On-Farm Conservation – Is it an appropriate conservation methodology for the Pacific?

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Introduction

In situ conservation of agrobiodiversity, or on-farm conservation, involves the maintenance of traditional crop cultivars or landraces and farming systems by farmers within traditional agricultural systems (Hodgkin et al., 1993; Jarvis, 1999). This method of conservation has been gaining importance in recent years, though farmers have been using it for centuries (Sthapit and Joshi, 1996). In the evolution of diversity on-farm, the effects of growers practices are of paramount importance, the baseline diversity being the one that is determined by the local adaptation of the genotype. On-farm conservation programmes must benefit local communities. Management by local communities can be developed to effectively link conservation and use (McNeely, 1996; Sthapit and Jarvis, 1999). In addition, it is important to consider indigenous knowledge (IK), people’s participation and cooperation between local people, researcher and conservationists and non-governmental organizations (NGOs). Several efforts by IPGRI are in progress (Jarvis, 1999). On-farm conservation is a major component in any conservation strategy, however, at the commencement of the TaroGen project in 1998 there was little experience in Pacific Island countries on this method of conservation of taro or any other crop. This paper describes efforts by the TaroGen project to gain a better understanding of the role of on-farm conservation of taro in the Pacific region.

Taro Genetic Resources: Conservation and Utilisation (TaroGen)

TaroGen, which commenced in 1998, was initially proposed to support the collection and conservation of taro genetic resources in Pacific Island countries and their use of in plant improvement programmes. A major impetus behind the development of the project was the spread of taro leaf blight (TLB) to the Samoan islands in 1993. The devastation that occurred forced farmers to abandon the crop, resulting in economic hardship and a loss of genetic resources. Many other countries are now vulnerable to the disease.

The seriousness of the situation resulted in several meetings of Pacific Island countries organised by the SPC, with assistance from the University of the South Pacific (USP), and support from many other institutes and agencies. Contingency plans against further disease spread, control measures of different kinds, ways of preventing further loss of genetic resources and the need to support national breeding programmes were discussed in detail. A meeting, held in June 1995, in Lae, Papua New Guinea, attended by eleven
Pacific Island countries, the Food and Agriculture Organization of the United Nations (FAO), the International Plant Genetic Resources Institute (IPGRI), representatives from the Australian Centre for International Agricultural Research (ACIAR), universities of the Pacific, Australia, New Zealand and the USA as well as scientific institutes in Australia, France, New Zealand and the United Kingdom, confirmed the desire for close collaboration on these issues, prioritised activities and developed an action plan. In 1996, the plan was reviewed and agreed by the Ninth Regional Technical Meeting on Plant Protection and the Twelfth Permanent Heads of Agriculture and Livestock Production Services meeting, and endorsed by the Committee of Representatives of Governments and Administrations, and the South Pacific Conference. SPC was seen as the appropriate organisation to implement the assistance required, working in close collaboration with IPGRI and USP.

Since 1998, in collaboration with IPGRI and USP, has worked closely with national programmes to develop a regional strategy for taro genetic resource conservation and crop improvement to improve food security and rural incomes in Pacific Island countries.

**On-farm conservation of taro - a component of a complementary conservation strategy**

In an effort to address the loss of taro genetic diversity, TaroGen has undertaken to collect taro germplasm in selected Pacific Island countries and, together with IPGRI and the University of Queensland (UQ) has rationalized this large collection of approximately 2200 accessions to a core collection of approximately 220 accessions. This core collection can be effectively and efficiently managed in the Regional Germplasm Centre (RGC) yet remains representative of the genetic diversity within the original base collection. Collaboration with the TANSAO project has ensured that collections from Vanuatu and New Caledonia have been incorporated into the regional core collection.

The project is investigating a range of conservation methods, both *ex situ* and *in situ*, with the aim of devising a complementary conservation strategy for taro. Each method has its own strengths and weaknesses but if used in an appropriate complementary manner a combination of techniques can offer the most effective and safest strategy for long-term conservation. TaroGen has prepared a complementary conservation strategy paper for taro (TaroGen, 2001). Recently, the project has completed a study comparing the costs of inputs required for an *in vitro* genebank, compared with those for a field genebank. The results were presented at the Taro Conservation Strategy Workshop in September 2001. Trials with cryopreservation have given acceptable results with some varieties. Techniques are now being refined so that the methodology can be extended to other varieties. Trials to develop an optimum slow growth methodology based on the results from the genebank study are also continuing. The project is interested in seed as a method of conserving genes. Seed studies continue to be carried out at the point of seed production in PNG but plans are underway for seed studies in Fiji.

*In situ* or on-farm conservation is a major component in any conservation strategy, however, at the commencement of the TaroGen project in 1998 there was little experience in Pacific Island countries on this method of conservation of taro or any other
crop. In an attempt to gain a better understanding of the role of on-farm conservation of taro TaroGen supported feasibility studies in Vanuatu in 1999 and more recently in 2001. Similar studies have also been carried out in Solomon Islands in collaboration with a local NGO, the Planting Materials Network (PMN). Papua New Guinea (PNG) is also carrying out some preliminary documentation on in situ practices and issues. Support has also been provided in Fiji to undertake a study of on-farm taro diversity and the factors that influence it. Presentations on the outcomes of these studies will be made later in this workshop.

On-farm conservation of taro in Vanuatu – a feasibility study

In Vanuatu, the Farm Support Association (FSA) was requested to carry out a feasibility study on in situ conservation because it been working with smallholders on commercial agricultural projects for a number of years, and had established a network of associates throughout the country (Farm Support Association, 1999). The absence of TLB in the country, the importance of taro as a staple, the presence of irrigated and dryland production and the large numbers of varieties previously reported, made Vanuatu an ideal country for the study. The study investigated the varieties grown, cultivation and conservation practices, traditional beliefs and the impact of domestic markets on production. Growers’ opinions and interests with regard to on-farm conservation were sought as well as those of taro sellers at the Luganville market. The study also considered the impact of new varieties on those traditionally grown, and the interest of growers in testing other, new, varieties.

The areas selected for the survey were South Santo, South Pentecost, North Ambrym and South west of Tanna. North Ambrym and South Tanna were visited for dryland taro in particular, while South Santo and South Pentecost were visited for both dryland and irrigated taro. In these areas, semi-structured interviews were held with individuals (men and women) or groups. On Tanna, individuals, known as Taro Chiefs, with special traditional authority in taro growing were sought and interviewed.

The main conclusions from the study were:

- **Taro cultivation is in decline**, especially in those areas where there is substantial kava production;

- **Where taro is still grown it is no longer cultivated purely for subsistence**, but has become a semi-commercial crop. This was more evident where taro is cultivated in the lowlands along the coast;

- **There is evidence of erosion of taro genetic resources**. With access to the Luganville market, farmers, particularly from South Santo, plant fewer varieties of taro. The varieties grown have been selected mainly for their acceptance by the market. This means that farmers only plant taro that they know they can sell. More varieties are grown in inland villages than in coastal areas as they have less access to markets. New, introduced, varieties are said to be easier to grow than the local, traditional, varieties. The acceptance of a new variety leads to the less-
preferred local ones being gradually abandoned. After some time, these less preferred varieties lose their value and are no longer grown; and

- **Farmers are keen to test new varieties.** In all areas, it was evident that growers are actively seeking new varieties and testing them. They want varieties that are acceptable to the market or for cultural reasons, and they can now move throughout the archipelago in contrast to former times. This means that farmers are very keen to plant new varieties, but will retain only those that meet certain financial or cultural criteria. In South Santo, farmers will select a new variety mainly for its marketability (main criteria are taste, colour, size of corm) while in North Ambrym and South Tanna, farmers select a variety for its ceremonial values (main criteria are taste and large corm).

The study proposed the following recommendations if on-farm conservation is be encouraged in Vanuatu:

1. Appropriate care should be taken when selecting sites for conservation. The areas selected should be remote and isolated, with no, or only limited, access to a market, for example, West Coast Santo and Aneityum. However, because these areas are isolated and remote it may be very costly to undertake programs there.

2. The concept of on-farm conservation is of no practical value to the farmers in the four areas visited unless it can be shown to be of economic value. Awareness of the value of maintaining traditional germplasm needs to be explained better to farmers, so that they can appreciate its importance.

3. On-farm conservation should consider the role of women, as they bear much of the responsibility of producing food for the family, a task that occupies most of their time. Men on the other hand are involved more in growing cash crops. On-farm conservation may not be an extra burden to women, if the concept is explained properly.

4. If possible, on-farm conservation should be integrated with other development activities that are already in place. For example in Lolihor (North Ambrym) activities are already focused on agriculture and rural development.

5. Where farmers have access to a market, (eg South Santo), it is likely that they will be more interested in testing new varieties.

6. An IPGRI on-farm conservation expert should visit South Pentecost and North Ambrym as being the most suitable areas to introduce the concept of on-farm conservation for the following reasons:

   - In South Pentecost both wet and dryland taro are cultivated, 22 varieties were identified during the survey, taro is the main stable food crop, and the area is accessible by plane.
In North Ambrym dryland taro are cultivated, 37 varieties were identified during the survey, there is increasing interest in the crop and there is some awareness about conservation initiated by the Lolihor Development Council.

Following on from recommendation number 6, Dr Bhuwon Sthapit, IPGRI On-Farm Conservation Specialist, visited taro fields in Vanuatu and Fiji and held discussions with various organizations and individuals interested in on-farm conservation of taro. A project proposal entitled, “Increasing Food Security through On-Farm Conservation of Taro Varieties” was developed and submitted to UNDP for consideration under their small grants scheme in November 1999. Unfortunately, funding was not approved.

Other feasibility studies

Despite not receiving donor support for further on-farm work discussions at the November 2000 and May 2001 Taro Genetic Resources Committee (TGRC) meetings agreed that the work was important and should be continued. AusAID made funds available for further pilot projects in Solomon Islands and Vanuatu. In both countries, NGOs took the lead, working closely with the relevant government institutions. Funding was also provided to undertake a survey to determine the extent of genetic erosion of taro landraces in Fiji. Outcomes of these studies will be presented and discussed later in this workshop.

These studies were intended to be the first step in a process of developing a larger regional initiative for on-farm conservation, using taro as a means of exploring appropriate approaches in Pacific Island countries. A proposal for funding was submitted to the Global Environment Facility (GEF) for PDF Block A funding to hold a project planning workshop which, based on the data from the pilot studies initiated by TaroGen, would be used to support the development of a Medium-Sized Project (MSP) proposal for regional on-farm conservation of taro. The proposal was endorsed by all countries involved and submitted in December 2001. The response from the GEF was that funds were oversubscribed and it was unlikely that the proposal could be approved for at least 12 months. Given that TaroGen is scheduled to finish in 2003 it was decided that the forthcoming TGRC meeting in May 2002 provided an opportunity to bring together the relevant stakeholders to consider future regional on-farm conservation initiatives in the region with the support and expertise from IPGRI.

Where to now – is on-farm conservation in the Pacific worth the effort?

This workshop provides an opportunity to bring together regional and international organisations and individuals to consider the role of on-farm conservation in the Pacific and to share experiences. It will allow participants to reflect on the information that has been compiled from various pilot studies undertaken in Melanesian countries where diversity of taro is greatest. These studies provide valuable insight in terms of locations where taro diversity is being maintained and the factors that influence this. They also highlight where erosion of taro landraces is occurring and the reasons for this. Importantly, the studies highlight where on-farm conservation initiatives might be successful and what activities will be necessary to ensure sustainability and benefits to
farmers and communities. In the broader context, participants will have the chance to discuss how on-farm conservation activities might encompass additional staple crops within the framework of the Pacific Plant Genetic Resources (PGR) network and linkages to other initiatives underway with other organisations such as the Foundation for the South Pacific (FSP). A greater understanding of the role of on-farm conservation in a complementary conservation strategy will also be apparent.

The workshop provides opportunity for participants to learn about the considerable global experience IPGRI has accumulated in the area of on-farm conservation and the lessons they have learned over recent years. The workshop will elaborate the concept of on-farm conservation, the Global Initiative and provide an overview of best practices for on-farm conservation from the perspective of IPGRI. A possible scheme for establishing an on-farm conservation project will be highlighted on Day 2 for consideration and to generate debate. This session will explore a proposed model for on-farm conservation, which will enable participants to fully appreciate the factors involved. Following this, and earlier discussions, national partners should have an enhanced understanding and ability to determine what is required for the implementation of on-farm conservation and to decide.

The workshop is structured to encourage participation of all stakeholders with national partners taking an active lead role. Countries will be given the opportunity to discuss ideas in small groups and to develop an on-farm conservation strategy, taking into account the types of information needed, and the institutional partners and collaboration required. Each national partner can share various ideas (workplan) in plenary with additional inputs from all participants.

Some of the important issues that will be discussed during the workshop will include:

- **Is on farm conservation an appropriate strategy for Pacific Island Countries, and what would be the benefits to farmers, countries and the region?** Should on farm conservation be considered within the wider needs of food security, nutrition, improvement and development of economic opportunities at the village level?
- **Identification of suitable target crops (multiple species or species specific) and locations for inclusion in an on-farm conservation project.** Do countries have the information necessary to make these decisions now?
- **What capacity is available in the countries with which to carry out all the necessary activities?** Where are the gaps, and could these be addressed easily within an externally funded project?
- **Identifying, assessing and monitoring diversity** – PRAs, diversity fairs, baseline surveys; community biodiversity registers (CBR) to monitor genetic diversity at the community level; measuring diversity using agro-morphological traits and molecular markers.
- **Creating an appropriate institutional framework for collaboration and the management of on-farm conservation.** Successful on-farm conservation requires a multi-disciplinary and multi-institutional approach. Requires greater
collaboration between the formal PGR sector and the informal sectors such as NGOs and other community based organisations (CBOs).

- **Strengthening local community management and grassroots organisations.** Many activities in on-farm conservation require decentralised approaches and involvement of organisations actively working at the community level e.g. diversity fairs, CBR, PPB.

- **What are the options for enhancing the benefits to local communities from on-farm conservation.** This includes consideration of value adding through better processing, marketing, public awareness and education about biodiversity. It can also include adding benefits through participatory plant breeding.

**References**


