

PART II
MASTER PLAN
FOR
PROMOTION OF SMALLHOLDER
RICE PRODUCTION IN PNG



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PART II. MASTER PLAN FOR RICE PROMOTION IN PNG

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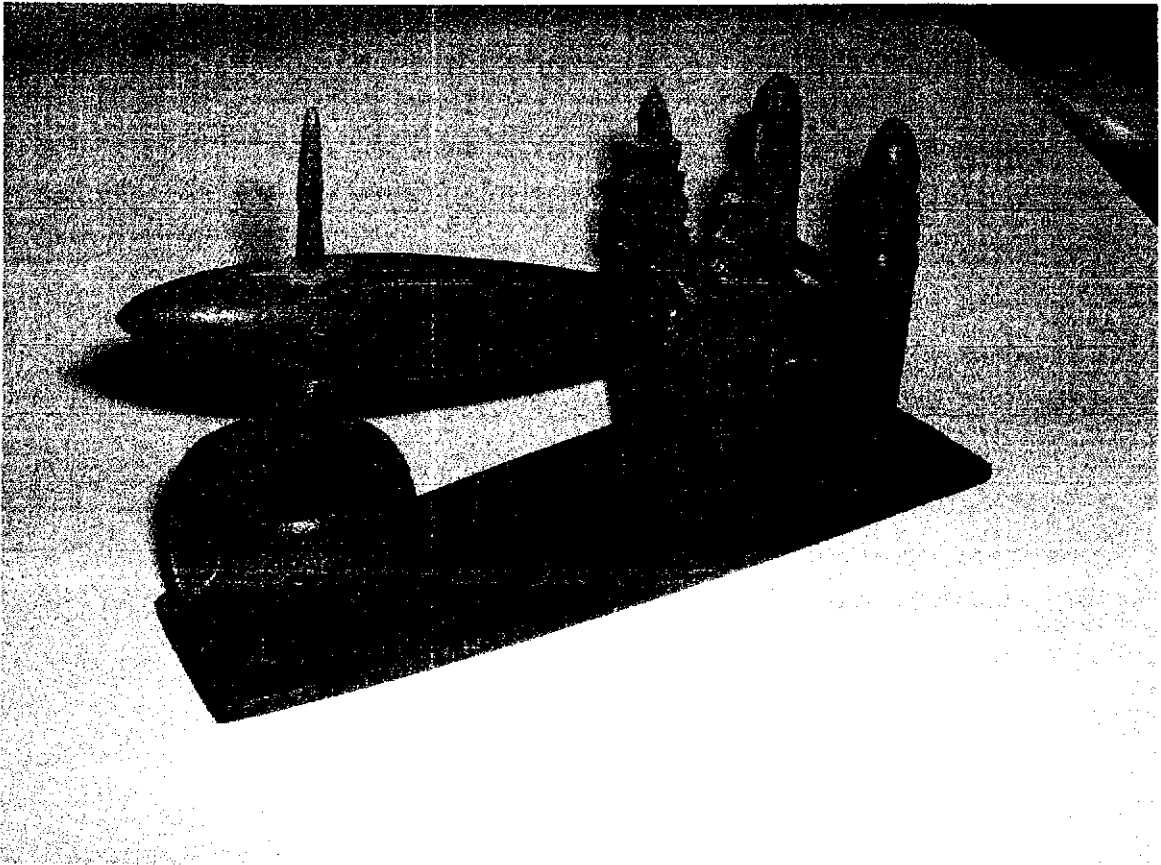
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Model of improved mortar and pestle from Indonesia driven by foot power

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Chapter 1. DEVELOPMENT CONCEPT FOR MASTER PLAN

1.1 Development Potentials and Constraints

Based on the results of the Rice Survey conducted in the five provinces, the development potentials and constraints in the field of smallholders rice production in PNG appear to be as follows:

1.1.1 Development Potentials

(1) Demand and supply of rice

Two kinds of agricultural systems are co-existing in PNG, namely the merchandise crops of agriculture such as copra, coffee, rubber, oil palm and the traditional subsistence agriculture that produce staple crops such as sweet potato, banana, taro, yam, sago, etc. The PNG Government has developed the merchandise or cash crops but it has been unsuccessful in promoting the development of subsistence crops despite numerous attempts in the past. The rice import is increasing year by year along with the increase of urban and rural population. About 146,000 tons of white rice equivalent was imported in the fiscal year 2001. In the same year, the population in PNG was 5.2 million. Per capita consumption of rice for that year reached 28 kg. Rice cultivation continues to remain limited only to a number of villages or districts in PNG despite the presence of suitable land for rice cultivation. Several attempts by the government in the past to develop the local industry have ended in failure. Local rice production is being done on small scale in some parts of PNG and the amount of the production is estimated at about 4,560 tonnes of paddy rice which is less than 2.0% of the domestic demand.

The devaluation of Kina which started in 1994 (at 0.8485US\$/Kina and 0.3110US\$/Kina in 2001) had increased the retail price of imported rice substantially in PNG. This situation gave the majority of local consumers who are subsistence farmers in PNG a good reason to start rice cultivation for their own consumption and/or for the informal markets within the neighborhood.

(2) Possibility for rice production

PNG occupies the area from the equator to latitude 12 degree S. and longitude 141°E through 157°E. The temperature is 21°C~31°C in the lowland areas and 13°C~24°C in the highland areas although differences in climatic conditions exist in a given area. The rainy season is from November till April during the northwest monsoon though the pattern and the amounts

of rainfall may be different by location. Most soils are fertile due to deposits of alluvial or volcanic materials in basins in the lowlands and in the highlands with some evidence of shallow soil deposits in some locations in the mainland. The fertile volcano soils are seen in the islands.

According to CSIRO, 25% of the total land area of PNG is suitable for agricultural use. Twenty-five per cent (25%) of the total area of 470,000km² is about 120,000 square kilometers. Generally speaking, that is a big area for agricultural production. If 10% of that area were used for rice production and assuming that the yield per hectare was 2 tonnes, annual rice production would be: $1/10 \times 120,000 \text{ km}^2 \times 100 \text{ hectares/square kilometer} \times 2 \text{ tonnes/hectare} = 2,400,000 \text{ tonnes}$ of paddy rice. That is a lot of rice for the current population in PNG. Calculations are easy to make but mobilizing all rural and peri-urban subsistence households to grow rice as a family food item is difficult.

The government of PNG is promoting rice cultivation from the viewpoints of self-sufficiency in rice consumption by farm households and the reduction of outflow of foreign currency from PNG. Previous attempts to stimulate rice production in PNG particularly in Bereina, Maprik, and Markham Valley had failed because they had promoted rice as a cash crop that was milled and marketed through formal marketing outlets. Rice projects in the past by government agencies, donors or NGOs did not consider the simple and practical way of economically disposing the milled product by consuming it right in the location where it was produced and that is by the members of farm households themselves. In the past when the Kina was still strong against overseas currencies, this policy was not feasible. Now that the Kina has devalued and the retail prices of imported rice have gone up, the policy of promoting rice for self-sufficiency at the farm household level makes a lot of economic sense.

In the National Food Security Policy for 2000 to 2010, the government targets to cut 10% of the rice import by the year 2010. The NFSP plan is to start with the promotion of upland rice cultivation and to follow it up with the development of lowland rice production in suitable locations in PNG and providing it with small-scale irrigation systems that will allow two rice crops per year. This study took note of that objective and the resulting Master Plan is in line with targets and the strategy of NFSP for rice development in PNG.

As described above, the price of imported rice is rising sharply and the desire of farmers to produce rice for their own consumption is rising sharply also.

Here is a trial calculation. Assuming that the average CIF price of imported rice is US\$ 300 per tonne of white rice and the annual amount of imported rice is 150,000 tonnes;

The cost of imported rice is: = US \$300 x 150,000 tonnes/year
= US\$ 45,000,000/year is the annual outflow of foreign currency.

10% of imported rice is reduced: = US \$300 x 15,000 tons
= US \$ 4,500,000/year is annual savings in foreign currency.

1.1.2 Development Constraints

(1) Rice crop experience in PNG

The experience of growing rice in PNG traces back to 100 years before when rice crop was introduced to the country in the Kairuku District. This was followed by smallholder upland rice projects by government agencies, donors, and NGOs in Central, East Sepik, and Morobe Provinces; all of which were not self-perpetuating or self-sustaining when production subsidies such as farm machinery, operational funds and supervisors were withdrawn by the sponsoring agency. In the past two years since 2000 after the launching of the Food Security Program, rice production for consumption by members of the farm households, has picked up in most provinces in PNG including the islands and the highlands. However, in comparison with traditional staple crops, rice cultivation still requires more physical work and continues to be faced with so many other constraints that hamper the promotion of rice production across PNG. The most prominent of these constraints is that all rice growers are unaware of appropriate farming technologies, selection of proper seed and post harvest methods including milling techniques.

(2) The land tenure system for customary land

PNG has a complicated social structure and land tenure. Land use by clan members is extremely complicated. The clan land is commonly called customary land and the system of securing authority or right for the usage of customary land by the clan members is commonly practised across the country. Generally the ownership of the land belongs to the tribe. Farm households within each clan can easily use clan land to cultivate traditional subsistence food gardens for themselves but a new system or crop such as irrigated or flooded rice will need permission from the custodian or landowner of the clan land. It is said that when a farmer develops a paddy field and invests some structures on the land, the right to use the land does not necessarily allow him to keep the land for himself or his family forever. Other resident clan members maintain the common belief that the developed and productive land still belongs to the clan and they have equal rights to its usage and share of production as the member who has developed that particular parcel of customary land. This attitude becomes more intense when there is shortage of arable land in the clan.

In case they want to build a gravity type irrigation system whose water canal will pass through the land belonging to another clan, it will take a long time to start the construction of the irrigation canal or it will be a cause for trouble. Negotiations between the two clans for the right of way will take years. A simple irrigation system outside the customary land of a clan is not therefore feasible unless compensation payments are first negotiated and made. The rice garden or farm in the first place can not be developed to the level needed for efficient production unless the developing farm household has first settled the issue of ownership or the permanent usage of the clan land is settled with the members of the clan in authority.

(3) Animal power

The use of draught animals in land preparation for rice cultivation is new to PNG. NDAL staff used to train water buffaloes for land preparation and transporting of farm produce during the 1970s and 1980s in some coastal provinces. The program has been shelved as a result of staff reduction and other cost-cutting measures. At present, the livestock section of FSB-DAL has an officer who has the skills in training and handling draught animals for soil tillage and hauling tasks. Any program to use draught animals for rice cultivation will require initially the sourcing of suitable calves that need to be trained to take up harness and to pull tillage implements and loads.

During the farm survey, an albino buffalo was seen ploughing a 1-hectare communal rice garden in Salodi in Finschhafen District in Morobe Province. The handler of the beast is a pastor of the local Lutheran Church. He charges a small fee for ploughing customary land for communal food gardens. This beast and a mouldboard plough are part of a subsistence food production program run by the local Lutheran Mission. The application of draught animals such as a buffalo or horse in rice production needs to be explored in a collaborative approach between government agencies, NGOs and the religious mission sector. Photograph on the use of animal power in land cultivation in Finschhafen District is shown on front cover of this report. Similar use of water buffalo in agriculture work for smallholder food production was seen in Duke of York Islands in East Britain and in Madang Province.

Soil cultivation in PNG for the planting of traditional staple crops such as tuber and root crops and introduced food crop such as rice, continues to be done mainly with a digging stick. Clearing of the food garden is by slash and burn method. It is only in recent years that the application of steel fork, spade or hoe for soil cultivation has been observed in limited occasions. There are a number of private farms in PNG where four-wheel tractors are used for soil cultivation. In most cases, they provide ploughing services on the fee base to neighbouring farm households.

Traditional food gardens and smallholder rice areas that are cultivated with four-wheel tractors in PNG are rare. They are located outside of major centres and commercial plantations and government or private institutions with road access such as in Rigo and Kairuku Districts of Central Province and in Lae, Huon, and Kaiapit Districts in Morobe Province, around the Ramu Sugar farm in Gusap, in Kabiufa in Eastern Highlands Province, in Kondiu in Simbu Province and in Banz in the Western Highlands Province.

In districts where farmers carry out rice cultivation traditionally, the rice plots size are small as 10 x 10 x 20 meters only or 0.02 hectare or one (1) are per plot. In case that the rice garden area of one farmhouse has two plots or 0.04 hectare or two (2) ares, the amount of yield to be harvested would be only 40 kg of paddy rice (or only 25 kg of white milled rice) if the yield is 2 tonne/hectare. If the per capita consumption is 28 kg, this amount is good only for less than one person in each farm household.

In order to expand the rice cultivation area, the use of draught animal power or machines such as a four-wheel tractor or a two-wheel power tiller are indispensable. A system for collecting fees for providing services in soil cultivation with these animals and machines such as in Finschhafen District should be established.

(4) Rice crop technology/extension

In the agriculture sector, PNG invested a lot in the development of export crops before and after independence in 1975. The government adopted a policy that promoted vigorously the production of export tree crops such as coconut, rubber, cocoa, coffee, and recently palm oil not forgetting an essential food crop as sugarcane. For the development of these industries, the required laws, research and extension systems were established.

The government proposed a 10-year promotion policy for rice self-sufficiency in PNG in 1999. This policy was preceded by a long history of government, donor and NGO projects in smallholder rice production in several rice sites in PNG notably in Central, East Sepik and Morobe Provinces. However this policy was not continued by the succeeding government of the day. Instead, it was replaced with the PNG National Food Security Policy which treated rice promotion as a sub-programme.

At present, there is in place a continuing policy of promoting smallholder rice production across the country. Likewise, support activities in rice promotion continue to come from NARI and Unitech in rice research and from donor agencies such as ROC, PRC, JICA and from NGOs such as Trukai Industries, City Mission and Hope Worldwide.

All these institutions have collaborated with government agencies in the continuing effort to develop and extend the rice cultivation technology in PNG but the achievement is still far below expectations. Even the training of extension officers and the extension system are not well established.

The nucleus rice farmer training course at OISCA farm organized by NDAL and sponsored by JICA started in 2001. The continuation and long-term success of this joint training trial are much expected by all parties concerned.

(5) Seed

The selection and the multiplication of the rice seed suitable for the climate of PNG are extremely important to develop the rice crop. The introduction of rice seed is being conducted by NARI in collaboration with IRRI and ROC (Taiwan) for the multiplication of Taichung Sen 10 variety since 1993 beside the traditionally planted varieties. NARI organizes joint trials with rice farmers for new varieties and for assimilation purposes. But the collaboration with NDAL on these trials is limited. Most of IRRI varieties used and the Taichung Sen 10 are for lowland ricefields and are not the variety suitable to upland conditions.

The trials of upland varieties being cultivated in neighboring country Indonesia and the NERICA variety which is highlighted in the world nowadays developed by WARDA (West Africa Rice Development Organization) should be conducted immediately by NARI in order to identify a suitable variety for upland rice cultivation in PNG.

(6) Government support

Since the independence, the government emphasized the development of tree crops for the exportation of agricultural products such as coffee beans, oil palm kernels, cocoa beans, natural rubber etc. For the promotion of these agricultural products, the laws, research institutes and associations were established. There are laws and promotion bodies like the following:

The Laws:

Copra Marketing Board Act

Cocoa Board Act

Coffee Industry Act

Rubber Industry Act
Spices Industry Act
Oil Palm Industry Act

Promotion bodies:

Cocoa and Coconut Research Institute
Cocoa and Coconut Extension Agency
Coffee Research Institute
Oil Palm Research Association

In the food industry in PNG, the following government statutory bodies were established also in the 1990s:

Livestock Development Corporation
Fresh Produce Development Company

Other statutory bodies were created for agriculture research and quarantine regulation such as:

National Agricultural Research Institute (NARI)
National Agriculture Quarantine & Inspection Authority (NAQIA)

These laws have enabled the promotion bodies to carry out their functions effectively up to the present time. However, there has been no legislation or creation of statutory body for local rice and grain production despite the big potential in the country for production of these food items and the annual increase in volumes of imported rice and grain.

The absence or non-issue of creating a Rice and Grain Authority demonstrates clearly a lack of foresight in the execution of the policy for self-sufficiency in rice and grain on the part of the executing department (NDAL) and the state government (Ministry of Agriculture and Livestock) and the local government (Provincial and LLG).

NDAL has formulated a number of policies for strengthening the Food Security Policy of the Government but NDAL is still unable to secure adequate technical back up and financial support from the government, donors, or NGOs.

1.1.3 Analysis of Development Potentials and Constraints

Below are four tables that show the potentials, constraints and the physical characteristics of the surveyed areas that relate to smallholder rice promotion in PNG.

Table 1. Development Potentials and Constraints in Each Field

Field	Potentials	Constraints
• Demand and supply of rice	• The big home market (150,000 or more tonnes annually)	• Rice industry is not fully developed
• Rice production	<ul style="list-style-type: none"> • The present local rice production is estimated at 2,000 tonnes of white rice a year. • When the rice crop spread to 10% of the suitable land to agriculture, 2,400,000 tons of paddy production will be possible for a year • Interest in rice as a food crop by subsistence farmers is high. 	<ul style="list-style-type: none"> • Rice crop technology is not extended • The number of rice farmers is very small • Road, irrigation facilities etc. are lacking • The number of rice specialist is very small.
• Land system	• The land suitable for the rice crop is voluminous and unused.	• There are restrictions in the use of customary land.
• Animal power/ Machine power	• Draught animals and tractors have been used in PNG	<ul style="list-style-type: none"> • Shortage of calves for training and skilled handlers • All machines are imported and expensive
• Rice crop technology and extension	<ul style="list-style-type: none"> • Rice crop development policy of the government is in place • Donors such as JICA and NGOs are enthusiastic to collaborate in rice development 	<ul style="list-style-type: none"> • Promotion system and administration are not unified across government agencies • Government budget deficit • Number of extension personnel is low and the budget is less
• Seed	<ul style="list-style-type: none"> • NARI is prepared for this work • Donors & NGOs have cooperated for many years • NERICA rice for the upland conditions are available 	<ul style="list-style-type: none"> • Suitable varieties have to be multiplied in large volumes. • The development of suitable variety to PNG has not been bred • There is no Seed Law • Seed multiplication and distribution organization is not established
• Infrastructure	• Roads are already in place and road improvement plans are available.	<ul style="list-style-type: none"> • Infrastructure network is poor • Government budget is in deficit
• Rice milling	<ul style="list-style-type: none"> • Farmers have accepted rice mills • Minor components can be fabricated in PNG. 	<ul style="list-style-type: none"> • Underdevelopment of the local manufacturing industry • Mechanical engineers for farm machinery are insufficient • Procurement and distribution network for servicing and spare parts are not developed • No experience in basic technology in manual or animal power for rice milling.
• Policy support	• National Rice Policy	• The lack of budget and implementing structure

Table 2. Physical Characteristics of Surveyed Areas

Province	District/LLG	Physical Characteristics			
		Population	Soil	Weather	Infrastructure
1. Central	Abau	38,378	Well drained loam to clays and sand	Warm with mean annual temperature 25.68C and mean annual rainfall of >2,000mm.	Access roads bad, irrigation nil, storage nil.
	Kairuku	78,784	Well drained loams to clays	Warm with mean annual temperature 26.18C and mean annual rainfall >2,000mm	Highway poorly maintained, irrigation nil, storage nil
2. Morobe	Lae	119,178	Poorly drained loams to clay and sand Well drained loams.	Warm to cool mean annual temperature of 26.8C and mean annual rainfall of >4,000mm	Access roads good, irrigation practical, storage nil
	Finschhafen	45,287	Well drained loam to clays	Warm to cool mean annual temperature of 26.8C and mean annual rainfall of >4,000mm	Roads good, irrigation nil, storage nil
3. Madang	Madang	86,693	- Well drained very shallow soils. - Imperfect to well drained loams to sands. - Deep well drained clays. - Well to imperfectly drained loams to clays.	Warm to cool mean annual temperature 26.8C and mean annual rainfall >3,500mm.	Roads satisfactory, irrigation nil, storage nil
	Usino/Bundi	40,079	- Imperfectly drained loams to sands. - Well drained loams to clays.	Warm mean annual temperature 26.8C and mean annual rainfall >1,700mm.	Roads bad, irrigation nil, storage nil
4. East Sepik	Wewak	63,965	Well drained loams to clays and sands.	Warm mean annual temperature 26.8C and mean annual rainfall >2,150mm.	Roads bad, irrigation nil, storage nil
	Maprik	57,806	- Well drained loams to clays - Imperfectly drained clays.	Warm mean annual temperature 26.8C and mean annual rainfall >1,600mm	Roads bad, irrigation nil, storage nil
5. East New Britain	Rabaul	27,048	Well drained loams to sands.	Warm mean annual temperature 27.8C and mean annual rainfall >2,100mm	Roads good, irrigation nil, storage nil.
	Kokopo	58,345	Well drained loams to sand and clays.	Warm mean annual temperature 27.8C and mean annual rainfall 1,900mm.	Roads good, irrigation nil, storage nil.

Table 3. Level of Support to Rice Production in Surveyed Areas

Provinces/Districts	Sources or Levels of Support											
	NDAL			PDAL			DDAL			LLG		
	Program/ Policy	Budget	Staff	Program/ Policy	Budget	Staff	Program/ Policy	Budget	Staff	Program/ Policy	Budget	Staff
1. Central -Abau -Kairuku	Yes	1 mill	Nil	Yes	Nil	Nil	Yes	Nil	1	Nil	Nil	Nil
	Yes	1 mill	1	Yes	Nil	Nil	Yes	Nil	1	Nil	Nil	Nil
2. Morobe -Lae -Finschhafen	Yes	1 vehicle	Nil	Yes	Nil	1	Yes	Nil	1	Nil	Nil	Nil
	Yes	1 mill	Nil	Yes	Nil	Nil	Yes	Nil	1	Nil	Nil	Nil
3. Madang -Madang -Usino-Bundi	Yes	1 vehicle	Nil	Yes	Yes	1	Yes	Yes	1	Nil	Nil	Nil
	Yes	Nil	Nil	Yes	Yes	Nil	Yes	Yes	1	Nil	Nil	Nil
4. East Sepik -Wewak -Maprik	Yes	1 mill	Nil	Yes	Nil	1	Yes	Nil	1	Nil	Nil	Nil
	Yes	1 vehicle	Nil	Yes	Nil	Nil	Yes	Yes	1	Nil	Nil	Nil
5. East N/Britain -Rabaul -Kokopo	Yes	Nil	Nil	Yes	Yes	1	Yes	Yes	1	Nil	Nil	Nil
	Yes	Nil	Nil	Yes	Yes	Nil	Yes	Yes	1	Nil	Nil	Nil

Table 4. Stages of Rice Cultivation in Surveyed Areas

Provinces	District/LLG	Experience in Rice Cultivation	Potential for various stages					
			1 st Stage	2 nd Stage	3 rd Stage	3 rd Stage (Break-up to:)		
						Potential Rice Area	No. of Households	Road Distances (km) to major centres
1. Central	Abau	Upland rice for subsistence since 1980s	Yes	Yes	Yes	10,000 ha	6,534	200
	Kairuku	Upland rice for subsistence since 1891-present; mechanized upland since 1935-1995 for cash.	Yes	Yes	Yes	25,000 ha	12,464	175
2. Morobe	Lae	Upland+rained lowland since 1999 for subsistence	Yes	Yes	Yes	500 ha	20,716	0.6
	Finschhafen	Upland rice since 1935 for subsistence	Yes	Yes	No	1,500 ha	9,404	200 (sca)
3. Madang	Madang	Upland rice since 1935 for subsistence	Yes	Yes	Yes	2,000 ha	14,562	0.15
	Usino-Bundi	Upland rice since 1999 for subsistence.	Yes	Yes	Yes	5,000 ha	7,664	200
4. East Sepik	Wewak	Upland rice since 1999 for subsistence	Yes	Yes	Yes	1,000 ha	12,188	0.10
	Maprik	Upland: 1950s-1995 for cash; 1999 for subsistence	Yes	Yes	Yes	20,000 ha	12,586	175
5. East New Britain	Rabaul	Upland rice since 1990s for subsistence.	Yes	Yes	Yes	500 ha	5,714	0.10
	Kokopo	Upland rice since 1980s for subsistence.	Yes	Yes	Yes	500 ha	11,138	0.10

Note: 1st Stage – Rice production only for subsistence
 2nd Stage – Rice production for subsistence + local market
 3rd Stage – Rice production + urban market

1.2 The Direction of Smallholder Rice Development in PNG

1.2.1 Recent Trend of Rice Production

Until recently, the rice promotion activities were loosely co-ordinated with little linkage to a well formulated and coherent national policy and strategy on all activities in relation to rice in general and, promotional activities for cultivating rice in particular. Rice had been introduced to the country in the early 20th century by missionaries but did not take root with all local food growers in terms of subsistence, semi-subsistence or commercial undertaking. Only a few areas such as in the Mekeo area of Central Province, the Markham area of Morobe, the Madang area and the Maprik area of East Sepik Province had persisted in growing rice on an organized scale intermittently over many years.

Previous consultancies (by external consultants) were based on terms of reference that looked at the prospect of growing rice purely as a commercial crop. They were all premised on the objective of evaluating rice production for the purpose of development of small commercial rice farms with attendant heavy and specialized machinery, chemical inputs, irrigation facilities and large volumes of manpower and financial capital and with profit objectives. In all cases, the recommendations were that commercial rice development was not a viable proposition from an economic point of view.

All the while in PNG, rice continued to be grown in isolated and scattered locations by local food growers for subsistence and/or barter. In the past, the government had ignored this small section of subsistence rice growers in favour of government-assisted or donor-funded rice production schemes such as in Bereina in Central Province and in Maprik in East Sepik and in Markham Valley in Morobe that had bigger and more obvious impact in the local community in particular and in the region in general. These projects worked for some time due primarily to government or donor funding support.

Less than a decade later, these projects failed to continue to operate when funding and technical support from the government stopped due to cutdowns in budget and departmental staff. After the closure of the three major rice projects in recent times, farmers in many provinces continued to grow rice for their own consumption much more so because of the continuing devaluation of the kina in 1995 onwards which resulted in the steady rise of prices of imported rice.

In 1996, the Food and Agriculture Organization (FAO) of the United Nations 1996 initiated a food security program that concentrated amongst other food crops, on smallholder rice production again as a cash crop in the Markham Valley of the Morobe Province. This and another program in rice promotion by the ROC (in Taiwan) are attempts that stopped when assistance was withdrawn for the same reason that rice was promoted as a cash crop and not as a food crop for the farm household that grew the rice crop.

In 2000, production of rice by subsistence households as a food crop started to increase as a result of the rising costs of imported rice particularly in remote villages where cash income is limited. NDAL reported that by 2001, there were 11,000 subsistence households throughout 12 provinces that produced 4,600 tonnes of paddy rice.

In the highlands of PNG, Simbu Province leads in the production of rice as a food crop by subsistence households. Rice growing is promoted in high schools and vocational training centers by encouraging students to grow rice for food and small cash income for their households.

A joint program was started in 2000 by NDAL, the Department of Simbu (particularly the Divisions of Education & Agriculture and Livestock) and the VSO (Volunteer Service Overseas of Great Britain). Rice seeds, rice information sheets and small rice mills were distributed to rice producing districts as a means to encourage subsistence households to produce local rice that is cheaper than imported rice. 15 metric tones of paddy rice was produced in Chuave, Kerowagi, Gembogl and Karimui Districts in 2001 as a result of this program. Rice was introduced to Simbu only in 1999 using two kilograms of rice seeds supplied by NDAL to the Division of Education.

In the Central Province, rice is planted as the initial food crop in food gardens along the river banks of Engefa, Ma'akunga and Akaifu river system in Northwest of Mekeo of Kairuku district. The 200+ subsistence households there have practiced this farming system for the last 100 years.

When the Bereina Rice Project closed down in 1995, production of rice as a food crop in Northwest Mekeo was not affected. In 2001, rice was produced as a food crop in Kubuna area of the same district. This year, NDAL entrusted a micro-rice mill to a farmers association in Idoido village in Kuni census division in order to mill three tonnes of paddy rice produced by more than 25 farm households there.

In Morobe province, rice is grown as a food crop in Finschhafen, Lae Urban, Morobe and Garaina Districts even with very little support given by the NDAL and PDAL in rice promotion. Subsistence farm households in remote villages in this province use mortar and pestle or the jean method to dehusk rice. Two districts have purchased small rice mills using funds from a local MP and a local business group. The other districts had to rely on rice mills from NDAL or aid donors such as ROC & FAO.

Starting in 2000, other provinces such as Madang, East Sepik Province and East New Britain Province have succeeded in the promotion of rice as a food item and as a source of small cash from selling milled rice within the villages. These provinces did not require large amounts of project funds similar to the Bereina Rice Project, the Maprik Rice Development Project or the FAO Special Project in Support of Food Security Program in the Markham Valley. Promotion of rice as food crop and as a source of small cash income for the subsistence households required the provision only of a small amount of funds for good seeds, small rice mills, short rice training, and small tools such as sickles and digging spades.

With these inputs, the subsistence households are encouraged to grow and process rice that is cheaper than the imported rice. Most of the milled rice is consumed and some are sold within the village. This approach in promoting rice production in PNG has succeeded where previous government PIPs and donor-funded schemes have failed to establish a demand-driven industry in rice cultivation.

1.2.2 Three levels of rice production in PNG

The local rice production industry in PNG is emerging steadily. It currently consists of three different levels of production namely:

- i. Smallholder production for self-sufficiency and small cash income of the farm households.
- ii. Institutional production for self-sufficiency of learning and rehabilitation institutions.
- iii. Semi-commercial production by capable landowners, farmers association or agricultural companies.

It is difficult at this time to determine the percentage of production for each of the three levels of rice production mentioned above because paddy production and milling in PNG is scattered in so many districts across the country. Another reason is that rice growing for food and small cash income of farm households has intensified across PNG only since 2000. It is however safe to conclude that smallholder production by farm households of rice for food and small cash income, accounts for most of the local paddy production in PNG.

For the production of rice as a food item of the village farm households and in training and corrective institutions, Simbu Province leads the way because of the active role played by the Divisions of Education and DAL under the stewardship of the Department of Simbu. As individual training institutions, OISCA Training Centre in ENB and PAU in NCD leads in rice production.

Regarding the status of semi-commercial rice production in PNG, on record there are three regular growers who are engaged in growing, milling and marketing of rice in Central Province particularly in the Solien farm in Veimauri river of Hiri district and in Patikalana Estate near Kalo village and in Kemp Welch Estate both in Rigo district.

1.2.3 Basic Approach of the Master Plan

This Master Plan employs bottom up approach as a basis for the whole concept of the Plan. In promoting small household rice production, top down approach alone is not realistic or feasible. It is important to identify farmers who have strong motivation to grow rice for their own benefit and encourage them by providing minimum and affordable input from concerned agencies. In order to pursue bottom up approach, the Master Plan suggests Model Farm strategy. Farmers with good performance are identified as Model Farmers and they are expected to play roles of trainers, demonstrators and coordinators for neighbouring farmers.

Master Plan also presents four basic directions for promotion of smallholder rice production, i.e. 1) to increase yield, 2) to increase size of individual farming area, 3) to increase number of rice farmers and 4) to promote local marketing of surplus rice. These might look too simple, but the idea behind is to show clear and feasible directions to stakeholders and related personnel so that they can take necessary actions easily.

This Master Plan does not set out certain national target for smallholder rice production. There are two reasons for this. Firstly, reliable data to scientifically predict future smallholder rice production were not available. Site surveys were conducted in five selected provinces, but they do not necessarily represent the conditions of rice production in other provinces in PNG. It would be risky to set a national goal without sound background. Secondly, setting out a target might induce top down actions to achieve the target. As was emphasized, this Master Plan places value on the initiatives of farmers themselves. Future production largely depends on the motivation and action of farmers, but the trend is not obvious yet. It would be more appropriate at this stage to monitor the tendency of farmers and provide assistance to them only when it is required. Action from the government agencies to achieve target might distort natural development of farmers' initiatives.

The Master Plan has prepared a system that can assist government departments and agencies in identifying production targets and schedules when they prepare rice action plans and programs that should be built from the bottom up.

The details or procedures of this system are shown in the enclosed Sample Village Rice Action Plan. At this point of the Master Plan, it should be emphasized that a district agriculture program officer can prepare a realistic and feasible district rice action plan only after he has prepared individual village rice action plans for several rice-producing villages within his/her district.

Likewise, his provincial agriculture program officer can prepare a realistic provincial rice action plan only after the district rice action plans were prepared within the province. The district and provincial and national rice programs are then built upon the corresponding district, provincial and national rice action plans that were compiled from the villages up to the districts and provinces.

This recommended system of preparing rice action plans and programs follows the fundamental principle adopted earlier in the Master Plan which dictates that all village, district and provincial rice plans or programs including the national rice program should be built from the bottom up.

In order to accomplish this bottom-up approach, the Master Plan has focused on the rice farm households as the key players in the utilization of all local and outside inputs for promoting rice production in the village communities. The farm households are the major participants in the four directions of smallholder rice promotion that are recommended in the Master Plan.

1.2.4 Four Directions of Smallholder Rice Development in PNG

- 1. Increase the yields in existing farms through a package of improved rice production and post-harvest technology.**
- 2. Increase the size of individual rice gardens or farms.**
- 3. Increase the number of rice farmers in the villages.**
- 4. Enable the rice farmers to market surplus rice beyond their villages.**

These four directions were determined by the following conditions or constraints existing in the rice farms or gardens that affect rice production in the surveyed villages. These constraints were identified during the Rice Study. They are:

1. Grain yield is low due to poor seeds used, wide spaces between rows and plants, poor soil management and presence of pests and diseases.
2. Area cultivated by each farm households is small due to shortage of digging tools and lack of draught animals and motorized tillers.
3. More than half of the resident farm households do not grow rice because they have little or no access to a rice mill and are not aware of bigger and better mortar and pestle.
4. Majority of the interviewed rice growers decided to grow rice for food because of the rising prices of imported rice in PNG. Those who can not grow rice want to buy locally produced rice at cheaper prices.

Considerations for the Four Directions

Potentials for increasing rice production in PNG through the four directions exist at the national level. As per data in the PNG 2000 Census – Community Profile System, there are 951,073 occupied households in PNG with a population of 5,190,786. Of these occupied households, 41.57 % are living

in the five highland provinces. 95% of these households live off the land. It is estimated that 50% of the total occupied households or 475,537 households have access to land that is suitable for rice growing.

In terms of land area, PNG has a total land area of 469,500 square kilometers of which 10% or 46,950 square kilometers is considered as suitable for agricultural production. Only a quarter of this agricultural area or 11,738 square kilometers is considered as suitable for rice cultivation. The Rice Study indicated that rice growing in PNG is confined to upland cultivation. Most of the soils studied and tested in 20 surveyed villages in the Study are suitable for rice cultivation.

Potentials also exist at the rice farm household level. According to national DAL, the following conditions in rice production in PNG are currently prevailing.

1. The current average upland rice yield is 1.50 tonnes/ha.
2. The average size of rice farm or garden/household is 4 ares (20m x 20m) or 0.04 ha.
3. In 2001, 11,000 farm households produced 4,600 tonnes of paddy rice.

Direction No. 1. Increase the current yield/hectare in existing rice farms or gardens

According to national DAL, the current yield of upland rice in PNG is 1.5 tonnes/hectare. During the survey, it was found out that low rice yields in the surveyed villages were caused by the following factors: - nil or poor soil cultivation, low soil fertility, poor and not enough rice seeds planted, wide distances of planting and nil control of insect pests, weeds, and diseases.

These conditions can be addressed if support is given to the rice farm households by supplying hand tools at affordable prices, certified rice seeds and basic knapsack sprayers and by teaching rice households basic methods, knowledge and skills in rice cultivation and disease and pest control or management.

This direction is the most feasible considering that it applies to existing rice farms or gardens across PNG. The farm or garden extension tasks to be carried out by the district/LLG rice extension officers and the selected rice farmer leaders under this direction will require a short training course within PNG and will not require expensive teaching or demonstration aids.

The short training courses and follow-up visits of rice farms or gardens of training course participants was started in the Joint JICA-DAL Smallholder Rice Training & Consultation Visit Program in 2001.

Other farm activities and basic production inputs such as certified rice seeds, small rice mills for the purpose of increasing the current yields of upland and lowland rice are shown in Figure 1.

Direction No. 2. Increase the area of rice farm or garden/rice household and the yield/hectare

According to national DAL, the national average area of the upland rice farm or garden in PNG is 0.04 hectare. In the Rice Study conducted in 20 surveyed villages, the average area of upland rice in five provinces is 0.08 hectare. The main reason given by the interviewed rice farmers for the small size of rice farm or garden per household is the shortage of basic tools and the absence of draught animals and small machines for soil cultivation, harvesting and threshing.

Basic tools such as axes, bushknives, spades, digging forks, hoes and sickles are expensive especially in remote villages because they are all imported items. Most households have only one set of tools that are shared among the members of the household and the community.

Only one instance of soil cultivation with a water buffalo and a mouldboard was seen during the Rice Study in Finschhafen district. Two-wheel power tillers still remain at rice farm demonstration stage throughout PNG.

Small motorized rice reapers and threshers are yet to be purchased and looked after by the smallholder rice growers themselves. But a foot pedal thresher was purchased and is operated by a rice grower in Madang. Local fabrication and field demonstration of manual winnowers are also required throughout PNG.

The potential for increasing the size of rice farms or gardens can be attained by the farm households if hand tools, draught animals and small machines for soil cultivation, harvesting and post-harvest tasks are provided to the farm households at affordable prices for purchase or hire.

Direction No. 3. Increase the number of rice households, yield and area cultivated.

The Rice Study revealed that the main constraint that stops the majority of farm households in peri-urban and rural villages from growing rice is the lack of access to a rice mill or to a better mortar and pestle.

There are no more than 10 small rice mills seen operating in the 20 surveyed villages during the Rice Study. As a result, adult members of the rice farm households have to travel 10 to 20 kilometers to get to a rice mill. In remote villages, public transport is difficult or non-existent. Most households resort to dehusking rice with poorly-designed mortar and pestle or with the jean method.

It was also observed in the Rice Study that the number of rice households increases in any village when a rice mill is provided by a government or donor agency or by a church group or local politician ie in Nienguanje in Wewak and Raputup in Duke of York Islands.

Direction No. 4. Enable rice households to market surplus rice beyond their villages.

In the report on results of interviews of rice consumers in urban centres and rural villages in the five provinces, it is indicated that the locally grown and milled rice is preferred by the members of the local households over the imported rice because of the lower price and acceptable taste of the local rice produced in the community.

It was also shown in the Rice Study that locally grown and milled rice is already being sold within the local communities through the informal marketing network. The responses made by the interviewed households showed that they are waiting for more local rice to be produced and sold at cheaper prices within their respective communities.

The potential for marketing of locally produced rice beyond the village has been shown by precedents in several provinces in PNG. Examples of brands of locally produced and milled rice are the Rigo Rice in Kwikila and the Pati Rice in Patikalana both of Rigo district and the Hiri Rice in Veimauri in Hiri district of Central Province. Earlier in 2000 in Lae, Our Rice was sold in

the city supermarkets and shops. Nana Rice is marketed regularly in Maprik district. Shoppers bought these local rice brands faster because of its cheaper price at 10 toea less than the imported brand.

This direction is feasible through the proposed projects on the distribution of small rice mills and the establishment of provincial rice resource centres that will promote storage, milling and marketing of local rice with better quality beyond the villages.

In summary, the project inputs that are required in the four directions to be adopted in smallholder rice promotion under this Master Plan are illustrated in Figure 1 below.

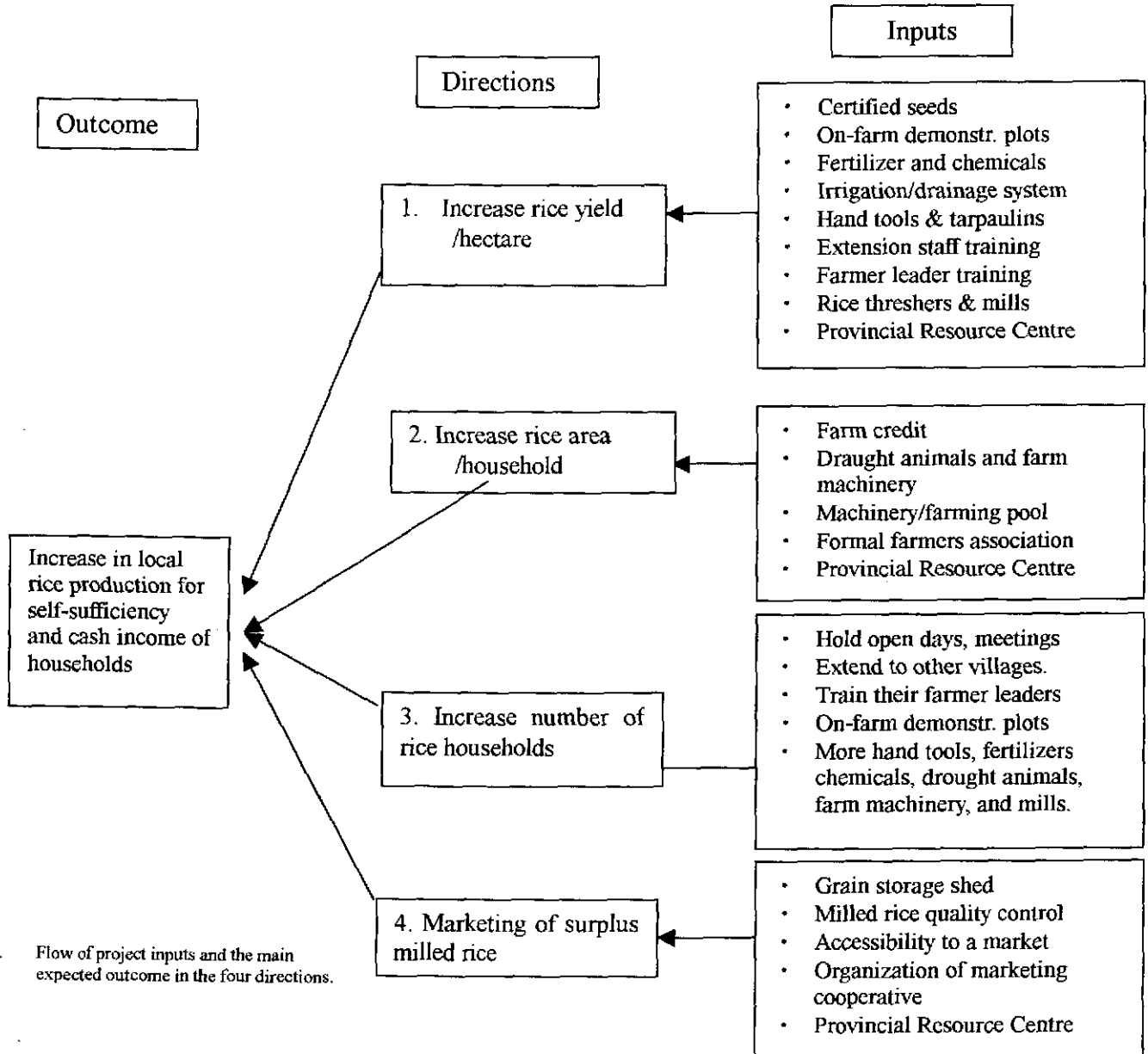


Figure 1. Flow of project inputs and the main expected outcome in the four directions.

1.3 Model Farm Approach

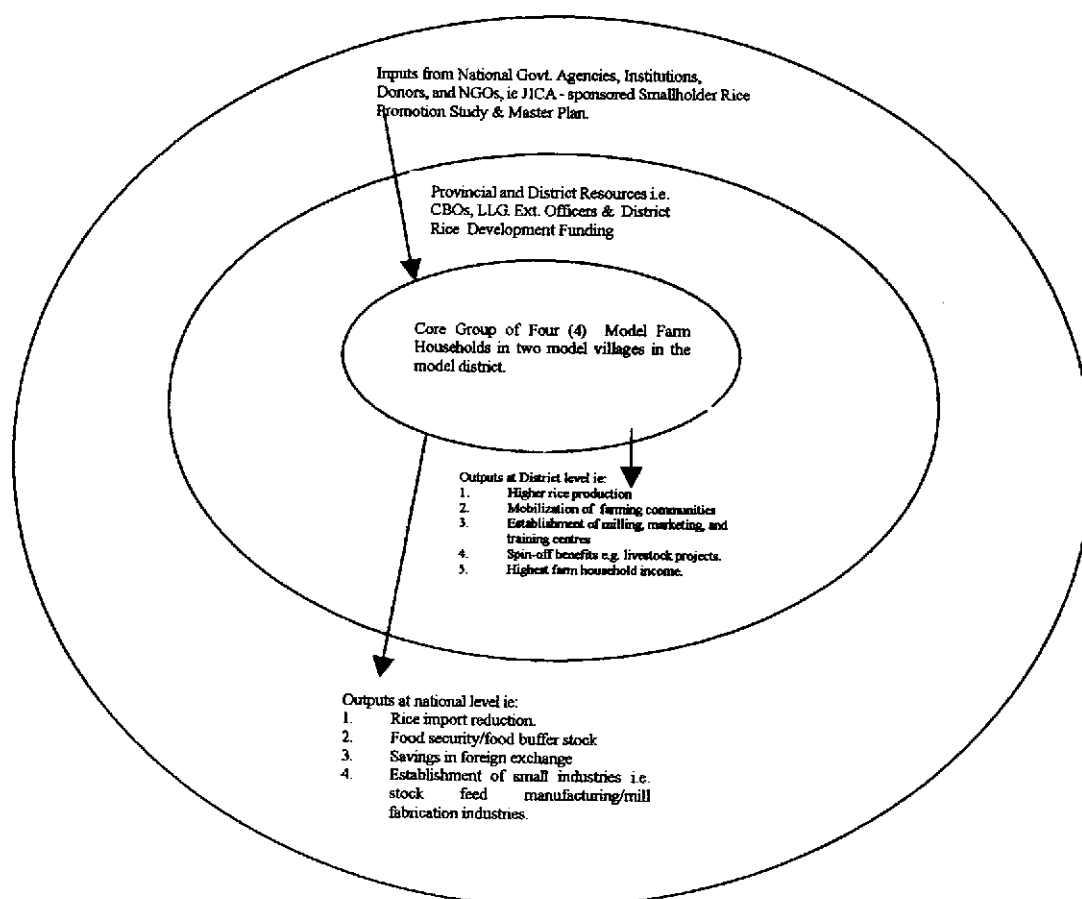
1.3.1 Reasons for selecting the model farm approach for the four directions.

- (i) This approach was adopted in the Joint JICA-DAL Smallholder Rice Training and Visit Program which was started in five provinces in 2001. It has been successful in channeling some of the proposed inputs mentioned in the four directions of rice promotion ie rice training, organic fertilizers, crop rotation.
- (ii) The existing model farms have been integrated into the subsistence food gardens by the selected rice growers themselves who are the heads of the farm households. The choice of model rice farms as a venue for introducing the projected inputs in the four directions is therefore feasible.

1.3.2 Criteria for selecting model rice farms

- (i) The model rice farm or garden must be accessible to rice extension officers.
- (ii) The selected model rice farmer is a landowner or leaseholder.
- (iii) The farm household has grown rice or is keen to grow rice.
- (iv) It is a resident household that is a subsistence or semi-commercial food producer.
- (v) The selected model farmer has leadership qualities.
- (vi) There is enough labour in the household or in the community for rice cultivation.

1.3.3 Figure 2. Role of Model Farms in Project Inputs & Outputs in Four Directions



1.3.4 Objective Tree of the Master Plan

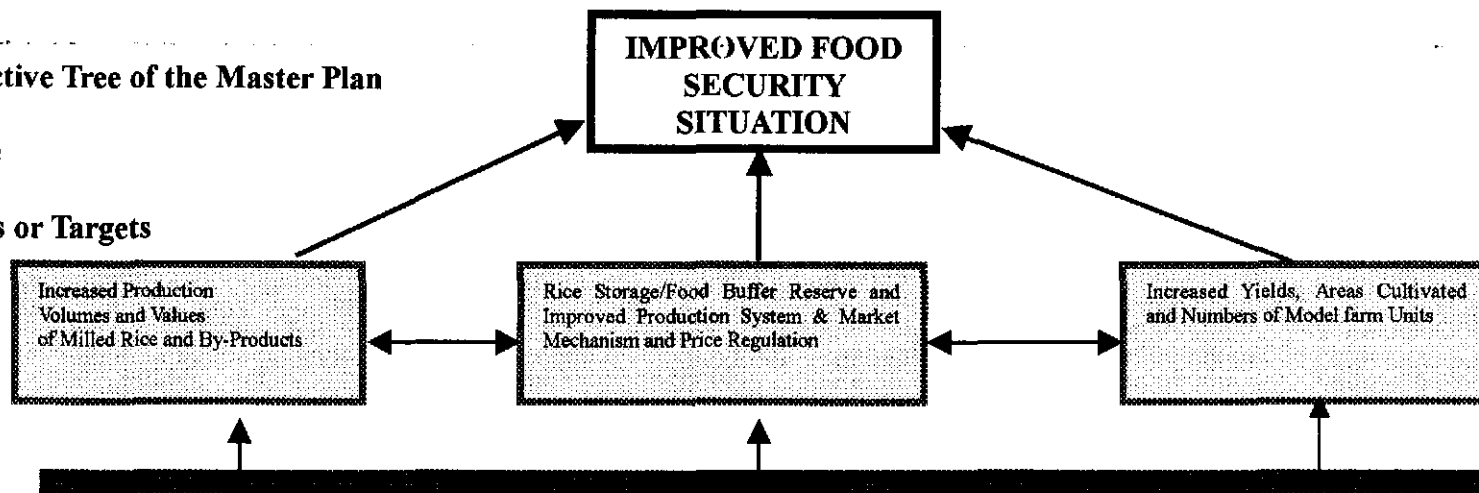
The overall objective of the Master Plan is to enable the country to achieve its goals for self-sufficiency in rice in the medium and long term and at the same time provide a certain level of food security for the majority of farm households that constitute the rural population of PNG. These two objectives are in line with the policy objectives as set out in the PNG NFSP framework. However to achieve this policy objective, the Master Plan will have three (3) final targets or outcomes, the achievement of which shall realize the final objective. There are three requisite intermediate outcomes.

The Objective Tree is set out in the manner that simply follows the decentralized roles and functions in the vertical tiers reflecting functional responsibilities. The horizontal tiers reflect the activities and project inputs and the intermediate and final outcomes or targets that lead to the conditions required to achieve the final objective of the Master Plan.

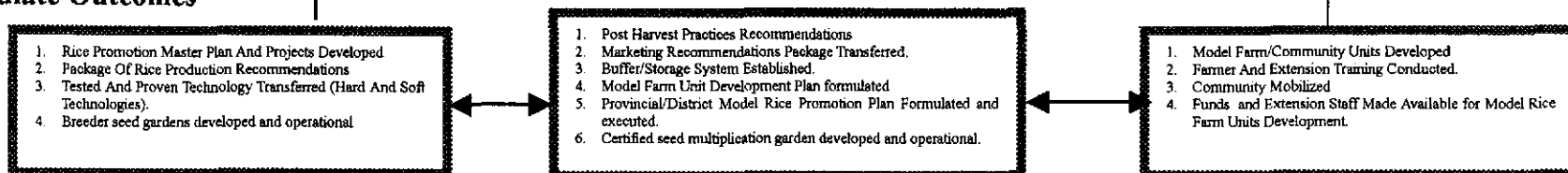
Figure 3. Objective Tree of the Master Plan

Final Objective

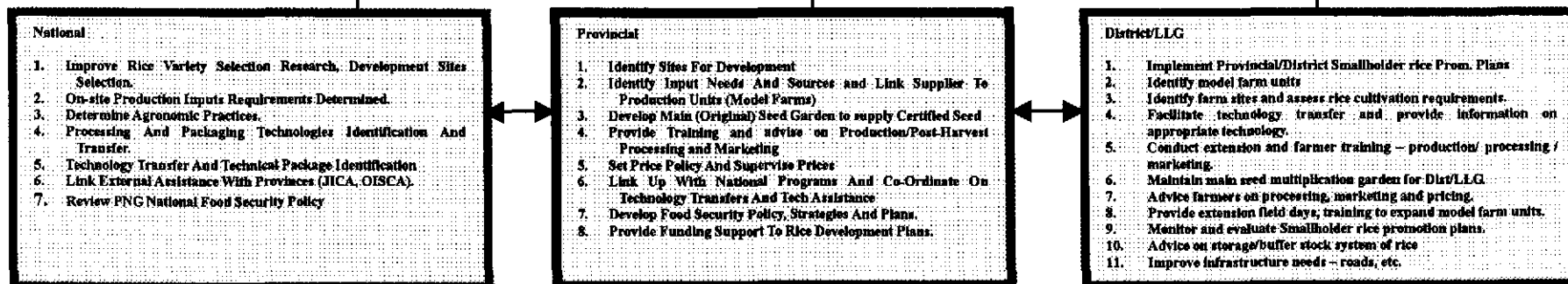
Final Outcomes or Targets



Intermediate Outcomes



Activities



1.3.5 Roles of various stakeholders in the overall rice program

National DAL and its four regional secretariats are tasked with the role of providing support in preparing, coordinating and monitoring provincial and district rice programs in PNG. As the leading government agency in rice promotion, national DAL is responsible for setting, monitoring and evaluating verifiable indicators or targets for local rice production and rice import substitution.

The provincial DAL is responsible for compiling, coordinating, monitoring and securing support for provincial rice programs. The district DAL and LLG extension staff are responsible for preparing and implementing the district and LLG rice program.

Technical support and manpower are provided to the national and provincial rice programs by government and private institutions such as NARI, Unitech, PAU and OISCA; donor agencies such as JICA, ROC and PRC; NGOs such as Hope Worldwide, City Mission, Volunteer Services Overseas (VSO) and Trukai Industries.

In some districts of PNG, community-based organizations (CBOs) ie FOSED in Kundiawa and Kome Training Centre and Sivarai Namona in NCD; Catholic Mission in Kubuna and Madang and the Lutheran Mission in Finschaffien not only provide technical manpower but directly are engaged in rice project supervision, farmer training, milling and marketing services.

1.4 Development Concept

The direction of development and future projects in each field are summarized in the following table.

Field	Present conditions (Constraints)	Direction	Future Projects
Land/water resources control	<ul style="list-style-type: none"> • Customary Land (Clan Land Usage Agreement Form) • No existing management plan for water resources • Degradation of the environment by slash and burn system of land clearing. 	<ul style="list-style-type: none"> • The promotion of a land utilization plan (for the security and protection of rights to use customary land) • Security and application of the water resource for the irrigation • The establishment of an appropriate control system of the resources (the protection of the forest and control measures for soil erosion) 	<ul style="list-style-type: none"> • Law for agricultural land application promotion • Water resources policy for the agriculture development • Soil and water conservation technology research program
System and Organization	<ul style="list-style-type: none"> • No laws and permanent research and promotional organizations for rice (Export tree crops have) • Poor coordination between NDAL, PDAL, DDAL/LLG through the decentralization policy • No system for the provision of extension officer for rice (The restriction for the activities by insufficient number of the personnel and budget deficit) 	<ul style="list-style-type: none"> • Rational laws and a system for rice crop promotion need to be established. • The role of NDAL, PDAL & DDAL/LLG should be reviewed and coordination be strengthened • More extension officers should promote rice within each district. 	<ul style="list-style-type: none"> • Rice research institute & extension agency (Act and board) • The review of budget distribution • To improve the skill of extension officers, categorized officer system (advanced, ordinary) to be introduced • Review of the extension personnel budget
Human resources development	<ul style="list-style-type: none"> • School curriculum does not teach rice as a major subject area in universities, colleges, high schools, etc. • Insufficient rice research activity of NARI • There are few rice crop technicians in provinces and LLG • Most of farm households are subsistence growers and farmer organizations are weak 	<ul style="list-style-type: none"> • Schools will teach rice, as a subject. (Improvement of the curriculum) • NARI is positioned as the center of rice research in PNG • The promotion and strength of a village organization, farmer organization 	<ul style="list-style-type: none"> • Provision of facilities for rice crop education at universities and agricultural colleges. • Provision of rice farms and equipment for the education at high schools • Training of teachers in rice production. • Promotion of NARI research on rice (Dispatch of JICA expert to NARI) • Strengthening of facilities of NARI for rice research • Strengthening of rice crop promotion division at provincial government (the

			<p>cultivation, processing, distribution and finance)</p> <ul style="list-style-type: none"> • Provision of rice crop training farms for the extension offices • Promotion of rice crop farmer association
Rice crop development	<ul style="list-style-type: none"> • Few rice farmers existing • Few rice farms existing • Farmer's education is not available • Few application of fertilizer and agricultural chemicals • There is no rice crop education for woman 	<ul style="list-style-type: none"> • There are many farmers who can grow rice. • Rice crop technology to be made accessible easily. • Supply of fertilizer and chemicals must be affordable to rice growers. • The rice crop training for women must go on 	<ul style="list-style-type: none"> • Promotion of core rice farmers (training, follow up and support) • Establishment of substantial extension officers system • Establishment of Training Centers for rice in major provinces
Rice crop development	<ul style="list-style-type: none"> • Researches for suitable rice cultivation is weak (Cropping, seed, etc.) • Seed multiplication and distribution system are weak • There are almost no application of machines and animal power • There is a no seed law • There are few rice-cleaning machines. • There are not enough rice mills available. • There is no office in charge of agriculture machinery in the government • There are not enough technicians for rice post-harvest processing 	<ul style="list-style-type: none"> • The development of suitable rice varieties for both upland and lowland in PNG should go on. • The multiplication and distribution of Certified Seed will go on as a private business (Certified seed system will be established) • Private rice millers will come out. • Increase of utilization of agriculture machine (Servicing business of agricultural machines will increase by private sector) 	<ul style="list-style-type: none"> • NERICA rice research and extension center (Strengthen NARI activity) • The strengthening of experimental farm of National In-Service Center (Upgrading rice crop section by providing upland and lowland paddy fields) • Provision of rice seed farm at NDAL • Seed inspection and processing facility at NDAL facilities • Establishment of Seed Law • Introduction of mobile rice mill service system (2KR project) • Domestic production trial of the stepping type rice mills • Research on the mechanized rice cropping suitable to PNG (NDAL farm expansion project) • Promotion of post-harvest engineers (South-South training, JICA training, dispatch of JICA expert) • Establishment of machine application associations. (Provision of farm village finance system)

<ul style="list-style-type: none"> • Stabilization of slash and burn agriculture 	<ul style="list-style-type: none"> • The slash and burn agriculture is the mainstream in PNG 	<ul style="list-style-type: none"> • Sustainable agricultural system will take place with the slash and burn agriculture system 	<ul style="list-style-type: none"> • The spread of sustainable land usage system (Establishment of agro-forestry research center)
<ul style="list-style-type: none"> • Market distribution/ farm product processing 	<ul style="list-style-type: none"> • Very poor infrastructure and transportation costs are high • Imported rice monopolizes the rice market of PNG • Agriculture materials market is undeveloped 	<ul style="list-style-type: none"> • Local rice will be marketed and consumed in urban areas • Rice surplus will form buffer food stocks along with main staple crops as counter measures against natural disasters 	<ul style="list-style-type: none"> • Roads and harbors are upgraded • Establishment of rice processing and consumption research institute • Governmental supports to rice marketing business (financial support, construction of warehouses) • A national food reserve system will function (rice reserve system, construction of warehouses for food reserve, disaster)
<ul style="list-style-type: none"> • Rural finance 	<ul style="list-style-type: none"> • The privatization of RDB (There is no public rural financial system) 	<ul style="list-style-type: none"> • A farmer will be able to utilize the finance system 	<ul style="list-style-type: none"> • Promotion of the farmers' cooperative and agriculture credit union system
<ul style="list-style-type: none"> • Rural development 	<ul style="list-style-type: none"> • There are many small farm villages in remote areas • Accessibility to a market is poor • It is difficult to access new technologies and equipment 	<ul style="list-style-type: none"> • Improvement of livelihood through increase in rice production • Improvement of nutrition when various food items become available through income from surplus rice. 	<ul style="list-style-type: none"> • Road construction • Extension offices • Irrigation facilities • Promotion of Agriculture Cooperatives
<ul style="list-style-type: none"> • Marketing 	<ul style="list-style-type: none"> • There is little surplus rice available for selling 	<ul style="list-style-type: none"> • Rice farmers will sell his surplus rice to neighbours and later to formal markets 	<ul style="list-style-type: none"> • Private sector will start rice business (Buying paddy – milling – selling) • Quality control of local rice

Chapter 2. MASTER PLAN

2.1 The Strategy of the Master Plan

4 Directions	<ol style="list-style-type: none"> 1. To increase the current yield per hectare in upland rice 2. To increase the size of individual rice farm 3. To increase the number of rice households 4. To enable marketing of surplus rice
2 Approaches	<ol style="list-style-type: none"> 1. Bottom up approach using Model Farms To select and train core farmers in different villages who would be leaders of rice farmers in the same villages. Each selected farmer leader will develop a model farm in his garden and will spread rice farming to neighbors. NDAL/PDAL/DDAL/LLG will support these activities by follow-up, supply of seed, other conveniences and technical guidance. 2. Extension approach The District and LLG Administrations will prepare action plans, provide funds and implement their rice extension programs that follow the four directions of rice promotion. All inputs from the participating LLGs, districts, provinces, national agencies and NGOs will be directed towards the mobilization of local resources of the farm households for the production of rice as a food crop first and as a source of small income later.

2.2 Demarcation

Level	RESEARCH		EXTENSION AND EDUCATION	
	Office in charge	Activities	Office in charge	Activities
National	NARI Universities	<ul style="list-style-type: none"> • Develop foundation seed • Develop upland rice cultivation in rotational farming • Develop researchers 	NDAL Agricultural Colleges	<ul style="list-style-type: none"> • Train extension officers belonging to PDAL/DDAL/LLG • Multiplication of registered seed • Demonstrate improved rice farms • Educate students in rice
Provincial			PDAL DDAL/LLG High-schools	<ul style="list-style-type: none"> • Train and guide rice farmers • Distribution of certified seed • Machinery rental and maintenance • Education of students in rice

2.3 Proposed Projects

As described in the Chapter 1, four development directions are set in order to achieve the government goal to produce 15,000 ton of local rice by the year 2010. The present conditions and constraints on rice development in PNG were also studied in the same chapter. In this Chapter 11, systematic approach to the four directions and two levels of approaches, proposed projects and action plans will be identified.

Table of proposed projects

Direction	Approaches	Activities	Proposed Projects	Project Code	Implementing Agency
1. Increase rice yields through improved Farming Techniques	• Research and extension of better rice seed suitable to PNG, specially for upland rice	• Strengthen the activity of NARI(Research of NERICA rice and upland rice varieties cultivated in Indonesia etc. for PNG	• To increase manpower, facilities and budget for NARI for rice research • Dispatch rice expert from JICA	Pj-10	NARI
		• Extension of new seed by distribution and demonstration	• Seed multiplication center to be established at Provincial Rice Development Center and will produce Registered Seed researched by NARI	Pj-3	PDAL/DDAL/LLG
	• Research and extension of better and appropriate rice farming technology	• Research of appropriate rice farming system including use of fertilizer and chemicals	• To strengthen the National In-service Center' activity for research and training of Provincial extension offices and demonstration	Pj-2	NDAL/PDAL/DDAL/LLG
		• Training of new technology to extension officers	• -do-	Pj-2	NDAL/PDAL/DDAL
		• Farmer training at LLG level	• To establish Provincial Rice Development Center at appropriate location in each provinces	Pj3	NDAL/PDAL/DDAL
1. Increase rice yields through Improved Farming Technique	• Promotion of post-harvest technology	• To establish appropriate post-harvest technology • Extension officer training for post-harvest technology	• To organize post-harvest technology office under NDAL and Pro.Gov.(LLG) for the extension • To facilitate post-harvest technology office in the National In-service Center under NDAL	Pj-6	NDAL/ PDAL/DDAL

		<ul style="list-style-type: none"> Farmer training at LLG level 	<ul style="list-style-type: none"> To establish Provincial Rice Development Center at appropriate location in each provinces for this training 	Pj-3	NDAL/ PDAL/DDAL
	<ul style="list-style-type: none"> Introduction and provision of hand tools 	<ul style="list-style-type: none"> Demonstrate the proper sickle, spade and hoe during training program and at model farms 	<ul style="list-style-type: none"> Sales of sickles, spades and hoes at low price to rice farmers 	Pj-3	NDAL/2KR project of Japan Gov.
	<ul style="list-style-type: none"> Promotion of water management (irrigation) 	<ul style="list-style-type: none"> Demonstrate the water management at National and Provincial farms Training works to extension officer and farmers 	<ul style="list-style-type: none"> To establish the National In-service Center under NDAL To establish Provincial Rice Development Center 	Pj-2	NDAL/ PDAL/DDAL
	<ul style="list-style-type: none"> Collection and utilization of data on present conditions of rice cultivation in PNG 	<ul style="list-style-type: none"> To improve statistic data and make Data-Base for the utilization 	<ul style="list-style-type: none"> Information network project. Periodical data collection and distribution net work to be established (from LLG/DDAL – PDAL - NDAL and versa.) 	Pj-2	NDAL/PDAL/DDAL/ LLG
2. Increase size of Individual Rice farms	<ul style="list-style-type: none"> Promotion of usage of farm machines (Tractor and Power Tiller, Animal power) 	<ul style="list-style-type: none"> Rental service to be started at Provincial level Training works to extension officer and farmers on farm machines 	<ul style="list-style-type: none"> To establish Provincial Rice Development Center and provide the center a rental service of machines 	Pj-3	NDAL/ PDAL/DDAL
			<ul style="list-style-type: none"> Sales of proper farm machines at low cost 	Pj-4	NDAL/2KR project of Japan Gov.
	<ul style="list-style-type: none"> Promotion of group farming 	<ul style="list-style-type: none"> Training programs for extension officers and farmers 	<ul style="list-style-type: none"> To establish Provincial Rice Development Center 	Pj-3	NDAL/PDAL/DDAL
3. Increase the number of rice farmers	<ul style="list-style-type: none"> Establish and promote the suitability of land for rice to farmers 	<ul style="list-style-type: none"> To categorize characteristic of the land on the suitability to rice growing. To promote the ability of judgments of extension officers and farmers for the suitability of land for rice 	<ul style="list-style-type: none"> To collect data of soil condition and its location on the suitability for rice and compile them as a technical guide book 	Pj-2	NDAL/ NARI/ Universities
	<ul style="list-style-type: none"> Promotion of Service Business of rice cropping 	<ul style="list-style-type: none"> To assist private sector to start leasing business 	<ul style="list-style-type: none"> Sales of proper farm machines at low cost 	Pj-3	NDAL/2KR project of Japan Gov.
	<ul style="list-style-type: none"> Review of the Customary Land system 	<ul style="list-style-type: none"> Promotion of commercial agriculture 	<ul style="list-style-type: none"> Governmental policy and campaign 	Pj-11	NEC/ NDAL
3. Increase the number of Rice farmers	<ul style="list-style-type: none"> Seed distribution 	<ul style="list-style-type: none"> Distribution of cleaned rice seed free of charge for the time being to farmers who wish to start rice cultivation 	<ul style="list-style-type: none"> To provide NDAL Seed Cleaning equipment at appropriate places 	Pj-3	NDAL/PDAL/DDAL

	• Provision of Rice Mills	• Provision of small Rice Mills for villages where certain numbers of farmers started rice cultivation	• To distribute rice mills where rice cultivation will increase by leasing or deferred payment or installment	Pj-4	NDAL/PDAL/DDAL JICA(2KR)
		• Provision of Mobile Rice Mills installed on a trailer for small scale rice villages	• To provide NDAL/Pro. Gov.(LLG) for starting milling service	Pj-4	NDAL/PDAL/DDAL/ LLG JICA(2KR)
		• Introduce manual type rice milling units such as Stepping type, Hand pounding type and Sack beating for mainly remote rice farmers	• To study and develop manual type rice milling by NDAL or University for local production • To develop "Winnow" by local materials	Pj-5	NDAL/UNITECH
		• Training of Operation & Maintenance (O&M) of rice mills and prime movers (engine)	• To organize rice machine office under NDAL and Prov. Gov.(LLG) for O&M for proper extension services to rice farmers	Pj-6	NDAL/PDAL/DDAL/ LLG
	• Farmers(Gender) Training	• Rice farming system including the application of fertilizers suitable to the districts to be established and demonstrated to farmers (gender) for the extension.	• To establish Provincial Rice Development Center at appropriate location in each provinces with consideration of gender training	Pj-3	NDAL/PDAL/DDAL LLG
	• Expansion of rice crop education	• Strengthen rice cultivation research and education program at University level	Unitech Lae Vudal University Campus	Pj-7	NDAL Min. of Education
	3. Increase the number of Rice farmers	• Expansion of rice crop education	• Strengthen rice cultivation education program at Agriculture Collages	Highlands Agric. College, WHP Popondetta Agric. College, Oro Province	Pj-8	NDAL Min. of Education
• Strengthen program on rice cultivation, education & practice at boarding high schools			60+ boarding high schools	Pj-9	NDAL Min. of Education

4. Marketing of Rice	• Promotion of private rice business(Rice Miller, Rice Trades, Rice Wholesaler)	• Management guidance and supports by NDAL or Min. of Prime Industry or Min. of Commerce	• Organize a training course on rice business management with SBDC(Small business Development Corporation) • Establish credit facility to rural personnel who want to start rice business through a judging committee.	Pj-12	NDAL/PDAL/DDAL
	• Construction of rice storage facility	• Design and demonstration of farmers rice storage, using locally available material	• Unitech Engineering Section shall study and construct it for demonstration and extension	Pj-3	NDAL/PDAL/DDAL/LLG
4. Marketing of Rice	• Improve and standardize the rice quality	• Extension of quality control technology • Training to extension officer and farmers	• To establish a rice training program with National In-service Center ,Lae • To establish Provincial Rice Development Center	Pj-3	NDAL/PDAL/DDAL/LLG

2.4 List of Proposed Projects

The proposed projects have been integrated and can be implemented simultaneously because their contents are complementary.

Project Code	Contents	Implementing Agency
Pj-1	Core rice farmer promotion (ongoing projects)	NDAL&JICA
Pj-2	MOU with NISTC, Lae for establishing NRRDC at NISTC campus, 3 Mile.	NDAL & NISTC, Lae
Pj-2	Joint research and extension program on new rice farming technologies at NRRDC	NDAL/NARI/PDAL/DDAL/LLG
Pj-2	Water management course at NRRDC	NDAL/NISTC
Pj-2	Grain quality control course at NRRDC, Lae	NDAL/NISTC/CAC/PDAL
Pj-3	Establishment of PRRDCs	NDAL/PDAL
Pj-3	Seed cleaning machines	NDAL/PDAL/DDAL
Pj-3	Promotion of better rice farming system	NDAL/PDAL/DDAL/LLG
Pj-3	Certified seed multiplication at PRRDCs	NDAL/PDAL/DDAL/LLG
Pj-3	Farmers training & demonstration at PRRDCs	NDAL/PDAL/DDAL/LLG
Pj-3	Promotion of group farming at PRRDCs	NDAL/PDAL/DDAL/LLG
Pj-3	Post harvest technology work at PRRDCs	NDAL/PDAL/DDAL/LLG
Pj-3	Farm machines rental service at PRRDCs	NDAL/PDAL/DDAL/LLG
Pj-3	Dev. of farmers rice storage facilities	NDAL/PDAL/DDAL/LLG
Pj-4	Provision of small rice mills	NDAL/PDAL/2KR/JICA
Pj-4	Provision of mobile rice mills	NDAL/PDAL/2KR/JICA
Pj-4	Provision of rice equipment and farm tools	NDAL/PDAL/&2KR Proj.
Pj-4	Sale of rice mills at low cost to farmers	NDAL/PDAL/2KR/JICA
Pj-4	Sale of rice mills to private miller/trader	NDAL/PDAL/2KR/JICA
Pj-5	Dev. of manual rice mills & winnowers	NDAL/UNITECH
Pj-6	Establishment of office in charge of farm machinery and rice mills in NDAL	NDAL
Pj-6	Section for post harvest technology development and extension in NDAL	NDAL/PDAL/DDAL/LLG
Pj-7	Rice research & education at universities	NDAL & Min. of Education
Pj-8	Rice crop education at agric colleges	NDAL & Min. of Education
Pj-9	Rice crop education at high schools, etc	NDAL & Min. of Education
Pj-10	Strengthening rice research work of NARI	NARI
Pj-11	Recommend review of customary land	NEC/NDAL
Pj-12	Promotion of private rice business (rice miller, rice trader, rice wholesaler, etc)	NDAL/PDAL/DDAL Min. of Trade/Industry

2.5 Profiles of Proposed Projects

The outlines of 12 projects are summarized in the following sheets; in which the purpose, project area, background and rationale, beneficiaries, contents of activities, inputs and outputs, pre-conditions/external conditions, risk, etc. are shown.

Project No.	Pj-1	Project Name	Smallholder rice production support program
Purpose		Project Area	
To attain sustainable rice production for subsistence of small-holders in target area as a model farm (On-going project)		Target areas in whole country	
Background and Rationale			
<p>Since the number of rice farmers is very limited in PNG, promotion of rice farmers must be taken as the first step. This program was designed in joint efforts between NDAL, Regional DAL, Provincial Gov. (LLG) and JICA to train selected core farmers who wish to learn about rice cultivation at OISCA farm in ENB. The selection of core farmers and the location where the core farmers stay were jointly studied by NDAL, Regional DAL and Prov. Gov. (LLG). The trainees after OISCA training will receive follow-up service by OISCA staff at their farm individually to solve any problems they may have in sustainable rice growing. Some regional extension officers were also invited to this training program.</p>			
Beneficiary		Main Activity	
<ol style="list-style-type: none"> 1. Core farmers. 2. Farmers surrounding to the core farmer. 		<ol style="list-style-type: none"> 1. Training of selected farmers at OISCA farm, ENB. 2. "Community Empowerment Program" of JICA is used for farmers training. 3. Follow-up service to trainees. 	
Required Input		Expected Outcome	
<ol style="list-style-type: none"> 1. JICA expert 2. JOCV 3. "Community Empowerment Program" of JICA 4. Involvement of NDAL, RDAL, LLG 		<ol style="list-style-type: none"> 1. Trainees will get proper skills in rice farming from the training. 2. Trainees will start rice farming at their gardens as model farms. 3. The neighboring farmers will imitate the rice farming. 4. Number of rice farmers will increase. 	
Implementing Agency		Implementing Schedule	
NDAL/RDAL/LLG/JICA/OISCA		2001 – 2003	
Pre-conditions and External Conditions		Risk	
<ol style="list-style-type: none"> 1. Farmers are interested in rice production. 2. Respective governments are eager with rice production. 3. Seed will be supplied to farmers. 		<ol style="list-style-type: none"> 1. Unexpected damages such as drought, insect damages may occur to a farmer of which he cannot overcome. 2. Extension officers after training have no support from their office for their activities. 3. Seed quality must be acceptable. 	
Special Remarks			
<p>This program started in September 2001 and 32 trainees studied already. The trainees are expected to develop their model rice farms and will become leaders of rice farmers in their areas. Neighboring farmers will start rice cropping imitating the model rice farms. The number of trainees and number of imitating farmers are expected to grow one after another.</p>			

Project No.	Pj-2	Project Name	Expansion of DAL National In-Service Center
Purpose		Project Area	
<p>To expand the existing Center for following activities:</p> <ol style="list-style-type: none"> 1. Training center of rice for extension officers 2. Research and extension of new rice technologies suitable to PNG 3. Multiplication and distribution of Registered Seed to Provinces 4. Quality control of paddy, rice 5. Water management 6. Rice storage 7. Produce an illustrated book on rice cultivation for farmers 8. Periodical rice and soil data collection & distribution 		Lae, Morobe	
Background and Rationale			
<p>Simultaneous approach to smallholder rice development is necessary in PNG. One is the direct training of core farmers as per the on-going project by NDAL/JICA. The other is to promote/train extension officers for rice farming. There is no such facility in PNG. The existing National In-Service Center in Lae is most suitable for this purpose as NARI facilities are in proximity. Small scale but fully integrated rice crop training and extension center shall be facilitated. A donor may assist in developing this Center and NDAL is responsible for the operation. Provincial Gov.(LLG) are responsible to train their officers at this Center for the development of rice cultivation in PNG.</p>			
Beneficiary		Main Activity	
<p>Extension officers Farmers</p>		<p>Expansion of existing center Start the activities as per the purpose</p>	
Required Input		Expected Outcome	
Need to be studied in detail		<ol style="list-style-type: none"> 1. Extension officers will be trained and the number is increased 2. Rice production in PNG will increase 3. Rice farming technology in PNG will improve 	
Implementing Agency		Implementing Schedule	
NDAL		2004 – 2005	
Pre-conditions and External Conditions		Risk	
<ol style="list-style-type: none"> 1. A donor will assist the expansion work or PNG Gov. will allocate the budget 2. NDAL will have enough manpower and budget for the operation 		<ol style="list-style-type: none"> 1. If Prov. Gov.(LLG) cannot allocate extension officers and/or budget, after this Center start servicing, there will be no trainee come 	
Special Remarks :			
<ol style="list-style-type: none"> 1. Detailed design and contents of facilities to be expanded shall be studied by NDAL(JICA). 2. NDAL/JICA need to study whether the counter-budget of 2KR can be allocated or not. 			

Project No.	Pj-3	Project Name	Provincial Rice Development Center
Purpose		Project Area	
<p>Provincial Rice Development Center to be established in major Provinces. The centre will have the following purpose and activity:</p> <ol style="list-style-type: none"> 1. To demonstrate rice farming to farmers and gender group including training services to them 2. Seed multiplication and distribution of Certified Seed 3. Seed cleaning and germination testing 4. Post-harvest technology extension 5. Water management technology including the promotion of simple irrigation system and guiding to farmers 6. Machine rental service and maintenance works 7. Rice quality control technology 8. Rice storage technology and develop local storing facility for individual farmers using locally available materials 9. Promotion of Group farming of rice 10. Marketing of surplus rice from the region 11. Sales activity of fertilizer, tools, materials and farm machinery 		<p>Major rice producing provinces. (The location shall be fixed after detailed study.)</p>	
Background and Rationale			
<p>To develop rice cultivation of smallholders in PNG, multi-functioned Provincial Rice Development Center is very useful to farmers. Various needs of farmers who wish to start or to enlarge or to improve rice farming or who want marketing their rice will be satisfied at this Center by face-to-face guidance.</p> <p>If PNG Government (Provincial Governments) wants to develop smallholders rice production, such training and guiding facility to rural farmers shall be established.</p>			
Beneficiary		Main Activity	
Farmers (gender)		<ol style="list-style-type: none"> 1. Establishment of Provincial Rice Centers 2. Extension of rice farming 3. Farmers (gender) training. 	
Required Input		Expected Outcome	
Need to be designed in details		<ol style="list-style-type: none"> 1. Number of rice farmers will increase 2. Rice production will increase 3. Rice cultivation techniques of farmhouses will be improved. 4. The size of rice field of individual farmhouse will be increased. 	
Implementing Agency		Implementing Schedule	
Provincial Gov. with technical support of NDAL(JICA)		2003 - 2004	
Pre-conditions and External Conditions		Risk	
<ol style="list-style-type: none"> 1. Farmers are interested with rice production. 2. Provincial Gov. will allocate manpower and budget 		Budget for the construction and operation of Provincial Gov.	
Special Remarks :			
Detailed designing and selection of appropriate location in the province shall be conducted by NDAL/Regional DAL/Provincial Gov./(JICA) after the National Center (Pj.2) is finalized.			

Project No.	Pj-4	Project Name	Provision of small rice mills
Purpose		Project Area	
<p>1. To encourage farmers to start rice cultivation, provision of rice mills is essential.</p> <p>2. In the initial stage, government will support farmers by special arrangement such as leasing, differed payment, etc. but the final purpose is to promote development of rice business in private sector including rice millers and rice traders eventually.</p>		Rice producing districts in whole country	
Background and Rationale			
<p>Farmers who harvested paddy can process it to white rice for their consumption. Since there is no milling technique that is commonly used in PNG, the provision of rice mills is the most essential encouragement to rice production by farm households.</p> <p>There are several types of small rice mill according to structure and operation:</p> <ul style="list-style-type: none"> ▪ By structure, the rubber roller type and iron roller (micro-mill) type. ▪ By operation, the stationary type and mobile type. <p>Rubber roller type has better milling recovery and better appearance of milled rice but the cost is more expensive and requires more spare parts.</p> <p>Iron roller type is simple construction, easy to operate and lower cost but milling recovery and appearance of milled rice are not so good.</p> <p>Station type is normal. The machine is installed at a mill site and serves to farmers who come to the mill. Farmers have to pay the milling fee by cash or by kind such as bran or some rice.</p> <p>Mobile type is installed on a trailer and can go to the rice farmers who are isolated from a stationary rice mill or in remote villages. A tractor will pull the unit and the visiting schedule is arranged by requests from farmers in advance. Farmers will pay the milling fee when such service is completed.</p> <p>The selection of type of the structure and operational methods will be studied closely and determined depending on the situation in each area.</p>			
Beneficiary		Main Activity	
Rice growing farmers		To provide small-scale rice mills of various types	
Required Input		Expected Outcome	
<p>Rice mills with engine and trailers (tractors as well)</p> <p>Input plan shall be determined.</p>		<p>1. Number of rice growers will increase</p> <p>2. Rice production will increase</p>	
Implementing Agency		Implementing Schedule	
NDAL /RDAL and Prov. Gov.(LLG) JICA(2KR project)		2002 - 2004	
Pre-conditions and External Conditions		Risk	
Financial support can be secured such as 2KR assistance		Machine operation, maintenance and supply of spare parts. Sustainability of this scheme	
Special Remarks:			
2KR scheme for 2003 is under the arrangement subject to Japanese Government's budget and approval.			

Project No.	Pj-5	Project Name	Development of manual type rice mills
Purpose		Project Area	
To copy manual-type rice milling units still commonly in use in Asian countries such as remote areas in Indonesia, Thailand, Myanmar, etc and then introduce them in PNG To produce winnowers with local available materials		National institute such as Unitech for the development (Copying) locally.	
Background and Rationale			
<p>Rice is new crop to farmers in PNG so there is no development of rice milling equipment in the past. Mechanical rice machine is known in PNG but manual type is not introduced to PNG yet. It will be very useful for people whose rice production is very little and accessibility to rice mill is very difficult or when rice mills break down.</p> <p>The manual type milling units are made of locally available wooden material and carpenters can produce it once a prototype is developed. Winnower will also be produced in PNG and distributed to farmers.</p> <p>Unitech Lae will be requested to gather necessary information from these countries for trial production in PNG.</p>			
Beneficiary		Main Activity	
Rice growing farmers		Gather information of the units (size, material, weight, etc) or import one unit for local production	
Required Input		Expected Outcome	
Institute(s) to start development of prototype units by gathering necessary information		Manual operation type rice milling unit will be introduced to remote area where farmers wish to produce and consume rice. The units will be made in PNG.	
Implementing Agency		Implementing Schedule	
NDAL Unitech Lae		2005 - 2006	
Pre-conditions and External Conditions		Risk	
The budget is allocated and Unitech can start the development.		Farmers will not use them because of hard work for the operation.	
<p>Special Remarks:</p> <p>Manual type rice mills have been developed with a lot of know-how in Asian Countries. Not only the size or material but the pattern or shape of mortar and pestle will be studied. Using a winnower makes cleaning of threshed rice easier since a lot of rice can be cleaned with a winnower.</p>			

Project No.	Pj-6	Project Name	Establishment of Office for Farm Machinery in NDAL
Purpose		Project Area	
To collect and distribute information on farm machines including rice mill machines, a section or office responsible for these requirements is necessary.		NDAL	
Background and Rationale			
There is no office in charge of farm machines especially of rice mills in PNG Government. A systematic approach on the collection and distribution of required information of engineering and economical aspects is necessary. This office will be an information center of all farm machinery in PNG. Operation and maintenance training on all types of machinery will be organized and conducted by this section in various Provinces and Districts.			
Beneficiary		Main Activity	
Farmers Local extension officers		Collection and distribution of information on farm machines. Organizing demonstration and training program.	
Required Input		Expected Outcome	
To set up an office and recruit necessary engineer(s)		Officers and farmers can access the information and development of farm machine' utilization will be accelerated properly. O & M training will be conducted time to time.	
Implementing Agency		Implementing Schedule	
NDAL		2006	
Pre-conditions and External Conditions		Risk	
National Government will allow setting up a new section or office and hiring of staff.		New Organic Laws try to minimize the Central Government's activities.	
Special Remarks: Most of countries even LLD (Least Low Developed) countries have such office in charge of farm machines and farm mechanization for the agricultural development. Farm mechanization and usage of rice mills will be accelerated through the activities of this office.			

Project No.	Pj- 7,8 & 9	Project Name	Promotion of Rice Education
Purpose		Project Area	
To circulate and disseminate that there are huge potentials of rice production in PNG, research and education on rice shall be strengthened.		Universities, colleges, boarding high-schools, vocational centres and primary schools.	
Background and Rationale			
<p>There was a compelled rumor that PNG is not suitable to rice cultivation in the past. Many people are not aware of the potentials of rice production in PNG. To accelerate rice development in PNG, the curriculum in school needs to be reviewed both in research and practical education.</p> <p>The subject of rice will be included in primary schools.</p>			
Beneficiary		Main Activity	
Students Farmers Country of PNG		<ol style="list-style-type: none"> 1. To strengthen research and education program in Universities 2. To strengthen education and practice program in Agricultural Collages 3. To strengthen education and practice program in residential High-Schools 4. Ordinary lessons will include rice subject in a Primary school 	
Required Input		Expected Outcome	
<ol style="list-style-type: none"> 1. Policy on rice education 2. Promotion by Professors and teachers 3. Provision of necessary education materials and teaching aids such as textbooks, rice mill, etc. 		Rice production will spread throughout PNG	
Implementing Agency		Implementing Schedule	
Ministry of Education NDAL		2004-2011	
Pre-conditions and External Conditions		Risk	
National consensus		Not enough professors and teachers available	
<p>Special Remarks: Research and education system to rice development will be reviewed in every field.</p>			

Project No.	Pj-10	Project Name	Strengthen NARI
Purpose			Project Area
To strengthen research activities in rice, national level research center of NARI will be upgraded.			NARI
Background and Rationale			
<p>National Agriculture Research Institute (NARI) is responsible for research work on various food crops including rice, yam, taro, sweet potato, tapioca, etc. NARI in Bubia, Morobe Province has facilities and research farms for various purposes but the field of rice is new to NARI staff and their rice research section needs to be expanded. Since most of rice cultivation in PNG is in upland rice, especially to develop better seed for upland cultivation in PNG. Some international cooperation will be necessary such as assistance from Indonesian Government for upland rice (seed and cultivation) and from WARDA (West Africa Rice Development Organization) for the NERICA variety.</p> <p>Strengthening of human resources, facilities and funding is required in NARI for this purpose.</p>			
Beneficiary		Main Activity	
Rice farmers		To collect and carry out research work on various seed varieties of upland rice from Indonesia, WARDA and others and multiply the foundation seed of selected varieties.	
Required Input		Expected Outcome	
Details to be discussed and confirmed with NARI		Better seed varieties will be introduced to PNG without delay.	
Implementing Agency		Implementing Schedule	
NARI		2003 – 2005	
Pre-conditions and External Conditions		Risk	
Financial support to be secured.		Institutes in other countries reluctant to cooperate with NARI (PNG)	
Special Remarks:			
<p>NERICA (New Rice for Africa) is a new variety bred from Asian rice species and African rice species by WARDA. It has special characteristics such as better yield, strong tolerance to drought and weeds. NERICA is of upland rice variety and is believed to be suitable to PNG climatic conditions which are similar to West Africa.</p>			

Project No.	Pj-11	Project Name	Recommendation, Review of customary land
Purpose		Project Area	
To develop agriculture including rice cultivation, ownership of the agricultural land needs to be established; otherwise any investments for better cropping in the land cannot be expected.		Whole country	
Background and Rationale			
Some time in the future, PNG will need to make the best use of agricultural land for better production in yield, quality and efficiency. The present customary land usage system needs to be reviewed if there is national consensus by PNG people for the development of the country.			
Beneficiary		Main Activity	
Farmers and people		To investigate disputes on the land usage for rice cultivation under current customary land tenure system then solutions should be recommend.	
Required Input		Expected Outcome	
No immediate input		Ownership of agricultural land will be established.	
Implementing Agency		Implementing Schedule	
NDAL/DLPP/NEC/National Parliament		(2009-2011)	
Pre-conditions and External Conditions		Risk	
National consensus will be required		People support present Customary Land system.	
Special Remarks: Most of developed countries have individual land ownership system.			

Project No.	Pj-12	Project Name	Promotion of private rice business
Purpose		Project Area	
<p>For the development of rice production in PNG, promotion of private business for rice milling, internal rice trading and wholesale business should be developed.</p> <p>To accelerate these activities, official support will be given to the private sector.</p>		Whole country	
Background and Rationale			
<p>Not only official efforts and endeavors for rice development in PNG, involvement and participation of private business in this field will accelerate the development. As rice business is quite new in PNG except for Trukai Industries, some training course by SBDC will help small business people to start with this kind of business. Provision of necessary information on domestic rice production and milling from government agencies to the private sector is necessary.</p> <p>If some kind of credit facility for these private sector can be arranged such as a rice business promotion fund to business-minded people staying in rural rice growing areas can contribute to the speedy establishment of this rural –based business activity.</p>			
Beneficiary		Main Activity	
<p>Rice growers</p> <p>Rice businessmen</p> <p>Rice consumers</p>		<p>To promote private business of rice milling and marketing.</p> <p>To encourage private sector to be involved rice business.</p>	
Required Input		Expected Outcome	
<p>Training program</p> <p>Credit facility</p>		<p>Commercial rice millers (traders, wholesalers) will be active and rice production is sustained with minimum interruption from the government.</p>	
Implementing Agency		Implementing Schedule	
<p>NDAL,</p> <p>Ministry of Trade and Industry</p>		2005 - 2007	
Pre-conditions and External Conditions		Risk	
<p>Rice farmers will accept private rice business</p>		<p>Private rice business will not be profitable</p>	
Special Remarks:			
<p>For sustainable rice development activity in PNG, the involvement and participation of private sector is essential.</p>			

2.6 Implementation Schedule

PJ. Code	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Pj.1	_____	_____	_____							
Pj.2			_____	_____						
Pj.3		_____	_____							
Pj.4	_____	_____	_____							
Pj.5				_____	_____					
Pj.6					_____					
Pj.7,8,9			_____	_____	_____	_____	_____	_____	_____	_____
Pj.10		_____	_____	_____						
Pj.11								_____	_____	_____
Pj.12				_____	_____	_____				

Chapter 3. ACTION PLAN

3.1 Background of Workshop on Master Plan

A workshop on the Master Plan was held in Port Moresby on September 4-6, 2002. Participants from the five surveyed provinces, NARI, Unitech, OISCA, Department of Planning, Monitoring & Rural Development, JICA, NDAL, Simbu, EHP and PAU attended this workshop. Provincial Rice Programs, Action Plan and Role Sharing in the Project List and in Project Activities were presented and discussed. Two weeks earlier, copies of the draft Final Report and Master Plan were provided to the five provinces. Some of the results of the workshops are enclosed in this Master Plan.

3.2 Results of the Workshop on Master Plan

(a) Criteria for Ranking of Projects

1. Output
2. Input
3. Feasibility
4. Urgency

(b) Priority Ranking of Projects

The 10 groups of projects listed below were ranked according to each criterion from one to 10 by the participants in the workshop. The rankings are totaled into scores. The project that got the lowest total score has the highest priority, etc.

In the order of priority, the participants at the workshop decided to give the following priority ranking to the 12 proposed projects.

Table 3.1 Priority Ranking by Participants.

Priority	Project Name	Project Code
1	Smallholder rice production support program	1
2	Provision of small rice mills	4
3	Provincial Rice Resource Development Centre	3
4	Expansion of DAL NISTC, Lae into NRRDC for PNG	2
5	Promotion of rice education	7, 8 & 9
6	Development of manual type rice mills	5
7	Strengthening of NARI rice research program	10
8	Farm machinery office in NDAL	6
9	Promotion of private rice milling and marketing business	12
10	Recommendation to review customary land ownership system	11

3.2.1 Priority Ranking of Proposed Projects by Workshop Participants

The 10 groups of projects listed above were ranked by the 26 participants from the five target provinces as well as by representatives from the NDAL and NARI as shown in Table 3.2. The ranking was based on each criterion from one to 10. The four criteria were output, input, feasibility and urgency. The prioritization of the 10 projects listing, for example, also considered the needs of the provinces and their capabilities to implement them. The first five projects listed by the participants on the basis of their ranking were (Pj-1) Smallholder rice production support program; (Pj-4) Provision of small rice mills; (Pj-3) Provincial rice development center; (Pj-2) Expansion of DAL NISTC, Lae into NRRDC for PNG; and (Pj-7,8&9) Promotion of rice education. The participant's rankings do not deviate very much from that done by the ACS members in Table 3.3. All the first four projects, for example, were given high priority by the participants and the ACS members, except for (Pj-7) Promotion of rice education, which was ranked 5 by the participants, while the ACS members ranked it 8. In general there is some agreement or indication that the first five projects listed in order of their priority ranking are important. On the other hand, (Pj-6) Farm machinery officer in NDAL; and (Pj-11) Recommendation, review of customary land received low priority in terms of ranking both by the ACS members and the participants alike. Since the focus of rice development is on a smallholder basis, which is household oriented, it does in this connection make sense to start small and think small in terms of project development and their budgetary requirements for their implementation. It is a model based on development from below rather than a top-down approach. Thus this evaluation and ranking of projects by the participants and the ACS members capture this thinking and the direction of smallholder rice development in the country.

3.2.2 Feasibility of the Proposed Projects

The participants were unanimous in their opinion that only the first five proposed projects are feasible to implement in their respective provinces because of the current conditions of their rice extension capability and their capacity to provide provincial counterpart funding for the proposed projects.

Table 3.2 Ranking by Participants in Rice Report Workshop, 4-6/09/02

		PRIORITIZATION																									TTL	Priority No.			
No	Project Name	Score																													
1	Smallholder rice production support programme	5	1	1	1	1	1	1	1	1	1	1	2	1	5	1	1	1	1	6	1	1	1	1	2	1	1	2	2	40	1
2	Expansion of DAL, NISTC, Lae into NRRDC for PNG	1	5	7	4	7	5	9	3	6	7	1	2	1	5	2	3	2	3	10	2	4	6	3	5	5	4	5	4	120	4
3	Provincial Rice Resource development officer		3	4	1	2	4	7	2	3	9	5	3	1	6	3	4	5	5	5	5	7	3	7	3	3	3	3	7	111	3
4	Provision of small rice mill		2	6	5	3	2	5	5	2	6	7	5	5	7	4	2	3	2	1	6	3	2	6	4	4	2	1	1	101	2
5	Development of manual type rice mills		4	3	6	8	7	6	8	7	3	8	6	4	7	6	5	4	8	2	4	2	5	8	10	8	5	9	6	159	6
6	Farm machinery office in NDAL		7	5	8	9	8	8	4	8	10	6	8	8	3	5	7	6	7	4	8	8	8	9	6	7	7	8	10	192	8
7, 8, & 9	Promotion of rice education		6	2	2	4	3	4	7	4	2	3	7	6	4	8	6	8	4	3	2	6	7	2	1	2	6	4	9	122	5
10	Strengthening of NARI rice research program		8	8	7	6	6	2	6	5	4	10	4	3	2	9	4	9	6	9	7	9	4	4	7	6	8	6	8	167	7
11	Recommendation to review customary land ownership system		9	10	10	10	10	10	10	5	9	9	7	7	7	8	10	10	8	10	10	10	5	8	10	10	10	7	239	10	
12	Promotion of private rice milling and marketing business		10	9	9	5	9	3	9	9	8	4	10	9	8	10	9	7	9	7	9	5	9	8	9	9	9	7	5	216	9

Table 3.3 Priority Ranking by ACS Team Members

Pj. Code	Criteria																				Score						
	Output					Input					Feasibility					Urgency					Total	Priority Ranking					
	JG	BM	IH	BT	JO	JG	BM	IH	BT	JO	JG	BM	IH	BT	JO	JG	BM	IH	BT	JO			JG	BM	IH	BT	JO
Pj.1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	4	4	4	4	20	1
Pj.2	4	6	5	5	5	3	6	5	5	5	5	6	5	6	5	3	6	5	7	5	17	24	21	24	21	107	5
Pj.3	3	4	3	3	3	4	4	3	3	3	6	4	3	5	3	4	4	4	5	3	18	16	14	17	13	78	3
Pj.4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	8	8	8	8	8	40	2
Pj.5	5	7	7	4	9	8	7	7	4	9	8	7	7	3	9	8	7	8	3	9	30	28	29	17	34	138	7
Pj.6	7	8	6	9	8	7	8	6	9	8	7	8	6	9	8	3	8	7	8	8	26	32	27	34	32	151	9
Pj.7,8,9	8	9	4	7	7	5	9	4	7	7	5	9	4	8	7	7	9	3	6	7	27	36	20	30	30	143	8
Pj.10	6	3	8	6	4	6	3	8	6	4	6	3	8	7	4	4	3	6	4	4	18	12	25	20	15	90	4
Pj.11	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	40	40	40	40	40	200	10
Pj.12	9	5	9	8	6	9	5	9	8	6	9	5	9	4	6	9	5	9	9	6	32	20	32	26	23	133	6

3.2.3 Role sharing in the Project List and in the Main Activities (2 Forms)

(a) Role sharing in the Project List – Summary of entries from five provinces

Organizations/Provinces Responsibilities		DAL	Central	Morobe	Madang	E.Sepik	ENB	DISTRICT DPI	JICA	NARI	NGO	FARMER
MAIN ROLE		Facilitation	Planning & coordination & partial implementation					Implementer 2	Supporting through DAL	Collaboration	Support through NGO	Implementer 3
PROJECT	BUDGET	0.6 mil/02		K16,000	K74,000			Planning & implementation	Resource person, training & equipment (1.5MIL/02)	Research & instruction on seed production	Training & instruction and seed production	Model farm and group activities
		Role sharing as perceived by participants										
1	Smallholder rice production support program	○ ○ ○	⊙	△	⊙	⊙	⊙	◇ ⊙ ⊙ ○	⊙ ○ ○ △	△ ○ △	○ △ △ △	◇ ◇ ◇ ⊙
2	Provision of small rice mills	⊙ ⊙ ⊙ ○		△	⊙	△	◇ ⊙	◇ ○	⊙ ○ ○ ○ △	○	△ ○	◇ ○
3	Provincial rice resources development center	⊙ ○ ○ ○ △	⊙	⊙	⊙	⊙	◇ ○	◇ ○	⊙ ○ ○ ○ △	○	○	◇
4	Expansion of DAL NISTC, Lae into NRRDC for PNG	⊙ ⊙ ⊙ ⊙ ○		△	○				⊙ ○ ○	○ ○		
5	Promotion of rice education	⊙ ⊙ ○ ○ ○	⊙	△	⊙		⊙ ⊙	⊙ ⊙ ○	○ ○ ○ △	○ △	○ ○ △ △ △	○
6	Development of manual type rice mills	⊙ ⊙ ⊙ ○ ○		○		○	○ ○	○ ○	⊙ ○ ○ △	⊙ ⊙ ○	⊙ ○ △	◇
7	Strengthening NARI rice research program	○ ○ ○ ○		△		△	○ ○	○	○ ○	◇ ⊙ ⊙ ⊙ ○	○	○
8	Farm machinery officer in NDAL	⊙ ⊙ ⊙ ○ ○		△			○	○	○ ○ △	○	○	○
9	Promotion of private rice milling and marketing business	⊙ ⊙ ○	⊙	○		⊙	⊙ ○	○ ○	○ ○ △	○	○ ○ △ △ △	◇ ◇ ⊙ ○
10	Recommendation, review of customary land	⊙ ⊙ ○	○		⊙		◇ ⊙	○	○	○	○ ○	⊙ ○ ○

◇ The main actor of the part ⊙ The most responsible authority of the part ○ The collaborative authority of the part △ the supporting authority of the part.

(a) Discussions on Role Sharing in the Project List

The views on the preceding table are those of the participants in the workshop. However, differences exist between the views of the participants and those of ACS as stated below. These differences are still subject to be resolved in future discussions by stakeholders.

1. Smallholder rice production support program

The 5 provinces and ACS team members disagree on the type of role that 9 out of the 11 stakeholders can play. ACS believes that:

- DAL should be the most responsible authority of this project,
- Central's role is mixed and ranges from 'most responsible' to the 'main actor'.
- Morobe, Madang, East Sepik and East New Britain should be the main actors,
- District DPI should either play a collaborative or supporting role,
- JICA play a supporting role,
- NARI's role is mixed ranging from collaborative, supporting to main actor,
- NGOs act in a supporting capacity, and
- the farmer to be the 'main actor'.

2. Provision of small rice mills

Apart from Madang, ACS team members and the 5 provinces disagree on the role that the other 10 stakeholders should adopt. ACS believes that:

- DAL should play a supporting role,
- Central, Morobe, East Sepik and ENB provinces should be the most responsible authorities,
- District DPI should be either the most responsible or collaborative authority,
- JICA, NARI and NGO should be the supporting authorities, and
- the farmer be the main actor of this project.

3. Provincial rice resources development center

ACS and the provinces disagree on the type of role that 7 stakeholders should play. ACS believes that:

- DAL should either be the collaborative or supporting authority,
- ENB should be the most responsible authority,
- District DPI should either be a collaborative and supporting authority,
- JICA, NARI and NGO should play a supporting role, and
- the farmer should either be the supporting or main actor.

4. Expansion of DAL NISTC, Lae into NRRDC for PNG

ACS and the 5 provinces differ on the type of roles that 9 stakeholders should adopt. ACS believes that:

- Central, Madang, East Sepik, ENB, the District DPI, JICA, NARI and NGO play a supporting role, and
- the farmer can either be a collaborative, supporting or main actor.

5. Promotion of rice education

ACS and the 5 provinces differ on the type of roles that 10 stakeholders should adopt. ACS suggest that:

- DAL should be the most responsible authority,
- Central, Madang, East Sepik, East New Britain, District DPI and JICA play a supporting role,
- NARI should either play a collaborative or supporting role,
- NGO should be a collaborative authority, and
- Farmer the main actor.

6. Development of manual type rice mills

ACS and the 5 provinces differ on the type of roles that 10 stakeholders should adopt. ACS suggest that:

- DAL and NARI should be either the most responsible or supporting authority,
- Central, District DPI, JICA and NGO play a supporting role,
- Morobe, Madang, East Sepik and ENB should either be a collaborative or supportive authority, and
- the farmer should be the main actor.

7. Strengthening NARI rice research program

The ACS team and the 5 provinces views differ on 7 stakeholders. ACS suggests that:

- Central, Morobe, Madang and East Sepik should be the collaborative authorities,
- JICA and NGO should play a supporting role, and
- District DPI should either be a collaborative or supporting authority.

8. Farm machinery officer in NDAL

The ACS team and the 5 provinces views differ on 8 stakeholders. ACS suggests that:

- Central, Morobe, Madang and East Sepik should be the collaborative authorities,
- JICA play a supporting role while NARI, NGO and the farmer can either be a collaborative or supporting authority.

9. Promotion of private rice milling and marketing business

The ACS team and the 5 provinces views differ on 8 stakeholders. ACS suggests that:

- DAL can either be a collaborative or supporting authority,
- Morobe, Madang, ENB and NGO be the most responsible authority,
- District DPI can either be the most responsible or supporting authority, and
- JICA and NARI be the supporting authority.

10. Recommendation, review of customary land

The ACS team and the 5 provinces views differ on 8 stakeholders. ACS suggests that:

- DAL, JICA and NARI play a supporting role,
- Central, Morobe, East Sepik and ENB be the most responsible authority, and
- NGO can either play a collaborative or supporting role.

(b) Role sharing in the Main Activities – Summary of entries from five provinces & other participants in workshop

ORGANIZATION/PLAYER		DAL	Central	Morobe	Madang	E-Sepik	ENB	DISTRICT DPI	JICA	NARI	NGO	FARMER
PRINCIPAL/RESPONSIBILITIES		Facilitation	Planning and coordination					Implementer 2	Supporting through DAL	Collaboration	Support through NGO	Implementer 3
ACTIVITIES	BUDGET	0.5 ml/02			K16,000	K74,000		Planning & Implementation	Resource person, training, & equipment (1.5MIL/02)	Research & instruction on seed production	Training instruction and seed production	Model farm and group activities
PROMOTION	EXTENSION SERVICE	⊙⊙⊙⊙	⊙	◇	○	◇	◇ ○	◇⊙⊙⊙⊙	⊙△	○	⊙⊙△	◇◇○○
	OFFICER TRAINING	⊙⊙⊙⊙△	⊙	◇		○	⊙⊙	⊙△	⊙⊙⊙△	⊙⊙⊙	◇⊙⊙	○○
SEED	PRODUCTION	⊙⊙		○	○	○	⊙⊙	○ ○	○	◇⊙⊙⊙ ⊙	⊙	◇△○
	SUPPLY	⊙⊙		○	⊙	○	○○	⊙⊙	○	◇⊙⊙⊙ ○	○○	◇
	SELECTION	○ △ ○		○	○		○	○	○	⊙⊙⊙⊙ ⊙	○○	○○
	TRAINING	⊙⊙⊙	◇	○	⊙	○	○○	○○	⊙	⊙○	○○△	○○
EQUIPMENT	ALLOCATION	◇⊙⊙ ○○△	⊙	○	⊙	△	◇○	○○○△△	⊙⊙○○	○	○△	○
	MANAGEMENT SYSTEM	○○○○ △	⊙	◇	⊙	⊙	⊙⊙	○○○○	⊙△	○	⊙	◇◇
	TRAINING	⊙⊙○○	⊙	◇	○	⊙	○	◇○	⊙△	○	⊙⊙	◇◇
FARMER ACTIVITY	FARMER TRAINING	⊙○○	⊙	△	⊙	⊙	⊙⊙	⊙○○○	⊙△	○○	⊙⊙△	◇◇○
	MATERIAL	⊙⊙	⊙	△	⊙	⊙	◇	◇○○	○○	○○	○	◇
	PROMOTION	○○○	⊙	◇	⊙	⊙	◇	◇○○	○	○	○○△	◇◇○○

◇ The main actor of the part ⊙The most responsible authority of the part ○: The collaborative authority of the part △ the supporting authority of the part
 * Subject to availability of funds.

(b) Discussions of Role Sharing in the Main Activities

The views on the preceding table are those of the participants in the workshop. However, differences exist between the views of the participants and those of ACS are stated below. These differences are still subject to be resolved in future discussions by stakeholders.

Promotion

Extension Service

The ACS team and the 5 provinces differ on the role of 9 stakeholders. ACS recommends that:

- DAL, JICA and NARI play a supporting role,
- Morobe, Madang, East Sepik and East New Britain be the most responsible authorities,
- NGO can either be a collaborative or supporting authority, and
- *the farmer be the main actor.*

Officer Training

The ACS team and the 5 provinces differ on the role of 10 stakeholders. ACS recommends that: DAL be the main Δ actor,

- Morobe, Madang, East Sepik and ENB be the most responsible authorities,
- District DPI and NGO play a collaborative role,
- JICA be the supporting authority,
- NARI can either be the collaborative, supporting or main actor, and
- the farmer can either be the collaborative or main actor.

Seed

Production

The ACS team and the 5 provinces differ on the role of 10 stakeholders. ACS recommends that:

- DAL play a collaborative role,
- Central, Morobe, Madang, East Sepik, ENB, JICA and NGO play a supporting role,
- NARI can either be the most responsible, supporting or main actor, and
- the farmer be the main actor.

Supply

The ACS team and the 5 provinces differ on the role of all the stakeholders. ACS recommends that:

- DAL be the collaborative authority,
- *The 5 provinces can either be the most responsible or supporting authority,*
- District DPI may the most responsible authority,
- JICA and NGO play a supporting role,
- NARI can either be the most responsible, supporting or main actor, and
- *The farmer can either be a collaborative, supporting or main actor.*

Selection

The ACS team and the 5 provinces differ on the role of 6 stakeholders. ACS recommends that:

- Central and East Sepik play a collaborative role,
- District DPI, JICA and NGO play a supporting role, and the farmer can either be collaborative or supporting authority.

Training

The ACS team and the 5 provinces differ on the role of 8 stakeholders. ACS recommends that: DAL can either be the most responsible or collaborative authority,

- Central and Madang be the collaborative authority,
- Distract DPI, JICA and NGO play a supporting role,
- NARI can either be the supporting or main actor, and the farmer can either play the collaborative or main actor role.

Equipment

Allocation

The ACS team and the 5 provinces differ on the role of 10 stakeholders. ACS recommends that: DAL be the most responsible authority,

- Central, Morobe, Madang, ENB, District DPI, and JICA play a supporting role,
- NGO play a collaborative role, and
- NARI and the farmer can either be the collaborative or supporting authority.

Management System

The ACS team and the 5 provinces differ on the role of 8 stakeholders. ACS recommends that:

- DAL, JICA and NGO be the supporting authority,
- Morobe and ENB be the most responsible authority,
- District DPI can either be the most responsible or supporting authority,
- NARI can either be the collaborative and supporting authority, and the farmer can either be the collaborative, supporting or main actor.

Training

The ACS team and the 5 provinces differ on the role of 9 stakeholders. ACS recommends that:

- DAL can either be the most responsible, collaborative, supporting or main actor,
- The provinces, JICA, NARI and NGO play a supporting role, and
- District DPI can either play a collaborative or supporting role.

Farmer Activity

Farmer Training

The ACS team and the 5 provinces differ on the role of 5 stakeholders. ACS recommends that:

- Morobe, ENB and District DPI be the most responsible authorities, and
- NARI and NGO play a supporting role.

Material

The ACS team and the 5 provinces differ on the role of 6 stakeholders. ACS recommends that:

- DAL be the collaborative authority,
- Morobe, ENB and JICA be the most responsible parties,
- District DPI will be the main actor while the NGO will be the supporting authority.

Promotion

The ACS team and the 5 provinces differ on the role of 6 stakeholders. ACS recommends that:

- Morobe and ENB to be the most responsible authorities,
- JICA, NARI and NGO to be the supporting authorities,
- District DPI can either be the most responsible, collaborative, supporting or main actor, and the farmer play the main actor role.

3.3 Samples for Tentative Rice Action Plans from Central Province, DAL and NAR

(a) Action Plan		Office Name: CENTRAL										Person in charge	Inputs from	
Activities	Expected Results	Schedule											National	Provincial
		02	03	04	05	06	07	08	09	10				
1	Increase rice yield/ha: <ul style="list-style-type: none"> • Use certified foundation seeds • Develop demo farms at LLGs • Educate farms on irrigation drainage systems • Conduct seminars and workshops • Research/ext linkage 	Increase 86.8tons over 10 years	63.44	65.98	68.62	71.36	74.22	77.18	80.27	83.48	86.82	Ext workers farmers	NARI NDAL JICA NGO EDUCATON INST. NAQIA	PDAL DDAL
2	Increase rice area per household <ul style="list-style-type: none"> • Increase farm size • Distribute seeds to more farmers • Use of drought animals/machinery • Standardize land area per household (per ha) 	28 ha after 10 years.	20	21	22	23	24	25	26	27	28	Farmers Groups Ext. Officers Rice specialist Rice Farm techologist	NARI NDAL JICA NGO EDUCATON INST. NAQIA	PDAL DDAL
3	Increase nos. of rice household. <ul style="list-style-type: none"> • Train more farmer (leaders • Conduct visit and field trips for successful farmers 	600 Kg paddy 300 Kg milled 555 h.h	406	422	434	456	475	494	514	534	555	Farmers Groups Ext. Officers Rice specialist Rice Farm techologist	NARI NDAL JICA NGO EDUCATON INST. NAQIA	PDAL DDAL
4	Marketing of surplus milled rice <ul style="list-style-type: none"> • Increase area to 0.2ha 	327 Kg per household (4%)	312	324	337	351	365	379	395	411	327	Households ext. officers consumers	NARI NDAL JICA NGO EDUCATON INST. NAQIA	PDAL DDAL

(b) Action Plan		Office Name: Department of Agriculture and Livestock												
	Activities	Expected Results	Schedule									Person in charge	Input	
			02	03	04	05	06	07	08	09	10			National
1	Smallholder rice production support program	Increasing rice production at subsistence level	←										Director in FSB	Coordination, facilitation, monitoring including training and material support
4	Expansion of DAL, NISTC, Lae into NRRDC for PNG	Trained farmers and extension officer		←									Director in FSB	DAL organizes implementation partially
3	Provincial Rice Resource development officer	Training course for farmer ad extension officer. Seed multiplication and distribution		←									Director in FSB	The training course and simple irrigation facility for seed production
2	Provision of small rice mill	Increasing milled rice and production	10	12	12	12	10	10	10	10	10		Director in FSB	Allocation of 96 units in nation wide.
6	Development of manual type rice mills	It will be available for farmers	0	5	0	0	0	0	0	0	0		Director in FSB	Financial support to the study and production
8	Farm machinery officer in NDAL	Facilitating farm-machinery operation and management		←									Director in FSB	Resource person and training course, publication service
5	Promotion of rice education	Improving knowledge on rice farming. More people will take up rice farming	←										Director in FSB	Coordination with D. of Education, providing information and material.
7	Strengthening of NARI rice research program.												Director in FSB	Collaboration and sharing of information.
10	Recommendation, review of customary land	Mobilizing landowners to use their land for rice.												
9	Promotion of private rice milling and marketing business		←										Director in FSB	DAL identified private rice business.

- Budget for rice promotion is 1 million kina in 2002

(c) Action Plan		Office Name: National Agricultural Research Institute										Person in charge		Inputs from		
	Activities	Expected Results	Schedule												National	Provincial
			02	03	04	05	06	07	08	09	10					
1	Variety evaluation & selection	Variety selected to give increase yield per 2 year/ Production to increase	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Sajjad M (Plan breeder)	✓	✓	
2	Breeder seed production for selected varieties	500 kg seed produced per variety to increase yield/ha		✓	✓	✓	✓	✓	✓	✓	✓	✓	M.S. Sajjad		✓	
3	Foundation seed production distribution to certified/Provincial seed multiplication centers.	6,000 kg per year			✓	✓	✓	✓	✓	✓	✓	✓	P. Gendua (Agronomist)	✓	✓	
4	Soil improvement/Agronomic studies	Increase yield/ha		✓		✓		✓			✓		R. Masamdu (Entomologist)	✓	✓	
5	Pest & disease management studies (IPM)	Increase yield/ha	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	J. Waramboi (Food Technologist)	✓	✓	
6	On-farm demonstration trials	Increase yield/ rice area / number of households	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	J. Waramboi	✓	✓	
7	Consumer preference testing	Marketing surplus rice	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	J. Waramboi (Food Technologist)	✓	✓	
8	Physio-chemical properties studies	Marketing surplus rice	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	J. Waramboi	✓	✓	
9	Integration into existing farming systems	Increase rice area/ household	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	P. Gendua J. Risimeri	✓	✓	
10	Development of small hand tools and small farm machinery	Increase rice area/ household	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Dr. Nath (Ag. Engineer)		✓	
11	Extension staff Training	Increase no. of household / area /ha (2 courses/year)		✓	✓	✓	✓	✓	✓	✓	✓	✓	Sajjad/Gendua Masadu	✓	✓	
12	Information dissemination	Increase number of households (2 publications/year)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	I. Powesuu (Information Officer)		✓	
13	Economics of rice production	Increase rice yield, area/household. Marketing of surplus milled rice.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	C. Gaibo (Economist)	✓	✓	
14	Enhance manpower training	Capability enhancement														
15	Machinery & equipment	Capability enhancement														

- Budget for rice promotion is 1 million kina in 2002

3.4 Recommended Procedures for preparing a bottom-up Rice Action Plan for selected villages, district and province

1. Observations on the Rice Study Final Report & the Workshop on the Master Plan

- a. The Rice Study showed that there are so many variable conditions that affect the planning and implementation of a rice action plan for any village or district or province ie yield per hectare, area cultivated per household, number of rice households per village, available rice land per village, etc. It is easy to prepare a provincial rice program or a provincial rice action plan by simply using available data on averages, a calculator and a computer. However, it is very difficult to make a program and an action plan that are built from the bottom to the top meaning that they are realistically based on the capabilities of the farm households and the capacity of the LLG and the district to implement.
- b. So far, all the provincial rice programs and rice action plans presented by the five selected provinces at the workshop have been planned from the top (province) down to the village level. They are workable documents having taken into account the available data from NSO, the district agriculture program officer, the LLG extension officers and contact farmers. On closer inspection, the targeted number of farmers, areas cultivated, and expected yields and other measurable indicators were calculated with very limited relevance to actual conditions and capabilities at the farm and village level.

2. Procedures for Preparing a Rice Action Plan

These recommended procedures are designed to establish a system of planning and forecasting outcomes that are identified at the farm and village level.

- a. Select a resident rice extension officer who can collect all the required data and who can prepare a realistic rice program and action plan using the data he/she has collected.
- b. Select a village within the district that is growing rice or is keen to grow rice. This village must be easily accessible to the resident rice extension officer.
- c. The selected village should have an active farmer leader or would-be leader who can be trained and relied upon to lead in the promotion activities.
- d. Determine the current and potential average yield/hectare of the rice garden or plots per household in this village.
- e. Determine the current average area of the rice garden or plots per household in this village.
- f. Determine the possible rice area available in this village.
- g. Determine the current and potential number of rice farm households in this village.
- h. List down the existing type and quantity of support given by the LLG, district, provincial and national DAL and NGOs to the local rice program in this village.
- i. Prepare a smallholder rice promotion program and action plan using the four directions of rice promotion for this village.
- j. Calculate the required inputs and the possible outcomes, ie paddy production of this village under the four directions or rice promotion.
- k. Do the same procedure for the rest of the rice growing villages within the district.
- l. When all the rice-growing villages have been covered in the district, go to another district and repeat the same procedures.
- m. When all the rice-growing districts in the province have been covered, summarise the action plans at the district and provincial levels. The resulting Provincial, District and

Village Action Plans have been built from the bottom up.

3. It is hoped that a representative from NDAL and JICA can travel to the five provinces to discuss the above procedures for preparing a rice action plan.

Table 1. Current rice production data for village A

Resident Extension Staff (no)	Average paddy yield (tonne/ha)	Average area /household (ha)	Total area cultivated (ha)	No. of rice households	Available rice land (ha)	Name & type of agency support
1	2.50	0.15	5.40	36	20	ROC, NARI, PDAL

Table 2. Potentials for rice production in village A

Potential paddy yield (tonne/ha)	Potential rice area (ha)	Rice area to be developed (ha)	No. of potential rice farm households
5.00	20	14.60	32

3.4.1 Sample Rice Promotion Action Plan for Village A (Figures are hypothetical, actual figures will depend on conditions in your village)

Description of Village A

Village area: 25ha Potential Farming Area: 10ha Population: 675 Number of Households (H/H):130 Current Rice Yield/ha: 1.3t
 Current rice farming area per H/H: 0.06ha Number of H/H currently engaged in rice farming: 70 Current rice production in the Village: 5.46t/year

Directions and Activities	Expected Results (by 2007)	Schedule						Responsible Person	Inputs		
		02	03	04	05	06	07		Village/Community	District/Province	National
1 Increase rice yield per hectare	2.2t/ha										
- Supply qualified/certified seeds	- All H/H receive qualified seeds	..	..	..	..	..	..	Extension Officer (EO)	Distribution of seed	Qualified seeds	Technical guidance
- Promote utilization of manures	- 50% of H/H apply manures	...	....		...	....		Model Farmer (MF)			Technical guidance
- Conduct training on irrigation and water management	- Training conducted 3 times - 20% of H/H introduce irrigation	..		..		..		EO, MF	Venue for training		Trainers, Material
- Provide micro finance for hand tools	- All H/H can afford hand tools	...	....	....	....			Village Chief (VC)	Accountant	Initial fund	
- Introduce rice mills	- 1 rice mill provided		.					EO	Maintenance cost	1 rice mill	
2 Increase rice farming area per household	0.4ha/household										
- Survey and identify land for expansion of rice farming area for each household	- Additional 3ha are identified as potential expansion area		....					EO	Survey assistant		
- Provide micro finance for hand tools	- All H/H can afford hand tools	...	....	....	....			VC	Accountant	Initial fund	
- Introduce a mutual labour support system among H/H to expand farming area	- 50% of H/H utilize the system		....	....	....	....	....	VC	Labour hand tools		
3 Increase number of rice farming H/H	65 H/H engaged in rice farming										
- Training Model Farmers	- 10 MFs attend training course	..	..	..	..	..		EO	MF	Transportation	Training course
- Conduct training on general rice farming	- On-farm training conducted 3 times - All H/H attend the training		..		..		..	EO, MF	Venue for training	Trainers, Material	Technical guidance
- Conduct observation tour to other village	- 4 tours are conducted		.	.	.	.	.	EO, MF, VC	Coordination	Transportation	
4 Marketing of surplus rice	10 tons of rice are sold										
- Sell surplus rice at village		.	.	.	.	.	.
- Transport surplus rice to the market	- Surplus rice is sold at Town B					.	.	EO	Transportation		
- Construct storage	- A storage is constructed					...		EO, VC	Fund	Technical guidance	

Chapter 4. GENERAL RECOMMENDATIONS

The following recommendations relate to the projects listed in Chapter 3. These recommendations are designed to make the implementation easier for all participants at various levels of rice promotion in the country.

1. Smallholder rice production on-going project is recommended to be continued until resource centers other than OISCA such as the National and Provincial Rice Resource Centres are completed.
2. It is expected that the provincial rice resource centres will operate closely with missions, NGOs and the private sector in their respective areas.
3. The Madang Extension Services Model should be extended to other selected provinces. The surveyed team found that Madang Province has the most effective extension service model.
4. Amend the NFSP to integrate subsistence smallholder rice production as a national policy in response to prevailing socio-economic conditions highlighted in the main report. Smallholder rice production will help provide the farmers themselves with cheaper rice and rice products in rural areas. Consequently, cash spending by household will be reduced and the saving could be spent for other urgent needs of the household, such as education, health, other income generation activities and so on. Such possible effects of smallholder rice production should be further analysed and stressed in the NFSP.
5. It is recommended to national and provincial governments to give higher priority in road and infrastructure rehabilitation program to the selected areas for smallholder rice production.
6. It is recommended that smallholder rice growing be taught in all high schools and secondary schools as part of the curriculum and to train existing agriculture teachers at the National Rice Resource Center.
7. It is recommended that extension officers from PDAL and DDAL to collect data on smallholder rice needs and submit to NDAL for compilation and analysis periodically.
8. Operational linkages between public and private sector agencies should be strengthened, and greater involvement of private sector in the delivery of agricultural services should be fostered through provincial and district level committees to be organized for this purpose.

9. There must be uniformity in smallholder rice policy from the national to provincial to district and to the LLG and the policy must be supported by budget allocation to smallholder rice farming at each level. This must be supported by political will and good governance.
10. It is recommended that smallholder rice farmers be organized into groups that are formally registered so that they qualify for credit from the Rural Development Bank (RDB), the Small Business Development Corporation (SBDC) and other financial institutions.
11. It is further recommended that NDAL prepare an NEC endorsement directing RDB and SBDC to make credit accessible to smallholder rice farmers.
12. It is strongly recommended that NDAL should take up through the DAL Minister the issue of establishing a Rice and Grain Authority as a follow up of the earlier NEC Decisions in 1992 & 1996 on the same subject.

Annex 1 Subject Area Recommendations

1. Recommendations on Rice Farming

On rice production technology, the following recommendations are given:

- a. Certified seeds should be multiplied at provincial rice resource centres and distributed to rice farmers by DDAL staff through the selected farmer leaders. NARI will be asked to certify to the quality and germination percentage of the seeds. The staff of the provincial rice resource centre, the DDAL, and the farmers association will determine the retail price of the certified seeds.
- b. Where soils are alkaline, gypsum (hydrated sulphur), farm animal manures, poultry manures and acid fertilizers should be added. NDAL/PDAL/DDAL staff to collect soil samples or carry out soil pH tests and to provide advises to affected farmers.
- c. Where soils are acidic, lime should be added as calcium carbonate, hydrated lime or dolomitic lime. NDAL/DDAL staff to collect soil samples or carry out soil pH tests and to provide advises to affected farmers.
- d. Overly cropped or poor soils should be planted with peanuts, beans or leguminous cover crop or applied with manures, compost or chemical fertilizers.
- e. Rice crops that are seriously affected by insect pests ie caseworms of transplanted seedlings in 3-5 Mile, Lae and stemborers in Bainyik and possibly in Waikakum in Maprik District, should be sprayed with organic and inorganic insecticides along with IPM practices.
- f. It is recommended that knapsack sprayers are made available to farmers associations in each LLG under the supervision of the respective provincial rice resource centre.
- g. It is recommended that hand tools for land preparation such as axes, bushknives, spades, hoes, forks and rakes are made available to farmers associations at low prices under the supervision of the respective provincial rice resource centre.
- h. Distance of planting upland rice should be closer like 30 cm between rows when drilled and 25 cm x 25 cm when dibbled with 5-7 seeds per hole.
- i. NDAL/PDAL should revive the water buffalo training and ploughing program similar to the water buffalo program of the Lutheran Mission in Salodi village of Finschhafen District of Morobe Province. This activity should be extended to other provinces.
- j. PDAL/DDAL staff should organize demonstration plots in the rice farms of selected farmer leaders to show improved rice farming techniques.

For harvesting and post-harvest technology, the following are recommended.

- a. Hand tools such as sickles and tarpaulins shall be sold at low prices to rice farming households through the provincial rice resource centres and the farmers association under the supervision of PDAL/DDAL staff.

- b. The national and provincial rice resource centres will provide demonstrations on making mortar and pestle with local timber materials.
- c. The national and provincial rice resource centres will import or arrange local fabrication of foot-pedal threshers and winnowers or their motorized versions. Initially, they will be used in demonstrations to farmer associations. Later, farmers can hire them out at low rent from the provincial rice resource centre.
- d. It is recommended that NDAL/PDAL/DDAL should purchase rice mills or obtain them from donor agencies or local suppliers. These rice mills should be set up in districts or LLGs that grow rice for farm household consumption and for village marketing.
- e. NDAL/PDAL/DDAL should entrust rice mills to rice growers who have demonstrated that they can produce and market rice in villages and district centres with minimal assistance from government or donor agency.
- f. The proposed provincial rice resource centres should have a rice storage shed that provides milling, packaging and marketing services.
- g. Demonstration and training courses in post harvest technology for extension officers and farmer leaders should be organized at provincial rice resource centres.

For smallholder farming support from government agencies or overseas donors, the following recommendations are made.

- a. The national and provincial resource centres should be established in the surveyed provinces with the following facilities.
 - i. Storage shed for rice mill, seeds, dry paddy, and milled rice with a small office for farm machinery pool, cooperative milling and marketing.
 - ii. Machinery shed for holding and servicing small farm machinery, tools and materials.
 - iii. These centres should have access to suitable land or rice farms that can multiply certified rice seeds and conduct farm demonstration plots.
- b. NARI should identify, import and screen varieties that are tolerant to alkaline or acid soil, drought conditions with medium to low amylose content and with medium to short grain, i.e. NERICA varieties from WARDA or suitable varieties from IRRI.
- c. Provincial, district, and LLG councils should plan and prepare realistic rice programs and should allocate funds from provincial, district, and LLG budgets to match funding from NDAL or donor agencies.
- d. PDAL/DDAL/LLG rice officers should send rice reports to NDAL regularly so that NDAL could establish a database on rice growers, rice production, rice mills, rice milling and marketing.
- e. NDAL should organize an office that looks after farm machinery.
- f. Provincial, district and LLG authorities or councils should support their rice promotion programs with staff housing in LLG wards and project vehicles such as motorbikes if budgets are limited.

- g. Although outside the TOR of this study, it is recommended that the Institutional Rice Self-Sufficiency Program for high schools, universities and CIS and the semi-commercial rice growers in PNG be supported with 2KR machinery on a pilot project basis.

2. Recommendations on Rice Marketing

- a. Provincial Agricultural Marketing Extension Officers should arrange marketing credit for rice farmers to purchase smallholder rice mills by assisting farmers to complete the documents required for such loans.
- b. Provincial Office of Agriculture and Livestock to assist rice farmers through group effort to obtain loan from financial institution to set up central processing and storage facilities to process, store and prepare surplus rice for marketing.
- c. Provincial Marketing Extension Officer to assist and encourage farmers to form organization for marketing activities by making them (farmers) realize the importance of group efforts in pooling small quantities of the marketable surplus of rice from individual farmers by initiating group marketing contract between farmer groups and traders.
- d. A provincial rice marketing system needs to be investigated by Provincial Marketing Officers to ensure that marketing services provided by traders or farmer co-operatives reach rice growing farmers.
- e. That in the event of an increase in surplus rice production, provincial marketing extension officer should assist the farmers in identifying markets for their produce (rice).
- f. A Provincial Marketing Officer be appointed whose role among other activities is to collect information systematically, analyse it and formulate sound action recommendations for consideration by the responsible authority. The Officer is also needed to plan facilities and services through government funding which will cater for the expansion of rice production to match the growth of population.

3. Recommendations on Rice Consumers

- a. The survey showed that a majority of households (more than 50 percent) interviewed in the urban and the rural areas of the five case study provinces prefer rice. Currently it is a staple food item for many households in the surveyed provinces. Thus current study on small holder rice industry in the country and the national government's current move to develop and expand small-holder rice industry in the country is a

logical one.

- b. Consumer behaviour of households interviewed is that they prefer quality rice which has good taste. Consumers prefer rice which has good taste and is cheap in terms of its price and is readily available. Therefore, current attempt to grow rice on a small holder basis in the country will certainly meet some of these requirements of the households, notwithstanding the fact that imported rice is seen to be too expensive to be purchased by the rural or urban consumers alike. In other words rice to be grown by model farmers on a small holder basis should be of quality product with good taste and high production. This will also facilitate perfect competition of imported rice to the country and eventually achieve the goal of import substitution, facilitate national food security and self-sufficiency at 12% by 2012.
- c. If any surplus of rice is to be marketed by the rural farmers in the future due to the fact that production levels have increased then relevant organizations and departments should strengthen current marketing arrangements which is fragmented and not operated in the best interests of the rural producers. In other words, the provinces and districts should assist rice farmers to establish a rice marketing co-operative movement.
- d. Provide continued extension advise by relevant government organizations directed at increasing production of quality rice at a village level.
- e. Provincial Rice Resources Center to collect marketing information on rice consumption in the urban areas and then distribute to rural rice growers.
- f. Develop and extend various ways of rice cooking methods through the Home Economic lessons taught at high schools and through women's organizations. This technology be extended to improve nutrition..
- g. Promote consumption of locally grown and milled rice by urban consumers through provincial agricultural shows, field days and school open days.

4. **Recommendations on Sociological Conditions**

The following are recommendations on the sociological conditions:

- a. Conduct a further feasibility study on the viability of smallholders rice development program at the local level in other locations with a view to understanding their local social situations and particularly in relation to situation regarding rice as it exists. This study should be done by appropriate Provincial Technical Officers with technical assistance from national DAL and any external agencies with the required expertise

and experience. Studies to commence as soon as funding is sourced and available at the beginning of Year 1 before implementation of the smallholder rice program.

- b. Under the above study, identify:
 - (i) factors that are or will be potentially advantageous or disadvantageous in the promotion of any smallholder rice development program which will have the same development program objectives as set under the current JICA and OSICA smallholder rice development program;
 - (ii) identify community organizations such as farmers' groups/associations, rural credit associations or co-operatives which maybe existing or that could be created to facilitate all activities in smallholder rice development and;
 - (iii) identify their strengths and weaknesses and how they can be assisted, who will assist and how.
- c. Based on the above findings, the respective Provincial DAL and national DAL should identify key stake-holders in the rice industry including; national and provincial administrations, research and training institutions, input suppliers, marketing organizations, NGOs and, LLGs on how these organizations will help in the development of smallholders rice program and grassroots organizations which will facilitate it. Through this exercise the DAL and Provincial DAL identify linkage and co-ordination mechanisms towards the proper running of the smallholder rice development program.
- d. In the above feasibility study, identify the areas where youth and women fit in the socio-economic situation, their organizations or identify potentials for the creation of organizations for them to participate in the smallholder rice development program. This exercise should be conducted by the respective provincial social services division such as Welfare and Youth Office.
- e. In the above study, undertake to understand the socio-economic situation of the local population with a view to understanding their land tenure system, factors affecting it, current land administration system(s) and its implementation and its strengths and weaknesses and, make recommendations that would facilitate a more favourable land tenure system(s) for local areas for development purposes such as for smallholder rice. It is recommended that this exercise be conducted by the National Department of Lands and Physical Planning and Provincial division of Lands in the Provinces.
- f. There should be a need to consistently monitor and carry out periodic evaluation, with an external evaluation every two years or so. This will allow for an assessment of the

viability of rice development and expansion/activities for re-programming and implementation. It is recommended that Provincial DAL and Monitoring Division be responsible for such activities including drawing up of monitoring and evaluation plans and developing budgets.

5. **Recommendations on Infrastructure**

a. National Road Infrastructure

- (i) The maintenance of National Roads is the responsibility of the National Government and the Department of Works must be funded for the minimum level of maintenance in full by the National Government.
- (ii) Aid funded national roads maintenance program should be further encouraged.
- (iii) Periodic road maintenance projects such as regravelling and resealing must be documented in detail by DOW or consultants so that payments are performance based.

b. Provincial Road Infrastructure

- (i) Provincial and Local Level Government should be urged to allocate funds routine road maintenance programs annually.
- (ii) Programmed road maintenance should be introduced and local youths groups etc used to undertake routine the maintenance activities such as grass cutting, culvert cleaning etc. Control grading should be contracted to local contractors with the required machinery.
- (iii) Any periodic maintenance and or road upgrading projects should be properly documented and contracted to local contractors so that payments made to contractors are performance based.
- (iv) Provincial Technical Division personnel be trained to adequately document, supervise between the LLG and the contractor.

c. Farm & Training Infrastructure

- (i) Before any project is implemented proper negotiations and agreements are in place between all the parties.
- (ii) Details topographic surveys are required for water supply projects and irrigation projects.
- (iii) Detail design drawings including site plans, tender documents and the structural certificate from a registered structural engineer must be obtained or provided for any building project.
- (iv) Planning and Building Board approvals must be obtained prior to the

- construction of any buildings.
- (v) Large and/or small scale irrigation system shall be studied and promoted for rice cultivation.

6. Recommendations For Improving Soil Fertility

- a. The Soil investigated range from strongly acid to strongly alkaline; have low amounts of some exchangeable elements, base saturation, moderate phosphorus retention and C/N ratio.
- b. The following soil series namely Tutubu Series, Four Series, Five Series and Waikakum Series are strongly alkaline soils. It is therefore, recommended that gypsum be used to neutralize the soils as the structure of the clay soil is usually improved by using gypsum. This can be facilitated with assistance from DDAL Officers, and this should also apply to points 3, 4, 5, 6 and 7 below.
- c. The strongly acid soils of the Apusolo Series can be improved by raising the pH (or acidity) of the soil by adding lime or dolomite.
- d. The soils that do not have any pressing nutrient problems are the Umun Series, Danaru 1 Series and Ngunguna Series.
- e. The other soils are low in NPK and other exchangeable elements. But the following soils namely Haiyo Series, Apusolo Series, Wareo Series, Four Series, Five Series, Poahum Series, Benedict Series, Raputput Series, Talvat Series and Gelagela Series have problems with Phosphorus retention and/or C/N ratio.
- f. Four Series, Five Series and Lagaha Series also have high amounts of sodium (Na).
- g. Organic matter or humus can also be used in place of the fertilizers from the stores.

ANNEX 2 – IMPLEMENTING ARRANGEMENTS

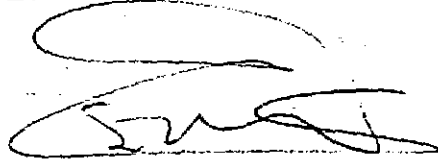
**Implementing Arrangement
for
The Development Study on the Promotion
of Smallholders' Rice Production**

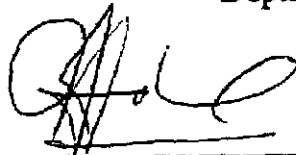
**Agreed upon between
Department of Agriculture and Livestock
and
Japan International Cooperation Agency
in Papua New Guinea**

Port Moresby, 13 December 2001

岩崎 薫

**Mr. Kaoru IWASAKI
Resident Representative
JICA PNG Office**


**Mr. Mathew'wela B. KANUA
Acting Secretary
Department of Agriculture and Livestock**



**Mr. Philip Kikala
Secretary
Department of National Planning**

Background

Almost 85% of the people are engaged in the agriculture sector in PNG. The most staple crops are sweet potato, taro, yam, banana and sago which are grown by smallholders using semi-subsistence farming for quite a long time. Rice has become the major staple food these days and the consumption has been increasing for some decades. Most of the rice is imported from Australia since the domestic production is very limited. The volume of the imported rice is estimated around 145,000 tones for the year 2000. However, the interest of smallholders in rice cultivation is increasing year by year. In some areas more smallholders have started rice farming and they are also trying to form farmers' group to help assist for further developments.

The Department of Agriculture and Livestock has emphasized on domestic rice production under the National Food Security Policy, which will contribute to the higher self-sufficiency rate of rice consumption. In this policy the promotion of the rice cultivation by subsistence smallholders are ranked as one of the most important policies in its Mid-long Term Strategy as their practical and essential policy.

However, the supporting framework of the Government is neither effective nor concrete so that Extension Services and other support do not meet the needs of the smallholders. The Food Security Division of the Department of Agriculture and Livestock has set the Mid-term Support Program for the promotion of smallholder rice production in collaboration with JICA, which is composed of Technical Training on Rice Cultivation and advise on the Framework of Effective Extension Service. In this program, major achievements will be the fostering of the model rice farmers, the training of Extension Officers, the effective utilization of Agro-machinery and the dissemination of appropriate technique on rice production.

I. Objective of the Study

The objective of the Study is to formulate the master plan for the promotion of smallholder rice production.

II. The Study Area

The study shall cover the whole country but currently it focuses on five (5) targeted provinces of; Central, Morobe, Madang, East Sepik and East New Britain Provinces.

III. Scope of the Study

In order to achieve the objectives mentioned above, the Study shall cover the following items.

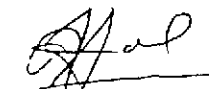
1. Preparatory Survey

1.1 Collection and analysis of relevant data and information

1.2 Inventory Survey on the rice industry including past and on-going rice development projects

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- 1.3 Institutional and Organizational survey
- 1.4 Rice Marketing Survey I
- 1.5 Rice Production Survey I (only in Central Province)

2. Detailed Survey

- 2.1 Review of the current institutional set-up and promotion strategy
- 2.2 Rice Marketing Survey II
- 2.3 Rice Production Survey II
- 2.4 Economic Analysis on Rice Project
- 2.5 Formulation of the Master Plan for the promotion of smallholders' rice production

IV. Study Schedule

The Study will be carried out in accordance with the attached Tentative Schedule. (Appendix I)

V. Report

a. Inception Report (20 copies)

The report shall be submitted within two (2) weeks after the commencement of the Study. The report shall include Study Team Member, the Scope, Schedule, Implementation Arrangement and Methodology of the Study.

b. Interim Report (20 copies)

The report shall be submitted by the end of March 2002. The report shall include the result of Inventory Survey.

c. Draft Final Report (20 copies)

The report shall be submitted within two (2) months after commencement of the Second Phase of the Study. The report shall include all the results of the Study. DAL shall provide the Study Team with its comments on the report within two (2) weeks after receipt of the Draft Final Report.

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d. Final Report (30 copies)

The report shall be submitted within two (2) weeks after the receipt of the above-mentioned comments on the Draft Final Report.

VI. Undertaking by the Government of PNG

To facilitate the smooth conduct of the Study, the Government of PNG shall take the following necessary measures;

- a. to provide the Study Team with available data, maps and information necessary for the execution of the Study,
- b. to assign counterpart personnel to the Study Team during the Study,
- c. to secure the safety of the Study Team,
- d. to permit the Japanese consultant(s) (Supervisor of the Study Team) to enter, leave and sojourn in PNG for the duration of their assignment therein, and exempt them from foreign registration requirement and consular fees,
- e. to exempt the Japanese consultant(s) from taxes, duties and or other charges on equipment, machinery and other materials brought into PNG for the implementation of the Study,
- f. to secure permission for entry into private properties or restricted areas for the conduct of the Study,
- g. to secure permission for the Japanese consultant(s) to take all data and documents (including photographs) related to the Study out of PNG to Japan, and
- h. Department of Agriculture and Livestock on the part of the Government of PNG shall act as counterpart agency to the Study Team and also as a coordinating body in relation with other Governmental and Non-Governmental Organizations concerned for the smooth implementation of the Study.

VII. Undertaking by JICA

For the implementation of the Study, JICA will take the following measures;

- a. to contact with at its own expense the local consultant firm in PNG,
- b. to dispatch the Japanese consultant(s) to PNG for the smooth implementation of the Study, and
- c. to conduct technical transfer to the relevant officials in PNG.

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VIII. Consultation

JICA and the Government of PNG shall consult with each other in respect of any matters that are not agreed upon in this document and which may arise from or in connection with the Study.

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Appendix I:

IMPLEMENTATION ARRANGEMENT FOR THE DEVELOPMENT D STUDY ON
THE PROMOTION OF SMALL HOLDERS' RICE PRODUCTION

TENTATIVE STUDY SCHEDULE

Description	Phase I			Phase II				
	1	2	3	4	5	6	7	8
Japanese Supervisors								
Japan	5 <input type="checkbox"/>		<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>
PNG	5 ⁴	<input type="checkbox"/>				<input type="checkbox"/>		
Local Consultants		<input type="checkbox"/>				<input type="checkbox"/>		
Report		Δ 1C/R	Δ Pr/R				Δ DE/R	Δ F/R

Note: Study Schedule in detail of Phase II will be determined based on the results of Phase I Study.

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ANNEX 3 – TERMS OF REFERENCE

TERMS OF REFERENCE
FOR
THE DEVELOPMENT STUDY ON
THE PROMOTION OF SMALLHOLDERS RICE PRODUCTION
(DRAFT)

JICA, PNG, 2002

Article 1. Instruction

Article 2. General description of the Study

1. Background

More than 80% of the people are engaged in the agriculture sector in PNG. However, the rapid increase of rice consumption presently has made it difficult to supply the staple crops by the traditional semi-subsistence farming system in PNG. The market price of rice is increasing under the influence of the devaluation of the local currency such that the interest of smallholders in rice cultivation is increasing year by year.

The Department of Agriculture and Livestock (DAL) of the Government of PNG has concentrated on domestic rice production under the National Food Security Policy and is aiming at a 10% reduction of imported rice by the year 2010. DAL has under preparation a promotion plan of feasible and sustainable rice cultivation, which will emphasize the extension of existing upland rice cultivation first, to be followed by rainfed rice cultivation supported by small-scale back-up irrigation systems and then fully irrigated lowland rice cultivation of two (2) crops a year.

However, the supporting framework of the Government is neither effective nor stable so that the Extension Service and other forms of support do not meet the needs of the smallholders. Relevant information and statistical figures on rice cultivation are not precisely collected and analyzed which makes a proper support plan for the promotion difficult. The project executing ability of the local authorities in PNG is not strong enough also. Therefore, the strengthening of the coordination and adjustment between DAL, which is responsible for policy making etc. and local authorities are necessary.

From such a background, the PNG Government is proposing to implement a development study on the promotion of smallholders' rice production, which will include a study and analysis of the present rice cultivation and a study of the necessary system and organization with the Japanese Government.

In order to fulfill such a request by the PNG Government, the Japanese Government has entered into an implementing agreement with DAL through JICA on the 13th December, 2001.

2. Objective of the Study

The objective of the Study is to formulate a master plan for the promotion of smallholders' rice production, through various studies of present conditions of rice cultivation, milling, marketing and rice consumption in PNG. The Study should verify the necessary plans, its control, extension, supporting systems and required items for technology transfer for the rice cultivation. The master plan should specify the target figures with high reality for the promotion.

3. The Study Area

The Study area is five (5) provinces designated as the rice cultivation promotion province, namely Morobe, Madang, East Sepik, Central and East New Britain.

4. Scope of Study

- (1) The Study is divided into phases 1 and 2. The work item in each phase is as shown in the following “(3) the procedures of the Study.”
- (1) Phase 1: From “(1) Preparation of the Inception Report” till “(4) Submission of the Progress Report.
- (2) Phase 2: From “(5) Field survey of 4 provinces except the Central Province” till “(8) Submission of the Final Report”.

5. Basic policy of the Study

- (1) This Study shall be carried out in accordance with the Agreement exchanged by and between JICA and the Counterpart Organization (DAL) on the 13th December, 2001.
- (2) DAL will provide all available data and counterpart personnel for the field survey needed for the Study.
- (3) This Study will cover present conditions and analysis through data collection and field surveys for the purpose of drawing up the Master Plan to encourage the rice cultivation under the National Food Security Policy. Accordingly, the extensive items such as the policy, agriculture, weather, rice processing, distribution, consumer's taste and etc. shall be included.
- (4) By exchanging opinions with rice farmers and farmers who are interested in starting rice cultivation. Donors and NGOs etc. related to this Study and their ideas should be reflected in the Master Plan. The field survey shall be

efficient by focusing on the target farmers and areas in each province.

- (5) The Study shall clarify the characteristics of each of the 5 provinces and shall reflect such characteristics from rice cultivation area until rice consumer location in each province in the Mater Plan concretely.

6. The procedure of the Study

Phase 1 will be used as the preparatory study before starting the standard survey. Through the collection and analysis of relevant data and information, the following items shall be covered. The field survey of the Central province shall be carried out in Phase 1.

- 1) To prepare Inception Report. This report shall include the executing schedule, the basic policy, methodologies, work processes, personnel arrangement plan etc. of the whole Study. This report shall be submitted to JICA within 7 days after the contract award and to be approved by DAL and JICA.
- 2) To grasp and analyze the present condition of rice cultivation through data and articles etc.
 - Agricultural policy/system, rice cultivation promotion plan
 - Food security systems for national, provincial and district levels.
 - Situation of food aid program by foreign countries and international organizations
 - Collection and analysis of the available data of rice and rice cultivation
 - Collection and analysis of costs of production at subsistence semi-commercial and commercial levels.
 - Collection and analysis of the agriculture basic data of the target 5 provinces.
 - Inventory survey on the rice cultivation and industry etc. including past and on-going rice development projects.
 - Institutional and organizational survey related to rice.
- 3) To carry out the field survey of the Central province regarding the following contents.
 - Present condition of rice distribution system
 - Amount of rice production
 - Rice cultivation technologies
 - Others. Roles of provincial & district DPI offices including national DAL.
- 4) To prepare Progress Report. By summarizing above 2) and 3) survey results, A Progress Report shall be submitted to DAL and JICA for approval. The submission time of this report is before March 25, 2002.

During Phase 2, the same survey as above 3) shall be carried out in the target provinces (if necessary, Central province shall also be added). The details of the survey items will be reviewed when Phase 1 is completed but following items are expected.

5) Field survey items of the target provinces

① Natural environment. To investigate inevitable natural environment for the rice cultivation plan for each province.

- Geographical features (an outline)
- Weather, hydrology (an outline of general weather, rainy season and dry season, river condition, etc).
- Water quality (an outline)
- Geological feature (an outline)
- Soil (an outline)
- Vegetation/flora (an outline)
- Other related information

② Social and economic situation. To investigate inevitable social and economic situations for the rice cultivation promotion of each province.

- Economic index (local economy, industry, employment structures, sanitation/water supply, gender issues, employment, the levels of living, population, numbers of the farmhouse and the rice crop farmhouse, the size of business, land systems, rural financing system, local customs, agriculture development support organization etc.)
- Social infrastructure (health care sanitation, schools/education, education standards, roads, transportation means, information transmission, supplying system of agricultural equipment etc.)
- Other related information.

③ Agricultural situation. To investigate the agricultural situation inevitable for the rice cultivation promotion of each province and to grasp the potential for rice cultivation and hindrance factors for the development.

- Land application
- Seed supply system
- Agricultural structures (cropping patterns, the production amount, agriculture technologies, fertilization methods/quantity, water supply and its security, others)
- Agriculture supports (the extension of farming technologies, extension office, no. of rice extension workers, education to extension workers, extension methods(national and provincial and district budget)
- Agriculture economy (income of farmhouses, disbursement and item of expenditure)
- Post-harvest processing, farm product processing.
- Market distribution, market analysis (the transportation system of agricultural

products, transmission of market information, supply and demand of agriculture materials, farm products price, transaction structures etc.)

- Farmhouse organizations (the agriculture organizations, activities of the collection/shipment organization, agricultural cooperatives etc.)
- Consciousness of rice cultivation development
- The existing rice farmers (Amount of production, production yield rice cropping structures / upland rice / rainfed paddy field / small-scale irrigation / floating rice / tidal rice etc., fertilizers and growing controls, Cropping Calender, post-harvest processing technologies and losses, food processing, sales and others).
- Other related information

④ Agriculture basis

- Outline of the existing irrigation facilities
- Water rights, nil
- Distribution and use of the agriculture materials, machines and equipment
- Survey of available farm machinery ie tractors.

⑤ Distribution, consumption and taste survey of rice

- Marketing situation of local rice (the organizations, routes, facilities, processing, sales networks, price, information networks)
- Marketing situation of imported rice (customs duties, organizations, routes, sales/information networks, price)
- The consumption volume
- Taste
- Cooking methods

⑥ Government support system

- National system
- Provincial system
- District system

Article 3. Preparation of the reports

1. Draft Final Report

When phase 2 field survey is finished, the Consultant should make a Draft Final Report (DF/R) and submit to JICA and DAL for approval. DF/R shall included following ① and ② in reference with the survey result.

- ① Examination of the system/organization necessary for rice cultivation promotion.
- ② Master plan for the promotion of smallholders' rice production

The submission date should be around the end of July 2002. This DF/R will receive the evaluation and examination of DAL and JICA. After some correction and adding, if necessary, this DF/R will be presented to the seminar.

2. Final Reports (F/R)

The Final Report shall be prepared based on the comments of review of the DF/R. Preparation of the F/R shall be completed by 20th August 2002.

3. Submission of the reports

- ① Inception Report, A4 version, typescript, both sides copies, 20 copies and FD x 2 set
- ② Progress Report, A4 version, typescript strokes, both sides copies, 20 copies and FD x 2 set
- ③ Draft Final Report, Aa4 version, typescript strokes, both sides copies, 30 copies and FD x 3 set
- ④ Final Report, A4 version, typescript stroke, both sides copies, 30 copies and FD x 3 set.

4. Items to be considered for the report preparation

- ① Consultant shall strictly comply with the submission date as instructed in the terms and reference.
- ② In case the reports are in two separate volumes, main and supporting report, consultant shall arrange it such that the item of a main report and supporting report can be referred easily.
 - ③ The source of any data and information used in the report shall be specified.
 - ④ By avoiding redundant sentences etc. and utilizing tables and figures, the

number of pages shall be minimized as far as possible.

Article 4. Condition on execution of this survey works

1. Process of the survey

This survey will start in the middle of February 2002 and to be completed by the end of August 2002. The survey process will be as per the following table.

Item/Period	Feb.	Mar.	April	May	Jun.	Jul.	Aug.	Sep.
Field Survey by JICA Consultant	■	■	■	■	■	■	■	
Local Consultant		■	■	■	■	■	■	
Reporting		▲	▲			▲	▲	▲
		INC/R	DPR			F/PR	DF/R	F/R

2. Prospect of business volume and expertise of survey team

- (1) Prospect of business volume
- (2) The expertise of survey team

The expertise needed for this survey is expected to be as follows:

- i.) Leader/agricultural policy/economy/rural society
- ii.) Agriculture/rice crop/agricultural civil engineering/irrigation
- iii.) Rice/post-harvest processing/distribution and marketing/consumption.