



Food and Agriculture
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The International Treaty
ON PLANT GENETIC RESOURCES
FOR FOOD AND AGRICULTURE

**Views, Experiences and Best Practices as an example of possible options for
the national implementation of Article 9 of the International Treaty**

Note by the Secretary

At its [second meeting](#) of the Ad hoc Technical Expert Group on Farmers' Rights (AHTEG), the Expert Group agreed on a revised version of the [template](#) for collecting information on examples of national measures, best practices and lessons learned from the realization of Farmers' Rights

This document presents the updated information on best practices and measures of implementing Article 9 of the International Treaty submitted by Papua New Guinea on 29 August 2019.

The submission is presented in the form and language in which it was received.



Template for submission of

Measures, Best Practices and Lessons Learned from the Realization of Farmers' Rights as set out in Article 9 of the International Treaty

Basic information

Title of measure/practice:

Farmer Participatory Approach in increasing genetic diversity in farmers field with exotic Taro Plant Genetic Resources (PGR).

- Date of submission:

29th April 2019

- Name(s) of country/countries in which the measure/practice is taking place :

Papua New Guinea

- Responsible institution/organization (name, address, website (if applicable), e-mail address, telephone number(s) and contact person)

National Agricultural Research Institution, P O Box 4415 Lae 411 MP, Papua New Guinea,

www.nari.org.pg

- Type of institution/organization (categories):

Agricultural Research

- Collaborating/supporting institutions/organizations/actors, if applicable (name, address, website (if applicable), e-mail address, telephone number(s)) :

The Pacific Community (SPC), Suva, Fiji Islands

Description of the examples

Mandatory information:¹

- Short summary to be put in the inventory (max. 200 words) including:

The measure brings together scientist working directly with local farmers in 18 village communities in three districts (Figure 1) evaluating and selecting progenies (F1) generation directly to increase taro diversity at the farm level. In a survey conducted in 2013 and other previous documentation by NARI shows that genetic diversity in farmers field is very narrow. To produce plants adapted to new environments - climate change, pest and disease outbreaks, market needs - it is necessary to broaden the genetic base as it is the fourth most important crop in PNG. To do that successfully, requires cooperation between the scientists and the farmers. While the crop does reproduce via seed, it is irregular and further affected by the inability to produce flower and set seed under changing climatic conditions. Hence, other approaches need to be adopted to increase diversity in the field and broaden the genetic base for development of taro varieties adapted to the changing climatic and commercial conditions. In this

¹ This mandatory information is required in order for the measure/practice to be included in the Inventory.



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participatory approach 50 international lines were received from SPC and evaluated on station including local and breeding lines. A selection was made for on farm trials of 34 varieties. This 34 varieties including 26 local varieties and breeding lines selected as parental lines for the participatory breeding. This activity were broken down into 7 work packages, crossing black establishment (WP1) followed by crossing of the varieties. Work package (WP2) seeds were harvested and germinated followed by transplanting of the progenies in field and evaluation (WP3). The evaluation and selection criteria was strickly around low stolon, good yield and growth performance and taro leaf blight tolerance. About 10 best progenies were selected amongst each family and distributed to the village communities to evaluate and select the progenies according to the adaptation of the progenies to their local environment, eating quality and low stolon numbers. The key outcome is new taro progenies introduced into the farming communities to increase taro diversity at the farm level giving the farmers opportunity make their own selection based on their own criteria rather than research criteria. Some of the key lessons learnt are: PNG has a diverse culture and social structure that sometimes makes it difficult to successfully implement such activities. To enact changes, local, cultural and political factors of the communities need to be taken into account and relationship within the community leaders and the community need to be identified. Women keener learners than man. Woman do most of the farming activities such as planting, weeding and harvesting. Therefore, it is important to include them in the focus group discussion but must be separated from the man to avoid biasness. If farmers are involved with to other socio-economic activities like betelnut selling along the roadside or produce cocoa and copra, they have little interest in food crop farming. Some of the model farmers held leadership positions in the communities including local village council, chairman of the church and schools. The leadership position that some of the model farmers held and the interaction that followed ensured information sharing at various levels which enhanced communication and sharing of plant genetic resources to increase diversity at the farmer field.

- **Brief history (including starting year), as appropriate**
The project was started in 2011 and ended in 2015 with an estimated 300 farmers trained on participatory plant breeding approaches
- **Core components of the measure/practice (max 200 words)**
The core components of the measure are selection of parental lines (60 parents) and establishment of crossing block (WP1) followed by crossing of the varieties. Harvesting of the seeds, drying of the seeds and germination of the seeds in the glasshouse. This was followed by transplanting of the progenies in field and evaluation (WP3) after 4 weeks in the glasshouse. In the field progenies were monitored for their susceptibility to TLB, many stolons, and growth performance and yield. About 10 best progenies were selected amongst each family and distributed to the village communities to evaluate and select the progenies according to the adaptation of the progenies to their local environment, eating quality and low stolon numbers. In the farm plots, the farmers manage the trials for free without any monetary reward to the farmer. The farmers evaluate the progenies along with their local best cultivars.
- **Description of the context and the history of the measure/practice is taking place (political, legal and economic framework conditions for the measure/practice) (max 200 words)**



More technical approach than political/legal

- To which provision(s) of Article 9 of the International Treaty does this measure relate

Art. 9.1 √

Art. 9.2a √

Art. 9.2b

Art. 9.2c √

Art. 9.3

Other information, if applicable

- Please indicate which category of the Inventory is most relevant for the proposed measure, and which other categories are also relevant (if any):

No.	Category	Most relevant ²	Also relevant ³
1	Recognition of local and indigenous communities', farmers' contributions to conservation and sustainable use of PGRFA, such as awards and recognition of custodian/guardian farmers		√
2	Financial contributions to support farmers conservation and sustainable use of PGRFA such as contributions to benefit-sharing funds		√
3	Approaches to encourage income-generating activities to support farmers' conservation and sustainable use of PGRFA		√
4	Catalogues, registries and other forms of documentation of PGRFA and protection of traditional knowledge		√
5	In-situ/on-farm conservation and management of PGRFA, such as social and cultural measures, community biodiversity management and conservation sites		√
6	Facilitation of farmers' access to a diversity of PGRFA through community seed banks ⁴ , seed networks and other measures improving farmers' choices of a wider diversity of PGRFA.	√	
7	Participatory approaches to research on PGRFA, including characterization and evaluation, participatory plant breeding and variety selection		√

² Please select only one category that is most relevant, under which the measure will be listed.

³ Please select one or several categories that may also be relevant (if applicable).

⁴ Including seed houses.



8	Farmers' participation in decision-making at local, national and sub-regional, regional and international levels		√
9	Training, capacity development and public awareness creation		√
10	Legal measures for the implementation of Farmers' Rights, such as legislative measures related to PGRFA.		√
11	Other measures / practices		

- In case you selected 'other measures', would you like to suggest a description of this measure, e.g. as a possible new category? _____
- Objective(s)
- Target group(s) and numbers of involved and affected farmers⁵
- Location(s) and geographical outreach

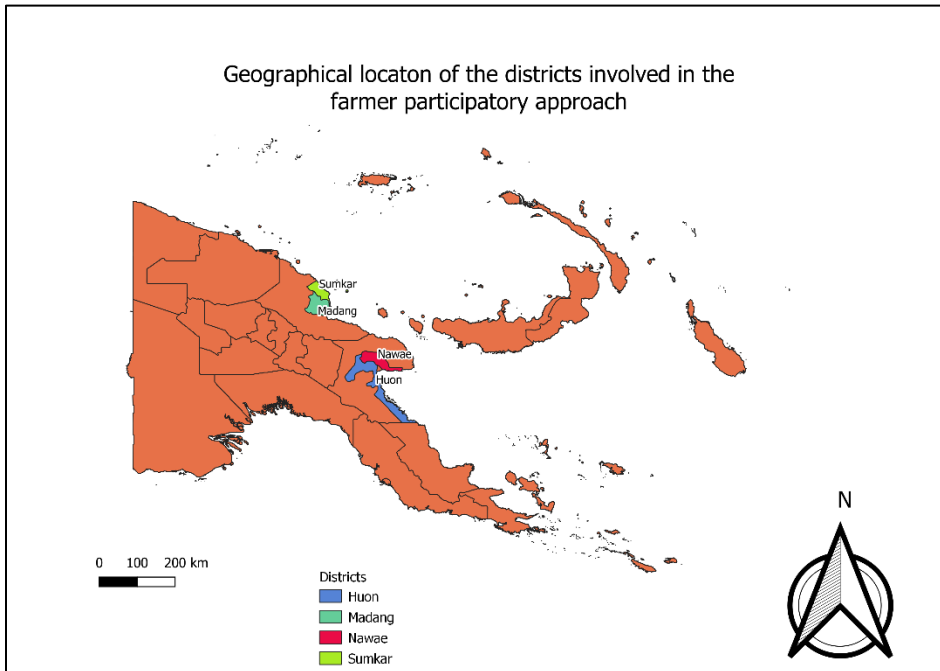


Figure 1 Map of the Participatory trial sites

- Resources used for implementation of the measure/practice
Taro progenies, farmer local variety, vehicle, training consumables etc
- How has the measure/practice affected the conservation and sustainable use of plant genetic resources for food and agriculture?
The practice has increased the genetic diversity in farmer fields specifically for.

⁵ Any classification, e.g. of the types of farmer addressed, may be country-specific.



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- Please describe the achievements of the measure/ practice so far (including quantification) (max 200 words)

On-farm progeny trials were established across three taro growing communities in Morobe Province, namely Gabensis (Huon Gulf District), Wankun (Markham District) and Situm (Nawaeb District) between October and November, 2015. In Gabensis farmers comprised of all married women settlers squatting with their families on ca. 900 m² pieces of land rented off customary landowners. They also have access to unoccupied land outside settlement area which are solely used for gardening. Taro, banana and leafy vegetables are mostly cultivated for either own consumption or market. Unlike Gabensis, the participants in Situm and Wankun were local villagers. Taro is significant staple in Situm, whereas in Wankun it is casually planted where new fields are cleared. Taro is cropped along with bananas and aibika in all the gardens in Gabensis and the other sites. The participants were all subsistence farmers with selling of surplus. They sell range of fresh produces to markets in Lae city and along main highway roads. In terms of climate, Gabensis and Situm experiences high rainfall throughout the year compared to Wankun. The latter lies in plains of Markham valley while Situm and Gabensis are located up slope lands and in close proximity to the coast lines. There is distinct variation in agro-climatic conditions within the locations. All the sites were easily accessed by road. Fresh produce are easily transported to the market. Taro is the main cash crop for Situm farmers as compared to the other two. In terms of climate, Gabensis and Situm experiences high rainfall throughout the year compared to Wankun. The latter lies in plains of Markham valley, while Situm and Gabensis are located up slope lands and in close proximity to the coast lines. There is distinct variation in agro-climatic conditions within the locations. All the sites were easily accessed by road. Fresh produce are easily transported to the market.

The progenies distributed for participatory evaluation were selected from a lot of 5000 juvenile seedlings that were planted and maintained to maturity on-station. The selection criteria applied were, less stolon/sucker number, less or no corm hair, and good corm shape. Additionally genotypes that were highly susceptible to TLB and those that showed virus symptoms were excluded. The single clone genotypes were carefully identified with labels.

At the main farmer sites, each identified household or individual was distributed 10 single plant progenies per individual to evaluate among their local cultivar stocks such that 100 progenies were distributed for each site. Altogether 300 progenies were distributed and evaluated across the three sites in Morobe.

At maturity (6 months) harvests were done from only 21 gardens. Out of the 30 farmer garden trials, 9 were omitted as the gardens were either abandoned or not properly managed by the farmers during the first three months.

The participating households or individual farmers were selected based on their experiences in cultivating taro for domestic use and also for market purposes. A total of 10 farmers were selected in each of the sites such that 30 individuals participated.

In March 2016, 16 on farm progeny trials were established in two different communities with different agro-climatic conditions in Madang to evaluate their performance to these conditions and broaden the genetic base of the local cultivars. The sites were previously selected for the previous taro trials between



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2013-2014. The communities were Derin (Madang District) and Murukanam (Sumkar District). Derin community comprised of many small village communities. Derin is a high rainfall area and experiences high rainfall throughout the year and taro is the main staple crop cultivated all year around. Taro gardens were planted on slope lands and swamps. Taro is intercrop with other crops such as banana, aibika and sweetpotato. The taro is marketed locally at the main Madang market and the employees of the logging company operating inland from roadside market. Unlike Murukanam where taro is planted under grassland condition or old cocoa block cleared for gardening. Murukanam is considered a dryland community. It experience dry season between May –September. This location makes it ideal for taro cultivation under dryland condition. Murukanam consist of two big communities Murukanam community and Debor community. The communities are separated by a small creek. The main staple in this community is banana, sweetpotato and cassava. Yams and taro are intercropped together with leaf vegetables such as aibika. The community has good access to good road network and there is high turnover of betel nut trade which leads to cash income unlike Derin. All the sites were easily accessed by road from the main road. Derin has taken up well the technology from previous trials and unlike Murukanam where only 2-3 farmers are promoting taro cultivation.

The progeny distributed for the participatory trials were selected using strict selection criteria as described under Morobe trials.

Farmers at each site receive between 30-50 single plant progenies unlike the Morobe trials where only 10 progenies were distributed to each farmer. These progenies were evaluated against a local popular variety Lanis in both Derin and Murukanam. About 378 progenies were distributed at Derin while a further 253 were distributed at Murukanam totaling to 631 progenies distributed and evaluated.

The trials were harvested 7months after planting. Harvest was done for only 10 gardens out of the 16 trials planted. During harvesting, selection was made for the top ten progenies to be harvested from each trial site for tasting. This data was pooled together from the selected lines for each community.

The selection of the household in these communities was from the previous trial 2013-2014 that show interest in cultivating taro. Interest has grown from the previous trial so we had 5 new farmers joining from Derin while four new farmers come on board from Murukanam. A total of 10 farmers were selected in Derin and Murukanam total 6 individuals farmers participated.

The garden trials were planted using an augmented design consisted of 300-400 diverse progenies from crosses between the local cultivars, breeding lines and INEA_SPC introduced materials. The plot sizes were 1.0m x 0.7-1.0m within and between plants consisting with single data plant per progeny. During the harvest not all progenies were harvested, we selected only the top ten progenies in each trial for corm yield assessment and culinary quality assessment.

The eating quality assessment was assessed based on the texture, colour, acidity and aroma. About 27 panellists attended the culinary quality assessment at Murukanam while 21 people attended at Derin. However, not most of the people attended participated in the assessment. Most were observers and we respected their decision. The panellists were issued the assessment form with the team leader explaining the assessment methodology. Farmers were given three choices, if they like the variety they indicate with



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a thick (√) mark. The overall rating determines the panellist final decision, if he or she likes the genotype a tick (√) should be checked in the last column and an (X) indicates not preferred

- Other national level instruments that are linked to the measure/practice
- Are you aware of any other international agreements or programs that are relevant for this measure/practice? No
- Other issues you wish to address, that have not yet been covered, to describe the measure/practice No

Lessons learned

- Describe lessons learned which may be relevant for others who wish to do the same or similar measures/practices (max 250 words).
- Farmers keen to learn and their involvement in the new approach.

The participatory approach is new to PNG farmers and during the establishment of the trials there was very high interest and participation from the participating communities. Farmers stated that the approach makes it easy for them to evaluate for themselves the progenies directly than getting it after some years by breeders. Farmers make selection at the earlier stage and base on their preference quickly adapt the varieties that they prefer.

- What challenges encountered along the way (if applicable) (max 200 words)

Some of the challenges are socio-economic dynamics of the communities. Some villages are close to the main highway where socio-economic activities are very high and many do not concentrate in their gardens on PGR but are notice selling crops like cocoa, or betelnut along the main highways to buyers. Another challenge faced by farmers is land tenure system which limits most farmers to expanding their gardens and continuous tribal fights within the communities are some of the issues that farmers face that affected them in maintaining PGR at the farm gate.

- What would you consider conditions for success, if others should seek to carry out such a measure or organize such an activity? (max 100 words)

In Derin/Salamaua lead farmers keep a record of the number of varieties each farmer is planting in each garden. They have been doing this before the practice/measure was introduced into the communities whilst in the new sites farmers were trained on participatory approach and farmers were willing to share planting materials within families and through their social networks and church network groups to spread the innovation.

Further information

- Link(s) to further information about the measure/practice