forgot what they had learned at the workshops, as they did not put into practice what they learned immediately. They needed more training and as the CFO did not visit regularly nor provide it, they did not carry out the trials; or where there was early disappointment in the results of the trials they were not encouraged to persevere. Several months elapsed trying to encourage the CFO to work as required and then, when it was realized that it was not possible, and another CFO was required, further time was lost in recruiting and training the appointee.

Unfortunately, the new CFO did not proved to be an improvement. Partly this was due to a lack of familiarity with the work: he did not have sufficient years of education or experience for the job. It was also due to a lack of support from the project. Neither KGA nor DAL have monitoring systems in place to alert them immediately when staff are having technical problems or are under-performing. In addition, DAL did not contribute to the management of the project, leaving the day to day running to KGA. DAL invariably worked through the DAL field officer, Malu’u, without informing others of its decisions. Sometimes even its own district extension staff were not told of visits beforehand.

During the first 18 months of the project, the officer responsible for the project in DAL made three visits. But apart from the workshop, the visits were not documented nor the results shared. Invariably, it was left to KGA and PestNet to organize and manage the project. On some occasions, DAL did liaise with the provincial agriculture staff to provide transport. But overall, it was apparent that collaboration was perfunctory at best; and there was no ownership of the project.

**Equipment** and other inputs were slow to arrive. Small sprayers were purchased in Australia and brought to Solomon Islands as nothing suitable could be purchased locally. It took several months before sufficient sprayers were available for farmers to use. And by that time their enthusiasm for trials had waned. At Takwa, seeds of new melon varieties were late in arriving, as they had to be purchased from Taiwan; this meant that the time of planting to obtain crops for the Christmas season was missed.

**Where are we now?**

We have reached a stage where we know that the email station is sustainable; it has sufficient income to cover its costs, and to provide a small income for the operators who would otherwise have none. The operators are well trained and likely to continue to be employed.
Some awareness about the station and its uses has been done, but more is needed. People are using the station, but not for pest and disease information, nor for more general agriculture. Pest problems in the area have been identified and prioritised and some work has been done to solve them. Unfortunately, for two of the three problems, they need more research and the project does not have the resources to do it.

Although there has been little use of the email station by farmers as yet, it has helped in other ways. The CFO and provincial DAL field officer have used the facility for sending reports (but not images), requesting information and advice and generally keeping in touch with all the partners. A project list of 21 members has kept everyone concerned with the project in touch on a day-to-day basis. The DAL field officer has asked technical questions about pests and diseases, for example, the cause of a dieback on cassava has been discussed between people on the Linking Farmer email list, and emails to PestNet on cocoa processing have elicited responses from FAO offering further assistance if required.

The CFO was not adequate for the task and this has exposed a difficulty in managing projects, particularly in monitoring, in isolated areas of Solomon Islands. People are expected to work without supervision to a great extent, as monitoring is difficult. In this project, the work is technically demanding and skills in social organization are required. It was difficult to find people with the skills required, and as systems were not in place to detect poor performance early, and to deal with it, project activities suffered as a consequence.

Experiences in building partnership between DAL and NGOs has been mixed. While it has been difficult to get the cooperation and collaboration from DAL head office to jointly manage the project, the relationship between provincial DAL and the partners has been excellent.

The increased involvement of SPC in the project has been an unexpected outcome. At the outset SPC undertook to provide funds to DAL instead of PestNet as originally agreed. However, in recent months the organization has provided extra funds, and supported monitoring visits by PestNet. This has meant that savings from infoDev funds can be given to KGA to improve project implementation during the last 6 months.

It is hoped that SPC will provide further support to the project, in particular, funds for an evaluation scheduled for May 2005.

**Future?**

The project has another 6 months to run, it will terminate in June 2005. During that time the essential work will be as follows:

1) Administration

   - The provincial extension officer will take the lead role at the project site and the CFO will give support.
• The station operator will take charge of the project digital camera, and be responsible for sending emails to the Linking Farmers list and to PestNet. If farmers want to use the camera, it will be possible as long as they pay for printing costs. Only the station operator will use the camera, apart from the CFO.

• Efforts will be made to have the Silolo Email Station Committee meet more regularly. Funds will be made available for this and for their participation in awareness raising in proximity to the station.

• It is hoped that SPC will continue to fund PestNet. Another visit is scheduled for March; this will be the last monitoring visit before the evaluation in May.

2) Plant collections

• A collection of *sliperi kabis* and Derris varieties will be made at Silolo. Taro imported from the SPC RGC will be grown at Silolo, multiplied and distributed to farmers, with preference given to those in the inland villages. Analyses of Derris are needed to determine the species with the highest rotenone content.

3) Trials

• Farmers at the project sites will be given contracts to investigate the following pests and diseases:

  □ Gwaiau: the use of Derris, neem and chilli against *Nisotra*. A commercial product containing 0.75% rotenone will be compared with preparations of Derris obtained from local species.

  □ Gwaiau/Masilana (highland villages): Tests will be done at Masilana and at the FFS (Suluigata) using Derris and rotenone for the control of *Tarophagus*, the vector of alomae. Masilana will also test Derris and rotenone for the control of *Nisotra*. Work will continue at Gwaiau to encourage the community to control alomae by rouging diseased plants, and to do it at the same time (Johnson will be involved). If possible neem will be tested.

  □ Takwa: the DAL field officer will be provided with spraying equipment, notes on preparing spray formulations and methods of spraying. A series of training courses will be given at Takwa and nearby villages where watermelons are grown. Importantly, training will be provided to growers in other disease control methods, including cultural practices likely to reduce the incidence of the blight.
4) Information exchange

An investigation will be carried out among women in the villages close to Silolo into agricultural information access and exchange. KGA will produce a short report.

5) Awareness

More meetings will be held around Silolo to create awareness about the email station and its uses. There will be visits to the east, and to villages inland, as well as a return to the west, to villages missed during the first round of visits.

6) Evaluation

An evaluation of the project will be held in May 2005. It is expected that the Melanesian Farmers First Network will be involved with representatives from Papua New Guinea and Vanuatu. Government agencies will also be invited to attend. After a week's training in Honiara, the workshop representatives will travel to Silolo and the project sites make an evaluation of the project and return to Honiara to write up.
Gummy stem blight – how to control the disease

What is gummy stem blight?

It is a fungus. It produces spores inside, small, black, round structures (bag or basket), like a dot made by a pen. It is hard to see the baskets by eye. Inside the baskets there are millions of spores. The baskets break open when it is wet and the spores come out. They are spread in the rain and wind. The spores land on the watermelon leaves; they germinate like a seed, and enter the leaf. The fungus grows outwards in a circle, and kills the leaf. This is why you see round, brown spots. The fungus is worse when it is wet.

The fungus can live a long time in rotten leaves, in the soil after the plant has died. It is waiting for the next crop of watermelons.
How can I control the fungus?

What do I look for in the nursery?

You must look closely at the plants in the nursery. As the plants grow, keep checking them.

Look to see if there are any with leaf spots. If not, OK; but if you see any with spots, throw away the plants. They might be spots of the Gummy Stem Blight fungus. If taken to the field they will spread the disease to other plants.

Checking

- Check often
- Remove plants with spots and burn
- Or, remove leaves and burn, and put plants separately
- If many leaf spots, remove leaves and spray with Bravo (3 ml/litre)
- Try protecting plants with leaf panels

Soil

- Do not take soil from gardens where watermelon has been grown before.

Site

- Make nursery away from old plantings, and upwind from main watermelon areas

Questions:

1. Ask the farmers if they have seen spots on leaves in the nursery. If so, ask what they did with the plants?
2. Ask the farmers where they take the soil. Do they always take soil from the mangroves or Abalolo trees; do they take soil from their gardens?
3. Do any of the farmers build a leaf screen around the plants?
4. Ask if farmers worry about the nursery site, or do they just want it close to their houses?
5. Ask farmers to think how the fungus might spread from infected soil to the leaves (same happens in the gardens, too).

Where do I plant my watermelons?

Site

Make sure you do not plant your watermelon next to other blocks that are older and already have leaf spots. If you do, the wind and rain will spread spores onto your watermelons.
lant as far away from older block as you can. And if possible **not downwind** from any other blocks in the area.

**NO!**

- NEW garden
- OLD garden
- Wind

**YES!**

- NEW garden
- As far as possible
- OLD garden
- Wind

**Rotation**

Never plant watermelons on the same land as the last crop. Leave a break between crops grown on the same land of at least 3 years. This is important, as the fungus can last a long time in the soil, living on organic matter.

**Questions:**

- Are they planting next to, or downwind from older, infected crops?
- How many months or years do farmers leave between crops of watermelon?
- Do they realize that if they plant one crop after another on the same land they will get a lot of disease in the second crop?

*How can I reduce the amount of fungus remaining after harvest?*

Do not leave the vine prunings in the gardens, especially in the paths. Take them out of the garden and burn them.

After the watermelons have been harvested, collected the vines and burn them. Do not let the leaves die in the field. If you do, then you will be adding fungus to the soil and there will be more fungus next time you plant the crop.

**Questions:**

- What do farmers do with the vine prunings?
- What do farmers do with the vines after harvest?

*How do I control the disease with fungicides?*

See the notes below
Chemical control of gummy Stem Blight

Reading a label

What does it tell you? Let’s look at the Bravo label

1) Active ingredient: This is the name of the chemical (chlorothalonil) you are using to kill the fungus.

That is different from Bravo – Bravo is the company name. There are other companies, and they will give the chemical another name

2) Precautions:
   • Keep away from children
   • Keep away from skin and eyes when spraying and don’t breathe the spray
   • Wash hands and other parts of body after use
   • Throw away containers in a safe place
   • Be careful you do not spray near water supplies, or throw away empty containers near them
   • The chemical is harmful to fish

3) General information: says that it is a fungicide and what crops it’s OK for

4) Directions: tells you how much of the chemical to use in how much water
   • Shake well
   • Add 3 mls of Bravo in 1 litre of water

That is:

In one bucket that is 3 x 9 mls = 27 mls

5) Withholding period: this is the number of days after you stop spraying until the plant is taken for food

For Bravo used on watermelon and similar plants, it is 1 day

6) Compatibility: this tells you what you can and cannot mix it with. If you do it may spoil the plants, or not work properly

Exercise: Do the same for Orthene

Active ingredient; Precaution; General information; Directions; Withholding period; Compatibility
How much Bravo to use?

When the crop is young (before flowering) use 2.5 litres Bravo per ha in 500 litres of water\(^1\). That is:

**5 ml Bravo in ONE litre water**

And 33 spray tanks full of water per ha if the sprayer holds 15 litre

When the crop is mature (flowers and fruit) use 3.75 litre Bravo per ha in 500 litres water. That is:

**7.5 ml Bravo in ONE litre water**

And 33 spray tanks full of water per ha if the sprayer holds 15 litres

---

What does that mean?

For 80 watermelons (60 m x 4 m area) use 12 litres Bravo.

It will take about 19 mins to spray 80 melons in a block if you spray at a rate of 1.25 litres per 2 mins (see later)

For 100 watermelons use 15 litres Bravo

Each sprayer will contain 5 x 15 ml Bravo for young plants = 75 ml

Or, it will contain 7.5 x 15 ml Bravo for mature plants = 112.5 ml

How often?

You will need to spray as soon as you see the leaf spots, and at 7 to 14 day intervals

---

Measuring out:

- Remove sprayer lid and place upside down
- Half fill sprayer with water
- Shake Bravo container carefully
- Wear gloves if you can get them
- Measure out carefully – do not guess!
- Put into sprayer, wash out and put washing into sprayer too
- Put pesticide in safe place
- Fill tank with water
- Rock sprayer back and forward to mix

Note, if the chemical is a wettable powder: add a small amount of water to the amount of powder needed and mix into a 'cream'. Add to sprayer

**Exercise: Do this as a group**

Cleaning sprayer:

- Spray remaining Bravo over crop
- Remove lid and place upside down
- Add water and wash out onto bare ground
- Add more water, and shake
- Replace lid
- Spray out some water
- Remove lid, and tip out water
- Replace lid
- Remove and clean nozzle
- Remove lance filter if present

**Exercise: Do this as a group**

Disposal of pesticide:

- Best bury the container in a deep hole, > 0.5 m deep
- First, wash out with water
- Dig hole away from village, but not where it floods, or near streams
- Cover with grass, etc

---

\(^1\) This is the amount used in Australia for watermelon and other cucurbits with gummy stem blight
Using a knapsack sprayer

**Hose, lance and handle:** Check for leaks. If there are leaks, you will waste the chemical; and worse, the chemical will get on your clothing and skin. If the sprayer leaks, repair it or change it.

**Nozzles:** they are the MOST important part of the sprayer and should be treated with care. Nozzles break the liquid into small droplets.

There are different types of nozzles: use a **cone** nozzle for insecticides and fungicides; use a **fan** or a **flood** nozzle for herbicides. Why?

Because CONE NOZZLES give smaller droplets, like a mist, wetting top and bottom leaf surfaces. FAN or FLOOD NOZZLES give larger droplets, and are used for herbicides, where there is no need to spray the under surface of the leaf, but there is need to avoid drift.

**Pressure:** if you can change the pressure of the sprayer (inside), use the high pressure for insecticides and fungicides, and lower pressures for herbicides.

**Cleaning the nozzle:** Do not blow into a nozzle. You may get the chemical into your face! Wash it to unblock it, or use a piece of grass. **Do not use wire or a nail.** Wash your hands after you have handled the nozzle.

**Exercise:** test the nozzle for damage

- Fill sprayer with water (half will do).
- Spray a strip on smooth soil
- Look at the pattern: it should be even, and water should dry out evenly
- If different bands or narrow streaks are present, the nozzle is worn, and it **should be replaced**

Also, check to see if the lance has a filter. This may need cleaning too.

**Exercise:** find out how much you spray

- Half fill tank with water
- Put sprayer on your back
- Stand still
- Maintain constant pressure
- Spray into a bucket for 1 (or 2) minute, standing still
- Measure the water in the bucket
- Repeat (3 times), and compare each occasion
- Compare amounts sprayed between farmers

Aim to spray 1.25 litres in 2 minutes

**Exercise:** spray with lance at different heights

- Half fill tank with water
- Spray over bare, dry, ground
- Raise and lower the height of the nozzle
- Note what happens
- Try and spray at 50 cm from surface of leaves
Putting it all together

Spray technique

• Try to walk at a constant speed
• Try and pump regularly
• Spray directly downwards over the plants with nozzle 50 cm above leaf surface

Exercise: How many litres do you use on 80 or 100 watermelons?

Spray with water and see -

If below 12 litres for 80 or 15 litres for 100:

• You may be moving too fast, and not covering the leaves
• You are pumping too slowly
• You have set the pressure knob too low inside sprayer
• You have the wrong type of nozzle: too small

If above 12 litres for 80 or 15 litres for 100 (ie some watermelons have not been sprayed):

• You may be moving too slowly, and putting too much spray on the leaves
• You are pumping too quickly
• You have set the pressure knob too high inside sprayer
• You have the wrong type of nozzle: too big
**Work program for Johnson Ladota**

1. **Trial with derris dust against bubulu**

   a) Find a small garden of *sliperi kabis* where there are 30-40 plants, but less is OK.

   b) Select 2 groups of 10 plants. Try and make the 2 groups a little far apart.

   c) Label the plants of each group, 1, 2, 3, 4 and 5.

   d) Count the number of Bubulu on each plant in each of the 2 groups of labelled plants

   e) Dust A with Derris each week (make new table each week)

   f) Count number of Bubulu on each group, each week, and record in a book.

<table>
<thead>
<tr>
<th>Plant Number</th>
<th>Date Day 0</th>
<th>Date Day 1</th>
<th>Date Day 2</th>
<th>Date Day 3</th>
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<tbody>
<tr>
<td></td>
<td>Number of Bubulu</td>
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<th>Date Day 6</th>
<th>Date Day 7</th>
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</tbody>
</table>
2. Trial with Derris dust against *Tarophagus*

a) Look for 10 plants with *Tarophagus* in a taro garden. Try and find plants that have a high number of the insects on the stems, some large and some small.

b) Label the plants 1,2,3,4,5,6,7,8,9 and 10

c) On plants 1-5, **count** the number of *Tarophagus* as accurately as you can

d) Dust the **stalks** (stems) with Derris, making sure that you get the powder on the leaves and stalks

e) On plants 6-10, **count** the number of *Tarophagus* (but do NOT treat with Derris)

f) After 7 days (or at another time depending on your work programme) repeat the trial

<table>
<thead>
<tr>
<th>Plant Number</th>
<th>Date Day 0</th>
<th>Date Day 1</th>
<th>Date Day 2</th>
<th>Date Day 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Derris</td>
<td>None</td>
<td>Derris</td>
<td>None</td>
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<tr>
<td>1</td>
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<th>Plant Number</th>
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<th>Date Day 5</th>
<th>Date Day 6</th>
<th>Date Day 7</th>
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<td>Derris</td>
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<td>Derris</td>
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</table>
3A. Collecting and killing Bubulu

a) Find garden where Bubulu is **just starting** to attack

b) Visit every 2/3 days and collect all the insects that you can find

c) Record the number of *sliperi kabis* plants in the garden and fill in the table below:

<table>
<thead>
<tr>
<th>Date</th>
<th>Number of plants with Bubulu</th>
<th>Number of Bubulu collected</th>
<th>Time taken (hours)</th>
<th>Appearance</th>
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</table>

3B. Collecting and killing Bubulu

a) Find garden where Bubulu is **very bad**

b) Visit every 2/3 days and collect all the insects that you can find on say 10 labelled plants at one side of the garden. Make sure the plants are **UPWIND** from the remaining plants

c) See what happens to the plants as you begin collecting. Do new shoots start to develop? Compare the 2 groups of plants.
### 4. Sprays and Bubulu

a) Find a garden where the Bubulu is very bad.

b) Select 10 plants in a group at one side of the garden, and label

d) Make sure the plants are **UPWIND** from the unsprayed plants

c) Spray 5 with chilli, around the bottom of the stems and the soil

d) Spray 5 with tobacco, around the bottom of the stems and the soil

e) Select 5 plants from the unsprayed group, and label

f) Count the Bubulu on each of the 5 plants in each group

g) Count insects on the leaves every 2/3 days

h) Compare the appearance of the plants with those plants that have not been sprayed.

#### Chilli

<table>
<thead>
<tr>
<th>Date</th>
<th>Number of Bubulu collected from 5 plants</th>
<th>Appearance of plants compared to others</th>
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</table>

#### Tobacco

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<tr>
<th>Date</th>
<th>Number of Bubulu collected from 5 plants</th>
<th>Appearance of plants compared to others</th>
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</tbody>
</table>
Unsprayed

<table>
<thead>
<tr>
<th>Date</th>
<th>Number of Bubulu collected from 5 plants</th>
<th>Appearance of plants compared to others</th>
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</table>

How to make the Chilli spray

50 bird chillies
Smash and put in 0.75 litre water
Leave overnight
Strain
Add soap
Add water to 1 litre
Use

How to make the Tobacco spray

6 large leaves
Smash and put in 0.75 litre water
Leave overnight
Strain
Add soap
Add water to 1 litre
Use

5. Visits to Gwaiau

You will visit Gwaiau every 2 months

• Call a meeting of the Alomae Committee, making sure Chief Feni is there. The next should be in 2 weeks time.

• Each member should say how they are getting on in controlling alomae. They should give the number of plants in the garden, when planted and the number of alomae.

• Inspect centre of the village and see if alomae is present

• Has there been a clear up? If not, try and get Chief Feni to organise it

• Tell people the following:
  - Alomae spreads in planting material (lali)
  - Alomae spreads by the small hopper
  - Frequent inspections of gardens is needed
  - Plants should be pulled out **carefully** as soon as they are seen
Do the members give lali to their children? If they do, do they tell them about alomae and help them control it?

The centre of the village has several plots with alomae; this is dangerous. They should be removed.

Uka probably will **not** kill the hopper

The number of alomae in September was as follows:

<table>
<thead>
<tr>
<th>Farmer</th>
<th>September 2004</th>
<th>December 2004</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Date planted</td>
<td>No. planted</td>
</tr>
<tr>
<td>Peter Foakwailiu</td>
<td>May</td>
<td>3000</td>
</tr>
<tr>
<td>Frederick</td>
<td>Jan</td>
<td>3000</td>
</tr>
<tr>
<td>Jack Wanetalu</td>
<td>Feb</td>
<td>3000</td>
</tr>
<tr>
<td>Maelibaea Memenia</td>
<td>March</td>
<td>500</td>
</tr>
<tr>
<td>Jack Sunatee</td>
<td>June</td>
<td>1000</td>
</tr>
<tr>
<td>Jackson Filiau</td>
<td>March</td>
<td>2000</td>
</tr>
<tr>
<td>Feni Aufiliu</td>
<td>March</td>
<td>500</td>
</tr>
<tr>
<td>Achan Maelausia</td>
<td>March</td>
<td>1000</td>
</tr>
<tr>
<td>Peter Irolanga</td>
<td>March</td>
<td>1000</td>
</tr>
<tr>
<td>Philip Iro</td>
<td>April</td>
<td>900</td>
</tr>
<tr>
<td>James Ngeobuli</td>
<td>March</td>
<td>360</td>
</tr>
</tbody>
</table>

- Get the members to look at the map and to add their own gardens if they want to. Look at the direction of the wind. Look at the plots in the centre of the village with alomae.

6. **Find the proper Uka!**

And test it on hoppers and Bubulu

7. **Akwa as a spray**

Chief Feni from Gwaiau has suggested that Akwa sawdust was good for killing fish, so try it against taro planthoppers and Bubulu.

8. **Note on Uka**

Discussions with Adrian Schuhbeck of the German volunteer service in Papua New Guinea has indicated two things: one, the size of the Derris roots should be no thicker than a little finger; and two, uka mixed with chilli is more effective than uka alone. The spray may not kill the insects but they are
repelled by its effect. It should be tried. Note that pyrethum is not likely to
grow at Masilana. It needs to be planted at about 1800m. It is not worth trying
there. Neem is a better choice and should be planted instead.