National Information Sharing Mechanism on the Implementation of the GPA in the Fiji Islands

Country Report

April 2004

Preamble

This report is a contribution to the process of monitoring implementation of the Global Plan of Action – and setting up a national PGR information sharing mechanism (NISM) – in the Fiji Islands. As the agency overseeing implementation of the regional PGR network (PAPGREN), the Secretariat of the Pacific Community (SPC) received support from FAO to contract consultants in Fiji and in Papua New Guinea to prepare reports on GPA implementation in their countries based on the agreed FAO reporting format and set of indicators. In both cases, these consultants were the national PGR focal points, Mr Tevita Kete of the Research Division of the Ministry of Agriculture, Sugar and Land Resettlement (MASLR) of the Fiji Islands and Mrs Rosa Kambuou, PGR Principal Scientist at PNG's National Agricultural Research Institute (NARI). To assist them in the work, they were provided with appropriate hardware and software and travel funds by the FAO project. After a briefing at SPC headquarters in Suva, Fiji, the consultants entered the focal point data (including common tables), conducted a survey among national PGR stakeholders, and entered data for their own organization as a stakeholder. The results will be discussed at the next meeting of the national PGR committee in each country, and the national PGR focal point will take responsibility for the regular updating of the data in the reporting format and generally managing the NISM.

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1. Overview of the pilot GPA monitoring process

The following three-stage process was followed:

1. Familiarization and entering data in the common tables plus the Focal Point information.
2. Field visit to collate information from stakeholders, install stakeholder CDs and train stakeholders on their use.
3. Inputting data for Koronivia Research Station, Agronomy Section (Germplasm and Seed Testing Center stakeholder program (data base).

Phase 1

The initial stage of the process included familiarization with the computerized reporting format. This was found to be reasonably user friendly. As suggested in the manual, data entry commenced with the common tables, important because much of the information required by the stakeholders refer to the data in the common tables.

A literature and internet search was carried out at the SPC Library. A visit was also made to the Department of Environment, but to date no information has been obtained from them, in particular concerning the new Draft Sustainable Development Bill.

The accomplishments of this phase are summarized in the following table:

Common table	Number of entries	Comments
Organizations	36	The coverage includes all main PGR stakeholders, especially from the Government sector and also statutory bodies, plus the regional organization. No NGOs or community groups working directly with PGRFA have so far been identified in Fiji.
Contact persons	54	As above.
Projects	20	
Taxons		No entry was made since all of the taxa in *ex situ* collections were already present.
Cultivars		No entry was carried out because no breeding work is carried out by MASLR.
Information system		The is no standardized information system used nationally.
Areas	5	These areas are mainly the regional and administrative

		divisions of the country.
References	85	The references entered cover a wide range of PGRFA and date back to 1925.
Agreements	5	

A number of stakeholder CDs were then created as follows:

Phase 2

Activities carried out in Phase 2 consist mainly of collecting information directly from stakeholders through visits and installation of the following stakeholder CDs:

- Taveuni Coconut Center, Taveuni
- Sigatoka Research Station, Sigatoka
- Wainigata Research Station, Savusavu
- Fiji Sugar Corporation, Lautoka

For the collection of information, interviews were carried out with the following personnel:

Person interviewed	Position	Locality
1. John Cox	Agricultural Officer	Taveuni
2. Manoa Irinacola	Officer in Charge	Taveuni Coconut Center
3. Vijend Kumar	Officer in Charge	Wainigata Research Station
4. Suren Nath	Farm Manager	Seqaqa Research Station
5. Bijendra Datt	Acting Principal Officer, Horticulture	Sigatoka Research Station
6. Jai Gawander	Research Manager	Fiji Sugar Corporation
7. Semi Moceiciri	Senior Agricultural Officer	Rakiraki
8. Anand Prasad	Acting Officer in Charge	Legalega Research Station

The following table summarizes the action carried out with the different stakeholders:

Stakeholder	Contact person	Action
Taveuni Coconut Center	Manoa Irinacola	Could not install the CD in his computer because the CD player was malfunctioning. A CD has been created and this will be sent to him.
Wainigata Research Station	Vijen Kumar	Could not install the CD in his computer because the computer gave an error message. Virus is suspected to be creating this problem. A CD has been created and will

		be sent to him.
Sigatoka Research Station	Bijendra Datt and Shalendra Prasad	The CD was first installed in a PC located in the office at the nursery. This did not work (Windows 98). The second computer was however new and is located in Mr Bijendra Datt's office. However, we could not open the program since the key generated by the Focal Point program somehow did not open the program. We had to re-load the Koronivia Research Station CD. This worked but Sigatoka Research Station will be sent another CD. Mr Prasad was given a rapid run through of the main computer program and he will fill in the necessary information and send it to SPC.
Legalega research Station	Anand Prasad	Could not load it into PC with Windows 98. We however loaded it into another PC located in his office (Window 95), but with a lot of delays and problems.
Fiji Sugar Corporation	Gawander Jai	He was given a CD and an explanation but he was not able to fill in the format right away because he was committed with other work. He will try out the program and fill in the necessary information.

Phase 3

Phase 3 of the project consisted of inputting information in the Koronivia Research Station, Agronomy Section (Germplasm and Seed Testing Center) stakeholder CD, summarizing information for MASLR as a whole. Some additions to the common tables were made at this stage as well.

2. Highlights of findings

This section summarizes the situation in the Fiji Islands with regard to each of the GPA priority areas.

I. *In situ* conservation and development

1. Surveying and inventorying

No country-wide evaluation has been carried out to determine the extent of continuing conservation and of genetic erosion of traditional crops in farmers' fields. However, limited studies on taro (at Bua and Cakaudrove on Vanua Levu and the island of Nairai), yams (on the islands of Kadavu and the Lau group) and coconut (Bua, Cakaudrove on Vanua Levu, the Lau group) in collaboration with COGENT and the TaroGen project, plus direct contacts with farmers and extension officers, suggest that traditional crops and varieties are undergoing genetic erosion in some cases because of urban migration and tourism development. However, farmers do seem to be maintaining landraces in many areas, and the yam competition held during the provincial meetings at Lau is an interesting example of a practice tending to promote such on-farm conservation. A systematic national survey is needed to document such practices and inventory genetic resources in farmers' fields.

2. Supporting on-farm management and improvement

No activities reported in this area. However, a recent (2002) national PGR consultation recommended the development of on-farm projects on taro, yams (including wild species), breadfruit and bananas.

3. Assisting farmers in disaster situation

An FAO project is providing planting materials to farmers after natural disasters (typhoon), but this is not currently linked to the MASLR's PGR work.

4. Promoting *in situ* conservation of wild crop relatives and wild plants for food production

No activities reported in this area. However, interest has been shown in developing strategies for wild yam conservation.

II. *Ex situ* conservation

5. Sustaining existing collections

Ex situ crop genetic resources collections in Fiji are largely in the form of field genebanks. This is because most of the nationally important crops are vegetatively propagated or perennial. These collections are maintained in different MASLR research stations around Fiji, mainly on the island of Viti Levu, but also on Vanua Levu, as follows (mandate in brackets):

- Koronivia Research Station, Viti Levu (root crops, rice, vegetables, tissue culture)
- Dobuilevu Research Station, Viti Levu (seed/planting material production)
- Legalega Research Station, Viti Levu (dry zone seed crops, fruits)
- Naduruloulou Research Station, Viti Levu (kava, fruit seedling production)
- Sigatoka Research Station, Viti Levu (vegetables, fruits)
- Seaqaqa Research Station, Vanua Levu (fruits)
- Wainigata Research Station, Vanua Levu (tree crops)
- Taveuni Coconut Centre, Vanua Levu (coconuts)

Tables 1-4 show the number of accessions of each species conserved in field genebanks, whether characterization has been carried out, and any urgent needs.

Table 1. Root and tuber crop field collections in Fiji.

Crops	No. accessions	Conservation	Characterization	Priorities
Cassava	27	Koronivia	None	Characterization
Cocoyam (*Xanthosoma*)	2	Koronivia	None	Characterization, further collecting
Sweet potato	30	1. Koronivia 2. Dobuilevu	None	Collecting. Need to replace 6 lost varieties
Taro (upland)	101	1. Koronivia 2. SPC (tissue culture) 3. Nadakuni (on-farm)	Morphological, DNA	
Taro (wetland)	11	Koronivia	None	
Yams	128	1. Koronivia 2. Dobuilevu 3. Seaqaqa 4. SPC (19 *D. alata*)	Partial (70%)	Collecting on Moala, Viti Levu (west). Need to replace 20 lost accessions.

Table 2. Fruit and nut field collections in Fiji.

Crops	No. accessions	Conservation	Characterization
Avocado	3	1. Sigatoka 2. Seaqaqa	None

Breadfruit	5	1. Sigatoka 2. Naduruloulou	None
Carambola	3	1. Naduruloulou 2. Sigatoka	None
Citrus	12	1. Seaqaqa 2. Naduruloulou 3. Legalega	Partial
Coconut	14	1. Taveuni 2. Wainigata	Partial (70%)
Dawa *(Pomentia pinnata)*	2	1. Sigatoka 2. Naduruloulou	None
Guava	4	1. Naduruloulou 2. Sigatoka	None
Ivi *(Inocarpus fagiferus)*	3	1. Sigatoka 2. Seaqaqa	None
Jackfruit	7	1. Sigatoka 2. Naduruloulou	None
Kavika (*Syzygium malaccense)*	5	1. SRS 2. Naduruloulou 3. Seaqaqa	None
Macadamia	1	Naduruloulou	None
Mango	68	1. Legalega 2. Seaqaqa	None
Mangosteen	2	Naduruloulou	None
Kura *(Morinda citrifolia)*	2	Naduruloulou	None
Ota *(Spondias cytherea)*	4	Sigatoka	None
Papaw	3	1. Sigatoka 2. Legalega	On-farm
Passion fruit	1	Sigatoka	None
Pineapple	5	Seaqaqa	Partial
Rambutan	2	1. Naduruloulou 2. Sigatoka	None
Tarawau *(Dracontomelon vitiense)*	2	1. Sigatoka 2. Naduruloulou	None
Vutu (*Barringtonia edulis*)	2	Sigatoka	None
Wi *(Spondias dulcis)*	2	1. Sigatoka 2. Naduruloulou 3. Seaqaqa	None

Table 3. Beverage and spice plant field collections in Fiji.

Crops	No. accessions	Conservation	Characterization	Priorities
Cardamon	2	Naduruloulou	None	
Cinnamon	1	Naduruloulou	None	
Cocoa	115	Naduruloulou Wainigata Dobuilevu	None	
Coffee	2	Dobuilevu	None	
Duruka (*Saccharum edule*)	1	Naduruloulou	None	
Ginger	8	Korinivia Legalega		Biochemical characterization

Kava	46	Naduruloulou	Partial	Biochemical characterization
Nutmeg	1	Naduruloulou	None	
Pepper	7	Naduruloulou	None	
Tea	1	Naduruloulou	None	

6. Regenerating threatened *ex situ* collections

About 60 accessions of a dozen or so pulse, vegetable and cereal crops are conserved in cold storage (-5° C) at Sigatoka and Legalega Research Stations. Other seed collections were held at Koronivia, but were recently lost due to problems with the cold store (see below). The Koronivia genebank is currently being recommissioned.

7. Supporting planned and targeted collecting

Recent collecting activities (with reasons and source of support) have included:

- Coconut in the Lau group: gap-filling (COGENT)
- Taro in Viti Levu: gap-filling, genetic diversity studies, breeding (TaroGen)
- Yams in western Viti Levu: gap-filling, genetic diversity studies (SPYN)
- Kava in Kadavu, Taveuni, Viti Levu and Vanua Levu: in connection with harvesting of material from the wild for biochemical analysis and commercialization (MASLR)
- Traditional fruits (ivi, uto, dawa) in Viti Levu: to support developing export activities (MASLR)

Germplasm collecting for research and development is continuing (especially evaluation for disease and moisture stress resistance, nutritional quality, medicinal value). However, important reasons for continued germplasm collecting efforts in Fiji also include risk of genetic erosion (i.e. rescue collecting), gap-filling and replacement of lost collections, and the need for planting material for natural disaster rehabilitation. Species that require collecting because collections are restricted and demand for germplasm either already exists or is expected to increase include:

- Cocoyam
- Traditional fruits
- Traditional vegetables (ota, karisi, bele, moca, duruka)
- Exotic vegetables
- Voivoi (*Pandanus caricosus*)
- Medicinal plants
- Tapa (*Broussonetia papyrifera*)
- Rice (re-building collection)
- Coconuts for cyclone resistance (Monasavu area, Yasawa)

GIS will be used to map the provenances of existing accessions and plan future collecting programmes. The necessary software and expertise are available in the Research and Land Use sections of MASLR.

8. Expanding *ex situ* conservation

There is a tissue culture laboratory at Koronivia Research Station, but it has not been functional for some time. However, it is presently being brought back to full operation with the assistance of SPC. It will conserve germplasm of taro, ginger and coconut. The national taro collection is duplicated in tissue at the Regional Germplasm Centre at SPC.

III. Use of Plant Genetic Resources

9. Expanding characterization and evaluation and the number of core collections

The status of characterization efforts is summarized in Tables 1-3. Characterization of germplasm has mainly been carried out using morphological descriptors in Fiji. Although useful, this has proved insufficient for adequate utilization of the collections, and other forms of characterization and evaluation are being considered. These could be carried out at overseas labs if the relevant technology is not available in Fiji or elsewhere in the region, as is being done for taro by the TaroGen project. Below are listed what are considered the priority characterization and evaluation needs for the future:

- Kava: biochemical, DNA
- Coconuts: DNA characterization differentiate among the different population of Fiji tall for breeding purposes (use local materials cyclone resistant and adapted to the local situation)
- Mangoes: sugar content, fiber content, shelf life
- Ginger: morphological, biochemical
- Yams: morphological
- Traditional vegetables: nutritional quality
- Traditional fruits: sugar content, nutritional quality

Many locally important traditional crops do not yet have descriptor lists, and it will be important to develop these on a regional basis, for example under the aegis of PAPGREN.

A core collection for taro was developed by the TaroGen project. This core collection is maintained in tissue culture by SPC's Regional Germplasm Centre. There is a plan to evaluate the regional taro core collection in Fiji.

10. Increasing genetic enhancement and base-broadening

The only crop improvement activities in Fiji are taking place in sugarcane. A sugarcane collection of about 2,500 accessions is maintained in Fiji by the Fiji Sugar Corporation.

11. Promoting sustainable agriculture through diversification of production and broader diversity in crops

No specific activities reported in this area, but agricultural diversification is a key government priority in view of the planned restructuring of the sugar industry.

12. Promoting the development and commercialization of underutilized crops and species

No specific activities reported in this area. However, there is interest in commercialization of local fruits as part of agricultural diversification in the context of the restructuring of the sugar industry. A consultation in 2002 recommended the preparation of project proposals for conservation and development of "new" crops (in collaboration with the forestry sector as appropriate) such as voivoi (*Pandanus*), masi, the kuta reed, kura (*Morinda citrifolia*), local fruit trees (e.g., ivi, uto, dawa) and local vegetables (e.g., ota, karisi, bele, moca, duruka).

13. Supporting seed production and distribution

No activities reported in this area. However, this was highlighted as a possible area for action by the recently-established EU-funded regional SPC project Developing Sustainable Agriculture in the Pacific.

14. Developing new markets for local varieties and diversity-rich products

No specific activities reported in this area, apart from a COGENT ADB-funded project on poverty alleviation for coconut smallholders which includes elements of training in the production of value-added products such as oil, desserts and handicrafts. There is also interest in developing taro for niche markets and different uses (e.g., chips).

IV. Institution and Capacity Building

15. Building strong national programmes

It has been suggested that a separate unit be established within MASLR's Research Division to oversee PGR activities, which at the moment are divided among different research station with relatively little coordination. Such a unit would manage a central, national germplasm database, and would act as a focal point for international PGR contacts. For example, it could act as correspondent for FAO/WIEWS. It would also review requests for germplasm collecting by overseas researchers. Legislation needs to be implemented to provide guidelines for the issuing of germplasm collecting permits and other PGR access requests. Fiji is a member of the World Trade Organization and is therefore considering options for effective *sui generis* plant varieties protection systems, including UPOV.

There is currently an MASLR PGR Committee. The Secretary to the committee is the national PGR focal point, but that position is currently vacant. The Committee organized

a nation PGR consultation for the government sector in late 2002, which resulted in a plan of action and the recommendation to establish a wider national committee including non-government stakeholders. However, such a committee has not yet met. A further meeting of the MASLR PGR committee is planned for mid-2004.

16. Promoting networks

A regional workshop on "Agricultural PGR in the Pacific: Formation of a Regional Network for Conservation, Management and Use" was held in September 2001 in Suva, Fiji, organized by the Secretariat of the Pacific Community (SPC) and the International Plant Genetic Resources Institute (IPGRI) and attended by representatives of several South Pacific countries. Participants at the meeting launched a regional PGR network, the Pacific Agricultural Plant Genetic Resources Network (PAPGREN), developed a regional action plan, and agreed that national PGR stakeholder workshops would be organized in each partner country to strengthen national coordination. Fiji is a founding member of PAPGREN. It is also active in COGENT (implementing an ADB-funded project). The databases of these networks reveal that seven coconut accessions and ten *Musa* accessions from Fiji as being maintained outside the country. This compares with zero and 14 being conserved in Fiji itself.

17. Constructing comprehensive documentation systems

Documentation is vital for adequate decision-making in PGR conservation and use. At present, each individual MASLR research officer maintaining collections has his or her own documentation system. When they go, the data often goes with them. Data are mainly maintained manually, with summaries published in annual research reports. Only a few collections have data in computerised form (mainly Excel and other spreadsheets). There is considerable scope for improvement of the existing system. In particular, data on all MASLR collections country-wide need to be centralized, preferably at Koronivia Research Station, which acts as headquarters for the MASLR's Research Division. Specialized genebank documentation systems will be tested with a view to eventually adopting an Internet-based, networked system.

18. Developing monitoring and early warning systems

See item 20 below.

19. Expanding and improving education and training

Most MASLR staff currently involved in germplasm conservation and use have not received formal training in the field. However, coconut, rice and cocoa researchers have attended a few short courses, and one staff member has just completed training to MSc in PGR funded by COGENT/IPGRI (Mr Tevita Kete), but he has now left the Ministry. Training needs have been identified in on-farm conservation, collecting, documentation, characterization and application of GIS. In addition, there is a critical need in Fiji for stronger plant breeding programmes, and training in this field would stimulate the use of germplasm collections.

Two important PGR education/public awareness initiatives are planned for 2004, both in collaboration with SPC:

- Include PGR in the review of the Agriculture Science prescription for 7th Form by the South Pacific Board of Educational Assessment
- Include theoretical and practical work on PGR in the curriculum of the Fiji College of Agriculture

20. Promoting public awareness

There are various efforts in Fiji to expose farmers, housewives, school children and other target audiences to information on new, recommended crops and crop varieties. This is carried out through field days, workshops, short training courses, even school visits, as well as through the media. Such approaches need to be used to a greater extent to disseminate information on PGR conservation, and might also have potential as means of gathering information on genetic erosion and levels of genetic diversity on-farm.

Summary of GPA implementation in the Fiji Islands

1. From the summary presented above it may be concluded that although Fiji's PGRFA activities have made significant progress in the past 5-10 years, they are still very much at a fairly juvenile stage.
2. In particular, activities are still focused almost entirely on the *ex situ* conservation of germplasm in field collections. Evaluation and use of collections has lagged behind, perhaps at least partly because of a lack of a proper centralized documentation system, and of expertise in plant breeding.
3. There is also a need for a comprehensive national survey of Fiji's PGRFA on farm, linked to a monitoring and early warning system (possibly as part of national disaster readiness plans and strategies). *In situ* conservation has not been accorded sufficient attention by MASLR, which needs to forge partnerships with NGOs and community groups on this issue.
4. Lack of trained personnel remains a critical constraint to PGR conservation and use, but this is beginning to be addressed. However, the recent departure of the national PGR focal point from MASLR is a set-back which needs to be urgently rectified.
5. The recent establishment of a regional PGR network in the Pacific (PAPGREN) has significantly stimulated PGR activity at the national level, for example through support for a national consultation in 2002 and regular technical interaction with the SPC PGR Adviser.

3. Achievements, constraints and suggestions

The work undertaken as part of the process described in this report is a significant contribution to the development of a national PGR programme in Fiji, but it needs to be endorsed by the MASLR PGR Committee, discussed more widely with other stakeholders and their additional inputs sought, and the resulting NISM effectively institutionalized (see next section).

Based on the experience with the reporting format thus far, any future training of stakeholders in its use should consist of at least two days, and should be carried out by someone fully conversant with the software and with the possible problem that can arise. For example, it was observed that the program does not load very easily into some PC. One stakeholder could not run the program at all.

The reporting format was found to be reasonably easy to use and to cover all the necessary areas. The early versions of the software used did not allow report preparation, a major constraint apparently addressed by later versions. There were a couple of minor suggestions for improvement to the software:

- Multiple responses should be allowed in some case
- There should be a spell-check built into the software

4. Future plans

The following strategy is proposed to build on the work undertaken as part of the establishment of NISM in Fiji:

i. A national PGR focal point within MASLR Research Division needs to be named as soon as possible, now that Mr Tevita Kete, the consultant who undertook the work summarized here, has left MASLR.

ii. The focal point will have responsibility for the regular updating of the information in the reporting format (using the final version of the software), and for liaising with stakeholders on their input to the GPA monitoring mechanism. In other words, for coordinating the NISM.

iii. Once a national PGR focal point has been named, the SPC PGR Adviser will work closely with him/her to organize the next meeting of the MASLR PGR Committee, during which this report will be discussed, amended as necessary and endorsed.

iv. More stakeholders will be identified and trained in the use of the final version of the reporting format by the national PGR focal point.

v. A wider national PGR consultation will be organized to follow-up the government-sector consultation held with support from PAPGREN in 2002.