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EVALUATION OF ROOT CROP PRODUCTION AND PROCESSING PROJECT WITH EMPHASIS ON SWEET POTATO

(A Project Funded by IDRC)

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EXECUTIVE SUMMARY

An evaluation of the technologies developed from root crop production and processing project with emphasis on sweet potato was conducted from November 1985 to January 1986 to determine the:

- a) extent of geographical distribution of the ViSCA-developed sweet potato lines and varieties and their performance in small farmers' fields and big sweet potato producers under monoculture conditions,
- b) impact of sweet potato hybrids and varieties in multiple cropping,
- c) extent of the use of sweet potato hybrids in emergency areas and situations such as typhoon-devastated areas and economically depressed geographical regions such as the coconut and sugarcane areas where depressed world prices of coconut products and sugar had taken their toll, d) extent to which sweet potato is being used for animal feed and other commercial purposes, and e) extent of use of the village-level storage technology for fresh cassava and sweet potato roots.

The evaluation, carried out by a social scientist and a biological (crop) scientist, included: a) a review of project documents and related literature, b) a series of interviews with project leaders, research administrators, local government officials, MAF officials, and research assistants, c) visits to on-farm trial sites in Leyte and Southern Leyte, d) interviews with farmer-cooperators and non-cooperators, e) analysis and write-up and f) presentation of findings.

The team came up with fourteen major observations/issues relating to the technologies under review. These are the following:

- a) that VSP varieties/lines have been distributed nationwide in a relatively short span of time,
- 2) VSP's yield potential is appreciated both by the small farmers and big growers,
- 3) VSP's short-maturing characteristic is most appreciated in typhoon-affected areas,
- 4) VSP varieties enable farmers to intensify land use,
- 5) government planners and private entrepreneurs now take a second look at sweet potato as a possible viable intercrop,
- 6) excess supply of sweet potato generated other productive activities such as cooking and selling snack items and delicacies,
- 7) increased supply of sweet potato also benefited the consumers in terms of lower price,
- 8) officially-approved sweet potato varieties may not necessarily be the farmers' choice,
- 9) farmers make certain adjustments in the technology or their environment to fit the technology according to their specific needs and resources,
- 10) in most cases, the positive attributes of VSP outweigh its negative qualities,
- 11) farm size and farm resources are not critical factors in the adoption of sweet potato varieties,
- 12) the use of sweet potato chips in commercial feeds is still limited,
- 13) although hut storage technology for sweet potato complemented and catalyzed the introduction of VSPs, the technology itself has not yet been fully adopted by most of the farmer cooperators,
- 14) state colleges and universities, other government agencies, and the private sector served as important conduits in the dissemination of the technologies.

The recommendations of the team are: 1) The breeding program aimed at developing varieties suited to the needs of small farmers who give prime considerations on eating quality and other vegetative characteristics should strive for a moderate yield increase and pest resistance but zeroing in on the qualities desired by small farmers; 2) Selection of farmer-cooperators for on-farm trials should consider the farmer's need for the technology being introduced; 3) There may be a need for the Philippine Seed Board to reconsider its criteria in the selection of varieties and institute a mechanism for screening of varieties for regional rather than national recommendations; 4) Care should be taken in the selection of cooperating stations because of the important role that they play in the verification and eventual dissemination of technologies. Commitment of the research leader to the objectives of the project, capability and available resources of the stations should be prerequisites; and 5) To beef up the initiatives taken by state colleges and universities and other agencies in the dissemination of technologies, PRCRTC should provide them with complete information about the technology and conduct constant dialogues with them to gather feedbacks from the field.

Significance of follow-up study

Research brings about significant increases in agricultural productivity by developing appropriate technologies for adoption by the farmers. This improvement in productivity results when a new product or process is introduced, product quality is enhanced, or the risk of crop failure of the farmer is reduced (Arndt and Ruttan, 1977). There is evidence that the rates of return to investment in agricultural research in Western countries have been two or three times higher than returns to other agricultural investment.

While the research literature is replete with quantitative cost-benefit analyses of the economic impact of research-generated technologies, some technologies have not been widely adopted because the social, economic, and political systems constrain their wider utilization.

An early assessment of the extent of a technology's diffusion and adoption and its socio-economic impact is essential in order to provide some preliminary indications of the benefits that have been gained from the application of the technology as well as the problems encountered in its use.

In the case of the ViSCA sweet potato varieties and the village-level storage technology for root crops which were outputs of IDRC-PCARRD-ViSCA funded research programs, an exploratory qualitative analysis of the returns to research investment would be useful to funding agencies in rationalizing their allocation of resources for research. This kind of evaluation can also call the attention of the policy-makers and research managers to extend or limit support to these activities.

Moreover, information on farmers' response to recommended varieties is a significant input in any breeding program. Information on the process and extent of diffusion of the technology would guide research and extension managers in the planning and management of technology diffusion strategies. Likewise, study results would guide communication specialists in mapping out strategic need-based communication campaigns to facilitate learning about the technology.

Background Information on Technology Development and Description of the Technologies Under Review

A. Development of ViSCA Sweet Potato (VSP) Varieties

The sweet potato was introduced in the Philippines during the Spanish colonial rule although the possibility that only one or a few varieties were brought from Tropical America to the Philippines is not discounted.

The first planned program for sweet potato improvement in the Philippines was made by Mendiola of the University of the Philippines College of Agriculture (UPCA) at Los Baños in 1921 which placed the Philippines as one of the pioneers in sweet potato breeding particularly on the use of sexual hybridization to effect improvement. Although Mendiola's work was shortlived, he was able to identify some promising materials.

From 1920s to early 1970s, work on sweet potato was relatively meager compared to that on other crops. Some varietal collections were maintained and evaluated at the University of the Philippines College of Agriculture at Los Baños. Other agricultural colleges and experiment stations of the Department of Agriculture and Natural Resources also conducted varietal evaluations of some sweet potato materials.

Most notable among the early work on sweet potato was the discovery and naming of a variety called BNAS-51 from the Baybay National Agricultural School (BNAS), the forerunner of the Visayas State College of Agriculture (ViSCA). This variety has proven its worth up to the present, being used as a standard check in the advanced regional trials of the Philippine Seed Board Root Crop Varietal Improvement Group.

In 1972-1975, a root crop breeding program at the University of the Philippines at Los Baños funded by the then National Science Development Board (NSDB), now the National Science and Technology Authority (NSTA), paved the way for more varietal collection and applied hybridization. This produced several types of crosses.

In 1976, ViSCA started a nationwide collection and evaluation of root crop varieties with support from the Philippine Council for Agriculture and Resources Research and Development (PCARRD). Additional financial assistance came from the International Development Research Centre (IDRC) of Canada in 1978.

The strong support accorded to root crops research program was made possible through the establishment of the Philippine Root Crops Research and Training Center (PRCRTC) at ViSCA in 1977. Worth mentioning in this effort is the assistance provided by IDRC and PCARRD.

In 1980, Saladaga, a recipient of ViSCA manpower development program funded by IDRC returned from Louisiana State University after completing his Ph.D. in plant breeding. Using the polycross hybridization for the first time in the Philippines in sweet potato breeding, Saladaga produced 82,000 plant genotypes. These were screened, evaluated and promising crosses were entered into the regional trials conducted at various agroclimatic locations in the Philippines.

Prior to Saladaga's feat, three sweet potato varieties have been recommended. In 1979, the UPLB identified "Kinabakab" as a superior variety from its collection and renamed the variety UPL Sp-1. In the same year, the Philippine Root Crop Research and Training Center (PRCRTC) at ViSCA also identified two outstanding varieties from its collection, namely: BNAS-51 and San Isidro, renamed as PRS-10 and PRS-12, respectively. Varietal releases prior to the organization of the Root Crop Varietal Improvement Group (RCVIG) of the Philippine Seed Board in 1981 were done by the agency that developed the variety.

After the establishment of RCVIG as one of the Technical Committees of the Philippine Seed Board, the first cooperative sweet potato advanced regional trial was conducted with entries from UPLB, Bureau of Plant Industry (BPI) and ViSCA-PRCRTC. From these trials, the Philippine Seed Board approved for commercial production five high yielding entries renamed as: VSP-1, VSP-2, VSP-3 (ViSCA-developed varieties), UPL Sp-3 (a UPLB-developed variety) and BPI Sp-1 (a BPI-developed variety).

B. Storage Technology for Sweet Potato and Cassava

In 1981, the Philippine Council for Agriculture and Resources Research and Development (PCARRD), a national agency mandated to coordinate research in agriculture and natural resources, approved

for implementation a research project on post-production technology research and development for cassava and sweet potato in the Philippines under the leadership of Dr. Emma Data. The project was jointly funded by PCARRD, IDRC and ViSCA. The over-all objective of the project is to develop post-production technology that will reduce yield losses by improving existing storage of cassava and sweet potato at farm and village level.

To gain an insight on the postharvest practices of the root crop growers, Data et al. (1982) conducted a 6-month survey in selected barangays of Leyte and Southern Leyte. Prior to the conduct of the survey, they started work on other aspects of the project.

After almost two years of experimentation and on-station trials, the project came up with two technologies namely, underground or soil storage for cassava and hut storage for sweet potato for further testing on farmer's field. Selected farmers attended a training course on the proper use of the technology of root crops held on February 2-4, 1983. From these trainees, farmer-cooperators were selected and in late 1983, they were all set to conduct on-farm trials.

The Technology Under Evaluation

The VSP Varieties. VSF-1 has a medium level dry matter content and a relatively wet taste. It has an attractive orange flesh.

The flesh color is retained even after cooking. It has a high vitamin A content and medium level protein content (3-6% dry basis). The plant is less spreading than the commonly grown native varieties. It has short vines with numerous branches close to the base, short internodes, normal petiole length and heart-shaped leaf lamina. VSP-1 is ready for harvest 105-130 days after planting. It yields an average of 21.9 t/ha. without application of fertilizer.

VSP-2 has high vitamin A content and medium level dry matter and protein content (3-6% dry basis). Its flesh is orange with purple tinge. Relatively bushy, the plant has short vines with short internodes and numerous major branches close to the base. It is characterized by long petioles and deeply cut lamina. It matures in 105-130 days and yields an average of 19.1 t/ha. without fertilizer.

VSP-3 has a high dry matter content and medium level carotene content. It has a yellow flesh preferred by people who eat sweet potato as staple. It has a creeping habit with relatively large vines, medium number of branches and large 3-lobed leaves with the middle lobe predominating. Compared with VSP-1 and VSP-2, VSP-3 has higher protein content (7 to 10% dry weight basis). It yields about 16.2 t/ha. without fertilizer and is ready for harvest in 105 to 130 days after planting.

Soil Storage Technology for Cassava. This technology involves storing harvested cassava by burying them in trenches and covering them with sea sand, river sand, clay or clay loam soil. Trench measuring 1 m. wide and 30-40 cm deep is dug in a well-drained, slightly sloped, and shaded area. The length of the trench can vary according to the volume of roots to be stored.

Roots for storage should be free from pests and mechanical injuries to prevent rapid deterioration during storage.

Any of the following fillers can be used as covering medium depending on their availability: sea sand, river sand, clay or clay loam soil. The filler is placed between stored roots. After fully covering the pile, the top (filler) is shaped like a cone to a thickness of 15 cm at the tip.

A drainage trench is also made at the lower end of the storage trench.

Sweet Potato Storage in Hut Structures. This technology involves building of structures made of locally available materials such as cogon (Imperata cylindrica), bamboo (Bambusa sp.) and nipa leaves (Nipa fruticans). The structural design is shown in figures 1-2. The floor is made of bamboo slats while the roof and walls are constructed out of nipa or cogon. To control the air flow inside the hut, the moveable flaps or door can be opened

or closed. The principle in using these structures is to maintain a lower temperature than the normal outside temperature.

A higher relative humidity is maintained inside the structure by placing a basinful or "bambooful" of water under the shelves where the sweet potato roots are stored. Experimental data show that roots can be stored in these structures for more than 30 days.

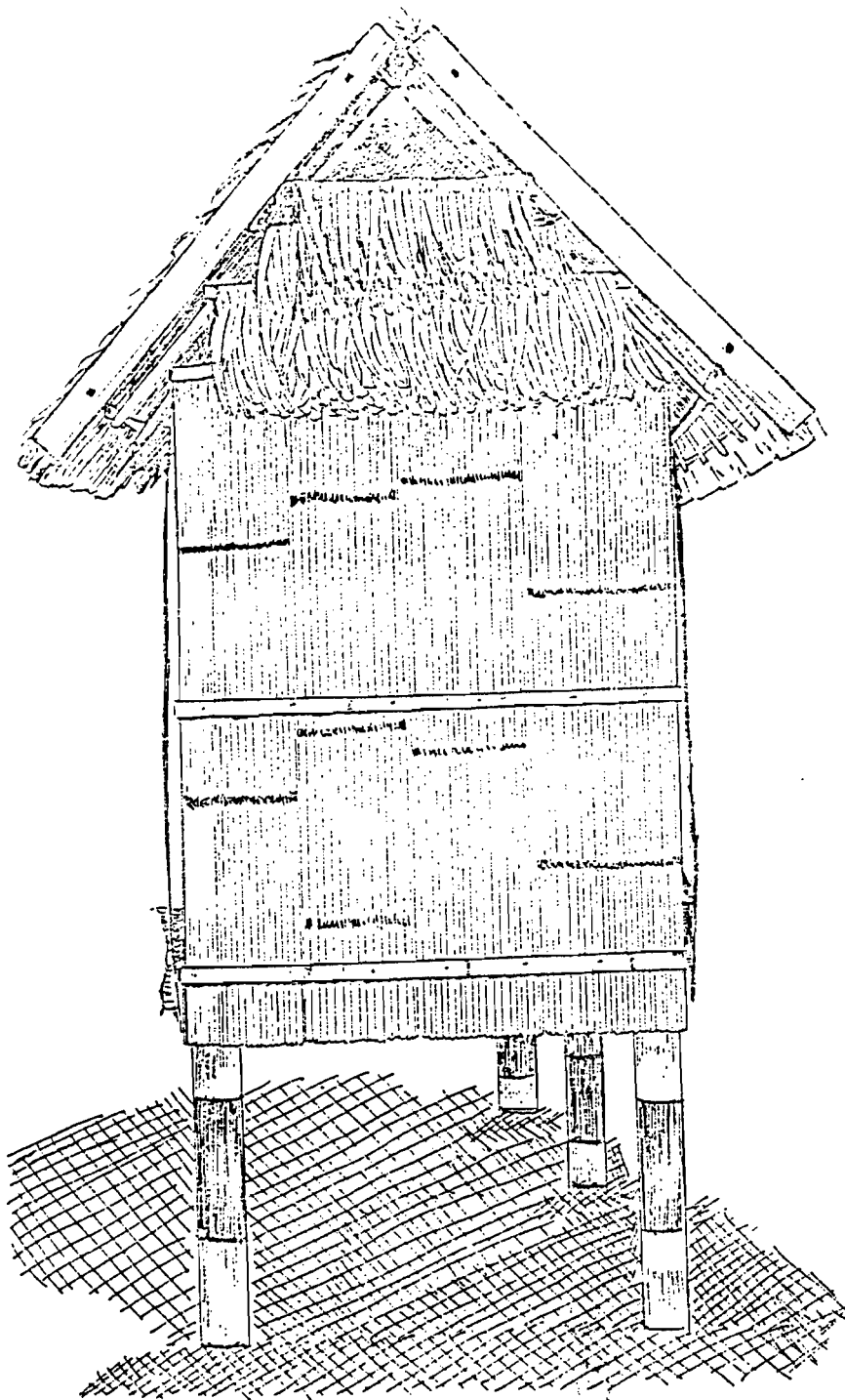


Fig. 1. Storage hut for sweet potato roots made of slats and bamboo slats.

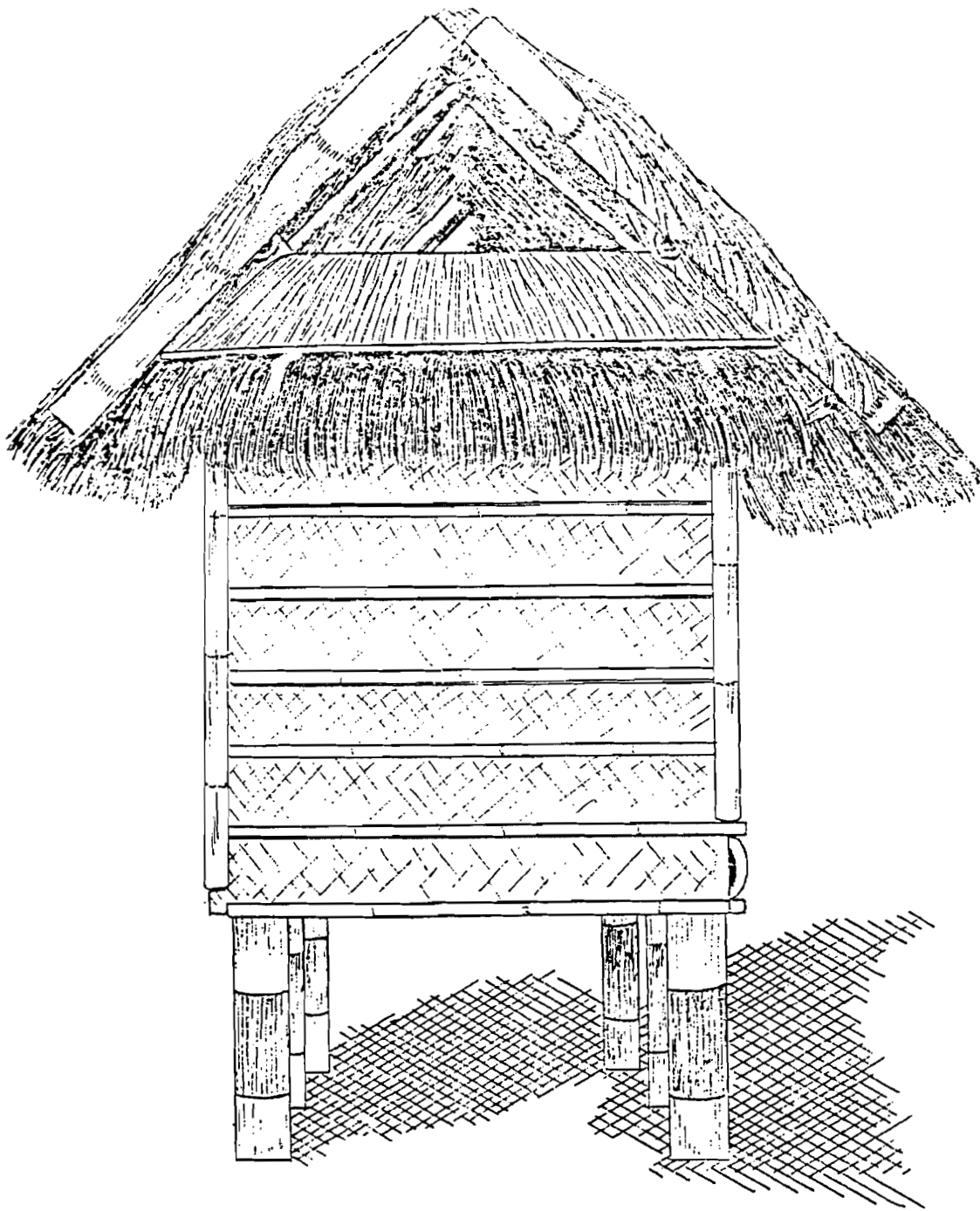


Fig. 2. Storage hut for sweet potato roots made of sagan and sawali.

Objectives of the present study

The present study aimed to determine the following:

1. Extent of geographical distribution of the ViSCA developed sweet potato lines and varieties and their performance in (a) small farmers' fields and (b) big sweet potato producers under mono-culture conditions;
2. Impact of the sweet potato hybrids and varieties in multiple cropping;
3. Extent of the use of sweet potato hybrids in emergency areas and situations such as typhoon devastated areas and economically depressed geographical regions such as the coconut and sugarcane areas where depressed world prices of coconut products and sugar had taken their toll;
4. Extent to which sweet potato is being used for animal feed and other commercial purposes; and
5. Extent of the use of village-level storage technology for fresh cassava and sweet potato roots.

REVIEW OF LITERATURE

An exhaustive review of recent studies on root crops has turned up only a few researches which addressed the new ViSCA sweet potato varieties and village-level storage of root crops. Understandably, the available studies on VSP and storage technology had been conducted in the Visayas.

Diffusion of technology

Most non-cooperators became aware and developed an interest to try the new sweet potato varieties and the storage technology as a consequence of their first-hand observation of the performance of the technology on farmers' fields.

Alfonso's survey (1986) which traced the interpersonal communication networks on the new sweet potato varieties in barangay Bubon in Baybay, Leyte, revealed that farmers learned about the varieties from neighboring farmers who grew the crop. A credible field technician and the barangay captain who were farmers' sources of initial planting materials played key roles as sources of information on VSP's cultural management practices.

With regard to the root crop storage technology which had been introduced, Data's assessment (1985) of its acceptability

indicated that majority of the non-cooperators obtained information on the technology directly from ViSCA staff who visited their communities to conduct seminars and to monitor farmer-managed storage experiments.

A case study of the diffusion of root crop storage technology documented the flow of information on root crop storage from cooperators to other farmers in one village in Southern Leyte (Manching, 1986). Preliminary results showed that farmer-cooperators, PRCRTC seminar-workshops, and sensory evaluation sessions where PRCRTC researchers were present served as the primary sources of information on root crop storage for non-cooperators.

Performance of technology

A recommended technology's relative advantage over an existing farmers' practice can be demonstrated best in actual farm conditions. Initial reports about a technology's on-farm performance are frequently important inputs in a farmer's decision to adopt a recommended technology.

Pascual et al. (1985) analyzed the costs and returns of various high-yielding sweet potato genotypes grown in experimental field conditions. Trials done in cooperating research stations showed that VSP-1 had the highest average yield among 13 varieties tested for the wet and dry seasons. Consequently, it had the

highest net return to land, labor, management, and capital. Of the three sweet potato hybrids, only VSP-3 yielded a high dry matter and protein content while VSP-1 and VSP-2 had a medium dry matter and protein content.

The experience of the Farming Systems Development Project-Eastern Visayas (FSDP-EV) with improved sweet potato varieties in an upland community was presented by Cornick and Alberti (1985) in an attempt to illustrate the effect of intra-household dynamics on adoption of improved technology. Emphasizing the incompatibility of these new varieties with the small-farm system, they compared VSP to native sweet potato varieties, describing the former as: bushy rather than ground-hugging in form, and smaller in plant size than the local varieties, allowing greater plant densities per area.

With regard to the storage technology for root crops, Data's survey (1985) reported that 45.45 percent of the cooperators rated soil storage as very acceptable and another 57.14 percent considered the use of a packaging medium as very acceptable. Two-thirds (66.67%) appraised the storage huts as acceptable. Expectedly, the technology was judged as not acceptable in places where the storage demonstration failed due to unfavorable weather conditions.

Extent of use for commercial purposes

In view of the relative newness of the technology, only Felicilda's study (1985) dealt with the commercial aspects of VSP. Specifically, the study tested a marketing strategy for VSP which involved selling previously packed 3-kg and 5-kg net bags of ViSCA-produced VSP-1, VSP-2, and VSP-3 in supermarkets in Ormoc City and ViSCA, Baybay, Leyte. Felicilda reported that during 6 months of selling operations in the two sites, VSP-1 had a high demand among Chinese, VSP-3 was preferred by camote cue makers and VSP-2 was chosen by consumers who went for boiled sweet potato roots. In terms of sweetness and dry matter content, VSP-2 was most preferred by consumers although the majority were satisfied with the overall eating quality of the VSP varieties.

To demonstrate the feasibility of formulating quality feeds with the commercial use of locally produced root crops and other ingredients, ViSCA has initiated the pilot production of root crop-based animal feeds. Among the various feed formulations, the largest quantity produced was broiler starter, followed by layer mash, hog grower, hog finisher and hog starter. Smaller quantities of experimental cattle and chicken grower rations were also produced (Gerona, 1985).

Another root crop which has demonstrated its potential as a feed ingredient is cassava. Feeding trials have shown that it can replace corn in the ration by as much as 50 percent. Gerona (1985) however, suggested that for practical reasons, the level of incorporation of cassava in feeds should depend upon the availability and cost of the material compared to that of corn for which it is substituting.

Besides continuously supplying the feed requirements of ViSCA animal projects, the feed mill has been selling feeds to broiler raisers in Baybay and Tacloban City. Bartolini (1984) reported that favorable feedback had been expressed by feed buyers on the quality and efficiency of ViSCA-formulated root crop-based feeds.

METHODOLOGY

Scope of evaluation

In order to determine the spread and impact of the root crop production and processing project, a team composed of a crop scientist and a social scientist was commissioned by Dr. F. A. Bernardo, Director of Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA), to undertake the evaluation.

The evaluation zeroed in on two root crop technologies that had been developed by the IDRC-funded projects titled, "Varietal Improvement Program for Sweet Potato" and "Post-Production Technology Research and Development for Cassava and Sweet Potato". These technologies were:

1. New sweet potato varieties/lines

- a) VSP-1
- b) VSP-2
- c) VSP-3
- d) V2-42
- e) V-11

2. Village-level storage of fresh cassava and sweet potato roots

- a) soil storage for cassava
- b) hut storage for sweet potato

Although the brief proposal prepared by Dr. F.A. Bernardo (Appendix A) served as our main guide in the conduct of this follow-up

study, there was a related issue - diffusion of technology - which was considered important to examine in-depth but the time constraint made it impossible for the researchers to pursue. Such a study would have required us to select a stratified random sample of three types of farmers such as those found in marginal hilly areas who grow sweet potato and cassava as their staple food for home consumption, those who grow sweet potato and cassava as cash crops and commercial root crop growers. Instead, we adhered to the original proposal and suggested the issue of diffusion of technology as a possible research problem to ViSCA thesis students in development communication. Consequently, midway through this study, two ViSCA seniors decided to conduct their undergraduate theses on interpersonal communication networks on the new sweet potato varieties in barangay Bubon, Baybay, Leyte and diffusion of village-level root crop storage technology in barangay Tawid, Maasin, Southern Leyte. The preliminary results of these research studies have been reviewed in the previous section.

In addition to the proposal which outlined the data collection activities, our consultations with Dr. Emiliana N. Bernardo, Director of the Philippine Root Crops Research and Training Center (PRCRTC); Dr. Florencio A. Saladaga, project leader of the sweet potato varietal improvement program; and Dr. Emma S. Data, project leader of the root crop storage project, provided us with useful

leads for our field visits and choice of key informants. Further, we talked to the research staff of Saladaga and Data to gather the details and location of their on-farm trials and experiments. Both their description of the national scenario for sweet potato and accounts of farmers' response to the varieties and storage technology were verified by our own review of documents and research reports available in PCARRD, MAF, and VisCA.

On the basis of our initial consultations and literature review, we were able to decide on the persons to interview and the sites to visit. For instance, Dr. E. N. Bernardo, who was under the impression that the MAF cooperating research stations played a lead role in disseminating the sweet potato varieties, suggested that we visit some of these testing stations to determine the extent of geographical distribution of VSP.

Given the limited time for this follow-up study, a random sampling of farmers who have tried the root crop technologies had to be dispensed with in favor of purposive selection of key informants (Appendix B). Following the leads earlier suggested and using the list of cooperators for the storage experiments and on-farm trials as a guide, the following sites were selected:

Luzon

1. Ilocos Norte

Pasuquin
Batac
Laoag

2. Camarines Sur

Pili
Naga City

3. Camarines Norte

4. Albay

Legazpi City

Visayas

1. Leyte

Babatngon
Barugo
Baybay
Bato
Carigara
Hilongos
Jaro
Julita
Matalom
Ormoc
Tacloban City
Villaba

2. Southern Leyte

Bontoc
Maasin
Macrohon
Malitbog
Padre Burgos

Research Approach

In areas where there were cooperators, our approach was to contact them and engage them in an informal discussion about their experience with either or both of the two root crop

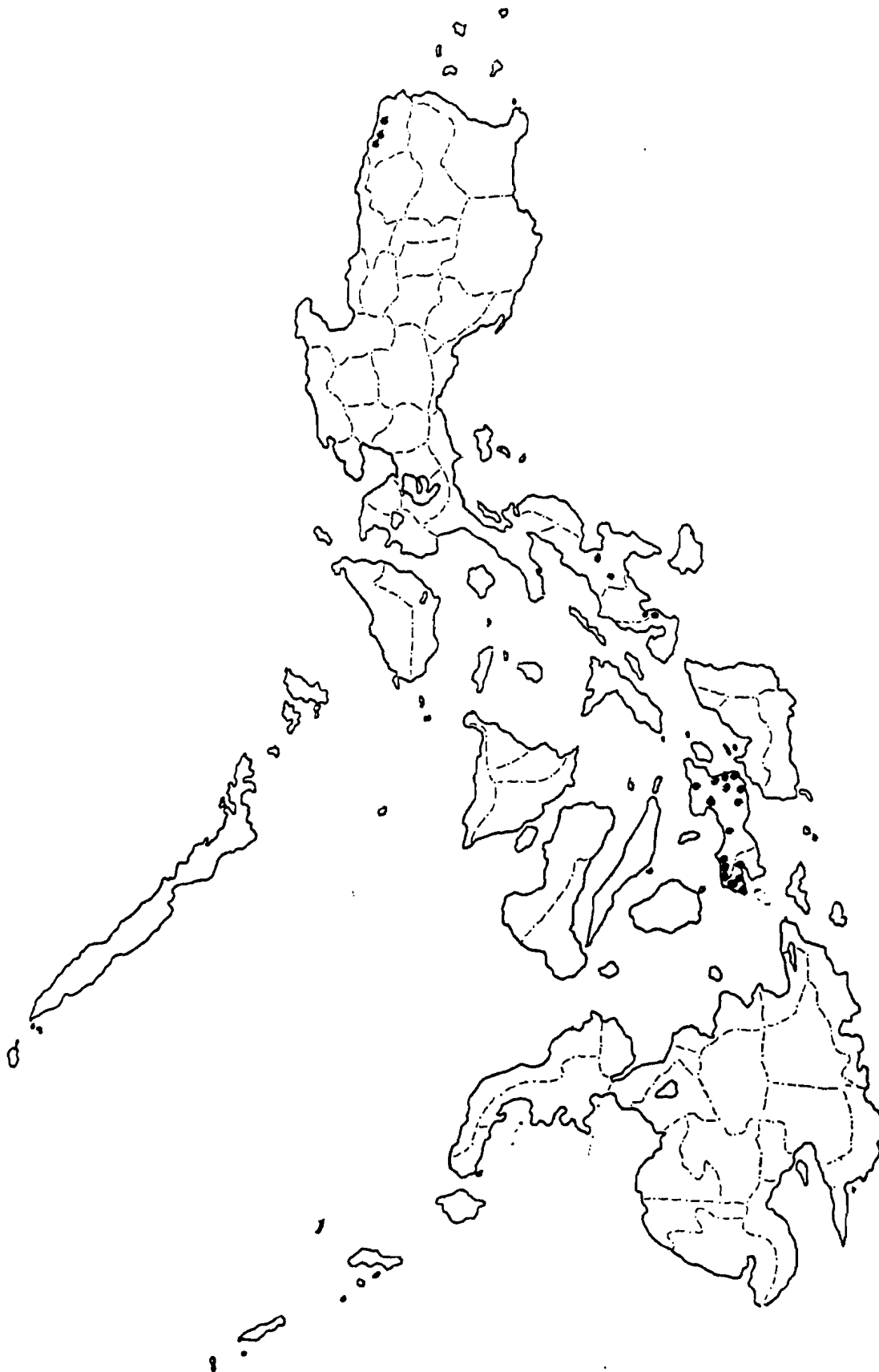


Figure 3: Map of the Philippines indicating the sites (towns) visited by the team.

technologies they have tried. Later, we talked to non-cooperators who tried the technology to find out their impressions and sources of information. These informal talks enabled us to obtain indications of adoption and changes in income, yield, and production systems brought about by the use of the root crop technologies. Since farmers harvested their root crops on a staggered basis, their lack of farm records complicated their recall of yield and production data. Hence, our indicators of the technology's impact on income are merely qualitative effects of additional income, i.e., ability to buy rice, fish, or meat; pay hired labor and support children's schooling.

Early on we ruled out the use of a structured interview schedule or written questionnaire as our principal data collection instrument in anticipation of farmers' general reluctance to speak candidly in a formal question and answer session. Instead, these informal discussions with farmers and other key informants were guided by a short list of key issues obtained from the proposal. The summaries of the team's interviews with selected informants are attached in this report (Appendix C).

One team member's ability to speak both Cebuano and Waray proved to be an advantage in many sites where these dialects are the medium of communication. This enabled us to strike a certain level of rapport with our respondents which was critical in ferreting out sensitive information such as their reactions to the recommended root crop technologies.

RESULTS AND DISCUSSION

1. In a short span of time, VSP varieties/lines have been distributed nationwide

VSP varieties developed by ViSCA-PRCRTC have been introduced in all regions of the country through various channels. Foremost among these channels is a government-supported program of the Bureau of Animal Industry - Ministry of Agriculture and Food (BAI-MAF) called "Feed Root Crops ng Barangay Program." The program initiated the establishment of a number of seedbanks in various regions of the country (Fig. 4). These seedbanks serve as sources of sweet potato planting materials for the region or area where they are located. The ultimate objective of the program is to encourage backyard livestock production. Planners behind the program are convinced that with the high yielding characteristics of VSP, the growers will produce sweet potato for feeds either in fresh form or chips.

According to a MAF program report as of December 1985, BAI has distributed more than 2.5 million VSP cuttings to 500 seedbank cooperators in nine regions including the National Capital Region. The report of MAF Leyte indicated that as of October 1985, about 1600 farmers have been given cuttings in Leyte alone. These cuttings have been planted to 1,528 hectares.

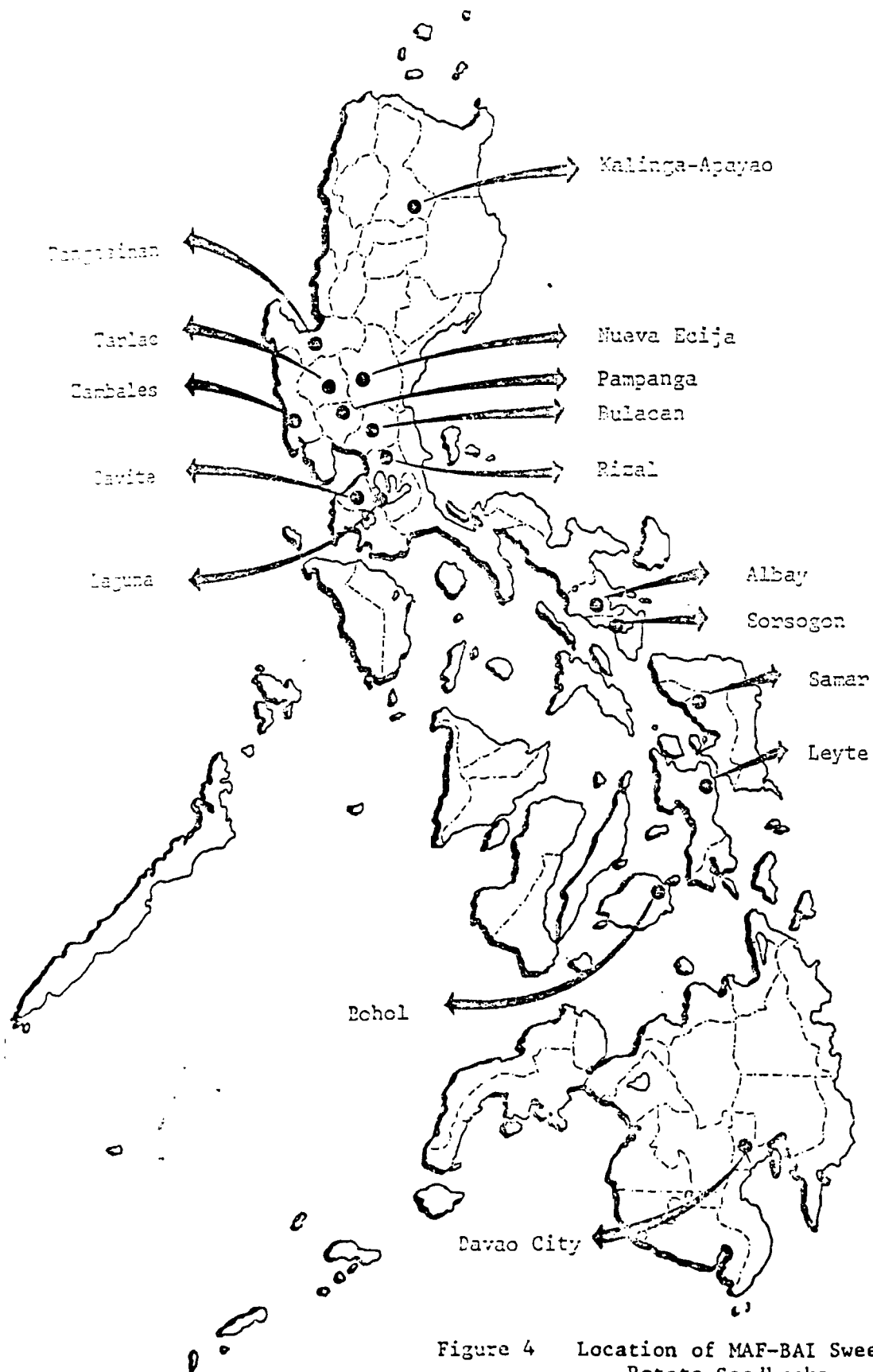


Figure 4 Location of MAF-BAI Sweet Potato Seedbanks

Based on the ViSCA records of those who availed of VSP varieties, Western Visayas, Bicol, Southern Tagalog, Eastern Visayas and Central Visayas lead all other regions in terms of number of cuttings brought in by different government agencies and private entities. As expected, distribution of VSP cuttings to a greater number of root crop farmers has been concentrated in Leyte and Southern Leyte (Eastern Visayas) mainly through ViSCA's efforts. The role of the National Root Crops for Feed Program in the distribution of cuttings in Eastern Visayas is also substantial.

A notable scheme which we observed in Leyte and Southern Leyte that could have contributed greatly in the distribution of cuttings and eventually in the dissemination of the technology is the farmer-to-farmer mode of distribution. Neighbors and relatives who are farming in the same or nearby barangays asked for cuttings from the farmer-cooperators. One farmer-cooperator from Dulag, Leyte gave cuttings to 30 farmers; another one from Maasin shared cuttings to more than 50 farmers. Non-cooperators were encouraged by the yield that the farmer-cooperators were getting. Because of this, it is highly possible that another transfer is made from farmer-recipients to other farmers.

Several factors contributed to the speed at which distribution took place. These are:

- a. Interest generated by the technology among public and private institutions and individuals.
- b. International and national economic situation, e.g., low price of sugar in the world market, which pushed sugarcane planters to look for viable alternative crops. It can be noted that among the early adoptors of VSP varieties are the sugarcane planters.
- c. High cost of inputs which made the farmers seek or concentrate on crops that will not need oil-based inputs or one that will give respectable yield even with minimal inputs.
- d. The active stance taken by ViSCA-PRCRTC in the promotion of its technologies. While other research agencies stop at technology generation or development, ViSCA-PRCRTC made vigorous efforts to "sell" the ViSCA-developed varieties through various media. ViSCA researchers do not "drop out of the scene" until the technology is fully developed and adopted.

For big growers, particularly the beleaguered sugarcane planters, the high-yielding attribute of VSPs has encouraged them to venture on large scale production of sweet potato. The advent of VSP also provided them with a viable alternative crop to sugarcane which had experienced a dismal pricing in the world market.

One grower from Carigara, Leyte who initially planted his 6-hectare sugarcane land to sweet potato in 1984 has already expanded to 30 hectares as of November 1985. According to this farmer-businessman, he intends to expand further this area to 100 hectares. Under this new venture, he will enjoin the participation of the farmers in the nearby barangays in his area.

Another big sweet potato grower in Camarines Sur who started planting VSP-3 in 1983 plans to expand his present 15-hectare sweet potato farm to 200 hectares in the near future. He will complement this plan with the establishment of a feed mill and a flour mill.

An added benefit mentioned by this former sugarcane planter made a lot of difference in the lives of the sugarcane workers whom he employs. He particularly appreciated the fact that high-yielding sweet potato varieties came at an opportune time - a time when he was all set to dismiss a number of sugarcane workers because of poor income from sugarcane production. Sweet

potato production made him decide to retain these sugarcane workers thus alleviating unemployment problem in his province.

Although our farm level study indicates an expansion in area planted to sweet potato and increased yield per unit area particularly in Leyte and Southern Leyte, the provincial and regional data gathered by the Bureau of Agricultural Economics (BAECON) show otherwise. From 1984 to 1985 data show that in Leyte, there was a decrease of about 293 hectares in area planted to sweet potato and a slight decrease in yield per hectare. The apparent discrepancy between specific observation and regional and provincial data could mean that the impact of high-yielding sweet potato varieties has not yet been felt over a large area. It can also mean that the increase in area planted and yield in one area is negated by a decrease in area and yield in other parts of the province.

Considering the pattern of underestimation of yield and production data, there may be a need to evolve a more systematic way of collecting these parameters on a yearly basis. Incidentally, this is being explored in a study by Villamayor (1986) which aims to get an estimate of root crop yield levels through sampling, compare the estimated yield based on survey and actual field sampling, and determine the agronomic constraints to production in farmers' fields.

4. VSP varieties contribute to land use intensification

Other farmers gain in a different manner from VSP's short-maturing characteristic. A case in point is Mang Ramon, a farmer-cooperator from Calbasag, Julita, Leyte. His experience is that since VSP matures after 3 1/2 months, he has been able to plant sweet potato 5 times in 2 years. With native varieties like Kaagbon and Katanghaw which he used to grow, he could only be sure to have one cropping a year. Because of this, he looks at VSP as a quick source of cash for his children's school expenses. Another farmer from Can-ipa, Baybay, Leyte who intercropped sweet potato with corn opined that it is because of intercropping that she needs a crop with a shorter growing season like VSP. In the past she used to grow Kaiti, a native sweet potato variety which matured longer but she eventually stopped raising it because it held up the field and delayed the planting of another crop.

5. Consumers are also benefited

Another gain from the VSP varieties has accrued to food consumers. In a public market in Barangay Tangkaan in Southern Leyte, increased supply of sweet potato has reduced the price of sweet potato roots from ₱2.50/kg to ₱1.50/kg during peak harvest season. Such price reduction took place only after the VSP varieties were introduced in the area. This observation validates the farmers' claim that with VSPs, they have more produce to sell.

A scheme developed by a big private VSP producer in Carigara, Leyte has enabled a group of consumers, the elementary school teachers, to buy sweet potato at reduced price. The producer who has about 30 ha planted to VSP supplied each teacher with 1 can of sweet potato per week (1 can contains 18 kg) at ₱20.00/can. The prevailing market price is ₱30.00/can. Payment is through salary deduction which is done at the end of the month. Company farm workers and other people living near the producer's farm also take advantage of the "company price" of ₱22.50/can.

In Camarines Sur, another sugar planter-turned-sweet potato producer supplied his farm workers with sweet potato through 'advances'. "Advances" is a management-laborer arrangement where the laborer gets his wage in the form of commodity. Whatever is the difference between the value of his actual wage and the cost of commodity will be his net earnings. Instead of "rice advances" this sugar planter encouraged his hired laborers to take "camote advances." The arrangement has reduced the amount of rice consumed by laborers and since sweet potato is cheaper than rice the laborers were able to save money to buy other household necessities.

While consumers gain from VSP, a lady who sells boiled sweet potato in the market complained that because more people are now planting sweet potato, she has lost most of her customers.

6. The use of sweet potato chips in commercial feeds is still limited

Sweet potato chips are not yet extensively used in the formulation of commercial feeds although a number of research studies conducted at UPLB and ViSCA have shown that sweet potato can replace corn as source of energy in feed formulations.

However, the feedmillers have signified interest to use sweet potato chips but they wanted to be convinced of the technical and economic feasibility of the technology. Such response is quite understandable because feedmillers are, first and foremost, businessmen. Any new venture or any change in their business structure will entail money and long-term investment.

In Bicol, the local feedmillers and hog raisers wanted to be sure that sweet potato-based feeds can indeed make the pigs grow as much as corn-based feeds. To convince the feedmillers, the Camarines Sur State Agricultural College (CSSAC), in cooperation with ViSCA, presently conducts a demonstration trial using sweet potato chips in feeding trials.

A feedmillers (De Leon, 1984) expressed his apprehension over the use of sweet potato in the following paragraph:

"Sweet potato or camote has a potential yield of 25 tonnes per ha compared to only 4-5 tonnes per ha for hybrid corn. Camote should be dried and processed immediately after harvest before the entry of aflatoxin.

A farm having 100,000 birds or more and are given feed containing high level of aflatoxin in 1 or 2 days may result in the destruction of the whole flock. Everything is lost and such losses can never be covered by insurance.

Besides, the pricing of livestock today does not make any provisions for such large-scale catastrophe at the farm level. The opportunity is present but the question is "could the higher output of camote from 4 - 25 mt (with 20 mt difference) be equated to cover the necessary processing cost? If it could, the feedmilling industry is willing to try any alternative ingredient provided its cost is equal to the current price."

Even at ViSCA Pilot Feed Mill, sweet potato chips are not used quite readily as those of cassava chips in feed formulation. The reason is that farmers prefer to sell fresh sweet potato because of higher demand and higher price.

7. Excess supply of sweet potato generated activities in cooking and selling snack items and delicacies.

The high yield of VSPs has encouraged some farm families to venture into processing and selling native delicacies. Village-level processing serves twin functions: it is another source of income and it generates more work and employment opportunities.

Farmers whom we interviewed quickly pointed out that processing sweet potato into delicacies -- camote candy, camote doughnut, suman and "bitsu-bitsu" -- bring in more income than selling the roots fresh. This extra income enables them to support their children's education and pay for other household necessities.

For the Oracions in Bubon, the making of camote candy is an activity where family members participate: sons grate coconuts and daughters help mother boil and mash the tubers, then cook these with sugar and coconut. Wrapped in brightly colored Japanese paper, candies are sold in stores in Baybay town and the rest are hawked by children in school. Children who sell camote candy are paid a small percentage of the total quantity sold.

8. Government planners and private entrepreneurs now take a second look on sweet potato as a possible viable intercrop.

For a long time, farmers especially those in the Eastern Visayas and Bicol regions, have traditionally practiced intercropping sweet potato with coconut or with corn. The objective of the farmers for raising this crop is mainly for home consumption.

At present, sweet potato is being tried as an intercrop for a number of crops.

In Carigara, Leyte an enterprising private grower is testing the performance of VSP-3 under 1 year-old cacao trees. He had gotten very good yield from a 7-hectare open and flat land planted to VSP-3. Encouraged by his net income from VSP production, he now wants to try VSP-3 under partial shade. In addition to maximizing land use, he also would like to observe whether sweet potato can effectively lessen weed population.

In Pasuquin, Ilocos Norte, the Fiber Development Authority (FIDA) is conducting an on-farm trial of sweet potato intercropping using VSP-3 with maguey. As of December 1985, sweet potato was observed to be growing well. Yield performance however, will not be available till January 1986.

The Farming Systems Development Project-Eastern Visayas in Jaro, Leyte is on its second cropping on-farm trial of sweet potato under coconut. Researchers would like to determine the performance of VSP varieties and other crops under shade. The main concern of the project is to select the most appropriate crop(s) under coconut that will answer the needs of the coconut farmers for food and cash.

9. Officially-approved varieties may not necessarily be the farmer's choice.

Farmers have their own definite set of criteria as regards the technology that they will finally adopt. Take the case of new sweet potato hybrids. When farmers in Leyte and Southern Leyte were given the chance to select among Philippine Seed Board-approved sweet potato varieties and some advanced lines, a significant number of farmers chose the advanced lines, namely V-11 and V2-42. The farmers based their selection on the following: yield, eating quality, pest resistance and drought-tolerance.

Farmers recognized that ViSCA sweet potato hybrids are all high-yielding but there are characteristics other than yield that matter to them. One of these is eating quality. Farmers found that tuberous roots of V-11 and V2-42 are flaky and less moist-fleshed, characteristics also found in their native varieties.

Some farmers also claimed that these advanced lines gave better yield than the Philippine Seed Board-approved lines. This observation may be valid considering the agro-climatic specificity of their farms. It should be recognized that under the scheme set by the Philippine Seed Board advanced lines are screened only under major agro-climatic types present in the Philippines and final recommendation is based on the overall performance of entries. Hence, it is likely that an entry that did very well in one region but performed poorly in another will not be considered for final consideration as an officially-approved variety. But as this study shows, a farmer if given the chance to do his own screening, will select what is best for his specific conditions and requirements.

10. In most cases, the positive qualities of VSP outweigh its negative properties.

Farmers whom we interviewed were quite emphatic on their perception of the overall performance of VSPs. Generally, the farmers would first talk about the better harvests that they are getting and the shorter waiting period between planting and harvesting.

but later they would also mention one or two negative aspects of VSP based on their experiences. Frequently mentioned is the "wet-taste" quality of the cooked roots especially of VSP-1. A farmer and his wife complained that VSP caused "stomach upset." A number of farmers also observed that VSPs are less tolerant to drought than the native varieties. Others complained that VSPs are more "prone to thieves" because the roots can easily be pulled. They attributed this to the shallow tuberous roots plus the fact that people get "attracted" to big roots of VSPs. Owing to the shallow root system, roots are also easily eaten by rats. In spite of these experiences and feedback, farmers continue planting VSPs. Majority of these farmers have expanded or are planning to expand their farm area planted to VSPs. This development shows that the farmers based their decision to adopt the technology on the overall performance of the new hybrids. Although they recognize certain negative qualities of VSP, the benefits that they get out of planting VSP such as higher yield and income offset the undesirable qualities observed.

11. Farmers make certain adjustments in the technology or their environment to fit the technology according to their specific needs and resources.

In resource-poor conditions, farmers have to adapt the new technology to make it suitable to their situation. This is demonstrated

in Villaba, Leyte where upland farmers grow VSP extensively on plain or contoured hillsides. Since VSP does not form as much vines as native varieties, farmers who tried planting VSP on steep slopes have discovered that during rainy season, VSP does not produce fleshy roots because the soil around the main roots is washed down by run-off water. In contrast, the native varieties, according to the farmers whom we interviewed, produce runners and thrive well on steep hillsides even on rainy months. Villaba farmers have learned to adjust to this blushy characteristic of VSP by planting it on the lowlands or contoured areas and reserving native varieties for steep slopes. They did not reject the technology but made adjustments to accommodate it.

This observation is contrary to Cornick and Alberti's (1985) conclusion that 'the improved sweet potato varieties have been largely rejected by farmers because they fail to meet the standards of local varieties.' It seems that they had interviewed only one limited sector of the farming population where sweet potato is not the primary crop, they did not present a complete picture of farmers' response to the crop.

The case in Barangay Tangkaan in Padre Burgos, Southern Leyte also highlights farmers' creative adaptation of recommended land preparation and planting practices for VSP to make these fit to their less favorable situation. In Barangay Tangkaan, VSPs

are grown on a wide scale despite the natural condition of the soil where the surface layer is shallow and the subsoil layer is limestone rock. While planting VSPs on ridges is the common practice in Southern Leyte especially during wet season, the rocky soil in Padre Burgos forces the farmers to plant VSPs in mounds which are about 0.5 m apart. To prepare the area for planting, a Tangkaan farmer hills up cone-shaped mounds using a pick mattock. In each large mound, two VSP cuttings are planted instead of the recommended one cutting per hill because of their experience that two cuttings will result in the production of more tuberous roots.

Many farmers whom we visited try to get the most out of their VSP crop by practicing "progressive harvesting." This involves harvesting first large tubers near the surface and leaving behind the small ones to give them a chance to develop. A few weeks later, these are harvested as fully grown tubers.

12. Hut storage technology for sweet potato complemented and catalyzed introduction of VSPs but the technology itself has not yet been fully adopted by most of the farmer-cooperators

The production of VSPs is an integral part of the storage technology project hence, farmer-cooperators were asked to produce the sweet potato roots that would later be stored. Through the project's scheme of involving the community during taste tests

where the barangay constituents were invited to partake and judge the taste of stored roots, a great number of farmers became interested in VSPs because of enhanced eating quality of stored roots. The storage technology for sweet potato has worked well under farmers' field conditions thus partly achieving the objective of a verification project. However, other farmers were not so much interested in the storage technology as in the varieties used in the storage experiment. Hence, farmer-cooperators observed that after the taste test sessions, other farmers began to ask for planting materials.

While storage technology contributed to the dissemination of VSPs, the technology itself as of the present time has not yet been copied by other farmers. None of the farmer-cooperators knew of non-cooperators in their barangay who had constructed a similar structure. Pressed for their opinion on why other farmers did not copy the technology, the farmer-cooperators advanced that constructing the storage hut, although made of indigenous materials, would also entail cash expense which they estimated at ₱200.00. This, according to them, may have prevented others to put up storage structures. Other farmer-cooperators viewed the non-adoption as lack of need to store since harvests can be sold easily or are just enough for home use. The team felt that the farmers are, in a way, expressing their perception of the

technology. This is supported by the observation that except for the storage hut of a farmer-trainor who had maintained it for demonstration purposes, all of the storage structures visited by the team did not contain sweet potato. Some were used as store house for bananas, coconut husks, corn, sprayers, etc. Since the project had been completed, the team expected that the storage hut, if really useful to the farmers, would still be used for storing sweet potato. Most of the farmer-cooperators informed the team that they still store sweet potatoes occasionally but mainly for home consumption.

Among the farmer-cooperators who indicated keen interest to continue storing were the sweet potato candy and "suman" makers. Storing sweet potato assures them of a continuous supply of roots for processing. Another farmer-cooperator indicated that he will store his produce if there is a danger of sweet potato weevil infestation, otherwise he would prefer to keep the roots in the field. In the latter case, the farmer recognized the value of storage, i.e., it provides him with an option to prevent loss of crop due to weevil damage.

13. Cultural practices used for VSPs may differ in small and big farms mainly because of farm size and available resources but these factors did not affect adoption

Judging from the adoption of VSPs by both small and big growers, it can be deduced that farm size and farm resources are

not critical factors affecting the adoption of sweet potato varieties.

Such observation may be attributed to the minimal input requirements of sweet potato. Unlike the early rice HYVs which were bred specifically to effectively respond and utilize high rates of fertilizer, VSPs were developed mainly for increased yield and not for fertilizer responsiveness. Thus, VSPs do not require so much fertilizer inputs. This strategy suits sweet potato because as a species it has a wider range of adaptability than most crops.

The prevailing notion that all HYVs are bred for responsiveness to fertilizer was however, reflected in our interview with researchers in at least two experiment stations of the Ministry of Agriculture and Food. They had the impression that the VSPs were bred for fertilizer responsiveness.

Farmers' experience showed that VSPs yield better than the native varieties even without fertilization. Except for one farmer-cooperator, all farmers interviewed did not fertilize the crop. The farmer who used fertilizer complained that he got small fleshy roots but more vines. Another farmer observed that on one occasion when he planted sweet potato after rice, he got low yield from sweet potato. It is possible that since he fertilized his rice crop, the residual fertilizer may have encouraged more vegetative growth at the expense of root growth in sweet potato.

Small farmers from Leyte whom we interviewed indicated that except for the number of cuttings per hill, they follow the cultural practices which they are using for cultivating the native varieties. So in the case of VSPs, a change in cultivar does not mean that a host of practices have to be altered as well. Since the introduced technology is simple, farmers can easily understand and adopt the technology.

As in the production of native varieties, small farmers did not apply pesticide. However, a big grower applied insecticide as a preventive measure.

Small farmers do not irrigate but big growers do. One grower practiced irrigation to control sweet potato weevil.

Land preparation also varies between small and commercial farms. In small farms, land preparation is by animal traction or by hand. In big farms, tractors are used to prepare land. Nevertheless, despite these differences, the benefits from adopting the new sweet potato varieties have been remarkably distributed among farmers differing in farm size and resources.

14. State colleges and universities, other government agencies, and the private sector served as conduits in the dissemination of the technologies

State colleges and universities, other government agencies, and the private sector actively participated in the promotion of

the new sweet potato hybrids. Their combined efforts led to a wider adoption of VSPs among small farmers and commercial growers.

In Batac, Ilocos Norte, the Mariano Marcos State University (MMSU) - Philippine Tobacco Research and Training Center (PTRTC) organized a seminar-workshop on sweet potato cultivation, conducted field trials, and distributed cuttings to farmers. The Pasuquin Integrated Agri-Foods, Inc. (PIAFI) brought in the initial batch of cuttings which were later distributed to farmers in Binsang, Naglicuan, Pasuquin, and Pagudpud in Ilocos Norte for propagation. Run by farmers and assisted by technicians from the Ministry of Human Settlements, Ministry of Agriculture and Food and the Ilocos Norte Agricultural College in Pasuquin, these propagation centers which covered a total area of 2.8 hectares had expanded to 9.49 hectares.

Aside from interpersonal contact, press releases were sent by the Provincial Task Force for Root Crops Development in Ilocos Norte to 8 local radio stations and 1 television station. The broadcasts dealt with the root crop development program, cultural practices, and marketing scheme.

In Bicol, the Camarines Sur State Agricultural College (CSSAC), MAF, a sugarcane planter-turned-sweet potato producer, and to a certain extent the Land Bank of the Philippines (LBP) in Legaspi City contributed in the distribution and promotion of VSP in the region.

CSSAC maintains a propagation nursery for VSPs. Through local radio programs, the college has also announced the availability of VSP cuttings. So far, they have given cuttings to various agencies. Among the recipients of VSP cuttings are the municipal mayor in Camarines Sur, a barangay development council and a group of farmers calling themselves BDL Farmers, the local branch of the Ministry of Education, Culture and Sports, and private agencies.

This ex-sugarcane planter, who had learned about VSP from the national dailies, distributed cuttings during his campaign for a seat in the Batasang Pambansa (National Assembly) in 1984. Whenever he had a speaking engagement, be it in a political rally or before the Rotarians, he encouraged the people to plant sweet potato.

The Land Bank of the Philippines, on the other hand, has chosen VSP when it looked for a viable crop. Not only did it recommend VSPs but it also assisted Operation Land Transfer beneficiaries in Masbate in producing the crop. LBP also provided the initial cuttings which it got from ViSCA.

Even with the limited use of the communication media in the dissemination of the VSPs, it is evident that various channels played important roles in creating awareness and encouraging big and small farmers to adopt the technology.

IMPLICATIONS AND RECOMMENDATIONS

1. While most small farmers whom we have interviewed appreciate the high-yielding quality of VSPs, they also emphasize eating quality and vegetative characteristics which are not compatible with high yield. In developing a variety for this type of farmers, the sweet potato breeding program should strive for just a little increase in yield and pest resistance and at the same time maintain the characteristics desired i.e., high dry matter content, creeping characteristics for hilly land, sweet taste, etc.

2. Most cooperators who were interested to continue storage of root crops and in fact have utilized their storage structures even after the completion of the storage experiment, were those who process root crops into delicacies. It appears that the farmer's need for the technology should be an important consideration in selecting farmers who will be trained and encouraged to adopt the technology. At this point, a survey of food processors to determine their need for a continuous supply of root crops and eventually for the root crop storage technology would be in order.

3. Care should be taken in the choice of cooperating stations for on-station trials to test the technology and eventually disseminate it. Commitment, capability of the researcher, and available resources of the station should be prerequisites.

In the case of VSP varieties, one cooperating station went out of its way to disseminate the varieties. In contrast, some researchers in other stations were not fully aware of the features of VSPs. As a result, the VSPs were not disseminated.

4. There may be a need for the Philippine Seed Board to reconsider its criteria in the selection of varieties and institute a mechanism for screening of varieties for regional rather than national recommendations.

5. The VSPs have different levels of dry matter content. To adapt the VSPs to buyers' taste, farmers who grow VSP-1 and VSP-2, advise their buyers to cook the roots in little water or steam them on banana bracts. Others however, have discontinued planting the moist-fleshed varieties because they dislike the watery consistency of the variety they planted. It is apparent that the lack of information on which varieties are best for food and which are suited for animal feed has constrained the proper utilization of VSPs. At the technology dissemination stage, it is important to provide complete information on the desirable characteristics and limitations of the varieties to field technicians and the mass media. On the part of PRCRTC, a leaflet or bulletin which describes all the features (i.e., positive and negative qualities) of VSPs would go a long way in teaching both farmers and technicians about the potential

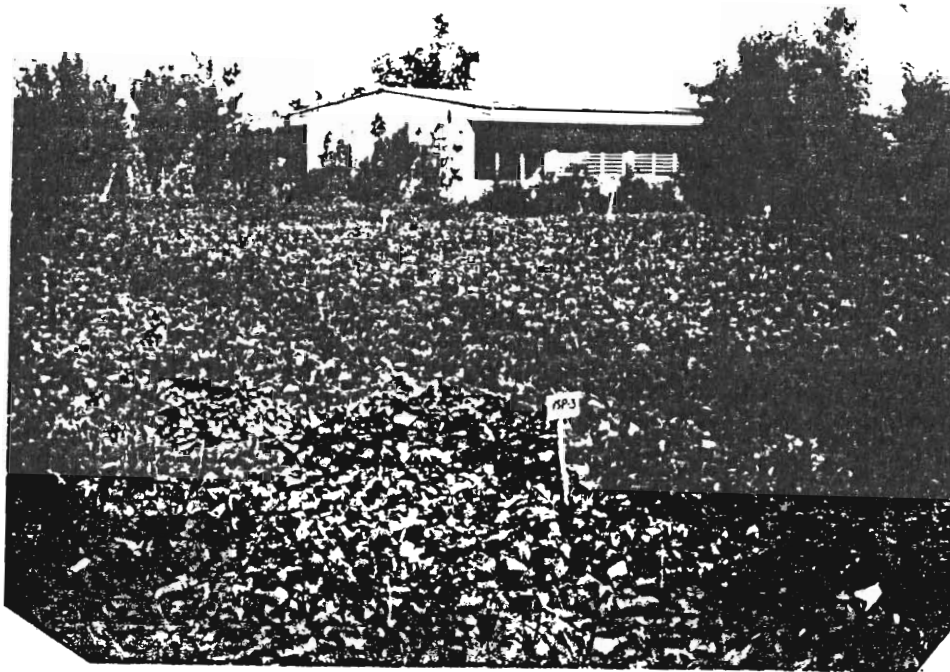
of the varieties for specific use. With MAF's National Root Crop for Feed Program, consultations between PRCRTC researchers and MAF technicians would lead to a better understanding of the proper utilization of the VSPs.

6. Institutions responsible for the development of agricultural technology which generate the initial planting materials should be ready to support or backstop the Ministry of Agriculture and Food or the national extension service in its initial technology dissemination efforts. During the early stage of technology dissemination, it is important to involve the technology developers because they would be in a better position to recommend technical modifications or solutions to users. Also, the feedback obtained from direct contact with users can serve as input in subsequent development activities.

PHOTOS ON ACTUAL FIELD OBSERVATIONS



A member of the evaluation team interviewing a farmer-cooperator.



VSP - 3 propagation nursery in Mariano Marcos State University in Ilocos Norte, Northern Philippines.



VSP-3 planted between young cacao trees in Carigara, Leyte, Philippines.



Maguey intercropped with VSP -3.



Sweet potato (V2-42) planted under coconut in Southern Leyte, Philippines.



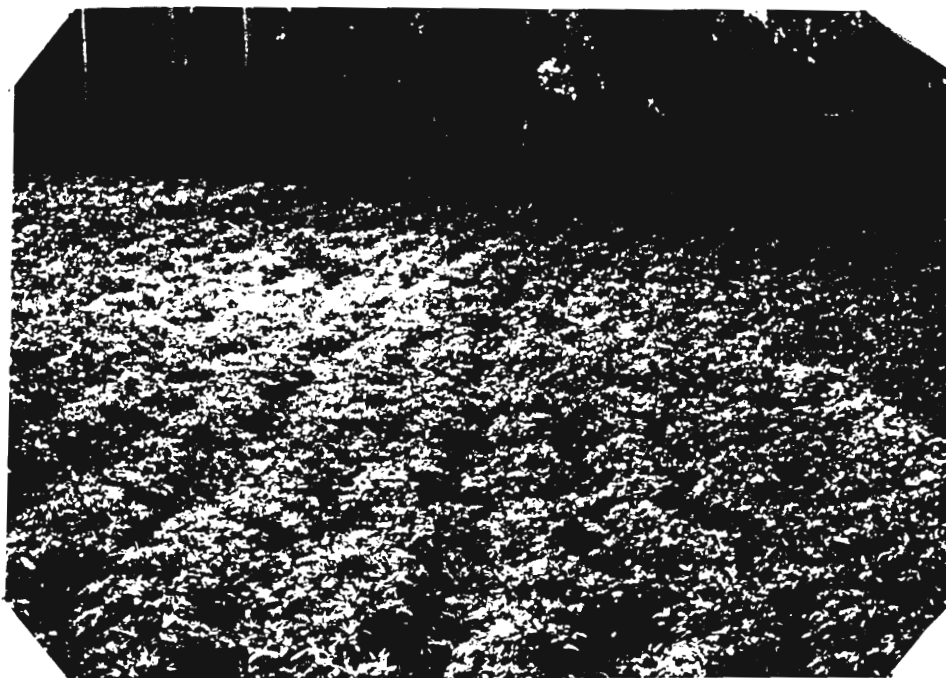
Sweet potato with cassava and corn in farmer' s field.



VSP-3 planted in a coastal area of Pasuquin, Ilocos Norte, Philippines. Due to extremely dry conditions, the area has not been utilized before.



ViSCA developed varieties being tried by farmers in idle, drought-prone farm lands in Northern Philippines.



A sweet potato field in Barangay Bubon, Baybay Leyte planted to V2-42, a ViSCA developed sweet potato hybrid.



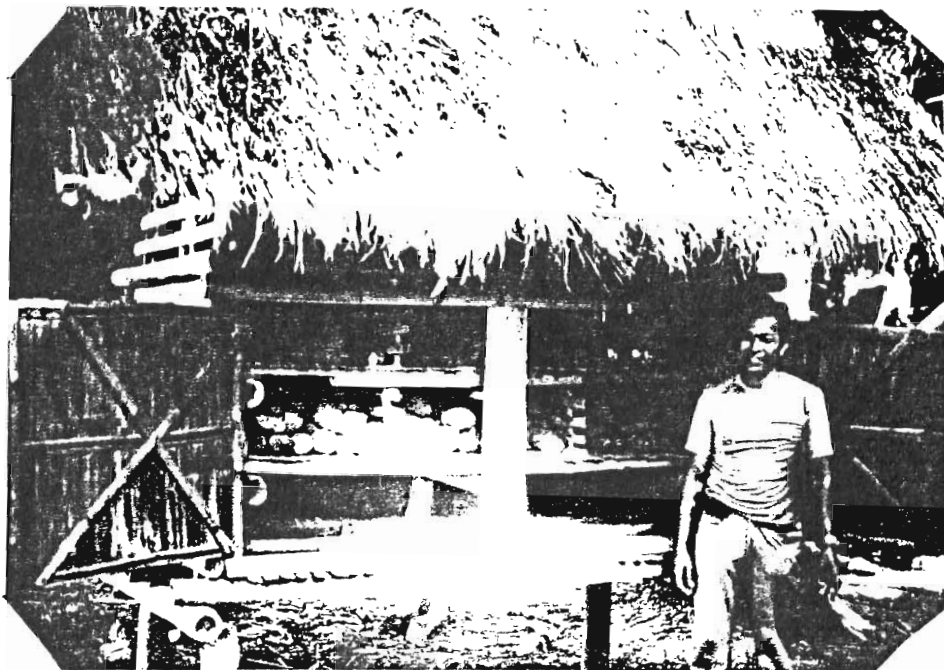
A farmer-cooperator inspecting the tuberous roots of VSP-3.



A farmer preparing the land for sweet potato planting. In the background is a portion of the farm already planted to sweet potato.



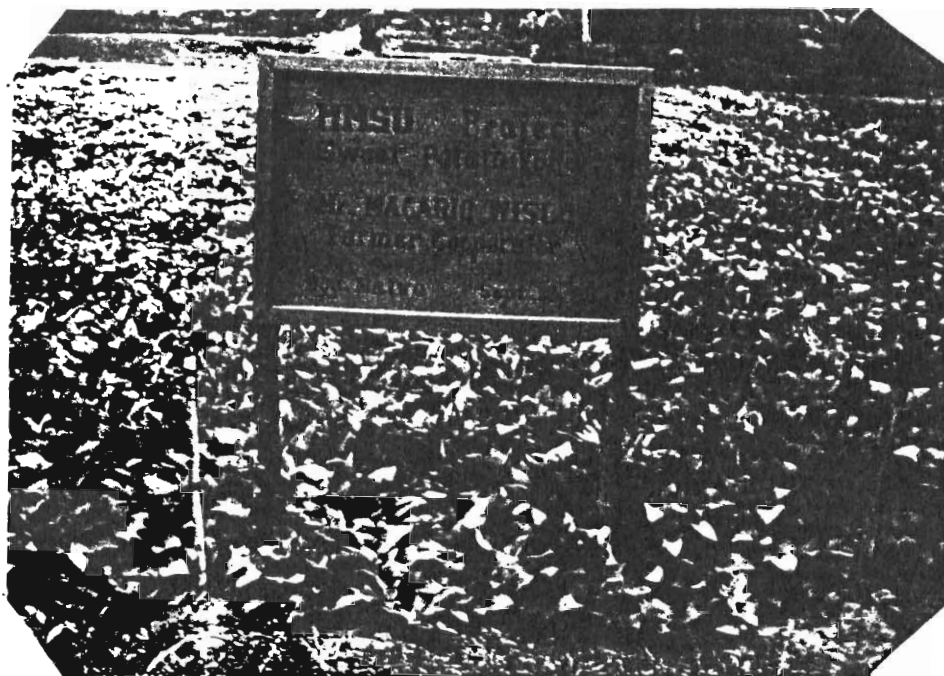
A farmer showing to the team his sweet potato area under coconut. The lady in white blouse and black skirt is the Lady Mayor of the town (Padre Burgos, Southern Leyte).



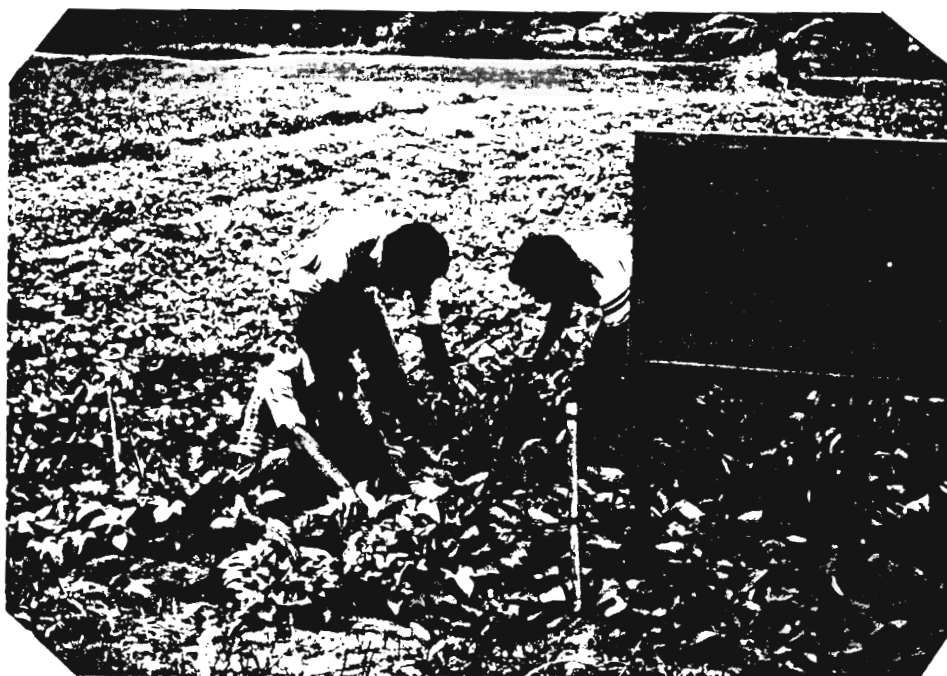
Mr. Felimon Gesulga, a farmer-trainer standing beside his storage hut for sweet potato. He had readied the storage hut for demonstration purposes.



Sweet potato storage hut containing other farm products and materials.



A MMSU-coordinated on-farm trial of VSPs.



State colleges and universities selected by ViSCA-PRCRTC as cooperators serve as effective conduits of technologies through research-managed on-farm trials.



Newly planted sweet potato cuttings in a propagation nursery farm.



Coconut trees just beginning to recover from the onslaughts of a strong typhoon.



Typhoon-ravaged coconut area in a coastal town in Southern Leyte, Philippines.



Sweet potato and corn are short-maturing crops that save farmers from hunger after the typhoon.



Sweet potato and cassava planted in a typhoon-affected coconut area.

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CAPSULE PROPOSAL

EVALUATION OF THE ROOT CROP PRODUCTION
AND PROCESSING PROJECT WITH EMPHASIS ON SWEET POTATO

Objective:

To make a follow-up study along these lines:

1. The extent of geographical distribution of the three sweet potato hybrids and their performance in (a) small farmers' field and (b) big sweet potato producers under monoculture conditions
2. The impact of the sweet potato hybrids in multiple cropping
3. The extent of the use of sweet potato hybrids in emergency areas and situation such as typhoon devastated areas and economically depressed geographical regions such as the coconut and sugarcane areas where depressed world prices of coconut products and sugar had taken its toll.
4. The extent to which sweet potato is now being used for animal feeds and other commercial purposes.

Activities:

1. Review of data and reports available in ViSCA and cooperating research stations
2. Visits to sites where results of researches are known to have been introduced to assess its spread and impact
3. Interviews and discussions with farmers, feed millers, consumers, extension agents, and cooperators in experiment stations
4. Writing and printing of report
5. Seminar to discuss findings with researchers at ViSCA

Budget:

1. Travel	\$ 1,350
2. Supplies	250
3. Communication	40
4. Representation expenses	500
5. Insurance (for three)	30
6. Support services (Secretarial services, staff costs, etc.)	100
7. Honorarium	1,290
8. Printing cost	1,000
9. Administrative cost (5%)	220
10. Contingency	220
	<hr/>
TOTAL	\$ 5,000

List of Key Informants

On-Farm VSP Trial Cooperators

1. Vicente Cawaling - Elebadc, Matalom, Leyte
2. Ramon Luciano - Calbasag, Julita, Leyte
3. Mario Vinculado - Sta. Cruz, Hilongos

Storage Project Cooperators

1. Serafin and Carmen Oracion - Bubon, Baybay, Leyte
2. Florencia Romano - Bubon, Leyte
3. Galo and Sofia Varron - Bubon, Baybay
4. Natividad Olo - Agbanza, Matalom
5. Policarpio and Amanda Binongo - Tawid, Maasin, Southern Leyte
6. Cornelio and Fe Valiente - Guadalupe, Macrohon, So. Leyte
7. Felix Balondro - Guadalupe, Macrohon
8. Felimon Gesulga - San Vicente, Bontoc, So. Leyte
9. Francisco Alterado - San Vicente, Bontoc
10. Juanito Capilitan - Sabang, Malitbog, So. Leyte
11. Rodolfo Macabuhay - Sabang, Malitbog

Root Crop Growers

1. Federico Jacela
Farm Manager
J.E. Livestock Corporation
Carigara, Leyte
2. Mr. Juan Triviño
Isarog Farms
Pili, Camarines Sur
3. Matina Tambis - Can-ipa, Baybay, Leyte
4. Ernanita Lavesorez - Bubon, Baybay, Leyte
5. Gregoria Lacaba - Nagaasan, Babatngon, Leyte
6. Melecio Capintis - Nagaasan, Babatngon, Leyte
7. Cirilo Birtumin - Bubon, Baybay, Leyte
8. Lorenzo Montecillo - Bubon, Baybay, Leyte
9. Marcelino Aguinaldo - Puyupuyan, Pasuquin, Ilos Norte
10. Ignacio Lagazo - Pasuquin, Ilocos Norte
11. Felipe Lagazo - Naglicuan, Pasuquin
12. Macario Wisco - Naglicuan, Pasuquin

13. Andres Damaso - Naglicuan, Pasuquin
14. Dorato Horca - Hibucawan, Jaro
15. Angel Liporada - Hibucawan, Jaro
16. Jaime Bunayon - Hibucawan, Jaro
17. Juan Labra - Hibucawan, Jaro
18. Rodrigo Navarra - Daro, Jaro
19. Pedro Horca - Hibucawan, Jaro
20. Juanita Navarra - Hibucawan, Jaro
21. Felix Roelan - Villaba, Leyte
22. Vicente Sulad - Villaba, Leyte
23. Fermin Roelan - Villaba, Leyte

Local Officials

1. Emiliana Borces
Municipal Mayor
Padre Burgos, So. Leyte
2. Teofila Aclao
Barangay Councilwoman
Padre Burgos, So. Leyte
3. Zosimo Cablitas
Barangay Captain
Triana, Limasawa, So. Leyte
4. Zosimo Sanchez
Barangay Captain
Bubon, Baybay, Leyte

Ministry of Agriculture and Food (MAF) Officials

- | | |
|---|--|
| 1. Lorenzo Ultra
Regional Rootcrops Coordinator
Region VIII, Tacloban City | 6. Romeo Esmero
Municipal Agricultural
Officer
Carigara, Leyte |
| 2. Pedro Tobias
Superintendent
Romualdez Experiment Station
Babatngon, Leyte | 7. Nelson Pepito
Vice Chairman
Integrated Agricultural Task
Force (Task Force Sugar)
Ormoc City |
| 3. Erlindo Laplana
Provincial Agricultural Officer
Tacloban City | 8. Silvestre I. Imperial
Provincial Root Crops
Coordinator
Pili, Camarines Sur |
| 4. Nonilor Gonzaga
Municipal Agricultural Officer
Baybay, Leyte | 9. Efren T. Baconawa
Chief Planning Officer and
Executive Staff
Office of the Minister
Quezon City |
| 5. Reynaldo Bodo
Municipal Agricultural Officer
Barugo, Leyte | |

State Colleges and Universities

1. Emiliana N. Bernardo
Director
Philippine Root Crops Research and Training Center
ViSCA, Baybay, Leyte
2. Florencio A. Saladaga
Head, Department of Plant Breeding and Agricultural Botany
ViSCA, Baybay, Leyte
3. Emma S. Data
Head, Postharvest Section
PRCRTC, ViSCA, Baybay, Leyte
4. Federico Villamayor
Associate Professor
PRCRTC, ViSCA, Baybay, Leyte
5. Rodrigo Sebidos
Instructor, Department of Plant Breeding and Agricultural Botany
ViSCA, Baybay, Leyte
6. Edilberto Hinay
Technician
Regional Coconut Research Center
ViSCA, Baybay, Leyte
7. Santiago R. Obien
Director
Philippine Tobacco Research and Training Center (PTRTC)
and President, Mariano Marcos State University
Batac, Ilocos Norte
8. Herald Layaoen
Deputy Director
PTRTC, Batac, Ilocos Norte
9. Loreto Ignao
Assistant Professor
Department of Crop Science
Camarines Sur State Agricultural College
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9. Loreto Ignao
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Other Agencies

1. Wilfredo Olaño
Bicol River Basin Development Program
Pili, Camarines Sur
2. Jorge Omolon
Field Agronomist
San Isidro Rural Systems Development Project (SIRSDP)
San Isidro, Leyte
3. Abraham Pasayloon
Site Researcher
Farming Systems Development Program - Eastern Visayas
Villaba, Leyte
4. Pacirico Mariano
Provincial Manager
Ministry of Human Settlements
Laoag City
5. Severino Tambio
Technician
Ministry of Human Settlements
Pasuquin, Ilocos Norte
6. Washington Bumanglag
Project Analyst
Ministry of Human Settlements
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7. Edgardo de la Torre
Agronomist
Farming Resources System Development Project
Pili, Camarines Sur
8. Inocencio Bolo
Director, Farming Resources System Development Project
Pili, Camarines Sur
9. Danilo S. Parro
Field Representative
Land Bank of the Philippines
Legazpi City

10. Inigo Varon
Manager, Field Office
Land Bank of the Philippines
Legazpi City
11. Edward Cabaluna
Research Assistant
Leyte Economic Development Council
c/o Ministry of Agriculture and Food
Ormoc City
12. Arnold A. Dauz
Technical Consultant
Philippine Integrated Agri-Food Inc.
Metro Manila

SHORT ACCOUNTS OF TECHNICIANS AND FARMER COOPERATORS

Mr. Edilberto Hinay
Technician, Regional Coconut Research Center
ViSCA, Baybay, Leyte

As an expansion area of the Philippine Coconut Research and Development Foundation (PCRDF) - funded community-based rural development project of the Regional Coconut Research Center, barangay Bubon has emerged as the highest producer of sweet potato and cassava in Baybay.

In August 1982, when Mr. Hinay got involved in the PCRDF project in barangay Buenavista as a resident technician, he found it difficult to work with the community residents because the farmers had already developed a negative attitude toward the coconut project. The long drought devastated all coconut demonstration farms and left only 20 percent surviving seedlings. For a number of years, the project had provided free fertilizers to cooperating farmers and paid them for their labor input during working hours while teaching them fertilization and intercropping coconut with cacao. Since funds had run out to subsidize the cost of fertilizers, the farmers were no longer interested to cooperate with the project. The technician could not do much because there were no more farm inputs to give away that would sustain farmers' interest. Hence, the project committee decided to explore possibilities in neighboring barangays, Bubon and Kabalasan.

Conducting some form of rapid rural appraisal, Mr. Hinay stayed in Bubon for 2 days and in Kabalasan for 3 days. Eventually, he went on to immerse himself in the area for 2 weeks to get to know the community and identify and define their problems. As it turned out, what surfaced was the need for training on crop production, processing and utilization.

By then, the ViSCA sweet potato varieties had become available and 2,000 cuttings of VSP-1, VSP-2, VSP-3, V2-42, and V-11 were procured from Dr. Saladaga's department. Residents of Bubon and Buenavista were informed ahead of time that VSP cuttings were available but Buenavista residents were not too interested to go into sweet potato production because they were busy gathering rattan in the mountains. Buenavista has a thriving cottage industry on rattan furniture making.

Later, Mr. Hinay had to approach the barangay captain of Kabalasan, a nearby community, for an area on which to plant VSP. The only available area then was the elementary school's garden site which was intended for peanut production as part of the school's Alay Tanim project. The VSP plot which was planted to 200 cuttings of each of the 5 VSPs became a communal garden of the Parents-Teacher Association (PTA). Two months later, the area was expanded to about 1/8 ha using cuttings obtained from the propagated initial set of cuttings that had been brought to Kabalasan.

The VSP crop was maintained for 5 months, making the school plot a propagation nursery for VSPs. Cuttings were later sold at 5 centavos each to buyers in other barangays.

Soon a conflict ensued over who should take the money from sales of the cuttings. Both the PTA and the barangay council wanted the money and fought over it. One barangay councilman wanted to buy the cuttings at 5 centavos each and sell them elsewhere at 10 centavos each, making a 100 percent profit.

In Bubon, the area planted to VSP was under coconut so the yield was lower than the expected potential yield. The farmers figured that if VSP grew under coconut, it would perform better in an open area. Thus, farmers expanded their area and bought cuttings from Kabalasan.

To help convince the farmers to raise VSP, Mr. Hinay set up a VSP demonstration area on a 1/4 hectare land mortgaged to him for ₱2,400. Hired laborers who plowed the land were taught proper land preparation. As many farmers as there were in Bubon were invited to observe and help in all phases of farm operations. Farmers who rendered services were paid by the hour but the first hour was spent for training on the recommended cultural management practices of VSP. Hands-on training was conducted on the field by Mr. Hinay.

The area which was eventually increased to 1 ha was entirely planted to VSP to make it a source of planting materials for Bubon. Cuttings were donated to Bubon although Mr. Hinay encouraged the barangay captain to sell the cuttings at 5 centavos each with the sales going to the barangay fund. If the farmer had no money at the time, he could borrow the cuttings on the condition that he would double his payment.

Three-fourths of the sweet potato tubers harvested from this demonstration area went to the barangay captain who managed the field and the remaining one-fourth went to Mr. Hinay.

After the farmers harvested their sweet potato, there were complaints about its watery consistency. To minimize this problem, root crop recipes were taught and a Hinay-designed charcoal oven was brought to Bubon. This was in conjunction with the training on coconut product, by-product and intercrop utilization of the project.

Today, Bubon residents supply Baybay town with processed root crop delicacies such as sweet potato doughnut, cassava choco flan and camote candy.

Galo Varron
Root Crops Storage Cooperator
Bubon, Baybay, Leyte

When Galo Varron grows sweet potato, he observes certain traditional practices to ward off weevil: he asks the spirits to prevent the weevil from attacking his crop and he speaks in a low voice and handles the sweet potato plant gently to avoid startling the crop.

Galo raises VSP-2 and V2-42 which he prefers to Siete Flores, a native sweet potato variety. He has long stopped planting Siete Flores because it requires a longer growing period.

From his 1/4 hectare of VSP, he has sold 7 sacks of tubers to buyers who purposely came to Bubon to buy the tubers at ₱55 per sack. When he sells his VSP, he advises buyers to use less water in boiling them. Unlike other farmers, Galo is reluctant to sell his produce in the market. He describes his last marketing experience as traumatic:

"Even if I am poor, I am shy when it comes to selling sweet potato. I don't want buyers to haggle with me. I charge them ₱70 per sack but they insist on ₱60 so I no longer want to go to the market to sell sweet potato. One harvest, my 15 sacks of newly harvested sweet potato tubers had been attacked by rats so that eventually I only managed to sell 3 sacks. I harvested my VSP on a Sunday and I could only sell it on Tuesday, the market day in Baybay town. Since it was rainy, I could not store the tubers in my storage hut so that some of the tubers became rotten. I was so embarrassed and shy to sell the VSPs because buyers said that although my sweet potato was good, it was a little rotten that the price was reduced to ₱40 a sack. Since then, I have not sold sweet potato in the market again."

The local name for VSPs in the market is ViSCA. When consumers buy VSPs from Galo, sometimes they comment on its moist consistency: "VSP's eating quality is not good because it is watery." To this Galo responds: "If you do not like its taste, why do you keep on buying?" This clinches the deal and the consumer eventually buys the VSP.

Income from VSP is used to buy fish or meat. Not used to eating root crops as a staple food, Galo's family eats root crops only as snacks.

Aside from growing sweet potato, Galo also raises and stores cassava. As a root crops storage cooperator, Galo assisted PRCRTC staff conduct the taste test sessions to which his neighbors were invited. During these tasting sessions, participants always preferred soil-stored cassava to fresh roots.

Besides Galo, none of his neighbors has tried root crop storage because the market could still absorb fresh roots and staggered harvesting is widely practiced in the community. While staggered harvesting is advantageous to sweet potato since it gives the crop a chance to produce roots in its runners, Galo observes that delayed harvesting in cassava renders its skin and flesh hard due to the long maturity period which is beyond 7 months, observes Galo.

On Saturdays when there are basketball games in Bubon, Mrs. Varron cooks camote fritters which she sells to players and onlookers. This brings in additional income to the household, admits Mrs. Varron.

Galo has found that sweet potato plants cultivated by hand thrive well. From ViSCA, he has learned postharvest practices for root crops, particularly that newly harvested tubers should be handled with care.

He has given VSP cuttings to 7 farmers in barangays Butigan, Buenavista and Bubon in Baybay. Galo's arrangement with farmers is that they can get cuttings for free provided that they give him cuttings whenever he needs them. Otherwise, they can never ask from him again.

In September 1984, after typhoon Nitang, Baybay Mayor Loreto had requested planting materials for Surigao. Bubon residents obliged by sending VSP cuttings and banana suckers.

Serafin Oracion
Root Crops Storage Cooperator
Bubon, Baybay, Leyte

A tenant, Serafin Oracion, 45, and his wife, Carmen, 44, have recently planted 1/2 hectare to VSP-1, VSP-2, VSP-3 and V2-42. At harvest, 1/3 of their produce will go to their landlord. Corn and peanuts used to be grown in the same area although coconut is their principal crop.

Their first planting of VSP was done on a 1/8 hectare area under coconut using VSP-1, VSP-2, and V2-42 cuttings which had been brought to Bubon by Edilberto Hinay, a ViSCA technician. With fertilizer, the sweet potato crop produced 4 sacks of big tubers. Two sacks were sold to buyers who had come to Bubon to buy it at ₱60/sack and the other two sacks were consumed at home.

The Oracions found VSP-1 to have big fleshy roots and a watery consistency, VSP-2 sweet and moist, and V2-42 slightly dry and flaky. Despite these varied reactions to VSPs' eating quality, they have decided to expand their area planted to VSP in order to produce more.

Although they used to plant Karingkit, a native sweet potato variety, on 1/4 hectare land, they have stopped planting it because it has a longer maturity period of 6 months. VSP-2 matures at 3 months while V2-42 can be harvested at 4 months. Also, they prefer VSP to native varieties because the latter does not always produce tubers.

While VSP and the native varieties require the same amount of labor input, VSP's advantage lies in the fewer number of cuttings required per hill. The recommended number of cuttings is only 1 per hill for VSP and the traditional practice for native varieties is to plant 3 cuttings per hill.

Almost the entire community of Bubon has planted VSP mostly in farm areas under coconut because the residents have seen its performance. The Oracions sell cuttings at 2 for 5 centavos although it used to be sold at 10 centavos per cutting. The price had to be lowered because of the abundant supply of cuttings and nobody bought the cuttings when they were priced at 10 centavos each.

In Bubon, the area planted to VSP has increased. The land utilized for VSP is also planted to corn and cassava. With crop rotation where VSP is grown after corn, VSP can be planted twice a year. To maintain a steady supply of planting materials, staggered harvesting up to 2 weeks only is practiced. Also, runners produce roots and do not dry up. These cuttings are then transferred to another clean area.

Generally planting VSP in the open and under coconut, farmers have found that VSP planted in the open yielded more than VSP planted under coconut.

Even after the storage project has ended, the Oracions still store VSP in their storage hut in order to ensure a continuous supply of sweet potato which they process into "camote" candy.

They ventured into camote candy making when they realized that additional processing brought in more income than selling the sweet potato tubers fresh.

V2-42 and VSP-3 are considered good varieties for making camote candy because they have more dry matter content.

Family labor is used in making candies: sons grate coconuts, daughters help mother boil and mash the tubers, cook this with sugar and coconut and wrap them in brightly colored Japanese paper. At 30 centavos apiece, candies are sold in stores in Baybay town and peddled by children in school. Children who sell camote candy in school are paid a small percentage of the total quantity sold. Income derived from camote candy ranges from ₱40-₱80 a day at three times a week or an average monthly income of ₱960. This extra income is used to support their children's education and pay for other household necessities.

Besides camote candy, the Oracions have also been able to sell stored sweet potato tubers when neighbors come to buy. Some buyers prefer to buy sweet potato which had been stored because it is sweeter; others prefer newly harvested roots.

Although their neighbors preferred stored sweet potato to fresh roots, they have not tried constructing a storage hut for sweet potato because their land is limited and they have no excess production that would require storage.

The Oracions are grateful to ViSCA for teaching them village level root crop storage technology and the sweet potato varieties which have turned out to be economically advantageous to them.

Cirilo Birtumin
Root Crop Producer
Bubon, Baybay, Leyte

From 200 VSP cuttings he had obtained from Eddie Hinay, Cirilo Birtumin propagated the slips and expanded his area for sweet potato to almost 1/2 hectare.

The Birtumins practice staggered planting and harvesting so that his wife would have something to sell on Tuesdays and Saturdays, market days in Baybay town. They have had no problem with staggered harvesting although during seasons when the rain frequently alternates with the sun, they have observed that sweet potato is susceptible to weevil attack. Sometimes, the carabao eats the tubers which have been left to grow in the field.

Alongside V-11 and V2-42, Cirilo plants Siete Flores, a native sweet potato variety. The chief differences between VSP and Siete Flores, cited by Cirilo, include maturity and yield. VSPs have a shorter growing period and produce more yield than native sweet potato varieties.

The income derived from VSPs has helped the Birtumins buy food such as fish, meat, salt, and "ginamos" (fermented salted anchovies).

Florencia Romano
Root Crops Storage Cooperator
Barangay Bubon, Baybay, Leyte

Recently adjudged as the outstanding corn grower in Baybay for 1985 by the Ministry of Agriculture and Food, Florencia Romano, 51 years old, plants more than 1 hectare of her farm land under coconut to VSPs.

In the entire community of Bubon in Baybay, Leyte, the Romanos' sweet potato field represents the largest area ever planted to root crops.

The Romanos learned about VSP through Eddie Hinay, the resident technician of the Regional Coconut Research Center/s project in nearby Buenavista.

At the time when Dr. Emma Data of PRCRTC trained farmers in neighboring Igang on village level storage of root crops, the Romanos had sweet potato and cassava crops that were ready to harvest. When Dr. Data learned about it she and her staff returned the following week and persuaded the Romanos to become a cooperator. The village level root crops storage project provided the materials -- nails, rattan, and a wooden crate made of plywood -- necessary to set up the storage structures. The project staff also assisted in digging the pit for cassava storage.

As a storage project cooperator, Florencia cultivated five VSP varieties: VSP-1, VSP-2, VSP-3, V2-42, and V-11. Of these, she had selected only two varieties so that now she only grows V2-42 and VSP-3 because these are the varieties preferred by buyers. Consumers find V2-42 sweet and contains a higher dry matter content making the flesh firm and flaky although it does not produce tubers as big as those of VSP-3. She claims that buyers do not like VSP-1 because it is moist, and farmers do not like VSP-2 because it dies quickly at maturity, and V-11 is susceptible to weevil.

Even after the termination of the storage project, the Romanos had continued to store root crops including cassava but they had to stop when their stored sweet potato tubers were attacked by weevil. Another important reason which figured in their decision to stop storing was the buyers' preference for fresh cassava roots because they found stored cassava roots hard to grate and they feared that storage might render the tubers poisonous. Their alternative storage practice which reportedly prolongs the shelf life of sweet potato tubers up to 2 weeks entails keeping unwashed newly harvested sweet potato tubers in sacks and placing them in a dry place.

Although PRCRTC suggested chipping sweet potato tubers, the Romanos find chipping laborious and drying turned out to be difficult because of the relatively longer wet season in Leyte.

"Progressive" harvesting is practiced by detaching well-developed roots and leaving behind small roots to give them a chance to grow for another two to three weeks. Staggered harvesting has also enabled the Romanos to grow two crops of VSPs a year.

While hired labor is utilized for plowing and planting, family labor is resorted to for hilling up with the use of a carabao-drawn plow. A labor arrangement for root crops which prevails in Bubon provides that whoever does the planting and weeding on a certain plot is given the exclusive right to harvest that same plot for a percentage of the crop. The percentage is usually 1/3.

Sold at ₱60 per sack, one cropping of sweet potato on an area equivalent to almost 1/3 ha brought in a net income of ₱1,000 to the Romano household. Buyers are sellers at the Baybay public market.

Grown under coconut, sweet potato is rotated with corn. No fertilizers and pesticides are applied.

The principal difference between traditional varieties and VSP lies in the latter's early maturity and high yield. Before the Romanos planted VSP, they raised such native varieties as Kabatu, Siete Flores, and Karingkit only for home consumption because the roots were not big. There was no surplus production to sell because the yield was low.

Using rice as the staple in their diet, sweet potato and cassava are eaten as supplementary food at snack time. Sweet potato chunks are cooked with rice. These are also served as a snack to their hired laborers. With increased yield, the Romanos have noticed an increasing

home consumption of root crops to the level where sweet potato or cassava is cooked daily.

The extra income derived from root crops has been used to pay hired labor and their children's school fees.

Being one of the first to plant VSP, they had sent cuttings to their relatives in Manila. Their neighbors in Bubon asked for cuttings after they had observed the performance of VSP. Encouraged by the high yield obtained by the Romanos, their neighbors were encouraged to plow their own idle fields and plant these to VSP. The use of traditional cultural practices on these varieties did not produce a good yield in the beginning but this did not discourage other farmers from starting a second crop.

Zosimo Sanchez
Barangay Captain
Bubon, Baybay

Zosimo Sanchez, barangay captain of Bubon, was one of the four farmers to whom Eddie Hinay sold the initial batch of VSP cuttings he had brought to Bubon. His 1/3 hectare farm planted to VSP-2, VSP-3, V2-42, and V-11, is the third largest sweet potato area in Bubon. In Simo's farm, sweet potato is planted in the open and under coconut. Although VSP grown under coconut does not produce big roots, it tends to have a relatively higher dry matter content, making it taste better. Because of its high yield and short maturity, Simo admits that VSP has increased his income and he has been able to utilize his area under coconut.

His first planting of VSP had a substantial yield but he only sold two cans. He gave some of the tubers to his father and he asked his neighbors to taste the boiled tubers. After they had tasted it, they wanted to get cuttings.

One neighbor, Eloy Labesores, 60, who considered VSP similar to the native sweet potato variety on his farm, became convinced that it was different after he had tasted it so he asked for cuttings. Since his first planting of VSP, Eloy has earned more than what he earned for corn utilizing the same area.

A small barangay, Bubon's rainfed rice area occupies only a total of 15 hectares so that farmers like Simo must concentrate on root crops and corn.

If sweet potato matures in December, harvesting stretches until February. Since Simo harvests his VSPs at about the same time as other farmers, harvesting and selling are staggered to avoid flooding the market because they anticipate that a big supply will dampen the market price of the tubers. Another reason for staggered harvesting is that at certain months -- e.g., January -- the land on which sweet potato is grown cannot yet be planted to a rotation crop, such as corn due to occurrence of heavy rains hence, the roots are left in the ground to develop further and grow bigger. Moreover, with the Baybay public market as the principal outlet of Bubon farmers, orders generally come in small quantities at a time, e.g., 5 sacks.

Under the staggered harvesting scheme, Simo and others farmers have had no problem in marketing VSPs. When VSP tubers are in large quantities, farm families in Bubon process these into camote candy, camote doughnut, and "bitsu-bitsu."

Cassava, on the other hand, is quickly sold as fresh roots and dried cassava chips. Dried chips are made into flour and processed as delicacies like cassava roll and choco flan which are sold in schools.

It is the tricycle driver that plies the Bubon-Baybay route who handles the marketing end. He takes orders for sweet potato in Baybay. The tricycle driver gets ₱5 for transporting the tubers to buyers in Baybay town. A sack of sweet potato is sold at ₱60 in Bubon.

Like other farmers, Simo had planted native sweet potato varieties before but he stopped because there were harvests when these varieties did not produce any fleshy roots. Also, native varieties mature longer than VSPs.

Not everyone in Bubon cultivates farms and those who do not, work as hired laborers and prefer to be paid in kind, e.g., 2 cans of sweet potato per day with meals.

As a barangay captain, Simo Sanchez is concerned about the plight of Bubon residents that he has repeatedly encouraged those who have access to land and a carabao to farm and not be content with working as hired laborers.

At harvest, Simo gives cuttings to other farmers in Bubon on the condition that the farmer will replace the cuttings they have borrowed. Any interested Bubon farmer is referred to farmers who have extra cuttings but farmers from other barangays have to pay for the cuttings. The Protestant residents in Bubon bought 4,000 VSP cuttings which were taken to Limasawa island after the typhoon in September 1984. Bubon farmers who sold those cuttings threw in a bonus of 1,000 cuttings as their assistance to typhoon victims in Southern Leyte.

Matina Tambis
Root Crop Producer
Can-ipa, Baybay, Leyte

Matina Tambis, a farmer who learned about VSP from an on-farm trial cooperator who used to reside in Can-ipa, is now into her second cropping of VSP-3. Her initial planting materials were obtained from a VSP experiment which had been set up near her area.

On her 1/2 hectare land, she intercrops VSP-3 with corn. It is because of this intercropping that Matina needs a crop with a shorter growing period like VSP-3. In the past, she used to grow Kaiti, a native sweet potato variety, which matured longer but tasted better than VSP-3. She eventually stopped raising Kaiti because it held up the field and delayed the planting of another crop.

Her buyers have commented on VSP's eating quality: "ViSCA sweet potato is moist-fleshed." But they go on buying VSP, Matina observes.

Since corn is their staple food, the corn that is produced on Matina's farm is milled for their home consumption. Sometimes, she sells a few ears to insistent buyers who sell these later as boiled corn on the cob.

Since her first cropping of VSP, she had not encountered any particular problem with weevil infestation, neither has she applied fertilizer.

Except for two farmers who asked for cuttings, none has come around to ask her about VSP yet. "Probably," she explains, "because they have not observed VSP's performance. They might imitate me once they see the result of my intercrop."

Felimon Gesulga
Root Crops Storage Cooperator
San Vicente, Bontoc

When Felimon Gesulga grew V-11 on 1/4 hectare of his farm, one harvest earned for him a total of ₱1,200 which excluded the portion eaten at home, given to neighbors and paid for exchange labor. As a result of the high yield, he intends to expand his root crop area to 1 hectare. A small parcel is planted to Siete Flores, a native sweet potato variety. Siete Flores produces only about 3-4 tubers per hill compared to V-11 which yields about 6-10. Both Siete Flores and V-11 have the same degree of sweetness, according to Felimon.

Because of its higher yield, V-11 has brought in more income than the native sweet potato varieties. No marketing problem with V-11 has been encountered with prices pegged at ₱30 per can; 1 can contains 18 kilos of tubers. Buyers who come from Maasin, Padre Burgos and Mahaplag towns, prefer regular-sized sweet potato tubers, passing up the big ones because they take up more space in a kerosene can. Small tubers fill up less space thus one can will contain more small tubers than big ones. Mrs. Gesulga also prepares cassava and sweet potato suman which she sells on market days in Divisoria, a nearby barangay.

In San Vicente, root crops are usually eaten at breakfast or supper if rice is not available. During the lean months of June

to August when farm households run out of rice, there is an increased consumption of root crops because they are cheaper and can be eaten alone, thus eliminating the need for a fish or meat dish to go with it. Root crops are also used to pay hired labor. When the Gesulgas run out of their rice stock, they sell their peanuts, root crops and banana in order to buy rice; rice is sold to buy corn grits; chicken is disposed to buy "ginamos" (fermented salted anchovies).

In the Gesulga household, however, increased production of sweet potato and cassava has not led to a greater consumption of root crops because, as Felimon explains, one grows tired of eating the same thing every day.

Although stored sweet potato roots taste better than fresh tubers, Felimon's neighbors have not constructed their own storage structures because of the cash expense involved in putting up one. The Gesulgas have continued storing cassava and sweet potato even after the completion of the root crops storage project not only for home consumption and as a source of ready cash but as a demonstration device. Recently, Felimon, who has been given an award for exemplary performance in root crop production by the municipality of Bontoc, has been harnessed as a resource person in the Sloping Agricultural Land Technology (SALT) training in Bontoc. He supports his lectures on root

crop production and postharvest practices with a result demonstration of his storage hut for sweet potato and soil storage for cassava.

In a church project which covers 4 barrios in Bontoc, SALT encourages farmers to grow ipil-ipil and madre cacao on hillsides and corn, peanuts, vegetables, and sweet potato on the strips. The training program was initiated by Msgr. Manuel P. Alonzo, Jr. and co-sponsored by the Bontoc Credit Cooperative, Inc. Among the 4 barrios covered by the project, San Vicente has the highest income derived from onion and pepper production.

Cornelio Valiente
Root Crops Storage Cooperator
Guadalupe, Macrohon, Leyte

After typhoon Nitang severely devastated the coconuts in Macrohon in September 1984, VSP quickly demonstrated itself as the earliest maturing crop among alternative food crops available to small farmers. Cornelio Valiente, a small farmer who had been a root crops storage cooperator when the typhoon struck, sums up VSP's impact on typhoon victims like himself: "Without VSP, where would we get food after the typhoon?"

Right after the typhoon, almost the entire community obtained VSP cuttings for planting. Root crops buyers from Limasawa island not only bought or bartered tubers with fish but also asked for planting materials.

Sweet potato and cassava are cash crops for the Valientes. Sweet potato is sold at ₱1.50 per kilo and cassava at ₱15 per can. Eaten with fish, coconut or salt, sweet potato and corn are usually consumed at breakfast and supper. Rice is reserved for lunch. However, if people have cash, they prefer to buy rice. Root crops are also processed into steamed cakes ("puto"), fried long doughnuts ("siakoy") and "suman." Limasawa root crop buyers come to Macrohon to barter root crops with flying fish and small shark known as "lahoy".

Trained in ViSCA in 1982, Cornelio Valiente became a storage cooperator in 1983. It was during the first taste test that Cornelio's neighbors found stored VSP to be sweeter than native varieties, thus stored VSPs from subsequent trial storage were bought by their neighbors. Altogether, the Valientes had been able to store VSP three times and cassava only once. While stored VSP has always been found to be sweet, the flesh of boiled stored cassava has been considered hard to eat. Boiled sweet potato which had been stored for a month takes longer to cook than fresh roots.

After the storage project, the Valientes' stored VSPs were eaten at home and some were sold. The Valientes still store sweet potato because storage, according to them, enhances its flavor and taste thus, rendering it more desirable. Storage also prevents rotting and weevil infestation, Cornelio added. However, they could not store their Golden Yellow cassava because it had already developed a slightly bitter taste at harvest. Also other tubers had been stolen before they could harvest them, thus, the little that was left had to be sold.

When eaten, V2-42 is sticky on the tongue because it seems to contain more latex than Katuha, a native variety that Cornelio used to plant. V2-42's advantage lies in its short period of maturity and high yield. Today, their entire sweet potato area is planted only to VSP because native varieties do not produce

tubers in less fertile soil or land which has been farmed continuously.

The area planted by the Valientes to VSP has been increased and sweet potato is rotated with corn. Crop rotation was resorted to because successive planting of sweet potato in the same area results in greater weevil infestation. VSP has also been found to become fibrous when planted during the dry season and rots on rainy months. Irrigated lowland rice is also planted twice a year but the Valientes also buy rice when they run out of rice stock. All rice and corn that they produce are intended solely for home consumption.

Felix Balondro
Root Crops Storage Cooperator
Guadalupe, Macrohon

Just about the time typhoon Nitang swept Macrohon in September 1984, Felix Balondro, a root crops storage cooperator, had a bumper harvest of V2-42. He sold his sweet potato tubers at a low price to Limasawa residents because Limasawa island was badly hit by the same typhoon and was almost engulfed by a tidal wave.

Among the VSPs tried, V2-42 has been found to be the best in terms of taste and yield. VSP-1, 2, and 3 were found to have moist flesh which buyers and farmers did not like.

Felix used to grow native sweet potato varieties --Amerikano and Japanese -- which were eaten at home because the low yield was not even sufficient for home consumption although the area planted was as large as the area cultivated now to VSPs. Native sweet potato varieties have not always produced tubers in the Balondro farm but V2-42 has had good yield even without fertilizer.

During his recent harvest, one-fourth hectare of his total farm area of 1/2 hectare planted to VSPs was able to produce 418 kg of V2-42 tubers. He reserved the other 1/4 hectare for staggered harvesting: some for home consumption and the rest will be sold a little at a time. The first time he planted 150 cuttings of

V2-42 these produced more than 300 kilos or about 8 sacks of tubers.

The parcel of land on which Felix raises sweet potato or cassava is later planted to corn. Corn, which is fertilized, is planted in August and harvested in the last week of November. Corn is always sold and the income is used to pay for inputs for rice and corn. Rice, which is intended mainly for home consumption, occupies only 1/4 hectare of the Balondro's aggregate landholding. The lack of family labor and capital to pay for hired labor for land preparation constrains Felix from expanding his rice area. With VSPs however, he was able to attend to its production first because it does not need a lot of farm inputs.

From his farm, a carabao-drawn sled brings the Balondros' sweet potato produce to the highway and then a jeep hauls these to the Maasin public market where it is bought at ₱1.50 per kilo. Newly-harvested sweet potato tubers are sold at ₱1.50 per kilo while stored roots command a relatively higher price of ₱1.75 per kilo. Apparently, there is an effective demand for sweet potato in the area because all tubers brought to Maasin are always sold out. Others who buy sweet potato at the Balondro farm ask for cuttings as a bonus.

Even up to two months, V2-42 still retains its good taste; beyond this period, it results in wet tubers and sprouting. There have been no complaints from buyers who bought stored V2-42.

For Felix, stored V2-42 develops a good eating quality which approximates that of yam or ubi. Stored cassava however, got rotten after one month probably because the type of soil used is not suited for cassava storage, explains Felix. Thus, he prefers to grow sweet potato because aside from its low perishability, it can also easily be bartered with fish from Limasawa any time.

Sweet potato which is intended for storage should be harvested after 4 months; those which will be sold fresh can be harvested after 3 months. Felix recommends storage when there is weevil infestation during harvest, otherwise, sweet potato can be left in the field.

Pressed for his opinion on why his neighbors are reluctant to construct a storage hut, Felix said that the cash expense involved for materials could run up to ₱200. Instead of storage; staggered harvesting is practiced.

In the Balondro household, root crops are usually eaten at breakfast and supper but rice is preferred. When their rice stock is consumed, root crops are sold in order to buy rice. Since sweet potato costs only ₱75 per sack and rice is pegged at ₱300 per cavan, Felix reckons that one needs to sell 4 sacks of sweet potato to be able to buy 1 sack of rice. The difference in price though does not bother him since sweet potato does not require as much inputs as rice in its production.

Francisco Alterado
Root Crops Storage Cooperator
San Vicente, Bontoc, So. Leyte

As a root crop storage cooperator, Francisco Alterado planted V-11 on a small portion of his hilly area. From this initial planting, he was able to sell one can of V-11 at ₱30 to his neighbors who came to buy.

Compared with Jeprok, a native sweet potato variety, V-11, according to Francisco, tastes better, yields more, and is not susceptible to weevil. Thus, he prefers V-11 to Jeprok particularly because of its high yield. VSP-2, which he had also tried, died when it reached maturity so he has no plans of growing it again. However, he pointed out that its sweetness can be turned into an advantage in that less sugar would be needed if one made "suman" out of VSP-2. His wife prepares "suman" a native delicacy, which she sells in the market.

Stored sweet potato roots taste better than fresh ones but Francisco warns that storage should not go past 1 1/2 months because deterioration would set in. When it is hot, stored sweet potato tubers dry up and eventually shrivel.

About 15 farmers have already planted V-11 using cuttings obtained from the Alterados' crop and more and more farmers have been coming to ask for cuttings. Francisco interprets this increased interest in V-11 among farmers as an indication that they like the variety.

Policarpio Binongo
Root Crops Storage Cooperator
Tawid, Maasin

Sometime in February 1983, Policarpio Binongo, 60, and another barangay official in Maasin attended training on root crop cultural management and postharvest practices at ViSCA. After the training, he agreed to become a cooperator for the root crops storage project because he has a daughter who is an instructor at ViSCA.

A tenant, Policarpio and wife Amanda, 60, cultivate lowland rainfed rice, coconut, and banana as their principal crops on a slightly rolling area.

Using cuttings given after the ViSCA training, the Binongos planted VSP-2 and VSP-3 which produced big tubers but "did not feel good inside the stomach" when eaten. This initial reaction to VSP's eating quality has led to a decline in their interest in these varieties. Growing VSP on a 6 m x 12 m plot yielded 3 sacks of tubers which were used entirely for home consumption. VSP-2 was more susceptible to weevil than VSP-3.

Before they learned about the ViSCA sweet potato varieties, they grew Siete Flores, a native variety. The Binongos admit that Siete Flores tastes better than VSP although the latter yields more tubers. Also, VSP tends to be more susceptible to weevil than

Siete Flores. For them, no marked differences exist in cultural practices and labor input between VSP and Siete Flores even in the number of cuttings planted per hill because they have always used one cutting per hill even with the native varieties.

Singapore, as cassava is known locally, is an important crop in the area. The Binongos could not recall a time when they did not grow cassava on their farm. Both cassava and sweet potato are valued crops in the area but farmers prefer cassava because it is a sturdy root crop and not susceptible to weevil.

Through the storage project, the Binongos came to know about the Golden Yellow cassava variety which, they discovered, matures at 6 months and produces about 10 tubers per plant. In contrast, the native variety, Java, with white flesh, can be harvested at 9 to 10 months and gives only 5 tubers per hill. A new cassava variety, Imelda, is now also being grown by the Binongos.

Although people recognize the risks involved in staggered harvesting such as typhoon damage to the roots if cassava is left in the field, cassava has still been largely harvested on a staggered basis. When a small farmer needs some cassava for home consumption, he harvests only a basinful of tubers at a time and not the entire plot even if the crop is already mature. Also, buyers come to the farm to purchase fresh cassava tubers at ₱1 per kilo.

People who eat root crops are mainly those who do not have rice. Fishermen like cassava which they eat with fish. In households that produce only one rice crop a year, root crops are generally eaten as a substitute staple during the lean months that span March to June when their rice supply has been consumed.

During the conduct of the storage project, the research staff would come around to hold a taste test every 15 days. For their part, the Binongcs took charge of inviting their neighbors to the taste test sessions. In all the sessions, stored cassava roots was the unanimous choice of participating Barangay Tawid residents. These sessions spurred the interest of other farmers to plant the Golden Yellow cassava variety with cuttings obtained from the Binongo farm during harvest.

With storage, Policarpio has been able to utilize the area previously planted to cassava for growing peanuts and sweet potato. Stored cassava is reserved for home consumption by the Binongos. Recently, a new storage pit has been started to expand the storage area for cassava.

Rodolfo Macabuhay
Root Crops Storage Cooperator
Sabang, Malitbog, So. Leyte

When he became a root crops storage cooperator, Dodo Macabuhay learned about the new sweet potato varieties at a training he attended at ViSCA. Consequently, he planted VSP-2, VSP-3, V-11 and V2-42 whose tubers were later stored in the structures he had put up with the help of the PRORTC research staff. Of these varieties, he selected V-11 because he found it relatively sweeter than V2-42 although he still raises VSP-1 and VSP-2 for his children. Also, V-11 in Dodo's farm produces runners that also root and form tubers, contrary to other farmers' experience.

VSP now occupies a total of 1/4 hectare of his farmland under coconut and in the open.

Before he learned about VSP, he had planted Amerikano, a native sweet potato variety, which has a higher dry matter content than V-11, but he stopped planting this variety because it is susceptible to weevil, has low yield, and not sweet. He also pointed out that V-11 thrives even during the dry season when there is intense heat and limited moisture.

Sold at ₱30 per can, VSPs are bought by his regular buyers who are fishermen coming from as far as Limasawa island. Regardless of whether it is stored or fresh, V-11 is always sold out. Income from V-11 is used to finance his children's schooling and to buy fish or meat.

In the Macabuhay household, V-11 is eaten at breakfast and supper to minimize consumption of rice. As a result of its greater availability, they have, in fact, increased their consumption of sweet potato, particularly in July which is the lean month for rice. During this period when their rice stock is consumed, they resort to sweet potato. Because it gives them a feeling of security to think that even if they run out of rice there is always a sweet potato crop to harvest, V-11 serves as their food insurance. Sweet potato can be eaten continuously, according to Dodo, but his children complain when rice is not seen on the table often enough.

Dodo has given cuttings of V-11 to her sister in Limasawa island, barangay captains of Sta. Cruz and Manining, and other farmers in Malitbog. This informal distribution network, says Dodo, has been responsible for the diffusion of V-11 practically throughout Malitbog.

MAF's multi-story cropping project in Malitbog which is a joint undertaking with the farmers, intercrops coconut, cacao, and V-11 on a 1/4 hectare area. The BLISS project in Brgy. Sangahon has also grown V-11 on 1/4 hectare.

After the storage project, Dodo has continued to store root crops mainly for home consumption.

Emiliana Borces
Municipal Mayor
Padre Burgos, Southern Leyte

Teofila Aclao
Barangay Councilwoman and Restaurant Operator
Padre Burgos

In September 1984, typhoon Nitang's fury seemed to have been unleashed on Padre Burgos that the damage was so extensive: the upper portion of the coconuts had been blown off and the concrete stairway leading to the beach in Barangay Tangkaan had been washed away by a tidal wave that eroded its concrete foundation.

In response to Padre Burgos Mayor Emiliana Borces' telegram requesting planting materials and seeds, ViSCA delivered VSP cuttings. In addition, the municipal government of Padre Burgos bought VSP cuttings from nearby Macrohon farmers. These cuttings were later distributed in Limasawa island.

Among the VSPs that have been cultivated, V2-42 is preferred by farmers because it thrives well in the area. People find V2-42's eating quality better than native sweet potato varieties. VSP helped typhoon victims because it was the earliest maturing and high yielding food crop available to them. With the massive damage to the coconuts in Padre Burgos, VSP was the only crop that immediately staved off hunger. After typhoon Nitang, barangay council woman Teofila Aclao narrated that sweet potato was eaten at breakfast, lunch, and supper.

In Barangay Tangkaan, VSP is grown extensively despite the natural condition of the soil where the surface layer is shallow and the subsoil layer is limestone rock. While planting VSP in ridges is the common practice in Southern Leyte, the rocky soil in Padre Burgos forces the farmers to plant VSPs in mounds which are about 0.5 m apart. To prepare the area for planting, a Tangkaan farmer hills up cone-shaped mounds using a pick mattock. In each large mound, two sweet potato cuttings are planted instead of the recommended one cutting per hill because of farmers' experience that two cuttings would produce more tubers.

Teofila, who also operates an eatery in the public market in Padre Burgos, has observed that before the introduction of VSP, very little sweet potato was sold in the market. Then, only traders from Macrohon came to sell sweet potato tubers. With V2-42 however, the volume of sweet potato roots sold in the market as well as the number of sellers have increased. Teofila, who sells boiled sweet potato tubers in her restaurant, has also noticed a decline in the number of people who buy boiled sweet potato. She explains this apparent loss of interest in boiled tubers with the fact that most people in Padre Burgos have planted V2-42 in their own backyards. In order to sell it, she recycles boiled sweet potato into "lupak," a native concoction of grated boiled sweet potato, grated coconut, and sugar. Ginataan or lidgid, both native delicacies utilizing the sweet potato tuber as the principal ingredient, are also prepared to entice people to buy.

Ramon Luciano
VSP On-Farm Trials Cooperator
Calbasag, Julita, Leyte

About three years ago, when Ramon Luciano was the barangay captain in Calbasag, he had agreed to serve as a farmer-cooperator in the VSP on-farm trials of the Department of Plant Breeding of ViSCA. For the trials, he grew V2-42, VSP-1, VSP-3, VSP-30, and Miracle sweet potato varieties. Carefully following instructions, he cultivated 1/10 hectare for these varieties in two croppings and finally selected VSP-30 and V2-42 to be the best among the varieties. VSP-30 later became known as VSP-2.

VSP-1 turned out to have a high yield and a watery consistency while VSP-3 which was relatively long maturing was fibrous and could not stand intense sunlight. Intense sunlight, to Ramon's experience, resulted in small tubers. On the other hand, V2-42 tasted like Karingkit, a popular native sweet potato variety. VSP's orange and purple flesh remains a standout in the market because consumers prefer this variety for cooking into "ginataan" (sweet potato chunks simmered in coconut milk and sugar).

After the trials, he planted V2-42 and VSP-2 on 1/4 hectare in the open despite the problem of rat and weevil infestation of VSP-2. Since VSP matures after 3 1/2 months, he has been able to plant sweet potato 5 times in 2 years. With native varieties which mature at 6 months, he is not certain if he could have 2 croppings a year.

When he used to plant Kaagbon and Katanghaw, both native sweet potato varieties, he could sell tubers in the market only occasionally because of their long growing period. On the other hand, he looks at VSP as a quick source of cash for his children's school expenses. Staggered planting and harvesting have enabled him to harvest only a portion of his sweet potato crop when the need for money arises.

While rice, coconut, and corn are predominant crops in Julita, Ramon's principal crops are rice and coconut. It was only recently with VSP that he has transformed the status of the sweet potato on his farm as a cash crop. He cites the ₱600 he earned during his last harvest of V2-42 and VSP-2.

In Julita, sweet potato is eaten with dried fish and coconut at merienda although it is eaten as breakfast fare by the poor, according to Ramon.

Use of sweet potato in FSDP-EV

Jaro (Barangays Daro and Hibucawan)

Key Informants: FSDP-EV Farmer-Cooperators: Donato Horca,
Angel Liporada, Jaime Bunayon, Juan Labra,
Rodrigo Navarra, Pedro Horca, and Juanita Navarra

Using cuttings obtained from VISCA, FSDP farmer-cooperators have tried planting VSP-3 under cacao as part of their multi-storey cropping pattern. Cacao is grown under coconut by farmer-cooperators who are largely coconut farmers. Most cooperators are now on their second crop of VSP.

Staggered harvesting is practiced to ensure a continuous supply of tubers for home consumption.

Children like the sweet taste of VSP-3. Farmers like its short maturity and high yield and find its taste comparable to that of native varieties.

There is no significant difference in labor requirements between VSP and native varieties. However, native sweet potato varieties which are long maturing produce runners that root and form tubers, thus, a farmer does not have to replant as long as the vines are not uprooted during harvesting.

Villaba

Unlike Jaro farmer-cooperators who operate lowland areas under

coconut, Villaba cooperators cultivate farms which are on rolling hilly lands. On steep slopes which are not contoured, farmers plant native varieties like Hawaiian, Kaloloy, Kaiti, Karayray and Binisaynon. Native varieties according to farmers, produce runners and thrive well on steep hillsides even on rainy season. Because Villaba is predominantly hilly, native sweet potato varieties are planted on a much greater area than VSP which farmers reserve for the lowlands.

VSP is grown on plain or on contoured hilly areas where soil erosion does not pose a problem on rainy months. Those who have tried planting VSP on steep slopes have discovered that during a heavy rainfall, run-off water flows through the VSP hills and washes down the soil around the main roots. As a result, VSP planted on steep slopes does not produce tubers.

Progressive harvesting is practiced where big tubers near the surface are harvested first and those small ones which are deep in the ground are left behind to give them a chance to develop. A few weeks later these are harvested as fully grown tubers.

Crop rotation is practiced where VSP is grown after corn or tobacco. Asked to compare the labor requirements between VSP and the native varieties, Felix Roelan said that there is less labor required in planting the latter because of the wider distance of planting. However, they require 3 cuttings per hill compared to VSP which needs only 1 cutting.

Consumers and buyers, according to FSDP farmer-cooperator Felix have varied reactions to VSP's eating quality. Some do not like its most flesh but others look for VSP because they like its watery consistency. VSP's advantages are its high yield and short maturity.

Sweet potato tubers are usually sold in the barangay's small market or sometimes hauled to the town market of Villaba. Other traders come right to the farm to buy sweet potato. Current market price for sweet potato has decreased to ₱10 a can because supply is greater this time.

Income from VSP is used to buy rice, meat or fish.

Vicente Sulad, 36, an FSDP farmer-cooperator in Villaba, grows VSP-2 on 1/3 hectare of his landholding. He plants only one crop of sweet potato per year in order to accommodate corn and peanuts which he rotates with sweet potato. Besides VSP, Vicente also plants Kaiti, a native sweet potato variety. Kaiti produces runners but there have been many instances where runners did not yield any tubers.

If cooked properly, VSP-2, according to Vicente, will turn out all right. Use less water if you want less watery tubers, he advises buyers. On the whole, he does not find any problem with VSP.

With contour farming, he has been able to plant VSP on hillsides unlike other farmers who prefer to grow VSP on plain. Vicente says that VSP becomes bushy and at closer planting, covers the soil completely. He considers the absence of vines in VSP as an advantage in that it is easier to clean the area because there is only one hill planted to VSP to uproot.

Interview with Ex-Governor Triviño and Nonong Triviño
Pili, Camarines Sur
December 2 and 3, 1985

From the newspapers, ex-Governor Juan Triviño learned about the ViSCA sweet potato varieties (VSP) which promised to be a viable alternative crop to his ailing sugar plantation. Arranging his trip through the office of Leyte Governor Benjamin Romualdez, he went to ViSCA to find out more about VSP. He stayed at ViSCA for 4 days and brought back with him cuttings of VSP-1, VSP-2, VSP-3, V-11, and V2-42.

Besides VSP, Mr. Triviño had tried the UPLB sweet potato varieties but he found that VSP outperforms them in yield. Also, UPLB could not supply him with planting materials in large quantities.

Propagating the VSF cuttings he bought in ViSCA, he was able to sell ₱1.5 million worth of VSP cuttings to the Ministry of Agriculture and Food (MAF) for distribution all over the country. At the time that he was ready with his cuttings, there were typhoons and volcanic eruptions that generated a need for an early maturing crop. The first batch of cuttings bought by MAF went to typhoon victims in Surigao. Other cuttings were sent to Cagayan, Batanes, Zambales, Bataan, and Albay.

Encouraged by VSP's actual farm yield of 20 tons/ha, the Triviños plan to expand their farm area planted to VSP. Compared with native varieties, VSP has a higher protein content as shown by tests conducted in Europe in which VSF was found to contain 10 percent protein.

In the Triviño farm, VSPs are planted in different areas, rotated with other crops, or intercropped with corn. They have observed though that if VSP is planted successively in the same area, there is a drastic drop in yield and even cuttings become shorter. They have found out that the best cropping combination is sweet potato-peanut-sweet potato.

Mr. Triviño declares: "With VSP, weeding is done only once but it has to be nurtured during its first 30 days. However, VSP grows like a 'tidal wave' that it can compete with cogon.

One limitation cited against VSP is that it is rather short-lived because it does not produce runners, hence, source of planting can be a problem. Triviño circumvented this problem by planting on a staggered basis. This system provides a continuous supply of planting materials. By programming the planting of VSP, it is possible to have a steady supply of sweet potato roots. In the summer or dry season, VSP cuttings should be planted 6-8 inches deep per hill."

He suggests that technical people should start teaching the recommended cultural management practices and sweet potato production should be encouraged because it is a better supplier of carbohydrates.

According to Mr. Triviño, the Chinese in Binondo, Manila have indicated a big demand for white sweet potato chips. The elderly Chinese find sweet potato chips easy to digest in the evening when

cooked as porridge. Dried sweet potato chips are stored in glass jars for domestic consumption. The Chinese have a way of processing sweet potato to enhance its storage quality: boiled tubers are steamed, mashed, dried, and formed into balls. In China, the Chinese army used these steamed sweet potato balls to sustain them during the war, thus, each soldier would bring a sweet potato ball with him when he went to war to stave off hunger. Also, Chinese cooking can not do without sweet potato flour for thickening sauces. Sweet potato flour, which the Philippines imports from China and the United States, is used as the base for most medicines.

Mr. Triviño plans to put up a feed mill. He already has a dryer which will be fueled by his mini-hydro plant and four chippers which were modified from the ViSCA model. The government promised the Triviños to help in putting up the feed mill. Later, a flour mill will be put up so that there would be no need to import sweet potato flour from the U.S. During his recent trip to Europe, he found that the prospects of exporting biscuits to Europe are bright. Since Europeans, particularly the Germans, are strict with food and the use of food coloring, one could capitalize on the natural coloring of VSP to produce multi-colored biscuits.

The feed mill will also create a market for VSP, thus, it will stabilize prices. VSP to be processed in the feed mill will come from the Triviño farm and from small producers. He plans to distribute chippers in barangays so that what farmers bring to the

feed mill are dried sweet potato chips. Some areas in Camarines Sur can be utilized for large-scale sweet potato production which could back up the feed mill.

By creating a steady market for root crops, one helps root crop producers so that someone buys their produce any time of the day, any day of the week. By converting the agricultural economy of Bicol from traditional crops to root crops, people will be assured of a steady income. Rice should no longer be relied upon as a staple because it has become a luxury item. With the kind of support the government has given the rice industry, eventually most of the people will have to rely on sweet potato.

With VSP production, the Triviños have been able to continue employing sugar workers who otherwise might have been displaced. VSP has been used to supplement the "rice advance" for sacadas. By giving sacadas a combination of VSP tubers and rice, the cost of rice advances has gone down from ₱38,000 to ₱17,000. As a result of this cost reduction, sacadas have been able to buy other household necessities radio sets, clothes, etc. In the beginning, it was difficult for sacadas to get used to sweet potato as a food staple or even as a rice substitute but eventually they got used to it and learned to accept it.

VSP has also helped volcanic eruption evacuees. Just after the eruption of Mayon Volcano, the Triviños supplied tubers and cuttings to evacuees who were billeted in school houses. The evacuees also planted VSP cuttings around the school house.

Whenever he has the opportunity, be it in political rallies or Rotary Club meetings in West Visayas, Mr. Triviño encourages sugar planters and small farmers to go into VSP production.