

**TERMINAL REPORT
GTFS/RAS/198/ITA
FAO/ITA/FSM/01
Assistance to Small-Scale Chuuk Farmers in Rehabilitation and Cultivation of
Disease-Free Bananas for Food Security in FSM**

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I. Introduction

The Regional Program on Food Security in the Pacific Islands (RPFS), GTFS/RAS/198/ITA is an initiative by the Food and Agriculture Organization (FAO) of the United Nations to support the implementation of the Special Program for Food Security (SPFS) in the Pacific Island Countries. Funded by the Italy Government, the program was approved in 2001 and the pilot phase commenced in 2004 with the goal of improving both national and regional food security in developing countries of the Pacific Islands Forum. The program has two components: 1.) Enhance production, food security and income generating activities and 2.) Building national and regional capacity on trade facilitation and agriculture policies. The Chuuk banana production project, FAO/ITA/FSM/01, titled “Assistance to Small-Scale Chuuk Farmers in the Rehabilitation and Cultivation of Disease-Free Bananas for Food Security in FSM” was granted under the pilot phase of the RPFS, component 1. Complementing the RPFS is the South-South Cooperation (SSC) (*see Tripartite Agreement and SSC TCP/MIC/3001 Terminal Report*). Based on the project document, the commencing and ending date of the banana project was from October 2005 to March 2007.

I. A. Project Objectives

The Banana Production Project, FAO/ITA/FSM/01 objectives are as follow:

- Rehabilitation and promotion of disease-free banana production through tissue culture;
- Train farmers and introduce to young farmers sustainable production and management practices;
- Meet household food requirements; and
- Improve banana production and supply.

I.B. Main Official Arrangements

With reference to Letter of Agreement (LOA/06/10), Dr. Virendra M. Verma of the Micronesia Plant Propagation and Research Center (MPPRC) in Kosrae, FSM was contracted to mass-multiply banana tissue cultures (procured by FAO and supplied by the SPC Germplasm Center in Fiji-2,000 virus-indexed banana planting materials) and supply them to Chuuk Agriculture Department. The SPC-supplied planting materials are to be mass-produced, targeting a total of 7,000 plantlets. Technical training of agriculture staff and farmers in Chuuk [and other FSM states] were also planned with technical assistance of the SSC Crop Production Technician, Mr. Zhou Jianjun (*see Project Document*).

The Chuuk Director of Agriculture, Mr. Hermes Refit was designated as the Project Manager (PM), thus, tasked to oversee the project in close collaboration with the project assistant, Mr. Robert Iwo (Chuuk Agriculture), the National Project Coordinator (NPC, FSM National Government), MPPRC (Dr. Verma in Kosrae) and FAO SAPA in Apia, Samoa. To facilitate implementation of project activities, an account requiring three

signatories from the respective government department (*FSM Department of Resources and Development, then referred to as Department of Economic Affairs*) was set up at the Bank of the FSM for disbursement of project funds from FAO SAPA to FSM. The FSM Government contributed a total matching amount of US\$63,300.00 in support of the SSC component of the RPFs, thereby provided funding for some of NPC's travel to the project site in Chuuk State (*see Duty Travel Reports*).

I.C. FAO Contribution

FAO contribution for the banana production project as stipulated in the project document stands at US\$124,760.00. The following office equipments were provided to the Chuuk Agriculture Department to facilitate and support project activities: computers-a lap-top and desktop, a printer; projector and a projector screen. The lap-top and printer was delivered by the NPC to Chuuk (*see Duty Travel Report, Chuuk, Feb. 20-23/07*) while the rest of the equipment were given to the PM and his Forestry officer (Mr. Jesse Mori) during their trip to Pohnpei later in 2007. The purchase of a project vehicle was initially considered and later rescinded due to technical and practical reasons.

II. Background Information

The Federated States of Micronesia (FSM) is an archipelago of 607 islands scattered over approximately 1.6 million square kilometers in the western Pacific Ocean. It is the largest and most diverse part of the greater Micronesia region and is comprised of the four main island States of Yap, Chuuk, Pohnpei and Kosrae and their outer islands. All but Kosrae State include more than one island. While few of the islands are volcanic in nature, the rest are low-lying islands or atolls. The total landmass is 438 square miles (702 km²) with a declared Exclusive Economic Zone (EEZ) covering over 1 million square miles (1.6 million km²). The soil is relatively infertile on the outer islands with little or less types of vegetation, apart from coconuts, taro, breadfruit, banana and other fruit trees, while the higher islands have fertile soils with a wide variety of vegetation and crop activities. Rainfall is extremely high on the volcanic islands of Kosrae, Pohnpei and Chuuk, exceeding 400 inches (1,016 cm) a year. The 2000 census preliminary count on the population stands at 107,000 (July 2000). Traditional, social and cultural institutions are still very strong in Micronesia (FSM NBSAP, 2002).

The National Economic Summits identified three (3) main areas of productive sectors of the economy: Agriculture, Tourism and Fisheries.

FSM's economy is small and is largely dependent on aid provided through the Compact of Free Association with the United States of America. The majority of activities are government services, wholesale and retail, and subsistence farming and fishing. The government services dominate the economy at 43%. The commercial tuna fishery (international and domestic) is the nation's second highest revenue earner with annual revenues between US\$13-20 million dollars (FSM NBSAP, 2002).

III. Main Activities

III.A. Mass-Production of Tissue-Cultured Banana Planting Materials at MPPRC

As arranged, 2,000 virus-indexed banana planting materials were procured by FAO SAPA and supplied to MPPRC in Kosrae for mass multiplication. Laboratory work at the MPPRC resulted in propagation and delivery of tissue-cultured planting materials to Chuuk during September 2006, and February and May of 2007 (though the project was officially closed as of March of 2007, the third batch of planting materials had to be delivered from Kosrae to Chuuk as they were ready for distribution and the need to conduct technical trainings on transferring of hardened plants to the field was necessary; as the MPPRC laboratory was undergoing major renovation during such time, NPC learnt from Dr. Verma in May of 2007 that remaining plantlets [in Kosrae] were distributed to farmers in Kosrae) (*see Duty Travel Reports, Chuuk, February 20-23/07 & May 5-11/07*).

During the span of the project, three batches of tissue-cultured plantlets [in plastic bags and vials] were provided to Chuuk Agriculture Department. The following table summarizes the details of the three shipments made in 2006 and 2007.

Table 1. Banana Plantlets and Varieties Supplied from MPPRC to Chuuk Department of Agriculture.

S. No	Variety Name	Shipment 1 (Sept. 23, 2006)	Shipment 2 (Feb. 17, 2007)	Shipment 3 (May 5, 2007)	Total
1.	FHIA 01	11	18	28	57
2.	FHIA 02	10	43	36	89
3.	FHIA 03	39	27	12	78
4.	FHIA 17	09	10	2	21
5.	FHIA 18	23	65	85	173
6.	FHIA 23	37	24	57	118
7.	FHIA 25	09	14	84	107
8.	Pisang Ceylan	06	61	-	67
9.	Yangambi	21	72	104	197
10.	Grande Naine	06	36	8	50
11.	Williams	02	95	182	279
12.	Saba	63	153	63	279
13.	SH 3640	-	06	33	39
14.	Pisang Berangan	12	71	51	134
15.	Calcutta 4	30	71	70	171
16.	Paka	-	03	2	05

17.	Yangambi km 5	04	38	22	64
18.	PA 03.22	09	28	46	83
19.	Pisang Lilin	-	8	1	09
20.	Pisang Ceyland	01	15	-	16
21.	Namwha Khom	02	18	45	65
22.	FHIA 21	20	96	27	143
23.	PA12.03	01	15	18	34
24.	Ducasse	-	51	22	73
25.	Dwarf Cavendish	-	03	4	07
26.	Yawa 2	19	11	-	30
27.	Dwarf Kalapua	-	-	12	12
28.	Robusta	-	-	5	05
29.	High Noon	-	05	1	06
	Total	334	1,057	1,020	2,411

III.B. Duty Travels, Supply of Tissue-Cultured Planting Materials and Technical Trainings, Chuuk, FSM

The Plant and Animal Quarantine Quarantine Specialist took over as NPC of the said project in June of 2006 after the approval of the project in October of 2005. For about ten months after its approval, not much progress was made other than a duty travel to the three states of FSM (Yap, Chuuk and Kosrae) by the former NPC and SSC Livestock Technician in late 2005 (*see Duty Travel Report: A Survey on Livestock Industry and Suggestions Report by Mr. Tang Huiyong*). Given the initial setback, the new NPC was tasked to implement project activities in conjunction with the on-going SSC Component of the RPFS, coupled with his agricultural quarantine responsibilities and duties (*see SSC TCP/MIC/3001 Terminal Report*).

With only eight months away from project completion date, the new NPC engaged with Dr. Verma (and the FAO Country Project Officer-Mr. Daniele Salvini) and carried out four (4) duty travels to Chuuk, supplied tissue-cultured banana plantlets, met with the PM, his relevant staff and some local farmers, and assisted with required technical trainings, among others (*see Dr. Verma's First Quarter Report, June 29/06; Field Technicians Training Report, May 21/07; and NPC's Duty Travel Reports, Chuuk: Sept. 25-29/06; Oct. 21-25, 2006; Feb. 20-23/07; and May 5-11/07 for details*).

III.B.a. First Duty Travel to Chuuk

The NPC accompanied Dr. Verma and delivered the first batch of banana plantlets during September 2006 (*see Table 1*). The first technical training was held at the Chuuk

Agriculture Station involving 32 College of Micronesia (COM-FSM CES) Extension staff, Chuuk Agriculture and local farmers. The following areas or topics were covered:

- Brief about tissue culture techniques;
- How to handle tissue culture plantlets;
- Sterilizing of substrates;
- Humidity and temperature control;
- Nutrient requirements for tissue culture plantlets;
- Fertilizer application;
- Ex-vitro rooting induction (if roots are damaged during transfer from the sterile tissue culture vials/bags);
- Transfer of tissue cultured plantlets from the sterile tissue culture vials/bags into the trays in the green house;
- Transfer of plants from screen house into the field; and
- General nutrient deficiency symptoms and their control during the process of acclimatization

Participants took part in preparing and sterilizing of soil and potting mix (for planting of newly delivered plantlets) and provided 'hands-on' and transferred plantlets from plastic bags to planting trays. The outcomes of the training were as follow:

- Participants gained knowledge/skills and developed interest in tissue-culture topics and techniques.
- Participants were keen in knowing the importance of tissue-culture and its practical applications in agricultural production.
- Agreed that four or less agriculture staff would be sufficient in handling of tissue-cultured materials (transferring from plastic bags and vials to planting trays).

The documents (*Project Document: FAO/ITA/FSM/01, NPC and Guidelines on FAO Operations and Procedures and Financial Monitoring*) and required supplies and materials (potting mix, fertilizers, all purpose/best, transplanter and an insecticide sprayer) were provided. Germinating trays were supplied by Chuuk Agriculture as they were readily available.

The proposed 'mother block' (for field transfer of hardened banana plantlets) and green-house (for newly shipped plantlets) at the Chuuk Agriculture Station on Weno Island were inspected and it was agreed that:

- As per FAO procedures, a written request is made to suppliers (indicating specifications of goods) upon collection of quotations. Quotations are provided to NPC for forwarding to FAOSAPA.
- Plantlets are to be transferred from germinating trays to 'poly bags' for hardening during the third week of October 2006.
- The next shipment of tissue culture plantlets will be made anytime in October 2006 from MPPRC. Director Refit need to identify person in charge for securing of plantlets upon arrival at Chuuk airport.

- The first farmers training is tentatively scheduled from Oct. 30th to Nov. 3rd 2006. Director Refit will seek University of Guam's [Frank Cruz] assistance in the delivery of the training and convey result to NPC.
- All other developments and quotations be made available to the NPC in Pohnpei at the soonest.
- A new and secure acclimatization unit is constructed for storing and hardening of 'transferred' banana plantlets prior to transferring to 'poly-bags' and into the field.

The NPC traveled to Fefan island by boat with four (4) Chuuk Agriculture staff. An area [approximately 100 ft X 100 ft] meant to also accommodate planting materials was inspected at the agriculture sub-station on Fefan. Mr. Sirino (Chuuk Extension Officer) of Fefan was advised to prepare the area through weeding awaiting developments at the Weno Agriculture Station. NPC was not able to meet with 'proposed' Fefan farmers as no prior arrangements were made by Chuuk Agriculture Department before or during the trip (*see Duty Travel Report, Chuuk: Sept. 25-29, 2006*).

The second, third and final trips to the project site were made separately with the visiting FAO CPO and Dr. Verma.

III B.b. Second Duty Travel to Project Site

NPC accompanied the visiting FAO CPO (Mr. Salivini) and traveled to Chuuk in October of 2006. The mission was held respectively from October 21-25, 2006 and lasted for two (2) working days.

During the second trip, it was conveyed (by the PM) and confirmed through visual inspection that earlier shipment of plantlets (about 300) have died. The reasons/ for death of plantlets were not known or made clear during the trip. The situation was not reported to all concerned until the current trip. The PM attributed death of plantlets to combination of factors, e.g., cooling time of sterilized potting mix and soil; handling of plantlets during removal of growing media and transfer to planting trays.

The attempt to collect quotations for office equipments and project vehicle was not successful during the visit. Given the slow mode of the project and conclusions from the meetings, it was decided that a project vehicle would not be necessary as there were no technical reasons for it: only 10 farmers are involved on Weno (40 on Fefan island) and the vehicle cannot be shipped to Fefan. It was then decided that office equipments (computers, projector and projector screen) be sourced from overseas (through the Bangkok FAO Office).

NPC, CPO and Mr. Iwo (project assistant) traveled to Fefan island on boat to see the proposed 'mother block.' Mr. Sirino was not present at the sub-station; hence, a detour plan was made to meet with Fefan farmers. Though 40 farmers are said to be engaged with the project on Fefan, only four (4) farmers were encountered and their lands surveyed. Besides banana cultivation training, farmers indicated their interest in vegetable production training.

(see *Duty Travel Report, Chuuk: October 21-25, 2006 for details*).

The NPC and CPO left Chuuk on October 25 for Pohnpei and met with the FSM-FAO NC (Mr. Soram-Foreign Affairs), the Secretary (Hon. Susaia) and Assistant Secretary (Mr. Henry) of the concerned collaborating Department (of the National Government-Dept. of Economic Affairs). Project issues were reported and it was agreed that relocation of the project from Chuuk to Pohnpei State will be explored and results communicated to FAO SAPA as early as possible. Once relocation is approved, CPO advised that he will do a budget-revision and grant an extension (of the project for a year) as ground work began late. NPC and CPO also met with the Pohnpei-based SSC Technicians (Plant and Livestock Production Technicians) and the Pohnpei State Agriculture Chief. The Pohnpei Agriculture Chief was briefed (by CPO) on project background, objectives and details and the likelihood of the banana project being transferred to his State. He was advised to be mindful and be prepared in case the project is transferred from Chuuk to Pohnpei. Mr. Lorens (Agriculture Chief) was keen in providing any assistance necessary and indicated his interest in future developments of the project. A visit to the Pohnlangas Chinese-assisted Pilot Farm in Madolenihmw was made to gauge implementation of SSC technicians activities (*see SSC 6 Months Progress Reports and TCP/MIC/3001 Terminal Report*).

III.B.c & d. Third and Fourth Duty Travel To Chuuk

The third and final (fourth) trips to Chuuk were made during February and May of 2007. The second (1,057) and final (third-1,020) shipment of tissue-cultured planting materials were delivered by the NPC and Dr. Verma.

Technical trainings continued with designated agriculture staff involving four to eight participants in acclimatization of banana plantlets, transferring of acclimatized plantlets from trays to ‘poly bags’ and developing of banana demonstration plot. Newly-delivered plantlets [in vials] were transferred to planting trays. Hands on training was also conducted on how to prepare soil mixture using soil, potting mix, chicken manure and fertilizer for acclimatized plantlets (in ‘poly bags.’).

A temporary polyethylene storage (acclimatization unit-8 ft X 3 ft) was constructed to store the newly delivered plantlets. The ‘mother block’ was also prepared awaiting plantlets to harden before their transfer to the field. Specific hands-on training on how to amend the soil, how to transfer plantlets from poly bags to the field and maintenance of plantlets in the field was also made. Recommendations as to planting space between plantlets and rows were conveyed. Several hardened plantlets were transferred to the prepared ‘mother block’ at the Weno Agriculture Station during the trip (*see Duty Travel Reports, Chuuk: Feb. 20-23/07 & May 5-11/07; Dr. Verma’s Report: Field Technicians Training: Demonstration/Germplasm Plot, May 21, 2007*).

Other Activities

As requisition of funds with FAO SAPA did not arrive on time, other planned project activities, e.g. farmers training, renovation and construction of a permanent green-house,

etc. were not forthcoming. The initial plan to utilize Mr. Jianjun (SSC Crop Technician) for technical trainings in Chuuk was not feasible given his inability to communicate in English (he could hardly speak it or understand it when spoken to) and time constraint.

Complementing with the national project [banana production], the NPC was also engaged with the Pohnpei-based SSC Technicians (livestock and crop production), implementing SSC activities at specified project sites with extension staff, farmers and DSAP officers in Pohnpei (*see SSC TCP/MIC/3001 Terminal Report*). In addition to duty travels to the national project site, the new NPC also did the following travels in his capacity as Quarantine personnel and/or NPC:

- Attended FAO sponsored Training on FAO Operations and Procedures in Support of the RPFS-Samoa, July 31 to August 4 , 2006;
- Effective Quarantine Pest Risk Analysis Workshop in Vanuatu-May 21-25, 2007;
- Seventh FAO Southwest Agriculture Ministers Meeting in Majuro, RMI-May 29 - 31, 2007;
- Second Annual Meeting of Pacific Invasive Learning Network (PILN) in Moorea, French Polynesia-late Aug. to early Sept. 2007; and
- Attachment with FAO SAPA, Sept. 18-Oct. 24, 2007.

IV. Conclusion

Without relinquishing his other official duties, the new NPC had only eight (8) months to carry the project through. The NPC coordinated and collaborated with parties concerned resulting in the achievement of some of the project's objectives. The project was able to mass-produce disease-free tissue culture plantlets [totaling 2,411; 26-29 varieties] and supply them to the project site. COM-FSM Cooperative and Research Extension staff, including Chuuk Agriculture and farmers were trained on tissue-culture techniques and related agronomic practices on banana production. Specifically, three (3) technical trainings involving a total of 32 agriculture staff and extension agents were engaged, with 50 farmers being selected to receiving acclimatized banana planting materials. Furthermore, an acclimatization unit was established on Weno (Chuuk Agriculture Department). Since the decision to retain the project in Chuuk was finally made in December 2006, an extension of one year was not made; hence, the project ended in March of 2007 with other planned activities stalling, and about half of the remaining cultured plantlets at the MPPRC being distributed to farmers in Kosrae [as there was unavailability of space for storage since the tissue culture laboratory underwent renovation].

Given the expected distribution of planting materials to other key local farmers, it is envisaged that improved banana production and meeting of household food requirements will be met and/or sustained thus improving food security.

Although the SSC Technicians were not directly involved with the national project in Chuuk State as expected, they carried out trainings complementing with policy programs and strengthening of technical capacity of counterparts, farmers and students through

technical trainings and sharing of their expertise throughout Chuuk, Pohnpei and Kosrae State.

V. Recommendations

1. Prior to its implementation, it would have been very ideal to have from the very start the goals, targets, work plan and parties [concerned] to the project with their respective responsibilities in a contractual agreement. As was learnt later, there was a clear agreement with the National Government but none with Chuuk State.
2. It is imperative to gauge the institutional capacity and technical know-how of the target organizations or agencies prior to implementation of the project.
2. Host countries should receive SSC Technicians that are able to communicate in English (written and spoken). It is very impractical dealing with technicians with such communication or language problem. Considerable time was lost due to misunderstandings.
3. Given the scale and scope of such a project, it is recommended that any NPC is dedicated or responsible solely for FAO activities.

VI. Appendix

*Note: No Technical papers and/or reference documents were provided to NPC during the span of the project. Otherwise, they could have been listed here as requested in the correct bibliography format (i.e., Author, Title, Date of Publication, Publisher, Place of Publication and Page nos.).

Photos of Project activities:



Tissue-cultured banana plantlets in vials. Labeling of vials during technical training.



Technical Training. Chuuk Agriculture Staff



Construction of acclimatization unit, Chuuk Agriculture Station, Weno.



Humidifying 'poly house' and watering of newly transferred plantlets.



Acclimatized plantlets in planting bags. Plantlets being transferred to 'mother block'



Banana plantlets planted at Chuuk Agriculture Station 'mother block.'



MPPRC (laboratory) under major renovation in Kosrae.
