

Summary: The report on basic survey concerning social structure of agricultural society in the Republic of Sierra Leone

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THE REPORT ON BASIC SURVEY CONCERNING
SOCIAL STRUCTURE OF AGRICULTURAL SOCIETY
IN
THE REPUBLIC OF SIERRA LEONE

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The Reason and Purpose for Sending Survey Team.

Basic area surveys have been conducted once a year in the fields of agriculture forestry, including current issues existing in the projected countries, so that we could effectively fulfill our goal of close cooperation in these fields.

With an environment - climate, national features, way of life - different from Japan, it is essential for us to fully comprehend the various conditions of the area's inhabitants, i.e. technical level, agricultural system and diffusion system, through such area surveys of the agricultural society and economic foundations, in order to provide the farmers with proper farming techniques and thus to promote more effective cooperation in agricultural field.

From these points, a general collection of relevant information on agriculture was made from 5 to 15 March, 1987 in the Republic of Sierra Leone. This year, in particular the survey centered on the theme of society and economy and was made through the sampling of some representative farm villages and farmers selected in advance in Sierra Leone. We hope this will be of great help in planning further technical cooperation with the country.

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Summary of Survey

I. Agriculture

(1) Production

The percentage of Sierra Leone's Agriculture to GDP has declined from 39.6% (1976/77) to 32.3% (1980/81). However, it is still ranked as the top industry in terms of GDP. Also, approximately 65% of the labour population is involved in the agricultural field, which has been recognized as an indispensable industry.

Rice is the staple food of the people. Rice production takes up 57 per cent (1984/85) of the country's total planted acreage including other crops. However, its self-supply ratio has shown a declining trend.

The rice production once exceeded 600,000 tons (642,000 tons in 1976) in the latter half of the 1970s while it amounted to 300,000 tons - 400,000 tons in the 1960s.

In the 1980s, the rice yield amounted to around 500,000 tons. However, it shows declining trend (460,000 tons in 1983/84). Meanwhile, although there have been some fluctuation in volume, rice imports have occurred every year, except the year of abundant yield in 1975. In particular, it reached 90,000 tons in 1979 and 1980, and thereafter it has temporarily declined to 70,000 tons but eventually reached 110,000 tons in 1985.

During 1971/72 - 1980/81, 115,000,000 leon were invested in the agricultural industry by the Government. In particular, in the three years of 1978-1981, the investment of 40,000,000 leon was directed to the irrigation projects to expand production.

The Government intends to promote a steady self-supply of rice, and if possible to export this commodity in the future. Nevertheless, the accomplishment of the original target is still far from realization, due to the lack of production materials such as fertilizer and necessary agricultural technicians.

Realizable export crops such as coffee, cacao, palm kernels reached a about 20 percent of the total export value every year, and sometimes have amounted nearly to 40 percent. However, they have made up only about 10 percent of the total production value.

It is reported that the Government has encouraged these crops' production as an important source of foreign currency, and has tried to raise their products prices. However, a considerable volume of the production has been directed to domestic consumption. Because of a lack of distribution and storage facilities these products have often spoiled.

(2) Production Conditions

According to the surveys made in 1984/85, the number of farmers exceeded 224,000 families, who have been farming on an average 1.6 Ha of their own land. 98 percent of those families work wholly by hand, and utilization of chemical fertilizer was only 7 percent for the entire area cultivated.

Most farmers have employed farm laborers in the busiest season, and it is reported that on an average 22 persons a day per house were annually employed.

The average in the family per house is 8.4 persons, 54 percent of which were younger generation, under 24 years. Also the number per family mostly engaged in farming is less than 4 persons (with slightly more females than males.)

Many farmers have been growing crops for their own consumption, while selling the surplus volume in years of abundant harvests. Sales volume is considered to be 15 % of the Gross National Products.

The slow progress of the production and income in the rural area may be attributed to the small amount of expenditure made by the Government for agricultural development and to little support to the agricultural industry.

Specifically, it would be said that there might be little arrangements for crop distribution, insufficient investment in services for distribution of agricultural equipment and lack of public relations efforts, etc.

In particular, based upon a cost policy through distribution, the Government has tried to keep the producer's cost of crops at a low level, while collecting tax out of the profits obtained from the export as their source of revenue.

There is no existing system for providing finances to farmers and generally most farmers borrow from local business men and loan brokers. Also, in addition to an insufficient marketing system, there are very inferior road conditions in rural areas.

Consequently, there are still many problems to be solved with regard to study facilities on price policies, improvement and extension of cultivation techniques, provision of equipment and the strengthening of cooperative activities, etc.

2. Rural Society and Farm Economy

Surveys concerning the basis of society and economy was conducted by the Government of Sierra Leone in 1980 and 1982. The major survey points were current real status of farm and its economy. According to these surveys, the average number of family members per farm was 8.2 persons, and the average age was 25.8 years.

The age distribution of family has shown a typical pyramid shape, namely lesser number in the higher age brackets, as is common in developing countries. Population is estimated to be increasing at 2.0-2.5 percent annually. Eleven percent of the heads of households have no wife, while among those who are married, 46% of the men have one wife, 32 % have two wives, and 22 percent have more than two wives. Therefore, men have on an average 1.98 % wives.

Also, only 16% of the heads of families attended school. Two percent received adult education, 19% moslem education, and 64% had no education at all.

The following are the reasons why farmers pay little attention to education for their children;

1. a thought that no education is required for agriculture
2. Children are expected to become labor force.
3. Educated persons have shown a tendency to leave the traditional religion and a large family-ism.

Agricultural society is composed of traditional, cultural, and religious groups. The members have helped each other for common interests, beyond the boundaries of their tribes.

In particular, when engaged in group work such as lumbering, harvesting and planting, they have shown good cooperative behaviour.

The major concern and target for farmers is self-sufficiency in foods. Most farmers (more than 80 percent) farm for the purpose of selling products, in addition to growing crops for their own use.

For production of agricultural products, capital, labor, and material are required. However, the most indispensable, are capital and fertilizer, which are the items in short supply. Availability of land is not so big a problem. Nevertheless, 75% of farmers have apparently felt unsatisfactory with the current farming acreage. Also 80% have been unsatisfied with revenue per unit. Consequently they are willing to adopt some suitable agricultural techniques, provided that these are suitable for their locality and ability.

Seventy-eight farmers have had no contact with the public relations activity of the government. The farmers were most interested in learning new ideas in agriculture, and obtaining assistance in the procurement of farming materials and tractors, and obtaining financial assistance, etc.

In Sierra Leone, a landownership has been granted to the family group and the distribution of land for agriculture has been decided by the head of the household and seniors in discussion with the family.

80% percent of expenditures necessary for agricultural production was labor charge. It has been good for farmers to employ laborers from the viewpoint that many people work together in friendly circumstances, but the costs have been high.

Profit per unit in the uplands is low, since labor cost is high. Thus, in terms of net profits, farmers are likely to suffer losses easily. It is true with Boffland.

Rice crops in mangrove as well as swampland have achieved the highest profits in every respects, which we think have been attributed to the fertility of the soils.

Meanwhile, in view of the losses which occurred in the upland and lowland, everyone would think about the shifting to more advantageous field. However, it would be risky for them to concentrate on a single field where considering the climatic conditions and occurrence of diseases. Most farmers have recognized that if they farm in the fields extending over two different ecologies, they would have an advantage in the long run in terms of expanding the agro-management's scale and obtaining profits.

3 . Land utilization and its high value

The climate and soil in Sierra Leone exhibit very favourable conditions for high production, which have a substantial potential for achieving extra economic benefits.

The potential of the land differs according to location. There are two types. The first is the uplands; the second is the swampland. Farming on the uplands is called rain water agriculture, where there is plenty of laterite soil. Molds are apt to occur due to heavy rain in the rainy season. Also when the soil is once planted, it has to lie fallow for 8-10 years in order to recover the strength.

So-called " Bush Fallow Agriculture " has been applied to 80 percent of the total acreage, even in 1980.

Nevertheless, if artificial fertilizers were used, the idle period would be shortened and the soil would be exhausted.

The second category is swampland, located in riverbasin or along the beach line. This ground (Swampland) has accumulated clays with the annual floods which have affected the recycle operation. Consequently, the soil has become comparatively fertile and has required no idle period.

In addition, there are inland valleys where the water drains well. Also, there is inland swampland combined with mangrove and sedge where the water drains slowly in the flat areas thereof, thus making the flooded period last longer.

There are deep water swampland plantations along the river basins in the southern part of the country. When the possibility of the development of rice crops is considered, the inland swampland would appear to be the most suitable places. The reason is the simple control of water supply and cultivation by man power could be easily applied.

4. Crops' Cultivation

Crop rotation in Sierra Leone often means Bush Fallow Agriculture. A field which has been cultivated once is left fallow until the next year. Therefore, many farmers have conducted their activities while looking for new fields every year. Consequently, when the virgin fields become exhausted, they had to switch to Bush Fallow Agriculture, and land cleaning for cultivation would be done in turn within an area accessible on foot from a residential village.

In general, the period from April/May to October/November is the rainy season, and the other months from December to March are the drought season.

During the drought dry season, crop rotation by burning the bush and grass has been conducted. In the idle uplands, there is a plenty of bush densely grown as 2nd bush, while there is often only grass in the swamplands.

Because the soil is hard, cultivation is undertaken after the land is softened by the first rain. Needless to say, it is very important in both the uplands and the swamplands to carry out cultivation and seeding on the right date, which decisively determines whether good or poor crops are obtained.

The seeding of rice is carried out largely in April and May. The harvesting period is October/November in the uplands, and December in the swampland.

Meanwhile, on entering to dry season, rice piled up in the farm fields is threshed. The harvesting of peanuts and casava continues up to January/February.

Coffee and cacao, as realizable crops, are grown by a different method from that described above. First, for coffee and cacao, trees are planted for providing shadow. These trees are usually burnt after the cutting down.

Banana, oranges, and papaya, etc, are usually planted around the farmer's residence and seldom in a plantation.

In traditional upland farming, the labour is shared between men and women. Land cleaning for cultivation is undertaken by men and the grass gathering is done by women. Seeding and harvesting are conducted by both.

Boys raise some livestock and chase away the birds for crop protection. Meanwhile, once the land is made ready for cultivation, and footpaths have been constructed between rice field and other clearings in the swampland, the people work together without distinction by sex.

In general, there are many cases of mixed crops in the African countries. This is to obtain steady yields despite certain damages from weather and vermin, and also to enhance the utilization of farm fields. With rice crops, single planting accounts for 60% and mixed planting for 40%.

When considered from the aspect of ecological district classification, 80% of rice crops in the uplands are in the form of mixed planting, while single planting of rice crops is prevalent in the swamplands (90%).

Rice crops in Boliland and the swamplands along the beach are almost all obtained by single planting. Of course, rice is considered as the most important crop, and is always treated as the main crop in mixed planting.

Coffee and cacao are treated as main crops although they are mixed planted. The minor crops are always beans and vegetables, etc., in case of fixed planting.

5. Landownership System

In general, the land belongs to the nation. Actually, however, the elders in a group, such as a tribe, have the right of its disposal and control. The right to use land is given to a member of the group by the elder. This system differs from individual landownership in the following point. In the communities it is not permitted for a member to sell, mortgage, dispose, reclaim the land or transfer the disposal right of the inheritor.

Inheritance of the right to use land commonly descends from the relatives of the male line or female line. In some tribes, the inheritance may simply mean giving a farm family only land enough to live on.

Usufruct is the name for the system where an individual transfers the land he first cultivated to a group of his descendants. A member of the group is allotted a piece of land according to his position in the family or his blood relatives, but an influential man can obtain a rich field in a good location. Even if a young member of the same family carries out some constructions on his land, the elder is authorized to redistribute the land and an individual cannot insist his rights.

When other tribes come into district from other areas, the elder can lease the land to a so-called a stranger under the control of the member group. In such a case, however, a kind of an oath is required. This means that the lease holder must pay the landowner a given amount of money or goods equivalent to the value of the leased land.

Customarily, landownership has been designed to protect an individual from dispossession of his lands. However, it is impossible for a willing farmer to make an investment in reclamation of land by borrowing money through mortgaging his farm land. This is also a big obstacle to the land reclamation that the government tries to do.

6. Agricultural Products Price and Distribution Policy

For rice, the minimum guaranteed price for domestic production and the consumers price for the imported rice are established by the Rice Corporation which is a government organization to which the functions for import monopolistic and price setting were transferred in 1965 from the Rice Department of the Ministry of Trade and Industry.

Cash crops, such as coffee, cocoa, palm kernels and ginger, have been controlled and exported by the public organization, also the Sierra Leone Produce Marketing Board (SLPMBN since 1949), and this board is also to handle palm oil and peanuts. However, a greatest portion of these two latter items are being handled by the private organization as in the same as rice.

Distribution policy for domestic food was developed by both the SLPMB and the Rice Corporation. The price policy of the Rice Corporation lowers the imported rice price and stimulates the demand and supply, but on the other hand, it causes stagnation of the domestic rice supply.

The government development plan in June 1974 proposed that the Rice Corporation, the SLPMB, and the Ministry of Agriculture and Natural Resources should consolidate their functions. The main duties of the SLPMB are (1) motivation of production (2) readjustment of the export price and the purchasing price from farmers, and (3) collection of dues from producers and taxation on export. In the middle of 1960s, the SLPMB encountered several problems, including failures in increasing production and price control. For this reason, the government announced the following measures against these SLPMB failures:

- (1) Even when the reserve in the SLPMB increases, it should be used for maintaining the price for the export produce, improvement of trade, and increase production of crops, not for developments other than agriculture.
- (2) Public announcement of the guaranteed price should be made at an appropriate time and the estimation of remuneration to the farmers should be clarified in consideration of the production costs.
- (3) Improvement of cultivation techniques, i.e. distribution of improved seeds to the farmers should be actively pursued.
- (4) In order to reduce imports of edible oil, further production should be promoted for cashew nuts, peanuts, and palm kernel.
- (5) Pineapples, sweet potatoes, etc should be raised as export produces in order to promote diversification of crops.
- (6) A standardization system for the minimum guaranteed price should be established while linked with the international market price.

(7) In consideration of the transportation from farmers, a buying location of export produce should be provided in the vicinity of farm houses. agricultural cooperatives should also participate in such purchasing activities and in distributing farm machines.

7. Supply of Food

By the middle of the 1950s, Sierra Leone was a self-sufficient country and was able to export its products in so far as no crop failures occurred.

During the colonial age, introduction of export products was encouraged at the farms. On the other hand, the income from diamond mines enriched the country's economy, and rice consumption increased as the people moved to the mines and urban cities. With the help of a subsidy for imports of rice by the government, the annual rice consumption per capita reached 120 kg, the highest level in West Africa.

The producers price of unhulled rice was maintained at 2 leons per bushel (27 kg) for a long time, but thereafter several times the price was raised in a short time of 1972 to 1975. The price reached 5 leons in May 1975. The 1974 and 1975 year were those of record-breaking crops. According to the report in 1974, the amount purchased by the government decreased, since the price paid by the government was considerably lower than the general market price. For this reason, the government could not store enough rice to stabilize the variation in seasonal supply and could not fulfill its function of controlling the price.

The 5-year plan from 1974 to 1979 stated that the Rice Corporation should go to the farm house directly to purchase unhulled rice, and for this purpose a buying location should be provided in each of the farm villages. Also, the plan stated that this would reduce the large difference between the purchasing price and the guaranteed price.

However, rice is still imported. The recent decrease in purchased quantity and the bad yield have caused an increase of rice import amounting 9-10 thousand tons and have put pressure on the general economy.

8. Stock-Farming

Stock-farming is not an important industry in Sierra Leone because fish is a more important source of protein.

The number of domestic animals is estimated to be 333,000 head of cattle, 244,000 goats, and 134,000 sheep (1979). Most are reared in the northern province. Pigs and poultry are raised by Europeans in modern facilities in the western part of Freetown.

Of the cattle, the Ndama breed has a small body and less productivity, but has a long life, and ability to stand both dry and wet climates. It has been hybridized with the Kenyan Sahiwal breed which has high productivity.

In part of the northern province, the overgrazing of cattle causes a trouble between nomads and farmers. The government is trying to settle such problems by settling the nomads in a location where they can rear animals, but has not yet succeeded in it.

9. Agricultural Development

due to a tendency of lesser investment in agriculture, a difference between the farm village areas and the urban areas in terms of incomes has increased more. The actual investment for the 5 years from 1969 to 1974 was 14 million leons. Conversely, export tax and revenues of the SLPMB were 19 million leons. In 1975, with the help of the good rice crops, 12 million leons were directed to the investment, which was 1/3 of the financial expenditure, but only 2.7 million leons were actually used. For the 5 years from 1975 to 1979, 64 million leons were directed to the investment. One-third of this amount was toused for rice production and two-thirds for cash crops. However, it was not used for the original purpose due to a change of the development strategy for price policy.

The first integral development plan started in 1973 in the eastern area with a loan of 4.3 million dollars from IDA. Then, in 1974 a loan from IDA in the amount of 10 million dollars was realized. This plan incorporated the development of the southeastern and northern areas (US\$4.3 millions).

The development in the southeastern area includes inland valleys, marsh lands and cocoa and palm farms.

The method of development in the northern area, different from those of the south-east area employed a Mass Saturation Program which aimed at increasing a single crop, such as marsh land rice, farmland rice and peanuts, including a distribution of seeds and supply of farm machines and implements on credit, in addition to providing mid and long-term loans in marsh land development.

Regarding other development programs, there are Multi Chiefdom Growth Center and a plantation system. The former is the system organized by Multi Chiefdom which was developed by expanding Rice program growing in small scale by local powerful person, and the latter is consisting of a plantation being a center of development and small farmers surrendered, where crop are yielded under plant ions supervision with farm machines and implements provided from a plantation.

Besides above, with the support from the China, there is a conglomerate management in growing and its processing factory for rice, sweet potato, and vegetable (tomato), pineapple, etc. In the riversides of Rokpul in the Northern state, tobacco cultivation in the small scale farmers have been succeeded in tie-up with processing factory supported financially by Europe and America. This is a good example of success program.

A large production of rice crop in 1975 is a good representative example as proof of satisfactory achievement of development. This is also recognized that inland marsh program and small scale rice intensive farming program have been successfully fulfilled.

10. Green Revolution Program (GRP)

(1) Preface

Sierra Leon completed a 5-year project for agricultural development in 1986, which was initiated in 1980, to break through the economical stagnation due to the slowdown in the mining industry.

After that, the Green Revolution Program, which is a development project covering agronomics, stock-farming, fisheries, and forestry, was announced in August 1986 and started in the same year.

(2) Background of Projects

Agriculture is the largest sector in Sierra Leone, and accounts for more than 30% of the general domestic production, about 25% of the total exports and for 70% of the total employment. Since rice is the most important product for the country to reconstruct its economy, this project gives priority to the increased production of rice to achieve self-sufficiency and to obtain foreign currency by exporting the surplus.

Rice production in this country could not keep up with the increasing demand resulting from the increasing population, and the shortage increased from 80,000 tons in 1982 to 180,000 tons in 1985. The single crop amount in the uplands is still lower than that of other ecological area, such as marsh land and boliland.

Since a burn-farm cultivation system is used, which requires a considerable idle period, the land for burn-farm cultivation is in short supply due to the increasing population. Therefore, the government is trying to encourage the population to gradually move from the uplands to marsh land and boliland for the purpose of rice production.

The most effective way to encourage the farmers and to get them to use new technology, fertilizers, and agrichemicals, is to raise the net price of their products. Therefore, this project also includes the supplying activities of seeds, seed potatoes, saplings, fertilizers, chemicals, farm machines and the financing for their easy purchasing of those articles.

As a special example, in the northern part, shrubs were cut for firewood, resulting in the deterioration of the ecology. To prevent further damage, trees for firewood and charcoal should be afforested.

(3) Details of Project

In this project, the measures to be taken by the government are conveniently classified into three categories: short-term, middle-term and long-term projects.

1) Short-term Projects

- a) To meet the demand for rice in the local market, to decrease the import of rice to the minimum, and to also increase production of goods other than rice.
- b) To raise the producers' price to an appropriate level and to improve the distribution system
- c) To supply varieties of improved seeds, fertilizers, chemicals, and to provide services for plant protection
- d) To promote mechanization and to heightening of the ability of live-stock animals, in order to expand rice planting in an ecology (marsh and bolilands) where high productivity of rice are expected and to establish a joint venture company to support mechanization and maintenance services.
- e) To promote an improvement in cultivating methods by providing integrated and efficient services
- f) To train farmers and growers in a group training project and in an on-the-job training project
- g) To minimize the loss of product after harvest
- h) To start a middle-scale or large-scale irrigation project
- i) To reexamine the production plan in order to heighten the efficiency of the Integrated agricultural development project (IADP) and to modify it, if necessary
- j) To develop an effective culturing method for each ecology.
- k) To conduct an adaptability test to answer the questions from the farmers on site
- l) To publicize the necessity of self-sufficiency in farm produce with a view to forming national consensus.
- m) To start afforestation plan to prevent desertification and soil erosion

- n) To initiate a firewood and charcoal forest district plan to maintain agricultural forests which will lead to preventing a shortage of fuels.
- o) To start a production plan of feed crops for breeding and raising goats and sheep
- p) To intensify poultry production at Newton or other centers in order to supply chicks to all farmers throughout the country
- q) To improve the organization of the Ministry of Agriculture, Forestry and Natural Resources with a help from the Agricultural Support System Plan

2) Medium-Term Projects

Medium-term projects for Rice

- a) To maintain a level of increased production
- b) To stimulate the price and to investigate an improved distribution system
- c) To make an inventory of resources
- d) Readjustment of land utilization plan
- e) Improvement of irrigation in marsh lands
- f) Development of effective planting systems
- g) To conduct an adaptability test in all ecologies
- h) To intensify mechanization in cooperation with the private sector
- i) To investigate the possibility of a commercial rice production plan
- j) To intensify the training of farmers, researchers and breeders
- k) To develop a large-scale irrigation and drainage plan
- l) Improvement of rice storage facilities and reduction of loss after harvest

Long-term Projects for Rice:

- a) To maintain a level of increased production
- b) To stimulate the price and to continue a research into an improved distribution system
- c) To prepare a land utilization plan
- d) Large-scale mechanization in cooperation with the private sector
- e) To develop an export market for rice
- f) To conduct fundamental tests and adaptability tests
- g) To investigate the possibility of large-scale businesses
- h) To continue the training of researchers, farmers and breeders
- i) Further improvement in rice production, storage facilities, and reduction of loss after harvest

As regards produce other than rice

The crops per acre of root and stem produce (cassava, sweet potatoes, yam, etc.) cereals, beans (peanuts, cowpeas, pigeon peas) in Sierra Leone are lower than those of other countries. Therefore, the following measures are to be taken for increasing these productions:

Short-term Projects

- a) To intensify the activities of the seed multiplication plan (SMP) and to provide varieties of improved seeds with a subsidy to enable distribution at a price the farmers can easily afford.
- b) To develop seed potato production farms in many areas in order to easily distribute good breed of seed potatoes
- c) To establish sales offices to enable farmers to easily buy fertilizers

- d) To encourage small-scale farmers to weed with hands and hoes, and to recommend the use of weedicides only to large-scale farmers
- e) To encourage the baking of bread which are made from starches of cassava, sweet potatoes and corn to save wheat flour

Long-term Projects for Produce Other than Rice

- a) To develop breeds adaptable to the growth environment in Sierra Leone and to conduct an adaptability test for improving them
- b) To develop an economical method for weed control, using the minimum amount of weedicide
- c) The government is to perform the following for the reduction of loss after harvest:
 - i) Evaluation of the degree of loss in goods
 - ii) Formalization of loss reduction measures
 - iii) Construction of appropriate storage and processing facilities
 - iv) Recommendation of new methods for preventing insect infestations, processing methods for goods, and storing, drying and preserving methods
 - v) Training of staff necessary for loss control of goods through study and seminars at a national level

Perennial Crops

Various measures have been indicated for coffee, cocoa and palm kernels. Therefore, only common problems are discussed here. The SLPMB collects and exclusively exports the produce. However, the purchasing prices from the producers are extremely low. Therefore, this plan proposes setting the price in accordance with the price based on the normal international exchange rate.

Forestry

Short-term Projects:

- a) To decrease the current loss in forests and woods by 30%
- b) To preserve the existing forest and woods resources, soil and water resources as well as the ecological environment
- c) To control severe shortages of firewood in urban cities by planting rapidly growing trees and to prohibit the cutting of cophira trees in the Savanna
- d) To promote the recovery of fertility and maintenance of soil by teaching the farmers techniques for preservation farming, agricultural stock-farming and agricultural forestation
- e) To create employment in farm villages by promoting a social forestry and to develop a forestry promotion project and to provide necessary technical supports for the purpose.

Long-term Projects

- a) To harvest overmature trees by establishing a joint venture company and by examination of forestry licence during the period of a short-term or a long term project
- b) To develop necessary forests to cope with future demands for lumbers used for residence construction

Stock-farming Sector

- a) To diagnose domestic animals on site by establishing an experimental station with a well-trained staff in 7 different areas for regular services for preventive injection against enzootic diseases prevailing in each area, extermination of mites and other external parasites
- b) To reinforcing stock-breeding and service centers to provide back-up support from time to time for supply of medicines, vaccines, supplementary inorganic matters and others

- c) To minimize disputes between agricultural farmers and live-stock farmers by settling the traditional cattle producer on his land, to confine a certain area and to fence with trees planting around the area in order to limit the cattle activities, to severely control the number of animals to be reared within the fence to prevent overgrazing and to establish watering areas for domestic animals wherever underground water or surface water can be obtained.
- d) The following two methods apply to the consolidation of stock-farming and agronomics:
 - i) To encourage stock-farming with a collective use of the land where produce is cultivated similarly to the case of oil palm plantations in the southern and eastern areas.
 - ii) To encourage a cattle-raising project to familiarize inexperienced persons with cattle raising.
- e) To employ instructors in the live-stock department to provide knowledge on economical methods of meat production, prevention of fire in bush, and reasonable control of stock farms including the proper density of grazing
- f) To encourage a partial use of the land as a breeding base and a pasture.
- g) To secure a spare land for grazing to be used for future development
- h) Supply of loans and materials
- i) To establish a live-stock development fund which provides loans and by which the investment by the private sector into the live-stock is promoted.
- k) To census the number of cattles to contribute to plan-making.

The live-stock development project incorporating some of the above-mentioned plans will be put into operation over the next 2 years in the whole area of the northern province by FAO with the help of a loan from UNDP (The United Nations Development Plan).

Another project for goat production is going to be put in operation by the same organization.

(4) Procurement of Required Fund

Prior to the actual implementation of this project, the Green Revolution Agricultural Fund (GRAF) will be established. Funds will be contributed by the following 3 major financial sources; (a) promotional subsidy from the government, (b) contribution from the private sector and (c) contribution from foreign countries. The finances from the government will be expected to play the major role in the Green Revolution Projects. The public organizations will all be requested to contribute at least 5% of their net profits gained. The SLPMB will be requested to contribute 15% of the net profit. The GRAF will open a bank account in the Sierra Leone Bank. The expenditure for the Green Revolution Project for the first 2 years is estimated to be 380 million leons calculated from the commodity price as of June 1986 (consisting of 30 million leons in domestic currency and 350 million leons in foreign currency).

11. Investigation of Farmers

Two typical farmers in Bolliland were selected for this investigation. One is a traditional farmer with a family of 56 members, a so-called expanded family. The other is a standard type of a part-time farmer, characterized as a nuclear family, who belongs to a most modern and intelligent class. Both farmers run a partly joint management (co-owned domesticated animals) and may be different from general farmers. That is, they mutually share labour, lands, capital, knowledge, and techniques to run the business and are considered to rank as the extreme upper class.

12. Current Situation and Problem Areas In Rice Cultivation

The planting acreage and production of rice, which were once ranked No.1 in West Africa, have recently shown a decreasing trend as Nigeria and Guinea increase their production. The self-sufficiency rate, which was once 90%, has decreased to about 70%. The factor interfering with the rice production is water as in the case of Guinea. However, the percentage of farmland rice planting having greater instability is about 70% which is larger than that of Guinea, and the average production per ha. is 1 ton of unhulled rice. From this fact, it is considered that the climate conditions (rain) and the average fertility of soil are better than those in Guinea.

13. Measures for Technical Improvement and Possibility of Increasing Production of Rice

Rice is very important staple food and its self-sufficiency is no less moral than those of Guinea. There were the requests of support from the leaders in central and local area, as well as farmers. As per our previous description, they have same environments and problems of rice production as those of Guinea and also, the way of improvement and policy of settlement are almost similar.

The experimental research and study on breeding and growing have been conducted at WARDA in Rokpuli and National Institutes, and the experimental use of multi-crop breed and technical improvement of culturing resulted in obtaining a crop more than 4 tons per ha.

These new breed and new techniques have been gradually adopted to farmers, which, however, would look insufficient. If the right introduction will be made, the increasing of rice production could be expected.

It is, needless to say, very important for them to expand the available rice acreage and to increase stability of production, while proceeding establishment of basic foundation.

In order to attain higher self-sufficiency of rice production, farmer's higher labour moral of will be indispensable, as well as raising the harvest level through improvement of culturing techniques.

Consequently, it is considered to be essential to increase the farmer's income and stabilize their operation so that technical improvement could result in real harvest.

14. Cooperation

The diplomatic policy of Sierra Leone has been to remain unallied with any country but actually they have been maintaining friendly relations with the U.K. and China and are allied with the West.

Consequently, Sierra Leone is always in a position to accept cooperation from any of those countries. In general, the U.K. is giving extensive cooperation. However, the main agricultural cooperation comes from China.

Their agricultural developments have been made under projects system, while assistances from various countries and the United Nations are often based on project units.

The Japanese cooperation with Sierra Leone has been directed to grant aid-type supply of rice as a part of KR Food Aid every year since 1979. There are no other outstanding areas of cooperation except for technical cooperation, such as acceptance of trainees and dispatch of a survey team (in 1981 to 1982).

The import of rice in Sierra Leone has recently exceeded 100,000 tons and this has put increasing pressure on its economies.

Therefore, the first target of this country is possibly to stabilize its national economy by achieving self-sufficiency in rice production.

In view of such a situation, our agricultural cooperation to this country may be stressed on technical assistance, since Japan is one of the world's most advanced countries in the field of rice production and has considerable capabilities for cooperation with Sierra Leone.

Investigation of Farmers

1. Background of Farmers Investigated

- Regional Characteristics of Northern Province

The typical rice crops in Sierra Leone include those in the seashore area and the inland marsh lands, dry field rice crops in the inland area, or rice crops in the riverine low swamp lands.

The investigation was made in Bolliland in Bombali prefecture in the northern province, as the result of examination by the government. The characteristics of the northern province where the investigated farmers are located are given below:

1) Administrative Classification of District and Population of Tribes

Northern province occupies about 50% of the total area of the country and has 35% of the population. Makeni, the provincial capital, is located approximately in the center of this province and includes 5 prefectures. Out of 5 prefectures, Kolnadugu located in the northern-most part has the least population, while Kambia has the largest population. Bombali prefecture where the investigated farmers are located is ranked at the middle in population.

In the northern-most part, the Foulah, Susu and Limba tribes live, and in a location slightly south, the Mendi and Temme tribes are found.

The Temme tribe is ranked at the top with 1/3 of the national population and forms the two largest villages with the Mende tribe in this country. However, the afore-mentioned tribes in the northern areas are small tribes with 3% of the population, except for the Limba tribe (80%). The Sherbro tribe lives in the seashore area and has a large christian population.

Northern Province of Sierra Leone

Administrative classification and Population (Northern Province of Sierra Leone, 1985)

Prefecture	Acreage (Km ²)	Population person(1985)	Population Density (person)
1.Bombali	7,985	317,729	39.8
2.Kambia	3,108	186,231	59.9
3.Koinadugu	12,121	183,286	15.1
4.Pot Loko	5,719	329,344	57.6
5.Tonkolili	7,003	243,051	34.7
Total	35,936	1,259,641	35.1
Sierra Leone	71,740	3,515,812	49.0

2) Natural Characteristics

(1) Topography

Koinadugu in the northern-most part forms a highland at 1500m to 1900m above sea level. Great Scarcies river, Little Scarcies river and Rokel river flow from the north to the south, reaching the Atlantic Ocean.

In the middle area, Boliland lies between the mountaneous region and the sea-shore area on the Atlantic coast. In the inland area dry field culture is mainly practiced with the use of rain water on the hilly land with a gentle slope and on the dry land. Rice is mainly cultured in the swamplands.

On the Atlantic coastal area and in the vicinity of the river port, mangrove swamplands are formed in a belt shape. In the inland area, there are many valley swamps in the depressed lands located at the foot of the mountains.

(2) Climate

The temperatures and rainfall at 3 observation points in the northern province are as shown below. Kabala is located in the mountains of the northern-most part Rokpur is in the vicinity of the port of Little Scarcies river and the nearest place to the Atlantic Ocean; and Makeni is in the middle area between them. The average temperature in three points are about between 24-27°C, higher temp during Dec. to Apr. in drought season, and lower during May to Nov. In rainy season. The lowest temp show less than 20°C during Dec. to Mar. in Makeni, which climate closing to an inland type. The total rainfall per year is approx. 2000 mm in Kabala in the mountains. In Makeni, and Rokpur. It closes to 3000 mm. The rainy season are from Apr/May to Oct/Nov, and it has plenty of rain in Aug. Meanwhile Dec to Mar/Apr. are drought season, shorter than rainy season. Inland heights (hills) and mountaineous regions are good for growing crops because of sufficient rainfall and less damage by drought.

Temperature and Rainfall Observations
Northern Province of Sierra Leone (1960-85)

	JAN	FEB	MAR	APR	MAY	JUN
Average (°C)						
Temperature						
KABALA	24.7	27.3	28.2	27.4	26.4	25.1
MAKENI	25.4	27.3	28.7	28.3	27.0	26.2
ROKUPUR	26.3	26.3	27.4	26.7	27.9	26.7
Maximum (°C)						
Temperature						
MAKENI	33.1	34.7	35.7	35.2	31.9	30.2
ROKUPUR	32.9	31.8	33.8	33.8	32.9	31.2
Minimum (°C)						
Temperature						
MAKENI	17.6	19.8	21.6	21.4	22.0	22.2
ROKUPUR	26.3	26.3	27.4	26.7	27.9	26.7
Rainfall (mm)						
KABALA	0.6	2.6	31.0	104.2	1832.0	266.4
MAKENI	12.2	9.4	29.2	93.0	224.3	409.2
ROKUPUR	2.3	2.8	8.1	54.9	178.8	364.0

- continued -

	JLY	AUG	SPT	OCT	NOV	DEC	Total/ Average
Average (C) Temperature							
KABALA	24.4	24.4	24.8	25.3	25.5	23.6	25.8
MAKENI	25.4	26.8	26.4	26.7	25.2	25.7	26.8
ROKUPUR	25.5	25.3	25.7	26.4	24.3	25.7	26.2
Maximum (C) Temperature							
MAKENI	29.8	31.6	30.5	31.6	29.2	32.1	32.6
ROKUPUR	29.3	28.9	28.0	31.0	31.4	32.1	31.4
Minimum (C) Temperature							
MAKENI	20.9	22.0	21.3	21.7	21.2	19.2	20.9
ROKUPUR	25.5	25.3	25.7	26.4	24.3	25.7	26.2
Rainfall (mm)							
KABALA	373.0	395.2	358.6	258.8	48.6	0.6	2027.8
MAKENI	518.4	643.9	372.6	441.7	180.8	51.1	2989.1
ROKUPUR	591.8	725.4	531.1	341.1	133.1	13.0	2946.7

Remarks; Figures for Makeni and Rokpur are based on the average temperatures and rainfalls during 1960-1985

Figures for Kabala show the average temperatures and rainfalls during 1980-1985

(3) Soil

The seashore area consists of alluvial soil and is fertile in general. Also, the flat land area along the river is good for cultivation of crops because of a thick soil layer formed by running water in the rainy season.

The inland area is almost covered with laterite soil and is a reddish tan color. The secondary forest spreads over the land in the northeastern part of Savanna and that makes it difficult to grow crops there.

3) Ecological Characteristics

(1) Seashore Area

The seaside forms a mangrove marsh land and the river port area forms a mixed area with sea-water and fresh water. Also, vegetable farming is seen on the fertile land.

(2) Inland Area

The inland area forms a hilly region with a gentle slope 30 m to 300 m high above sea level and a Bolliland is seen everywhere. In the rainy season, the low land changes to a marsh suitable for rice culture. The secondary forest with bush covers all the inland area. On the farm land, a burn-farm cultivation used for rice, as a main crop, and other cereals and cassava. The northern part forms a savanna area with shrubs and grass. There stock-farming is carried out, making good use of grass. Also, sorghum, and millet durable in a dry climate are cultured.

4) Cultivating Methods

In the inland area, rice cultivation starts in April, using rain water. In Bolliland, the burn-farm cultivation is popular and the harvest season starts from July or August in the earliest case, but more usually in November or December. The harvested rice is piled up on the field during the dry period and threshed and prepared in about February or March of the next year.

In the seashore area, so-called marsh land rice is cultured by sowing in April or May and planting in May or June. In the inland valley marsh land, there is an idle time for the cultivated land, while in the mangrove marsh land or the low riverine lands successive cultivation is carried out.

5) Distribution of Farmers

The farmers in the northern province amount to 43.3% of the total number in this country. Bombali prefecture has 20,542 farmers, which amounts to 21% of the total.

According to the ecological classification, in the northern province except the riverine or swamp areas, there are farm lands and inland valley marshlands especially Bolliland which cannot be seen in other provinces. Bombali prefecture is characterized with the greatest number of Bollilands among others.

Distribution of farmers in Northern Province
(based on sampling census in 1984/85)

Prefecture	Small Farmer	Large-scale farmer	Total	Distribution(%)	
Bombali	20,508	34	20,542	9.2	21.2
Kambia	14,445	25	14,470	6.5	14.9
Koinadugu	20,863	35	20,898	9.3	21.5
Port Loko	23,921	18	23,939	10.7	21.7
Tonkolili	16,964	34	16,998	7.6	17.6
Total	96,701	146	96,847	43.3	100.0
Sierra Leone	223,265	283	223,548	100.0	

Data from: PEMS/MANR in February of 1986

Numbers of Farmers by Estimated Pref. Classification and Ecological Classification at Northern Province of Sierra Leone (1984/1985)

District	Ecological Classification				
	Upland	Inland Valley swampland	Riverine	Mangrove Swampland	Bolliland
Bombali	17,389	13,535	-	-	3,842
Kambia	8,685	5,460	-	7,224	457
Koinadugu	8,991	12,810	-	-	-
Port Loko	17,702	11,740	-	10,640	661
Tonkolili	16,892	10,625	-	-	418
Total	69,662	54,190	-	17,867	5,378
S. Leone	179,720	139,422	10,714	17,867	5,378

2. Distribution of Farmers

1) Selecting and Investigating Method of Farmers

An investigation of a typical marsh land in the seashore area in Sierra Leone had been made in the past with the cooperation of the Japanese team. Therefore, this time an investigation was made for 2 typical farmers selected from a dry land and an upland (swamp land) in a Boliland (a plate-shaped land) which is seen everywhere in this country. These typical farmers are located in the north-eastern part, 180 km away from Freetown and near Makeni city which is almost in the center of this country.

This investigation was made at the office of Northern Integral Agriculture Development Program with the assistance of its staff for interpretation of English into the native language. The interviews lasted about 4 hours with Farmer No.1, and 2-1/2 hours with Farmer No.2. The major investigation items consisted of the following 10 items.

- <1 > Land Holding Conditions
- <2 > Conditions of Family and Side-lines
- <3 > Holding Conditions of House, Farming Machines and Implements and Furniture
- <4 > Agricultural Cultivation (Major Produce)
- <5 > Introduction of Improved Breeds
- <6 > Live-stock Raising and Diseases
- <7 > Labour required for Farming, etc. (Manpower)
- <8 > Purchasing Situation for Seeds, Fertilizers, Chemicals
- <9 > Expenditure for Foods in all Household Expenditures
- <10> Domiciling Situation

2) Result of Investigation

(1) Land Holding and Characteristics of Land

Farmer No.1 has a land of about 20 ha, 9 ha of which has been idle land. He has no shrub or forest lands. He has 2 ha each for a lent and rental land. He uses rain water only and no land can be irrigated. All the land he has is flat but includes some Bolilands.

Farmer No.2 has 24 ha and another 2 ha of rented land. The idle land occupies 14 ha out of the total. His farming also depends only on rain water and no land can be irrigated. All of his land is flat but is categorized as dryland in a Bolliland and forms an upland.

(2) Conditions of Family and Side-lines

Farmer No.1 has a so-called expanded family consisting of 56 members, including 12 family members, dependents of brothers and sisters, relatives, etc. This investigation involved 12 members. The 12 members consist of 6 males and 6 females including 4 wives from No.1 to No.4. 9 members are over 16 years old. Out of the 12 members, 6 are in a primary school or a junior high school and 2 females out of 6 are graduates of a Mohammedan School. This family is considered to have a high level of education.

In view of their side-lines, of the No.2, No.3 and No.4 wives, 2 are fish merchants and one is a firewood and charcoal merchant. The eldest son is a teacher in a junior high school. Their yearly gross sales were 45,000 leons and 12,500 leons from the fish merchants and 7,500 leons from firewood and charcoal merchant, respectively. Besides the above, the eldest son earns 230 leons as his monthly salary.

Farmer No.2 has a modern nuclear family consisting of parents and their 3 children. The head of the family is a university graduate and is now the principal of a junior high school. His wife is a graduate of a nursery school and is now a teacher of a primary school. One of the children is a primary school student and the other two are in a kindergarden. The annual income of the head of the family is about 20,000 leons and his wife earns 4,800 leons per year. For farming, he owns a tractor in common with the other farmer, and the farming depends on employed labor. His farming can be regarded as entrepreneurial management.

(3) Holding Condition of House, Farming Machines and Implements and Furnitures

Farmer No.1 has 2 residential houses. One residence was built 40 years ago and the other in 1980. In addition, he has 2 barns and one warehouse.

His farming machines and implements consist of small implements, such as axes, hoes, sickles, and shovels, in addition to a 4-wheeled large type tractor commonly owned by 2 farmers. He also has 2 harrows. The scale of farm management exceeds 10 ha, but the farming mainly depends on the employed labors and this tractor.

Furniture includes a radio which he purchased in 1980, electric lights, and over 50 units of chairs, and beds, etc. and a motorcycle.

Farmer No.2 is a side-line farmer with a high intelligence level. He has one residence, 2 barns, and one warehouse, all built in the 1980s.

For farming machines and implements, he has a 4-wheeled large type tractor commonly owned with Farmer No.1. For his employee's use, he has hoes, axes and sickles in addition to 2 harrows, but he also has modern machines, such as one steel-made plow for cultivation and one wagon, which is very rare for a farmer.

His furniture consists of 2 radios, chairs and beds, and a motorcycle.

(4) Agricultural Cultivation and Introduction of Improved Breeds.

Farmer No.1 cultivates 4 ha of rice, 60% of which is cultivated by direct sowing and 40% by planting. Even though he applies fertilizers to the soil, the yield per unit area (a single crop) for direct sowing is as low as 0.9 tons, while it is as high as 1.2 tons for transplanting.

Besides the above, he obtains a remarkable yield from extensive cultivation of cassava.

Farmer No.2 cultivates 4 ha of rice, part of which is used for cultivation of cowpeas, corn and sorghum. Though it is Boliland, it is categorized as dryland, and therefore, direct sowing is used there, as in the case of uplands.

In the rice cultivation by this Farmer No.2, first shrubs and grass are burnt in March or April and then the land is cultivated with a tractor. Two or three weeks after sowing, the soil is fertilized with 15-15-15 chemical fertilizer. Additional fertilization is done with urea fertilizer.

The yield is 1 ton per ha, including a single crop and mixed crops. The above mentioned is the case with the mixed sowing.

In case of a single culture of rice, cultivation of land takes place in March or April, and sowing is done in May. Three weeks after sowing, 15-15-15 (content rate of N,P, O₂,K₂O) chemical fertilizer is applied in the amount of 125 kg per ha and also additional fertilization is done with 125 kgs of urea fertilizer per ha in July. The harvest time is September. The yield is 1 ton per ha, including a single crop and mixed crops. This farmer also obtains 7.5 tons with a single crop of cassava in 6 ha.

Both Farmer No.1 and Farmer No.2 are regarded as leaders in this region and have introduced multi-kinds of improved varieties. They introduced CP4 (Philippine variety) and ROKIO (Rokpur variety) for rice, and Nucass and Rocass varieties for cassava from the Northern Integral Agriculture Development Program Office in Makeni city.

(5) Live-stock Raising and Diseases

Farmer No. 1 keeps 6 heads of cattle, 1 milk cow, 15 goats and 30 fowl. All of those are owned by both farmers in common, and therefore, actually each farmer owns half the number of those animals. The prices are 4,000 leons per head of cattle, 500 leons per goat, and 55 leons per fowl.

They are mostly pastured and modern methods such as artificial fertilization are not used. In this region, there are many tsetse flies which cause disease in domestic animals. This fly causes sleeping sickness (trypanozooma) which is most feared. Other diseases, such as anthrax, polytumor, pyroplasma and foot and mouth disease exist in this region, but they are prevented to a certain extent with vaccines.

(6) Labor required for Farming and Stock-farming

Farmer No.1 always requires 25 family laborers, either men or women. Besides them, he employs labor for 500 days for rice and other field crops. The wage is 10 leons per day for a man and 6 leons per day for a woman.

Farmer No.2 depends on employing his required labor. He employs labor for 800 days per year for rice and other field crops. It is considered that he depends for a great portion of the labor on mechanical power. For small-scale animal raising, he employ a family consisting of parents and children, and supplies them rice every year for their wages instead of money. He also gives them a calf after three years.

(7) Purchasing of Seeds, Fertilizers, and Agricultural Medicines

Farmer No.1 buys seeds and fertilizer on credit from Northern Integrated Agriculture Development Program Office (SMP) and pays in kind. The amount of seed purchased is 2,700 kgs (100 bushels) and the price is 1 leon per kg. because of the government subsidy.

Besides that, he buys 450 kgs of cassava samplings at a price of 4 leons per kg. from SMP.

For fertilizer, he buys 5,000 kg of 15-15-15 chemical fertilizers at a price of 0.66 leons per kg and 2,500 kg of urea fertilizers at a price of 0.70 leons (2.6 yen) per kg. They are all cheap because of the government subsidy.

Farmer No.2 also buys 1,890 kgs of unhulled seeds at a price of 28 leons per kg from SMP and 3,000 kg of chemical fertilizers.

However, the amounts purchased by Farmer No.1 and the Farmer No.2 are considered to be too large for their farming acreage. Therefore, it is considered that the purchased amounts may be used over several years or for other purposes.

(8) Expenditure for Food in All of Household Expenditures.

Farmer No.1 has an expanded family consisting of 56 family members in total and the self-sufficiency rate is 75%. He buys 100% of his meat and fish and consumes a considerable amount. Self-sufficiency in vegetables is low so that he buys a large proportion of them. The expenditure per day per capita is as low as 3.7 leons.

Farmer No.2 buys all of his food including rice, and consumes a remarkable amount of animal protein, such as meat and fish. The expenditure for foods is 16 leons per day per capita, which is 4 times as much as that of Farmer No 1.

(9) Domiciling Situation and Land Holding

Farmer No.1 has lived in the present location for 50 years since he was born). All the land he has was obtained by succession of property.

Farmer No.2 has lived in the present location for 9 years. After he domiciled there, he developed a friendly relationship with Farmer No.1. He was given a piece of land by Farmer No.1 free of charge and he has taken care of the farm management for Farmer No.1.

(10) Summary

These farmers are considered to be two different types of typical farmers in the inland region, so-called Boliland. Farmer No.1 has formed an expanded family, following the hereditary practice, and the head of this family is considered to be a kind of a tribal chief. Conversely, Farmer No.2 has formed a modern nuclear family, with a family head who graduated from a university. This family is categorized as highly intelligent class.

These two farmers were selected by the Integrated Agriculture Development Program Office in this province. The selection standard is not clear, but they are considered to be in the upper class of farmers in this region. Farmer No.2 mainly handle the actual management and tries to diversify and stabilize the management by using a tractor for fertilization and by introducing new varieties in fruit culture and stock-farming.

Table Farmers Investigated
(Sierra Leone 1987)

Farm-er #	Name of head of household	Family Member	Address	Features of locality
1	Alhaji Gbrahins Cnrteh	56	Sebola, Bonbui Pref. in Northern province Sierra Leone	Boliland swampland
2	Sahid Abdul Kargbo	5	Makali, Gubenti Northern province	Boliland (upland)

Table Land Holding & its Characteristics
(Sierra Leone) (1987)

Farmer No.	1	2
Land Possessed		
Cultivated land	11.1	10.0
Idle Land	9.2	14.0
Forest Land	-	-
Shrubs and Grass Land	-	-
Other	-	-
Total	20.4	24.0
Leasehold	1.8	2.0
Rental land	2.0	6.0
Land using rain water	20.0	28.0
Irrigatable land	-	-
Fertile Land	20.0	28.0
Flat Land	20.0	28.0
Sloped Land	-	-

(Unit: ha)

Table Status of Family Members
(Sierra Leone)

(unit: person)

Farmer No.	1	2
Total Number (male + female)		
Of family	12	5
Of housewives	4	1
Sex : Male	6	2
Female	6	3
Age : Over 30 years old	5	1
between 16 - 29	4	1
Under 15 years old	3	3
Total	12	5
Educa Primary School graduates & pupils	3	1
-tion: Junior high school graduates & Students	3	-
Others (University)	1	2
Moslem School graduates & pupils	3	-
No Schooling	2	-
Student/Pupil at present	5	3
including kindergarden children		
Total	12	6
MALE		
Age : Over 30 years old	1	1
between 16 - 29	3	-
Under 15 years old	2	1
Total	6	2
Educa Primary School graduates & Pupils	1	1
-tion: Junior high school finish & Students	3	-
Others (University)	1	2
Moslim School graduates & Pupils	1	-
No Schooling	0	-
Student/Pupil at present	4	6
including kindergarden children		
Total	6	6

Farmer No.	1	2
Major works (MALE)		
Mainly farm work	1	-
Mainly side-lines	1	1
Engaged in farming/side-lines	4	-
No works	2	-
FEMALE		
Ages: Over 30 years old	4	-
between 16 - 29	3	1
Under 15 years old	1	2
Total	6	3
Educa- tion: Primary School graduates & Pupils	2	1
Junior high school graduates & Students	-	-
Others (University)	-	-
Moslim School Graduates & Pupils	2	-
No Schooling	2	-
Student/Pupil at present	1	2
Including kindergarden children		
Total	2	2
Major work (FEMALE)		
Mainly keeping household	1	-
Mainly engaging in side-lines	3	1
Engaged in farming partly	1	-
No work	1	-
Remarks;	(A)	(B)

(A) 2 females engaged in side-lines are operating business and selling farming products at small scale; first son is a teacher. Total four persons engaged in side lines.

(B) 2 childrens(boy/girl)attend kindergarden. Head of household is principal of a school,and wife is teacher.Side-lines are main employment.

Table Status of side lines
(Sierra Leone (1987))

Farmer No.	Side Line	Kinds of Work	Place of Work	Kind of Income	Gross Income annually thru side-line
1	Yes	1. Fish Sales	Makeni	Sales	900 leon x 50 week=45,000 leon
		2. Fish Sales	"	"	250 leon x 50 week=12,500 leon
		3. Fire wood Sales	"	"	150 leon x 50 week=7,500 leon
		4. Teacher	"	Salary	230 leon x 12 month= 2,760 leon
2	Yes	1. Teacher (principal)	"	Salary	1,640 leon x 12 month=19,680 leon
		2. Teacher	"	Salary	400 leon x 12 month= 4,800 leon

Table Holdings of House, Farm Equipment & Furniture
Sierra Leone (1987)

Farmer Number	1	2
Houses & Major Farm Equipment		
Residence (Bldg)	2 '40/'80	1 '82
Barn (Bldg)	2 '83	2 '80
Warehouse (Bldg)	1 '84	1 '80
4-wheeled Tractor (Unit)	1/2 '84	1/2 '83
Cart (Unit)	-	1
Steel Plow (Unit)	-	1 '83
Hoe (Pcs)	17	24
Ax & Sickle (Pcs)	12	20
Harrow (Unit)	2	2
Bucket (Pcs)	6	6
Shovel (pcs)	6	2
Mortar (Unit)	5	2
Major Farming Equipment		
Motorbike (Unit)	1 '81	1 '81
Radio (Set)	1 '84	2 '79
Well (Unit)	1	-
Oil Lamp for lighting (set)	3	?
Compression Lamp (set)	-	?
Electric Bulb (pcs)	24	?
Jar (pcs)	1 '80	2 '80
Chair & Bed (set)	24/bed,30/Ch.	4/bed'78 8/Ch.
Cooking Stove (set)	1	1
Hack (pcs)	?	-
Carpet (pcs)	?	-
Pan (pcs)	?	?
Torch (pcs)	-	1 '87
Cassette (cases)	-	1 '83

Figures shown on the right of qty indicate year of purchase or construction.

Table Situation of Crops Cultivation
Sierra Leone (1987)

Farmer Number	1			2		
Name of Crops	D.Sowing/Trans.p/Cassava			Rice	Cassava	
Planting Acreage	2.4	1.6	7.2	4.0	6.0	
Single Crop and /or Mixed Crops	Single	Single	Single	Mixed	Single	Single
Classification of Works by Season						
Cultivation Start/Mon.	-	6	-	5	3-4	
Sowing Month	7	-	11-12	D.Sow/5	D.Sow/5	10
Rice Planting Month	-	7-8		-	-	-
Weeding Month	9	8-9		7	6-7	-
Cultivating Month	-	-	-	-	-	-
Fertilizing Month	9	8-9		6-7	6	-
Irrigating Month	-	-		-	-	-
Chemical Sprinkling/Mon.	-	-		-	-	-
Harvesting Month	12-1	12-1	10	9	9	9-10
Yield /ton	2.1	2.2	19.0	4.0	45.0	
Yield per ha/ton	0.885	1.35	6.0	※1	1.0	※2 7.5

Remarks for Table

※1= Bolland dry=upland

Yields of mixed crops, cowpeas, beans, corns, sorghum are unknown.

※2 =This farmer also cultures 0.4 ha of mango and 0.8 ha of oil palm, but they have not yet reached the bearing stage

Table Introduction of Improved Varieties
Sierra Leone (1987)

Farmer Number	Introduced or not	Name of crop/Variety	Introduced Route	Year	Reason for Introduction
1	Yes	Rice(C4)	From project field	1979	1)Higher Adaptability than the conventional varieties
>		(Rok10)			
2		Cassava (Nucass)	N.I.A.D.P	1982	2)Available for Distribution of seeds on credit
		< (Rocass)			
		Potatoes	P.R.P.C.	1982	3)Better Germination of Varieties
		Citrus	N.I.A.D.P	1984	4)Treated with Agents
		Oil Palm			5)Fertilizer and Agricultural Medicines are simultaneously supplied and the pay-back can be made in kind at the time of harvest
					6)Sales route for the crops is prepared

Table Number of Domestic Animals reared
Sierra Leone (1987)

Farmer Nos.	1	2
	Quantity / Price	Quantity
Kinds of Domestic Animals		
Cattle	6 (Native Breed)	Commonly owned by farmers No.1 and No.2 by half and half
Milk Cow	1 (Improved Breed)	
Goat, Sheep	15/500 Leons	
Fowl	30/ 55 Leons	
Pig		
Others		
Rearing Method for Cattle, Sheep, Goats, etc.	Grazing on his own or other land	
Existence of Tsetse Flies	Yes (Many)	Yes (Many)
Existence of Artificial Insemination	No	No

**Table Existence of Domestic Animal Diseases
Sierra Leone (1987)**

Farmer No.	1	2
Foot and Mouth Disease	Some exists	Same as left
Anthrax	Available for preventive Vaccine	
Polytumor		
Pyroplasma		
Mammitis	Nil, generally	
Tripanozooma (Sleeping Sickness)	Frequent occurrence	

The above shows the occurrence within the Makeni region and not for both farmers.

Table Required Labor Force (for Farming and Stock-farming)
Sierra Leone (1987)

Farm Nos.	Name of Crop	Farming							Stock farming		
		Family Labor (person.day)			Employd Labor (person.day)			Wage/day Person		M	F
		M	F	Total	M	F	Total	M	F		
1	Rice	**	**	25	****	****	400	10 L	8 L	365	365
	Farm crp	**	**	*****	****	****	100	10	6		
	total	**	**	*****	****	****	500	-	-		
2	Rice	-	-	-	****	****	600	10	8	per- son	per- son
	Farm crp	-	-	-	****	****	200	10	6		
	Total	-	-	-	****	****	800	-	-		

Remarks: M = Male, F = Female, Crp = Crops L=leon

1. Farmer No.1 answered that 25 of the family member work every day. However, it should be construed that Farmer No.1 requires 25 persons every day in the busy farming season.
2. Farmer No.2 depends completely on the employment of labor.
3. For the labor required for stock-farming, Farmers No.1 and No.2 employ a married couple jointly, supply rice to their family, and give them a calf every year from the third year, according to the regional custom.

Table Purchase of Seeds, Fertilizers, and Agricultural Medicines
Sierra Leone (1987)

Farm er No's	Crop	Seeds			Fertilizers			Agr. Medicine			Total
		Qty	Unit	Amount	Qty	Unit	Amount	Qty	Unit	A	Amount
1.	Rice	2727	1	2,727	5050	0.66	3,333	-	-	-	8,610
	Casava	450	4	1,800	2500	0.70	1,750	-	-	-	
	total			4,527			4,083				
2	Rice	1890	28	5,250	3000	0.66	1,980				8,280
	total			5,250	1500	0.70	1,050				

Note: 0.66 leons shown in the column of " fertilizers " indicates the unit price for 15-15-15 chemical fertilizer and 0.70 leons for urea fertilizer, respectively.

Table Cash Expenditure for Foods, etc. per capita
Sierra Leone (1987)

Farmer No's	1				
	Consumption per day kg (g)	Unit Price leon	Self- Sufficiency Rate(%)	Purchase Rate(%)	Purchase Amount (leon)
Rice	0.48	5.6	75	25	0.68
Meat	2.3 g	54.0	-	100	0.11
Fish	0.01	10.0	-	100	0.10
Eggs					
Milk					
Vegetables	32.1	0.056	25	75	0.14
Sugar					
Tea					
Table Salt	0.08	14.3	-	100	0.11
Pepper					
Palm Oil	0.05	27.3	-	100	1.38
Firewood	0.035	10.0		100	0.35
Kerosene	0.03	21.9		100	0.66
Total					3.68

Farmer No's	2				
	Consumption per day Kg (g)	Unit Price Ieon	Self- Sufficiency Rate(%)	Purchase Rate(%)	Purchase Amount (Ieon)
Rice	0.03	4.8	-	100	1.44
Meat	2.0 g	5.0	-	100	1.00
Fish	0.4	10.0	-	100	4.0
Eggs					
Milk					
Vegetables	40.0	0.025	-	100	1.0
Sugar	0.01	2.2	-	100	0.2
Tea					
Table Salt	0.04	10.0	-	100	0.1
Pepper	0.03 cup	10.0	-	100	0.3
Palm Oil	0.17 lit	21.8	-	100	3.7
Firewood	0.2	10.0	-	100	2.0
Kerosene	0.11 lit	21.8	-	100	2.4
Total					16.1

Note: The above values are the average values per person of Farmer No.1 consisting of 56 family members and Farmer No.2 consisting of 5 family members.

Table Domiciling Conditions and Acquisition Method of Land
Sierra Leone (1987)

Farmer No's	1	2
Length of time the head of family has lived here	For 50 years since the birth	For 9 years
Location of residence before move to this place	-	Kolifa Wabong Tonkoli-Pref Northern Prv.
Reason for move	-	In order to be a teacher
Acquisition Method residential place and farm land	By succession of Inheritance	Acquired free of cost through friendly relation
Reason for selection of present location	-	Because it is located in a big city and many people from tribe live there

Rice Crop Situation

1. Importance of Rice Crop and Supply and Demand

The planting acreage and amount of production in Sierra Leone were ranked at the top in West Africa in the first half of the 1970s. Rice crop acreage out of the total planting acreage for products accounts for 93%.

Although the rice crop plays an important role, its acreage has been level for recent 10 years, but production has been decreasing. Self-sufficiency of rice decreased to 64% in 1985.

This is caused not only by a social situation, such as a trend of increased population of advanced age due to out-flow of young laborers into urban cities but also due lack of producing materials, lowering of fertility and under-development of technical improvement. Therefore, a policy for increasing rice production is the most important task.

2. Production Situation

a. Land Conditions: The planting acreage, which once has been ranked at the top in West Africa as mentioned above, dropped to 4th position at 400 thousand ha. There are many infertile lands due to lack of organic material. Farm lands especially have low content of organic material and acid soil. In addition, some soils are lacking in microelements to an extent insufficient for soil improvement, resulting in a poor single crop. Consequently, the low yield at the farm land, 70% of which is shared by rice crop, interferes considerably with the increase of production of rice.

b. Weather Conditions: The weather is tropical humid climate and clearly divided into a rainy season and a dry season. Variation in temperature is small throughout the year and the average temperature ranges from 25°C to 30°C.

90% of the rainfall is concentrated in the period from July to September. Rice grows at a peak in this season, but it rains considerably, resulting in less hours of sunshine. High temperature and less sunshine are a minus factor for the growth and yield of rice. Also, like in Guinea, due to underdevelopment of drainage and irrigation systems, the rice crop in the dry season is impossible and in the rainy season is also affected by floods and submergence.

3. Area and Type of Rice Crop

The rice crop area is divided into 4 regions, such as the western region where Freetown, (the capital) is located, the southern region, the eastern region and the northern region. Very little rice is grown in the western region.

According to the data from the Ministry of Agriculture and Forestry Resources for 1986, the rice crop acreage is a little more than 90 thousand ha in the southern region, about 100 thousand ha in the eastern region and a little less than 130 thousand ha in the northern region. The northern region has the highest production followed by the eastern region and the southern region. In this way, rice is extensively grown in the northern region, and especially the Rompe marshland is the greatest granary where an agricultural development project is planned mainly for water-field rice crop.

In the classification of rice crops by type, dry field rice is 67%, low land swamp rice is 26%, mangrove marsh land rice is 6%, deep water rice and floating rice is 1%. In the rice crop of Sierra Leone, there is a special type called Bolliland rice which is a stereo type of Bahon in Guinea. According to the above-mentioned classification by type done by WARDA, Bolliland rice is included in the low inland swamp rice. In the classification by type done by the Ministry of Agriculture and Forestry Resources, the types are divided; dry field rice low swamp rice, riverine rice and Bolliland rice. Among them, riverine rice is distributed only in the southern region, Bolliland rice only in the northern region, while dryfield rice and low swamp rice are distributed in every region

The average yield is 1 ton of unhulled rice per ha and shows a decreasing trend annually. In classification by type, the yield of dry field rice is the lowest with the greatest variation and is no higher than 1 ton per ha. The other types vary depending on region, but the yield ranges from 2 to 3.5 tons per ha.

However, the average yield is 1 ton because the dry field rice crop, which is the main crop, is low.

Cultivating methods for dry field rice, deep water rice and floating rice are the direct sowing method while low swamp land rice cultivation employs a transplanting method. Bolliland rice employs a direct sowing method in the highland and a transplanting method in the low lands. In the direct sowing method, mixed seeds with miscellaneous cereals and corn are often sown. Since the rice crop is limited to the rainy season, each type of rice is planted during the period from May to November and all the farm work is done with hand. As for the planting seeds, imported varieties are used in addition to the native varieties.

In Rokpur, there is a national rice experimental laboratory in addition to the WARDA experimental station. Five departments for variety development, cultivation, product protection, agricultural machines, and management have been established for research and development purpose. For example, the variety development department, a selection of varieties is done and the seeds of the recommended varieties are multiplied and distributed by the management department.

4. Rice Crop in Northern Province (Subject Area)

1) In the northern region, the low swamp land rice occupies a high percentage as compared with the southern and eastern regions. Especially in Port Loko prefecture, including the Romple marsh land area, which is the greatest rice crop area in Sierra Leone, the low swamp rice accounts for 40%. Therefore, WARDA has placed its experimental station at Rokpur in Port Loko prefecture to perform research on the low swamp rice in West Africa.

Especially in Bambali prefecture, there are many dry field rice crops which account for over 70%. Bolliland rice is distributed only in the northern region and the planting acreage reaches about 40% of the total planting acreage in Sierra Leone.

Summarizing the whole northern region, dry field rice occupies the highest percentage followed by low swamp land rice which is 1/2 of dry field rice, and a small percentage of Bolland rice is distributed. According to the Ministry of Agriculture and Forestry Resources, the ratio of those 3 types is 65:33:2.

2) Summary of Cultivating Methods

Low Swamp Land Rice Crop

Rice Nursery: The sowing season reaches the peak in May or June and the nursery normally take about 40 days.

Preparation of Main Rice Farm: Cultivation in the main rice farm is often done twice with manual labor.

Rice Planting: Transplanting season is July or August. Transplanting is roughly done with a standard planting density of 20 to 24 roots per square meter, each root consisting of 4 plants.

Control of Main Rice Farm: Mostly neither fertilization nor weeding are done, except for a few cases of additional fertilization and weeding, once or twice. The maximum amount of fertilization is 80 to 100 kg of nitrogen per ha. No agricultural medicines are used, but there is some damage by harmful insects.

Dry Field Rice Crop: After mowing in March or April and then burning the land, cultivation is done with manual labor. In case of a mixed crop, a mixture of miscellaneous cereal seeds is sown. There is no case of repeated cultivation of rice. The farming season is earlier than that of transplanting rice and the sowing is done in May. The harvest is in September or October.

Bolland Rice Crop

In general, direct sowing is done in the highlands and transplanting is done in the low land. Direct sowing culture uses a method applied to a dry field rice crop and transplanting culture uses a method applied to a low swamp land rice crop. As for either type, threshing is done with a striking method.

3) Culturing Methods of Investigated Farmers (Makeni In Bombali)

Bolliland Rice Crop Farmers

<1 > Varieties of Sample and Planting Acreage: 『CP4 』 30 a, 『ROK10 』 30 a,
Native Varieties 41 a.

<2 > Farming Season:

Month	Tansplanting Rice	Direct Sowing Rice
Jan		
Feb		
Mar	Plowing of Land	Plowing of Land
Apr		
May		
Jun	Plowing of Land	Plowing of Land
Jly		Sowing
Aug	Transplanting	
Sept	Weeding/Fertilization	
Oct		
Nov		Harvest
Dec	Harvest	
Jan		
Feb		
Mar	Threshing	Threshing

<3 > Preparation of Main Rice Farm: Cultivation is done twice in March and June, using a tractor co-owned by the two farmers.

<4 > Sowing and Transplanting: Both sowing and transplanting are done in July or August, since planting is made after sufficient rainfall in the rainy season

<5 > Control: Fertilization is done with chemical fertilizer (15-15-15), and 3 weeks after transplanting and weeding, urea is added to the fertilizer. Even though there are damages caused by rice blight, rice borers and birds, no agricultural chemicals are used.

<6 > Harvest: Harvesting is done in November or December, since the variety used is a late maturing seed. The crops are piled up on the farm field and dried, and then are threshed in February or March the next year. The yield is 0.8 to 1.4 tons of unhulled rice per ha and 75% is used for household consumption.

Dry Field Rice Crop Farmers

1. Varieties of Sample and Planting Acreage: (LAC23), (ROK3), 24a

2. Farming Season

Month	LAC 23	ROK 3
Jan		
Feb		
Mar	Mowing	Plowing of Land
Apr	Grass Burning	Land Clearing
May	Plowing/sowing	Sowing
Jun	Weeding/Fertilization	Weeding/Fertilization
Jly	Weeding/Fertilization	Weeding/Fertilization
Aug		
Sept	Harvest	Harvest
Oct		
Nov		
Dec		
Jan		
Feb		
Mar		

3. Preparation of Main Rice Farm: After mowing and burning grass, plowing and land clearing are done once or twice by a tractor.

4. Sowing: Sowing is done in May, using a machine and soil is stirred and recovered. Sowing is done in the quantity of 50-60 kg of seeds per ha using a sprinkling method. The farmer buys a pack of seeds and pays in kind after the harvest.

5. Control: Weeding is done in June or July, and then urea is added in the amount of 60 kgs per ha. The basic fertilization is done with a chemical fertilizer (15-15-15) in the amount of 125 kg per ha. No agricultural chemicals are used.
6. Harvest: A normal growing variety is used. Since the sowing is done early, rice is harvested in September. The crop is piled up on the farm field and is threshed in next March. The average yield is 1.6 tons of unhulled rice per ha. 100% of the crop is directed to household consumption.
7. Planting System: Mixed sowing with cowpeas, corn, sorghum and others is done and the farmland is idle during the dry season.

The two farmers covered in this investigation are considered to have a higher technical level and better cultivation management than the average in other areas.

Rice Planting Acreage, Production,
Import and Consumption
(Sierra Leone)

	Rice Area (1000 ha)	Paddy produc- -tion (1000 T)	Paddy Yield (kg/ha)	Local Rice Consum- -med (1000 T)	Net Import (1000 T)	Total Rice Consum- -med (1000 T)	Per Capita Consum- -med (kg)	Rate of Self Suffi- -ciency (%)
1960	344.0	207.0	834	...	88.6
1961	352.0	300.0	852	147.29	4.1	151.39	72.4	97.3
1962	255.0	315.0	1235	159.74	26.8	186.54	87.4	85.6
1963	264.0	325.0	1231	167.92	20.8	188.72	86.6	89.0
1964	264.0	331.0	1254	173.68	0.5	174.18	78.3	90.7
1965	301.0	401.7	1335	175.24	18.7	193.94	85.4	90.4
1966	335.0	420.8	1256	214.23	34.5	248.73	107.3	86.1
1967	352.0	440.7	1252	224.36	23.8	248.16	104.8	90.4
1968	320.0	416.8	1303	237.46	16.8	245.26	105.2	93.4
1969	320.0	407.0	1272	223.69	12.7	236.39	95.9	94.6
1970	354.4	622.0	1755	223.05	49.4	272.45	108.3	81.9
1971	380.4	536.0	1409	349.38	26.5	375.88	146.4	92.9
1972	395.8	564.0	1425	297.49	0.6	304.09	116.0	97.8
1973	411.6	594.0	1443	313.28	43.7	353.98	132.3	88.5
1974	571.0	506.0	1026	322.09	45.0	340.39	124.7	94.8
1975	434.6	609.0	1401	325.14	0.0	330.43	118.6	98.4
1976	463.4	642.0	1385	337.88	3.5	358.41	126.1	94.1
1977	410.0	624.0	1522	359.70	16.5	383.58	132.2	93.8
1978	416.0	633.1	1522	348.69	29.5	348.19	127.7	92.2
1979	400.0	500.0	1250	354.94	90.7	445.64	147.4	79.6
1980	383.5	425.0	1108	276.80	99.3	376.10	121.9	73.6
1981	373.0	416.0	1115	232.80	44.5	277.30	88.0	84.0
1982	395.0	460.0	1164	226.20	73.2	299.40	93.1	75.6
1983	400.0	360.0	900	252.10	70.7	322.80	98.3	78.1
1984	424.9	370.6	872	191.40	73.6	252.60	75.3	75.8
1985	422.0	422.0	1000	197.80	112.0	307.80	89.9	64.3

1984/85 AREA AND PRODUCTION ESTIMATES OF RICE AFTER
RECONCILING M & E AND ADCU FIGURES (Sierra Leone)

Area: in hectares
Production: in metric tons

District	Total		Upland Rice		Swampland Rice		Riverine Rice		Irrigated Rice	
	Area	Production	Area	Production	Area	Production	Area	Production	Area	Production
Sierra Leone	318892	504137	224011	218230	79622	236036	12046	41047	3213	8824
South Province	93424	148677	66951	63817	14427	43813	12046	41047	-	-
Bo	31002	41218	27338	30619	3664	10662	-	-	-	-
Bonthe	18781	45469	6892	4066	972	1993	10917	39410	-	-
Moyamba	31755	48746	23951	22993	7804	25753	-	-	-	-
Pujehun	11886	13180	8770	6139	1987	5405	1129	1636	-	-
Eastern Province	99523	164929	75635	85872	23881	79056	-	-	-	-
Kailahun	19489	41890	11837	16098	7652	25711	-	-	-	-
Kenema	50614	78297	40398	44034	10216	34256	-	-	-	-
Kono	29420	44823	23400	25740	6020	19083	-	-	-	-
Northern Prov.	125091	188634	80836	68193	14042	112617	-	-	3213	8824
Bombali	29470	28564	21581	13812	7889	14752	-	-	-	-
Kambia	16435	28893	11376	11262	4970	17345	-	-	89	286
Koinadugu	21180	50743	7308	9208	11497	35121	-	-	2375	6354
Port Loko	28697	46422	18182	16000	10418	30108	-	-	97	314
Tonkolili	29309	35012	22389	17911	6268	1523	-	-	652	1870
Western Rural	854	897	589	348	265	549	-	-	-	-

1984/85 M & E, ADCU RECONCILED YIELD OF RICE BY DISTRICT BY ECOLOGY

Sierra Leone

Yield: in metric ton/ha

District	Upland			Swamp/land			Riverine ADCU (7)	Bo/land ADCU (8)
	M&E (1)	ADCU (2)	Reconciled (3)	M&E (4)	ADCU (5)	Reconciled (6)		
Bo	1.14	1.09	1.12	3.02	2.81	2.91	-	-
Bonthe	0.80	0.38	0.59	3.47	0.64	2.05	3.61	-
Moyamba	0.90	1.02	0.96	3.47	3.13	3.30	-	-
Fujehun	0.65	0.74	0.70	1.65	3.78	2.72	1.45	-
Kailahun	1.01	1.70	1.36	3.36	4.84	3.36	-	-
Kenema	0.87	1.30	1.09	3.38	4.62	3.38	2.55	-
Kono	0.79	1.41	1.10	1.49	4.86	3.17	-	-
Bombali	0.70	0.58	0.64	1.88	1.86	1.87	-	-
Kambia	1.30	0.68	0.99	3.65	3.33	3.49	-	3.20
Koinadugu	1.54	0.97	1.26	2.81	3.78	3.06	-	3.59
Port Loko	0.81	0.94	0.88	3.33	2.46	2.89	-	2.23
Tonkolili	0.88	0.72	0.80	2.90	1.97	2.43	-	2.87
Western Area	0.58	0.59	0.59	2.77	1.37	2.07	-	-

Rice Varieties of the Past, Present and Future
Sierra Leone

Ecology	Yesterday	Today	Tomorrow
<u>Uplands</u>	Tikiri Samba	ROK 1	ITA 257
	Anethada	ROK 2	C-22
	Faya	ROK 3	ISA 6
		ROK 15	FAROX 299
		ROK 16	IRAT 161
			ITA 235
<u>Inland Valley Swamps</u>	RH 2	ROK 4	IR-58
	BD 2	ROK 5	BO 5B
	CP 4	ROK 6	WARKAIYO-4
		ROK 7	ITA 235
		ROK 11	RAY 4045-24
		ROK 12	SUAKOKO 8
		ROK 14	BG
		ROK 2	
<u>Dollands</u>	CP 4	ROK 3	SL 22-617
	Gantang	ROK 10	Gissi 27
			Adny 301
			Moyamban-1
			Rohyb 1-1
		Rohyb 16-4	
<u>Mangrove Swamps</u>	CP 4	ROK 4	Mashuri
	SR 26	ROK 5	BG 400-1
	BD 2	ROK 8	Rohyb 1-1
	RC 4-46	ROK 9	Rohyb 15 WAR3-3-B-2
		ROK 10	
<u>Riverine Grasslands</u>	Gantang	Indochine Blanc	Rohyb 6-W6
	Indochine Blanc		Adny 381

High Yielding Varieties under Production during 1986/87

Sierra Leone

VARIETY	DURATION	SUITABLE ECOLOGY
1. ROK 11, ROK 14	Early (100-120 days)	Associated Mangrove Irrigated Inland Inland Valley Swamp <u>(free from iron)</u>
2. Suakok 8	(" " " ")	Associated Mangrove Irrigated Inland Inland Valley Swamp <u>(could withstand iron)</u>
3. ROK 16	(" " " ")	Upland
4. ROK 3	Medium (121-155 days)	Upland, Lowland
5. RPL 5. ROK 6. ROK 7	(" " " ")	Mangrove, Inland Valley Swamp <u>(Iron free)</u> Associated Mangrove
6. Gissi 27	Medium (121-155)	Associated Mangrove Inland Valley Swamp Bolliland, Irrigated Lowland
7. ROK 10. CP 4	Long duration (176 days)	Mangrove, Inland Valley Swamp
8. Adny 301	(" ")	Bolliland, Associated Mangrove Irrigated Lowland

Rice Crop in Guinea and Sierra Leone

1. Type and Planting Acreage of Rice Crop

Rice in West Africa is classified into various types depending on the culturing environment. This report mainly adopted WARDA's classification, but there are such special classifications as Bahon (Guinea) and Boll (Sierra Leone) depending on the country.

The following table shows the summary of types and planting acreage of rice in both Guinea and Sierra Leone according to WARDA's data:

	Guinea	Sierra Leone
Upland :	257,000 ha	265,000 ha
Lowland:		
Inland Swamp + Bolliland	164	103
Mangrove Swamp	82	23
Deepwater		
Floating	17	4
Riverine		
Irrigated	27	0
Total	547	395

According to the investigation in Guinea, there is no irrigation rice crop and the Bahon rice crop is grown in depressed land of the flat inland area. It is considered that an irrigation rice crop would be included in the inland swamp crop. Also, from the investigation in Sierra Leone, it is considered that the Bolliland rice crop would be included as part of a dry field rice crop.

According to the data from WARDA, dry field rice crops are tending to decrease, especially due to the damage from the drought which occurred during the years from 1981 to 1983.

2. Technical Problems and Possibilities for Improvement

Summarizing the major restrictive factors for each culture and type of rice according to WARDA, there are many problems related to water, such as drought, flood and submergence, in addition to salt pollution, release of nutrients and outflow loss. Those problems can be solved by raising seeds having high resistance to a certain extent, but fundamentally, it is inevitable that just the land foundation be improved.

As far as the problems of cultivation techniques are concerned, rough management, such as no weeding, no fertilization, inappropriate planting density, and prevention of noxious insects can be pointed out. An appropriate fertilization is necessary, but with the current low price of rice, free use of agricultural medicines should be avoided. It would be better to use more resistant varieties with agronomical extermination and prevention of noxious insects. Also, effective use of a limited organic re-source should be considered.

Like the other countries of West Africa, rice production in both Guinea and Sierra Leone increases because of an increase in planting acreage, while the single crop yield is level and shows no increase. For this reason, rice production cannot match the increasing demand due to the rapid population increase.

However, WARDA is trying to select new and better varieties among the varieties introduced from the IITA, IRR, and IRAT, in addition to its own improved varieties, to proceed with the study on the improvement of culturing methods.

Both Guinea and Sierra Leone are proceeding with a project for improving rice crop with the help of advanced countries as their primary policy for increasing the production of rice, and are trying to reinforce experimental and research stations and to expand technical training and promotion activities.

When those measures progress smoothly and heighten the farmers' volition for production, a remarkable increase in production of rice will be achieved. It is considered that the best way is to construct and readjust the paddy field foundations and road network, and to complete water storage, irrigation, and drainage facilities in the area, where water resources can be adequately obtained with the help of advanced countries to increase the acreage of land where a stable production of rice can be done.

The following are the reference materials and books concerning rice crops:

1. Rice Statistics Yearbook, Nov. 1986 WARDA
2. Riceland in West Africa, (Occasional Paper) July, 1986 WARDA
3. Rice Varieties Recommended in the WARDA Region Feb. 1982 WARDA
4. The WARDA Technology Assessment and Transfer Programme Report of Activities and Major Achievements (1981-1986) by Dr. S.A. BOTCHEY Nov. 1986 WARDA
5. Activity Report-1986 WARDA, ROKPUR
6. A Guide to Better Mangrove Swamp Rice Cultivation In The WARDA Region 1986
7. Strategy for The Development of Rice Cultivation in The Peoples Revolutionary Republic of Guinea
8. Appraisal Report of Rice Development Project, Republic of Guinea (CONAKRY) AUG. 1979 AFD
9. Reconciled Area and Production of Rice for The 1984/85 Farming Season. Masch. 1986 Ministry of Agriculture Natural Resources and Forestry, (Sierra Leone)
10. Research is The Key to Food Self-Sufficiency Nov. 1986 Rice Research Station ROKPUR.
11. Annual Report 1983-1984 Ministry of Agriculture and Natural Resources, (Sierra Leone)

