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Title or Activity: Rice Production Improvement in Cambodia

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The Background

In Cambodia, at the time of achieving independence in 1954, as result of laissez-faire by former French administration, technological improvements in rural areas had been retarded to such an extent that rural farm practices generally were at the pre-French(1860) level with the exception of development of rubber plantations in selected(and limited) areas. In response to request by the Government of Cambodia, the United States, through its Agency for International Development provided a staff of agricultural technicians to help the Cambodian government to (1) develop and train governmental agricultural organizations and staff to provide the rural Cambodian people adequate modern agricultural service; to (2) assist with the modernization of Cambodian agriculture; and to (3) coordinate Cambodian agricultural development with the overall development of Cambodia.

The USAID agricultural assistance to Cambodia included a soil survey project, to which I was assigned in Feb. 1961 from duty in Korea and years of soil survey and soil conservation experience in the U.S. and South America. Due to administrative and organizational problems for soil survey in the Cambodian government, my actual work in this field was resolved into the operational task of making a country-wide exploratory soil survey at great soil group level, with a series of Cambodian trainees accompanying me as field assistants. That task was completed prior to home leave in June-July 1962.

Upon my return from home leave, I was assigned as general agriculture adviser to the rapidly developing Cambodian agricultural cooperatives system, the Royal Office of Cooperation(OROC). This is an autonomous self-sustaining body outside the framework of government structure but working closely with government and originally started with initial authorization and capital from government. The structure and development of the cooperative movement was well conceived and carried out under the management of Royal Delegate Moeuh Kem, Director of OROC, with effective advice and assistance from the USAID Cooperatives Adviser Fred Knobel.

As Agriculture Adviser to OROC, I was originally assigned specifically as adviser to the Production Division of OROC, with the task of assisting in production development plans on a broad front: Montagnard tribal resettlement; integration of cooperative organization and service with other activities, services, and projects; and demonstration of tested improved techniques of production through established cooperatives and with individual volunteer farmers. In these tasks, an OROC, USAID and Ministry of Agriculture team was the operational implementing body. For the specific project which is the subject of this discourse, a team composed of Mr. Boun Khan, Production Division technician of OROC, Mr. Ho Tong Lip, Chief of Agronomy of Ministry of Agriculture, and Charles D. Crocker of USAID comprised the team. Mr. Boun Khan of OROC, with background of elementary school education, several years as a rice farmer, and

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several years as a cooperatives manager, worked continuously on the program under discussion. Mr. Ho Tong Lip, an Ingenieur of Agronomy, leading authority on Tropical Agronomy for Cambodia, and chief of the government Agronomy Service, due to demands for his services that were endemic to the shortage of high level, competent, educated men in agriculture(and in all professions) spent a limited amount of time on the actual field operation of the program, sending in his place subordinate Ministry technicians Meas Chhuth, Heng Satthal and others. The USAID adviser participated with Mr. Boun Khan in all of the operations of this program until evacuated with the removal of the USAID Mission from Cambodia in December 1963.

The specific project under consideration here was a rice production improvement program to promote application of improved techniques by extension demonstration methods applied by volunteer farmers, on contract with CROC, cooperating with the CROC-Ministry-USAID team for application of new practices, measuring and recording of results. The demonstrations were established in this manner in the southern half of the rice-growing area of Cambodia, where farmers with poor soils, poor seed, and poor techniques were getting normal yields of from 500kg. to 1,600kg. paddy per hectare per single crop year. Area-wide average yield was 1,100kg. paddy per hectare. The demonstration contracts were set up by CROC as a business venture, working completely with volunteer members of organized farmer cooperatives. This was to supplement the farm demonstration program carried out solely by the Cambodian Agricultural Extension Service, to speed the extension process of adult rural education, because the recently organized, insufficiently financed Ag. Extension Service was limited in resources, both human and material, for rapid extension to widespread production application of techniques developed and tested in Cambodia by agricultural research in the years since independence in 1954.

The Objectives

The primary objective of the work is embodied in the title: Rice Production Improvement in Cambodia. This particular project was for the purpose of carrying out extension-type demonstrations within the local cooperatives, with volunteer farmers, to demonstrate that, by use of certain easily applied methods, rice yields could be significantly increased economically. In the selected demonstration fields, a series of simple improved techniques were applied by the farmer with advice, physical assistance and supervision from the field team of CROC-USAID-Ministry technicians. The techniques applied were changes from usual standard practice, and direct application was accomplished by the technical field teams working directly in the demonstration fields alongside the farmer-demonstrator.

Several secondary objectives were involved, some directly related to the primary objective, and some to the broader purpose of general country-wide rural improvement:

1. The secondary objective to strengthen the agricultural cooperative movement was most significant in that the project was carried out with volunteer farmers who were active cooperative members in young, growing rural cooperatives.

The rural cooperative movement itself was relatively new, and channeling of development projects through cooperatives helped to focus rural attention on their activities and on the benefits to be derived by individual farmers as active members of cooperatives.

2. Another secondary objective was to speed the extension application of known, tested technology for more rapid dissemination of agricultural improvements. The Extension Service was new and under-staffed, with young, inexperienced workers, while OROC had a small group of competent, experienced people able to carry on this work.

3. Yet another objective was to promote cooperation and coordination between OROC and the Ministry of Agriculture, especially the Extension Service. All of the operations were developed by joint OROC-Ministry-USAID effort, and the field activities were carried out by a joint team. (Even though the Ministry member was changed often and was frequently absent from the actual field work). In this way, the work load of the fledgling Extension Service was made lighter as OROC provided effective extension assistance within the rural cooperative structure and areas without supercoding or overriding the regular functioning of the Extension Service. OROC also possessed the tremendous advantage of ability to provide both supply and capital support to this work beyond the capabilities of the Extension Service.

4. Another secondary advantage accruing from the project was that a sound economic base was used for dissemination of the knowledge developed and proved by agricultural research to widespread public use of that knowledge for production improvement. This was in contrast to programs based on total subsidy by government agencies, which seriously weaken farmer incentive, initiative and interest, and his sense of personal involvement. As a business organization, OROC entered into the project for present and future profits. The demonstrations were based on a verbal contract with the farmer-volunteer by which OROC guaranteed a base minimum rice return from the demonstration field, equal to the rate of return from the check field, while the farmer agreed to repay OROC one half of the increased rice return of the demonstration field over the check field, provided the farmer carried out the demonstrations as directed by the field team.(It is worthy of note that, of 72 demonstration farmers selected from among more than 220 farmers who volunteered, only 6 were dropped by the team for not following the directions of the field team). With OROC fiscal support, improved rice seed, cowpea seed, fertilizer, insecticides and sprayers were provided to the demonstration farmers, with repayment anticipated in the return of one half the increased rice production. The results proved that this was an economically sound gamble for OROC as well as for the farmers.

5. Another secondary objective was the training of technicians, both in the Ministry of Agriculture and in OROC. The most effective feature of the technician training actually proved to be the involving of the technicians directly in the actual physical work in the field alongside the farmer-demonstrator. This developed an invaluable personalized relationship between technician and farmer and demonstrated to the farmer the faith and competence of the technician in applying the techniques that were being demonstrated.

6. A major secondary objective was to teach all of the members of the various cooperatives the effectiveness of the applied techniques by showing them, in their home environment, that one of their own people could accomplish significant production increases by applying simple practices which they themselves could use: That this was not simply a government-run thing, but a practical thing anyone could do and should do.

7. Through the public information program carried out for the project, all of the rural people, both within cooperatives and otherwise, were provided access to the techniques as applied and with information about the results. In addition, numerous people were able to see the results for themselves thru group observation tours. Since one criteria for selecting the 72 plots was that they be adjacent to the highways and close to villages, many passersby were able to observe for themselves and talk with the demonstration farmer about what was done.

Course of Events

A. Preliminary:

1. The program was developed by the USAID adviser and approved in joint conference of CROC-USAID Agriculture Division and Ministry of Agriculture. CROC supplied funds and materials, Ministry reviewed and standardized techniques and procedures as drawn up by USAID advisers, CROC technicians and Ministry technicians. CROC also issued the call for volunteer farmers and kept all records. USAID provided some funding, material and travel assistance.

2. From the initial call for volunteers from among cooperative members in seven southern provinces, more than 220 individual farmers, one entire cooperative and one entire srok(county) offered to carry on the demonstrations. This number was reduced to 72 in a selection process of interview by the field team to select leading farmers; farmers whose fields were readily accessible - near a road and near the village, for optimum information value; fields where there were check fields adjacent to the demonstration fields and where both fields had similar soils, similar water supply, and similar cultivation characteristics. In Cambodia, rural cooperatives average 500 member farmers. For this project, one block of 20 farmers in a single group near Phnom Penh was selected to carry out the demonstrations, and, in sixteen other cooperatives, an average of three individual farmers fields were selected on the above criteria. The soils and water conditions of the fields selected covered the full range of rice growing conditions in the southern provinces of Cambodia.

B. Pre-rice operations:

1. Prior to this project, an effective information campaign had been carried out countrywide to discontinue the old habit of burning over the rice fields. The demonstration fields selected had not been burned over, so the straw residue remained.

2. The fields - both check and demonstration - were selected and were carefully measured by the field team. Calculation of area, and from it, needed sup-

-plies of seed and fertilizer were made and obtained or reserved from UROC by the field team.

3. At the time of field measurement, the volunteer farmers discussed and contracted verbally with the field team the terms of the agreement or contract under which the demonstrations were to be carried out. The contract was verbal because of acknowledged resistance by the normally illiterate farmers to any written instruments of commitment and to a high standard of integrity among the rural people.

4. After measurement, the demonstration field was prepared for planting of cowpeas early in the spring(April), with four months of dry season remaining, during which time "dry farming" was carried out locally utilizing regular gentle showers - "mango showers" - for crop water supply. Cowpea seed and half of the annual fertilizer supply were provided by the field team to the demonstration farmer, with assistance and instruction for spreading the fertilizer and planting the cowpeas.

5. During the cowpea growing season, dikes on the demonstration fields were built up to a minimum of 50cm. high and 40cm. wide for later water control in the paddy. The optimum of 20cm. water during the growing season is easily maintained, and overflow prevented by use of the high dike, and dike maintainance is much easier year after year. Cowpeas were harvested by hand for use as green beans, dried for home use and/or dried for market sale.

6. With the coming of the rainy season rains, before the fields were flooded, the cowpea plants were plowed under to achieve aerobic decomposition. The fields were plowed to a minimum depth of 16cm.(in contrast to the local normal practise of 10-12cm. depth of plowing) - often requiring double plowing of the demonstration fields because of the primitive buffalo or oxen drawn plow used by most of the farmers.

C. <u>Rice crop operations:</u>

1. The particular improved variety rice seed to be issued to the farmer(three kinds were used, based on Ministry recommendations) was weighed and distributed, and the field team assisted the farmer in seedling nursery preparation and planting. In Cambodia, making of compost was being taught, and, since supplies of compost were limited, the available compost was used on the seedling nurseries. The seedling nurseries also were fertilized with balanced chemical fertilizer supplied by the project. It was found that the demonstration nurseries produced large, strong, durable seedlings ready to plant a full two weeks ahead of the check field seedling nurseries.

2. After plowing, half of the fertilizer for the rice crop was broadcast on the demonstration field and the field harrowed, first dry and then flooded, for field leveling and for preparation for transplanting.

3. Between pulling from nursery and transplanting, the roots of the seedlings were soaked overnight in a soupy paste mixture of manure and rock phosphate. This is a local Cambodian technique used in the sol alune, or kat-klei areas, where, without it, the yields range from failure to 600kg. per hectare - but with this technique alone(no other fertilization or other special practice), the yields are 1000 to 1500kg. per hectare.

4. The field team assisted in transplanting to teach and to check the transplanting distance of 30cm. each way and to limit the number of plants from the common practice of 6 to 8 plants to 3 to 4 plants per set. Signs were posted in the fields indicating the cooperative demonstration and the check fields.

5. During growth, the field team and the farmers checked frequently to insure weeding of the field, water control, insect control and spraying as needed, and supplemental fertilization ~~with~~ first with complete fertilizer and later with urea fertilizer until the computed fertilizer needs had been applied as recommended by the Ministry.

6. In December, as the crop approached harvest stage, the USAID Mission was removed. The field team, less the USAID member, assisted the farmers with harvest, threshing, measurement of results and settlement of the contract.

Problems Encountered

A. The biggest problem was in selection of demonstration farmers: There were many volunteers who were not selected because of a shortage of technicians to service a large number of demonstrations, and even the 72 selected made an excessive workload, which kept the field team going too long hours, seven days a week. An actual workload of 50 would have been more practical. Also, the 72 were scattered over seven provinces: Had it been possible, two or three provinces would have been an appropriate team work area.

B. Of the original 72 volunteers, 5 farmers, for various reasons, did not carry out the initial work - the growing of a cowpea green manure crop - and were dropped from the program, released from their contract.

C. The field team had no regular uniform transport support, with the result that some delays resulted from the need for "scrounging" vehicles for the work from USAID or from OROC.

D. The USAID mission was removed from Cambodia before the results were measured, precluding follow-up or accurate determination of effectiveness of the program.

The Results Achieved

A. On a personal tourist visit to Phnom Penh in May 1964, the USAID adviser learned that the yields on the check plots averaged 1,100kg. per hectare versus from 3,600 to 6,500kg, per hectare on the demonstration fields; that the average yield on the demonstrations was 4,600kg. per hectare. This was verbally reported to the USAID adviser by Mr. Boun Khan, OROC of member of the field team. It was confirmed generally by a part-time Ministry team member, Mr. Meas Chnuth, in interview with a writer for National Geographic Magazine reported in the October 1964 issue. In addition, the food and sales value of the cowpeas picked by the farmers were not measured but were considered as a significant added bonus to the farmer-cooperator.

B. Even during the first demonstration season, many farmers ordered supplies of fertilizer and sought advice and guidance to duplicate the work. These were accomodated as far as facilities were available and the following year's fertilizer import by OROC was increased tenfold to meet the public demand for continuation and expansion of the program.

C. With removal of the USAID mission, as result of such activities as this one, the Cambodian government actually asked that the agricultural technicians remain there to continue these programs. This request was refused.

Significant Factors

A. I believe that the primary factors contributing to success here were:

1. The work was with willing volunteers.

2. It was an economically sound program based on contract agreed and lived up to by both sides.

3. Close personal relationship existed between technicians and farmers, as the technicians worked shoulder to shoulder with the farmer.

4. One of the technicians was an experienced rice farmer himself.

5. The rural population were eager to receive advice and guidance, and the project had a well organized and effective public information program supporting it.

6. Effective inter-agency cooperation and coordination was established from the inception of the project.

B. Things which could be done differently as result of this experience:

1. Limit team area.

2. Limit number of demonstrations to be serviced per team.

3. Increase number of teams.

4. Include additional farmer participants on group basis, with localized record keeping within each cooperative.

5. Add to the project a series of awards: for example a special prize or medal for the biggest increase in yield, a prize or medal for the biggest percentage increase over the check field, and/or a prize or medal(based on points) for the farmer who most completely and correctly applied the improved techniques.