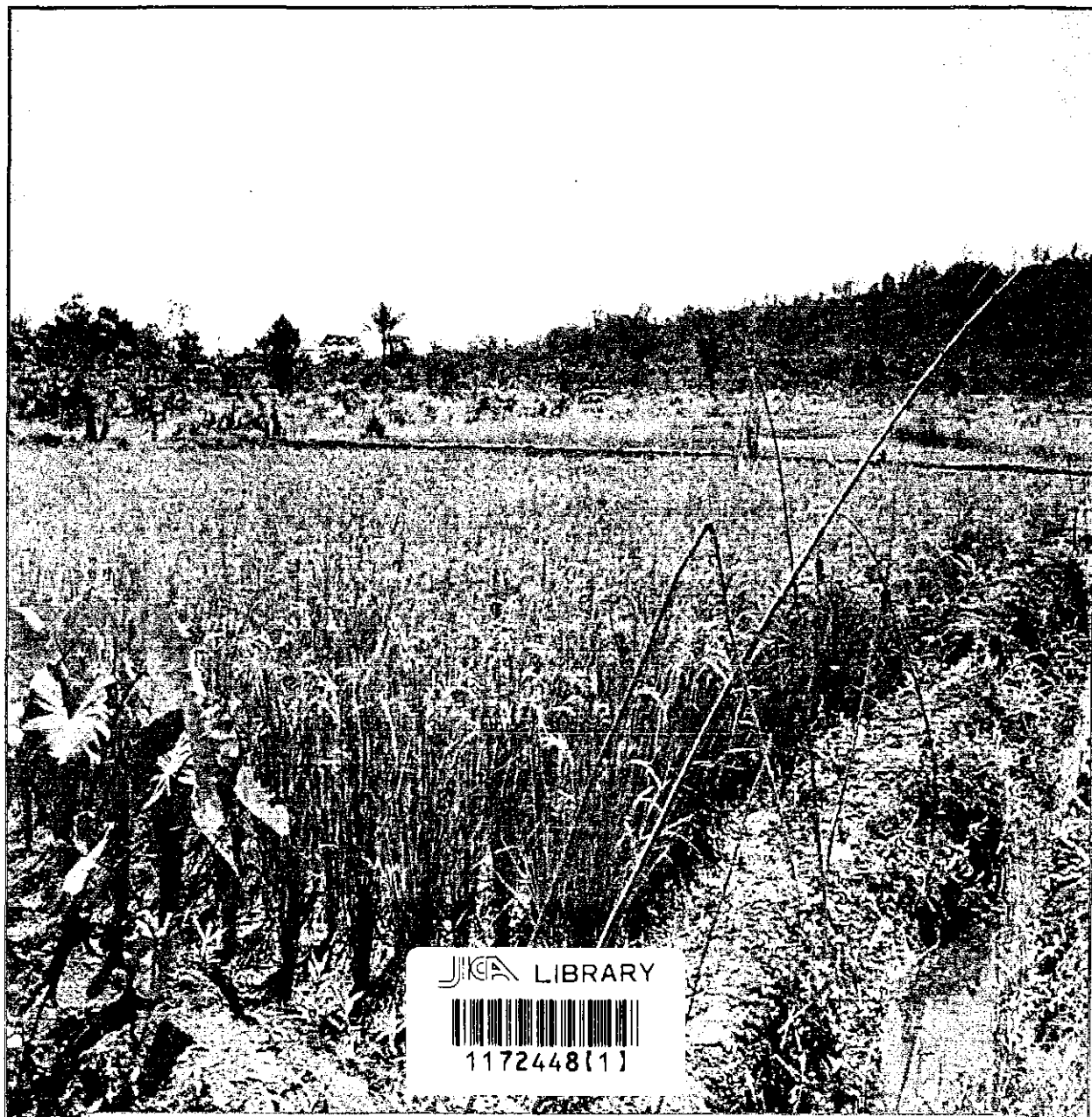


FINAL REPORT – PART I (1)

THE DEVELOPMENT STUDY ON THE PROMOTION OF SMALL HOLDER RICE PRODUCTION IN FIVE PNG PROVINCES



March – August 2002

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Executive Summary

Part I – Analysis of Present Conditions of Rice Production

Chapter 1 - Introduction

This Study originated from a Memorandum of Agreement between the Office of the Japan International Cooperation Agency (JICA) of the Government of Japan and Government of Papua New Guinea (GOPNG) – the Department of Agriculture and Livestock (DAL), on the 13th December 2001. A mutually agreeable Terms of Reference (TOR) formed the basis for the study. Copies of the same form part of the addendum to the report.

The survey intends to achieve three main objectives. These are: (i) to gather useful data such as the volume of rice imported annually and current level of demand on imported rice marketing systems that are in place; (ii) to provide to the relevant statutory bodies, and the private sector, formal and informal sector a matrix of proposed causes of actions and recommendations and (iii) to develop a Smallholder Rice Promotion Master Plan

The study was divided into two phases. The phase 1 covered the Central Province whilst Phase 2 covers the Morobe, Madang, East Sepik and East New Britain Province. The study was conducted over six (6) months from March to end of August 2002.

Chapter 2 - Background on Rice Situation in PNG

Rice was introduced in Papua New Guinea (PNG) almost one hundred years ago. Despite its early introduction, rice has remained a subsistence enterprise. Many attempts have been made in the past to increase production in the traditional rice growing areas like Mekeo, Finschhafen and Maprik. In 1989 to 1995, the PNG government launched the DAL, Smallholder Rice Production Programme through the PIP Rice & Grain Project. It started the Bereina Rice Project in the Mekeo Plains of Kairuku District of Central Province and the Korambu Rice Project in Maprik District of ESP. Both projects aimed at encouraging the establishment of a local rice industry.

Chapter 3 - Socio-Economic Situation

The economic indicators show that the economy has contracted since 1994. Economic growth has basically oscillated around the zero% growth rate mark. The economy began to slide especially after 1995 after the Kina was devalued in 1994 and then floated. Past efforts at reform were undermined by political instability, instability in the public service, management failure, lack of attention to implementation and lack of political support.

The overall Human Development Index indicates that PNG has performed poorly in terms of providing for its population. Education indicators have shown marked improvement but the increasing output from the education system, have far outstripped formal employment opportunities. Health indicators have generally improved but the areas for concern are the increase in the infant mortality rate, more patients per doctor and the increased incidence of HIV/aids cases. Over 70% of the populations do not have access to safe water.

Agriculture sustains the livelihood of more than 85% of the 5.1million Papua New Guineans engaging in subsistence and semi-subsistence, and the plantation and estate based production systems. 60-70% of all cash crops are exported. Over the last decade, the average production in the agriculture sector was around K1,558.86 million (US\$463.92). The analysis on rice imports

raised some important food security issues. It is very clear that the weakening Kina and the fall in import volumes will translate into further increases in the retail price of imported rice. Therefore, the proposed domestic production of rice through the Smallholder Rice Scheme is very critical and well justified, as in 1999 and 2000, rice imports amounted to over (cif) K75 million (145,000 tonnes) and K52 million (143,000 tonnes) respectively.

Chapter 4 Rice Production in PNG

The main constraints to rice production by smallholder growers are:

1. Lack of rice mills
2. Shortage of basic tools for soil cultivation, crop harvesting and winnowing.
3. Lack of draught animals or small machinery for soil cultivation
4. Inadequate support from district and provincial authorities for smallholder rice production.

The average size of the typical rice garden in all the five provinces surveyed is 0.08 hectare. The average yield is 2 tonnes per hectare. The average number of rice growers per village surveyed is 22.

Chapter 5 - Rice Marketing

Marketing requirements for all 19 provinces is dominated by imported rice. The main parties involved in the marketing and distribution of rice are the various intermediaries – importer/distributors, wholesalers and retailers. Traditionally, the distribution to urban and rural consumption areas is done through normal commercial marketing channel. Estimated total volume of rice distributed to 19 provinces is given in Table 5.1.

Table 5.1 Annual distribution of imported rice, 2000

Distribution	Tonnes	Retail Value Kina
PNG	143,000	270,678,960

Chapter 6 - Rice Consumption: Urban & Rural

The staple food for a majority of households surveyed in the five towns was rice. For example, it was 100 percent for Lae city, 85 percent for Madang, 80 percent in Wewak town and Kokopo town was 90 percent. These high proportions for the five towns suggest that rice is certainly becoming a staple diet within the household food basket.

Responses given with regard to rice consumption and reasons for their preference, gave in many instances, more than one answer. For example it was possible for a family to eat rice daily and also consume taro and bananas simultaneously.

Chapter 7 - Sociological Conditions

Household size - Initial selection criteria created a bias towards interviewing only the heads of households and almost all farmers interviewed therefore males. For the Central, Morobe and East Sepik Provinces comprising 120 households, household sizes varied from less than 2 members (10.8%) to seven and over members per household (36.7% of households) and with an average of

6 members per house household. Hence, these study provinces' (surveyed areas) household sizes are very large.

Labour and Availability - There is adequate labour available per household and this was the most common response from respondents. Labour availability varies from as low as two units (42.5% of households) to seven or more units (10.3% of households) per household. However, most households (42.5% of households) have only 2 available labour units.

Chapter 8 - Road, Irrigation, Grain Storage & Milling Infrastructure

An efficient rural transport Infrastructure network linking people to services leads to not only social well-being and economic prosperity within the area but contributes indirectly to the nation's overall development and prosperity. The locals in the study locations have either existing rural road network or sea transport infrastructure, which links them to other areas of their respective provinces. This transport infrastructure quality is in decline. Investigations into the social well-being and the rate of economic activity within the studied areas indicated a general decline due to transport difficulties and other problems encountered by the people.

As required under the study, following facilities were identified to be developed into Rice Resource Centers: (i) Kubuna Pastoral Centre, for Central Province; (ii) Former National and Provincial DAL training facilities at 3 Mile, Lae,, for Morobe Province; (iii) St Benedict's College, Madang, for Madang Province and PNG Bible Church College at Wewak for ESP. *Concept Plans of Rice Milling and Storage Shed, Machinery workshop and other maintenance items are costed in annexure of the report.*

Chapter 9 - Soil and Land Use Potential

Most soils have moderate to high fertility for upland rice except for (a) Tutubu Series (low N, P.), (b) Kubuna Series (low P, K), and Gelagela Series (low, P.). The soil and land has been evaluated for both upland and lowland rice cultivation, and the suitability ratings for all sites range from highly suitable (S1) to permanently not suitable (N2) (refer Table 9.19 - page 410).

Part II - The Master Plan

The core of the Master Plan is the four directions of promotion of rice development in PNG which are in Chapter 1. They are:

- To increase rice yield per hectare;
- To increase rice area per household;
- To increase number of rice households; and marketing of surplus milled rice, and
- To enable rice farm households to market rice surplus beyond their villages.

The four directions will require inputs from NDAL, PDAL, DDAL, NARI, Unitech, JICA, ROC, PRC, Education Department, NGOs and CBOs in order to enable the participating farm households to achieve the related outcomes for all the four directions in rice promotion.

As much as possible, the inputs which are listed in the proposed projects in Chapter 2 of the Master Plan, will be concentrated and introduced through the model rice farm households or the community of model farms as the venue for mobilizing the neighboring villages for rice production, processing and marketing.

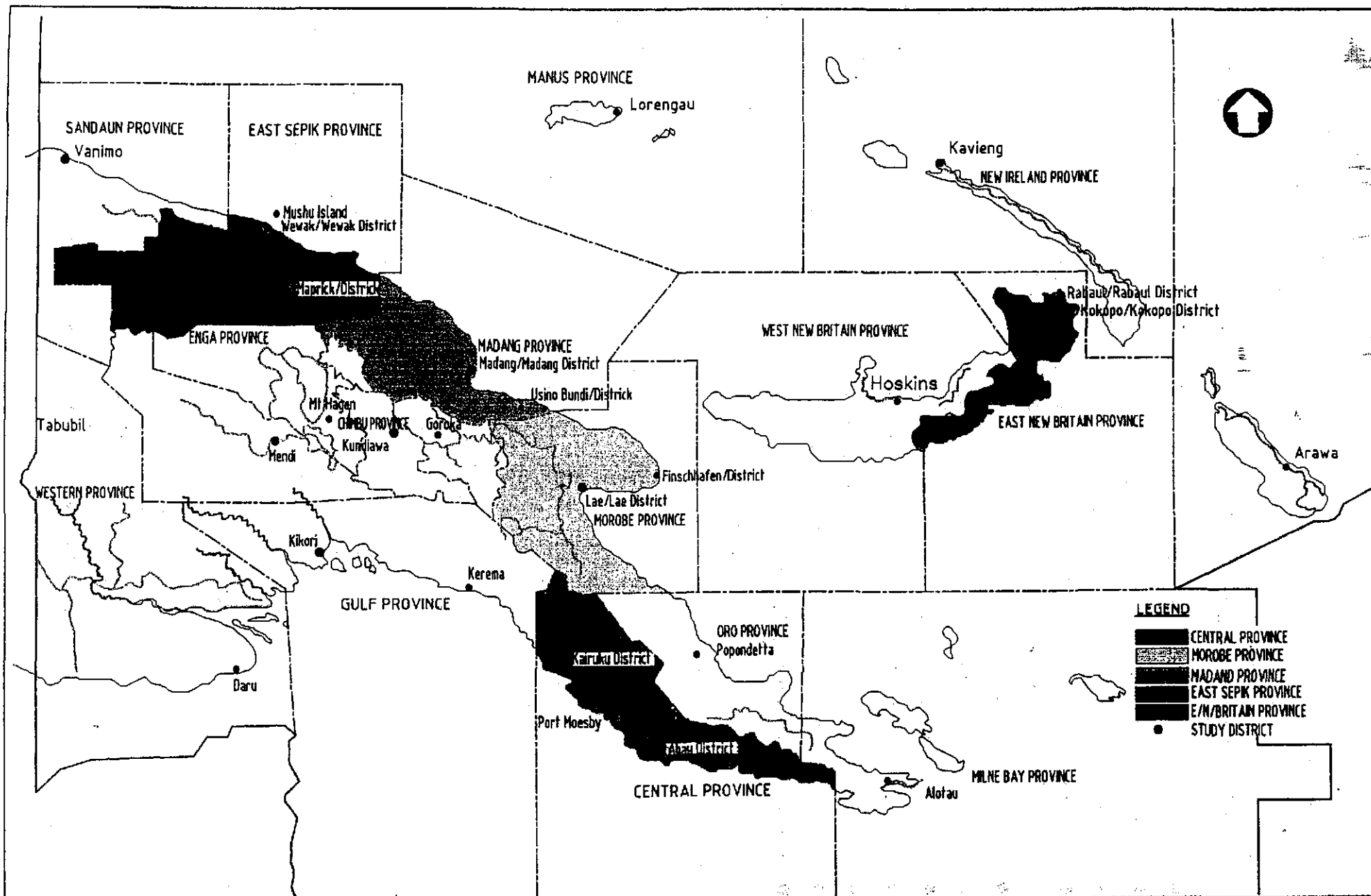
Basically, the Master Plan shows how the four directions of rice promotion that focus on the model farms can be accomplished through the village and district rice action plans and programs as shown in the last chapter.

Chapter 2 of the Master Plan includes a list of proposed projects. It outlines the purpose of various proposed projects, their background and rationale, identifies the beneficiaries of the projects, main activity, required inputs, expected outcomes, implementing agency and time schedule of implementation.

The proposed projects in the Master Plan will provide the inputs that are required to achieve the objectives or outputs for the four directions of rice promotion in PNG.

A workshop was held in Port Moresby to discuss the Final Report of the Rice Study.

The results of the workshop that relate to the proposed projects, role sharing on proposed projects and promotion activities and on action plans and programs are discussed in Chapter 3. Recommendations are given particularly in the preparation of rice action plans and programs that follow a bottom-up approach right from the individual rice villages through to the districts and the provincial level.



<p>1. Title</p> <p>2. Purpose / Amendment</p> <p>3. Date</p>	<p>ASSOCIATED CORPORATE SERVICES</p> <p>DESIGN AND PLANNING CONSULTANCY SERVICES</p> <p>100, 100, 100</p> <p>100, 100, 100</p> <p>100, 100, 100</p> <p>100, 100, 100</p>	<p>In Association With:</p> <p>SESEKA CONSULTANTS LTD.</p> <p>CONSULTING ENGINEERS, PROJECT MANAGERS & PLANNERS</p> <p>100, 100, 100</p> <p>100, 100, 100</p> <p>100, 100, 100</p>	<p>Client: J.I.C.A.</p> <p>Project: PNG RICE STUDY PROJECT</p>	<p>Drawing Title: STUDY PROVINCES AND DISTRICTS</p> <p>Sheet 1 of 1</p>	<p>Drawn: 01/09/2002</p> <p>Checked: 01/09/2002</p> <p>Designed: 01/09/2002</p> <p>Scale: 1:100 000</p> <p>Drawing No: 10002/PNCE</p> <p>Issue: A2</p>
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ACKNOWLEDGEMENT

Sincere and heartfelt thanks are due to the following:

- National Department of Agriculture and Livestock.
- Provincial Departments of Primary Industry
- District Administrators' Office in surveyed areas
- National Statistics Office, NARI, NAQIA, Trukai Rice Industries, UNDP and other Statutory Bodies and NGOs that have not been mentioned.
- JICA PNG Office
- All consultants who contributed towards this report
- Local village people in all five provinces visited, who helped in the surveys.
- Urban and Farm Households for lengthy interviews
- Mr. T. Akutsu for the overall organisation of the report
- Mr. T. Laka for the field Logistic Arrangements
- Mrs. F. Mou for typing the report



ACS meeting with DAL & JICA representative on Progress Report at FSB HQs

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Abbreviations and Acronyms

ACIAR	:	Australian Centre for International Agriculture Research
ACS	:	Associated Corporate Services Ltd
ADB	:	Asian Development Bank
AgBank	:	Agriculture Bank
AusAid	:	Australian Aid
Ca	:	Calcium
CEC	:	Cation Exchange Capacity
CP	:	Central Province
CPI	:	Consumer Price Index
CRADP	:	Cape Rodney Agricultural Development Program
DAL	:	Department of Agriculture and Livestock
DOW	:	Department of Works
DPI	:	Department of Primary Industry
ESP	:	East Sepik Province
EU	:	European Union
FAO	:	Food Agriculture Organization
GDP	:	Gross Domestic Product
GOJ	:	Government of Japan
GOPNG	:	Government of Papua New Guinea
IRRI	:	<i>International Rice Research Institute</i>
JBIC	:	Japan Bank for International Cooperation
JICA	:	Japanese International Cooperation Agency
K	:	Potassium
LIFDC	:	Low Income Food Deficit Country
LLG	:	Local Level Government

Mg	:	Magnesium
MOA	:	Memorandum of Agreement
MP	:	Member of Parliament
MTDA	:	Medium Term Development Strategy
MTRF	:	Medium Term Resource Framework
MU	:	Mapping Unit
Na	:	Sodium
N/A	:	Non Available
NAQIA	:	National Agricultural Quarantine and Inspection Authority
NARI	:	National Agriculture Research Institute
NCD	:	National Capital District
NEC	:	National Executive Council
NGO	:	Non Government Organization
NPK	:	Nitrogen Phosphorus Potassium
NSO	:	National Statistics Office
NZODA	:	New Zealand Overseas Development Agency
OISCA	:	Organization for Industrial, Spiritual and Cultural Advancement
OM	:	Organic Matter
PIP	:	Public Investment Program
PMV	:	Public Motor Vehicle
PNG	:	Papua New Guinea
PNGBC	:	Papua New Guinea Banking Corporation
PNGNFSP	:	Papua New Guinea National Food Security Policy
PRC	:	Peoples Republic of China
PTB	:	Plant and Transport Board
RBFS	:	Rice Based Farming System

ROC	:	Republic of China (On Taiwan)
RRA	:	Rapid Rural Appraisal
SDA	:	Seventh Day Adventists
TOR	:	Terms of Reference
T/ha	:	Tonne per hectare
US	:	United States
VAT	:	Value Added Tax
WB	:	World Bank

CHAPTER 1 - INTRODUCTION

CHAPTER 1 INTRODUCTION

1.0 General

The Draft Final Report is the third of a number of reports presented to JICA to date. The first report was the Inception Report, followed by the Progress Report presented on the second week of April 2002. The first report was a description of the general approach to be taken in doing the study, survey methodology and the study implementation schedule. It basically set the basis and the focus for the study on promotion of smallholder rice production in selected provinces. The Progress Report basically encompassed the survey findings in the NCD and the Central Province.

The Draft Final Report now extends to cover all the other four surveyed provinces being Central, Morobe, Madang, East Sepik and the East New Britain Province.

The study on Promotion of Smallholder Rice aims at identifying constraints and opportunities for the development of smallholder in Papua New Guinea which resulted in the presentation of a Master Plan. This plan is envisaged to comprise medium to long-term smallholder rice promotion in PNG.

This Study originated from an Implementation Arrangement for the Development Study between the office of the Japan International Cooperation Agency (JICA) of the Government of Japan and Government of Papua New Guinea (GOPNG) being represented by the Department of Agriculture and Livestock (DAL), on the 13th December 2001. A mutually agreeable Terms of Reference (TOR) formed the basis for the study. A copy of the arrangement is provided as an annex to this report.

1.1 Background of the Study

The agriculture sector is the single most important sector of the economy, employing over 75% of the population in the last decade (1990-1999). This sector contributed to the PNG GDP by over 26 % whilst annual export accounted for 15 % of the national revenue. It will continue to remain an important sector in the medium to long term affecting economic growth and rural development.

The agriculture sector is characterized by a large subsistence to semi-subsistence sub-sector that produces mainly food crops for domestic consumption and over 60% of cash crops for export. The future growth in agriculture will depend on the ability to mobilize smallholder farmers. Smallholder farmers account for so much in terms of export production. This group however, is characterised by lower production over-head costs and lower production yields in agriculture production, necessitating improved high yield production mechanism. Improvements in terms of extension delivery systems and inputs supply, improved marketing strategies (increase yields, improve productivity, increase value through down-stream processing) need to be employed to ensure produce gets to the market. Improved agriculture practices and yield will depend on increased skills and knowledge base of farmers, extensionists and other development agents. This will increase production volumes, improve quality of products and increase the rate of commercialization of agricultural produce.

In the past, public sector investments had concentrated on export crops notably in the tree crops sub-sector of agriculture. Food crops and livestock sub-sectors both for domestic consumption and export have been neglected such that currently PNG has a

large food importation bill. Notable of this has been the import of rice and grain which has increased substantially over the last decade. Amongst others, population growth and increased consumer demand for rice as staple food especially in the urban and peri-urban areas are some contributing factors. The devalued and weakening of local currency (kina) has not affected rice import or demand for rice in any significant way.

Whilst the increase in the consumption of imported rice may have necessitated an equal increase in domestic rice production, the general investment climate remain soggy and uncondusive. The current semi-subsistence practices of domestic rice production, processing and marketing are considered insufficient to meet the increasing demand for rice. On the other hand however, the increase in price for rice as a food item has caused farmers to produce rice as domestic food crop. The excess is sold at competitive price in local markets.

Because of the growing dependency on imported rice as a staple food item, the food "safety net" in PNG is being threatened by the inability of the traditional staple gardening system to provide enough food during major emergencies such as the El Nino drought. This dependency on imported rice may result in rice shortage and therefore possible starvation during periods of prolonged droughts although the GOPNG, through the DAL strongly advocates the issue of food security through its National Food Security Policy.

In 2000, DAL embarked on the review of existing food security policies, programs, projects and related issues, resulting in the formulation of the PNG National Food Security Policy (PNGNFSP). In its National Food Security Policy 2000 to 2012, DAL established and ensured that the policy framework was coherent enough to deal with the National Food Security situation in PNG. Amongst others the PNGNFSP concentrated on domestic rice production as one of its priorities. It aims to reduce rice imports by 10% by the year 2010.

DAL also initiated a rice promotion plan to meet the intentions of the PNGNFSP policy by concentrating on domestic rice production. It aims to increase domestic rice production by emphasizing the extension in upland rice cultivation first, to be followed by rain-fed cultivation supported by small-scale irrigation systems and then fully irrigated lowland rice cultivation of two (2) crops per annum.

Good and sound sectoral policies alone may not improve conditions surrounding appropriate scale and volume of rice production to meet the existing demand level. Improvements to the current rice production and supply practices as well as improved transport infrastructure network, coupled with some form of rice growing subsidies and better extension services may boost an increase and continued production and supply of rice to the market place.

Appropriateness of data, its collection and analyses, and information dissemination on aspects of rice in PNG from importation and domestic production to consumption are not readily available from stakeholder industries in PNG. This has frustrated the development of strategic, sound and workable plans to make credible contributions to policy decisions. Executing agencies at all levels of government also need to be capacitated and strengthened.

The process culminated in the decision by DAL to request for a study of the promotion of smallholder rice production in PNG. This study and plan requires a survey and

analysis of the present rice cultivation and the necessary system and organization that needs to be instituted to enable a working domestic rice industry. The Government of Japan through its Development Co-operation Agency, JICA, has committed both technical and financial support to assist with this study. This bilateral support was made possible through the signing of an Agreement between JICA and the DAL in late 2001.

1.2 Purpose of the Study

The study intends to achieve two main objectives. They are:

- i) to gather useful data such as the volume of rice imported annually and current level of demand on imported rice marketing systems that are in place. On the other hand the survey intends to establish how extensive rice is grown in PNG premise of which is a sample of five provinces - if or not farmers are self sufficient in growing rice as food crop. Further more, to identify existing constraints and issues (financial & economical, transport and capital infrastructure, sociological, soil & land use, mechanical etc) and the same that may have also affected the status of rice in the past. The study will verify the necessary plans, its control, extension, supporting systems and required appropriate technology and its transfer for the cultivation, processing, and marketing of rice throughout PNG and on that basis suggest and recommend means and ways to rectify if not minimize the same with the bid to assist farmers produce better, improved yields using simple user-friendly and appropriate technology and tools in a sustainable manner.

JICA/DAL, believes that the processed information and its recommendations will become useful for both the public and private sector organizations for future planning and implementation purposes. Currently such information is not readily available for those who need it. This exercise is consistent with efforts of the GoPNG to ensure PNG becomes self sufficient both in its traditional food crops and in rice in order to achieve the intents of food security. Particularly so because rice is increasingly becoming a major household food item both in the urban centers as well as in rural villages. The Food and Agriculture Organisation (FAO) of the United Nations Committee on World Food Security defines its objectives as ensuring "that all people at all times have both the physical and economic access to the basic food they need". This definition in brief relates to food availability, stability of food supplies and food utilization.

- (ii) to provide to the relevant statutory bodies, and the private, formal and informal sector a matrix of proposed causes of actions and recommendations by way of projects that can be taken to ensure that imported rice can be reduced proportionately over a specified period of time with a similar increase in small scale locally produced rice.

If the above objectives are correctly and sufficiently met, then the overall benefit to the government, private sector, consumer and subsistent sector can be met.

1.3 Study Output

The main output of this study would be to develop a ***Smallholder Rice Promotion Master Plan***. This Master Plan will be developed in line with the Policy Goals and objectives of the PNGNFSP and be closely linked to the rice development goals and strategies of DAL. The status of rice as a food and cash crop, in particular, rice

cultivation, milling, marketing, consumption and, importation, amongst others will determine the parameters of the Master Plan.

1.4 Scope of Study and Duration

The study was divided into two phases. Phase 1 covered the Central Province whilst Phase 2 covered the Morobe, Madang, East Sepik and East New Britain Province. The study was conducted over six (6) months from March to end of August 2002.

The study covered five (5) Provinces including Central Province (Kairuku & Abau districts) Morobe Province (Finschhafen & Lae Districts), Madang Province (Usino Bundi & Madang Districts), East Sepik Province (Maprik & Wewak Districts) and East New Britain (Kokopo & Duke of York Districts).

1.5 Study Methodology

Two methods of survey were applied during this exercise.

- (i) survey questionnaires
- (ii) secondary data review

The targeted subjects were existing rice farmers and potential farmers and rice consumers. The consumer survey in urban centers was conducted with the help of selected students from universities and colleges, whilst other surveys in selected districts were carried out by ACS team members with assistance from PDAL & DDAL staff.

a). Desk-Top Study / Research.

Based on the scope of work and TOR, this approach was necessary to analyse relevant secondary data and help in the preparation of a platform for primary data collection and further field interventions. It also enabled respective consultants to determine the volume and type of data and information requirements that may be necessary but not in print, questionable or data that need verification.

Desk-top research and analyses of data and information was a continuous exercise through out the duration of the study. This was deemed necessary even to test the findings of the field survey. The main sources for information on rice imports were Internal Revenue Commission, Trukai Industries Pty Ltd and the National Statistics Office (NSO).

Information on rice imports by origin of export, type (dehusked, husked, brown, white and brown) and volume, ports of landing, prices, distributors, and distribution by volumes to each province were considered vital.

Some discrepancies exist in this approach particularly because not all information were readily available. Trukai Industries for instance was unable to provide what is considered vital statistics for the purpose of the study. Information and statistics received from NSO were bulked and relatively unprocessed. For the purpose of the study there was no indication of origin of imports, identity of importer, provincial and regional distribution by volumes and perhaps types and import costs.

The Central Bank figures on imports are also aggregate and may be of little use for regional or provincial and district study on rice importation. The availability of the annual average exchange rates is however vital in financial and economic evaluation of past project interventions on rice such as the Bereina and Maprik Rice Public Investment Program (PIP) projects.

b). Field Survey.

JICA designed and issued survey questionnaires for field survey. The questionnaires were designed with the view to provide an in-depth understanding of rice farmers and their socio-cultural, farming situation, political and administrative setting.

Four types of questionnaires were administered; the farmer questionnaire, the socio-economic questionnaire, the rice consumer questionnaire and the marketing questionnaire. The questions were consistent throughout and in some areas repeated. Attempts were made after the first study in Abau District to review and reformat the survey questionnaire but due to limited time, minimal changes were made.

1.6 Survey Strengths and Weaknesses

Like most survey, this survey had its weaknesses, constraints and/or problems. The outstanding ones were logistical hurdles, budgetary constraints, bad road conditions and remoteness of some villages that were interviewed.

Given the above situation, the findings and conclusions derived from this report may not be exhaustive. It should be viewed as indicative of PNG.

CHAPTER 2 - BACKGROUND ON RICE SITUATION IN PNG

Chapter 2 BACKGROUND ON RICE SITUATION IN PNG

2.0 Background

Rice was introduced in Papua New Guinea (PNG) almost one hundred years ago. Despite its early introduction, rice has remained a subsistence enterprise. Many attempts have been made in the past to increase production in the traditional rice growing areas like Mekeo, Finschhafen and Maprik. In 1989 to 1995, the PNG government launched the DAL, Smallholder Rice Production Programme through the PIP Rice & Grain Project. It started the Bereina Rice Project in the Mekeo Plains of Kairuku District of Central Province and the Korambu Rice Project in Maprik District of ESP. Both projects aimed at encouraging the establishment of a local rice industry.

Each project followed a different approach. The Bereina Rice Project encouraged interested landowners to engage in mechanized upland rice cultivation by extending farm credit through the Agriculture Bank (AgBank) of PNG. The credit allowed for the hire of local farm machinery for land preparation, planting, crop management, harvesting, and transport of paddy rice. With financial and management assistance of Trukai Industries Limited, it also provided subsidized services for milling and marketing of milled rice known as Bereina Rice.

On the other hand, Korambu Rice Project encouraged subsistence growers to grow rice in small labour-intensive food gardens. DAL purchased dry paddy, milled and marketed it as Korambu Rice. In the long run, DAL could not sustain the operational costs of both projects. Both projects closed down in 1995 during the cash flow problem that affected all government departments.

In 1993 when both projects were in full swing, a rice consultant company in Australia, Sloane, Cook and King, carried out a rice feasibility study in PNG on appointment by DAL. Recommendations on how to build up the rice industry were given in a report called PNG Rice Sites Development Studies. It recommended to DAL to source internal or external funding for the development of pilot rice-based farms in four sites in PNG under full irrigation or upland conditions of farming. DAL had been unable to provide funding for this type of intervention due to cash flow problems which started in 1994.

In 1999, the PNG government through DAL attempted to re-vitalize the stagnant rice industry by launching the 10-Year Rice Self-Sufficiency Program of PNG. This program was aimed at supporting initiatives by Provinces and districts in smallholder rice production. But, this program was short lived. It was funded only once in 1999 with K4m. In 2000 & 2001, the continuing shortage of funds in the government had forced this program to be shelved and incorporated as a sub-component of the only remaining PIP of DAL- the PNG National Food Security Policy under the Food Security PIP, the rice development funding was K1 million for 2000 and K1.2 million for 2001. Both funding for two years had to be spread to other sub-components of the PNP National Security Policy that had received lesser funding.

But in 2000 & 2001, despite little funding assistance from the Food Security Program, rice production as a subsistence food crop picked up dramatically in the Momase Region, the Islands Region particularly in East New Britain and North Solomons, and in the Highlands Region particularly in Chimbu, Western Highlands, and Eastern Highlands. In the Southern Region, reaction to little funding assistance from national

DAL by traditional rice growers was mixed. Mechanized upland rice production in the Mekeo floodplains with the exception of two DAL pilot farms in the villages of Aviara-Oreke (1996) and Mainohana (1999), stopped completely. In contrast, subsistence food growers continued to plant upland rice in North Mekeo villages as the initial crop in most traditional food gardens there. In year 2000, outside of the North Mekeo area, rice growers came out in Kubuna and Gailala after being supplied only with seeds and basic information on how to plant and harvest rice by hand. Elsewhere in Hiri District, settlers near Veimaui and Brown rivers planted and harvested upland rice. In NCD, peri-urban settlers and institutions such as CIS and City Mission started upland rice production with little assistance from NGOs. However, in Rigo district of Central Province, two commercial food growers continue to pioneer in irrigated rice-based farming with their own resources. In Hiri district, a commercial grower has embarked in a combined labour-mechanized upland rice and grain production. Overall in the Southern Region, upland rice production picked up in Gulf, Milne Bay, Oro and Western Provinces.

The increase in upland rice production in most parts of the country was brought about by pro-active participation of provincial and district administrations, NGOs, aid donor agencies, and the business sector to a lesser extent and equally because of the steady increase in retail prices of imported rice. The effect of rising retail prices of imported rice on the increase in upland rice production throughout PNG is discussed in the Marketing and Consumer Sections of this study. Since 1994, the Republic of China (on Taiwan) had been involved in rice extension and seed distribution program. In 1994, the Government of Japan extended a grant-in-aid on chemical fertilizers to PNG totaling K402,000. In 2001, it sent three JICA experts to PNG to assist DAL in the rice production program. One is on a three-year contract as Smallholder Agriculture Advisor. Another is on a six-month contract as a Farm Machinery Expert. The third is a Rice Expert on a three-month duration. FAO provided some funding in 1996-98 for rice development and irrigation under Pilot Phase of Special Project for Food Security in Markham Valley. Trukai Industries provided funding for the Joint IRRI-PNG Rice Training Project from 1994-1998 as well as operational funds for milling and marketing of Bereina Rice. It continues to provide milling services at subsidized costs at the rice receival depot in Erap in Markham Valley and funds for short training courses for rice extension staff and farmer leaders. NGOs Sivarai Namona, City Mission, and Hope International in NCD joined in the promotion of rice as a food crop in 2001.

The results of the previous PIP Grain & Rice Project and the current rice production program under the PNG National Food Security Program of national DAL were a mixture of successes and failures. The recent success is attributed to the latest strategy adopted by government agencies and NGOs in promoting rice as a subsistence crop. The devaluation of the PNG kina and the steady rise in prices of rice in supermarkets and tradestores have created local markets everywhere for home-grown rice in any community in PNG where there is available land for rice to be grown as a subsistence crop. Most subsistence growers in PNG are now beginning to realize that they can participate in a local agriculture activity that not only provides them with an import-substitute food item but also cash income if they have access to a rice-milling machine.

Beforehand, the failures were attributed to various reasons of which the notable ones included inappropriate varieties and technologies, poor management, inadequate extension support, poor infrastructure in terms of road networks, lack of milling machinery and good storage facilities, lack of irrigation and access to markets, land tenure issues and lack of sustained government support. Furthermore, with the introduction of cash crops like coffee, cocoa, rubber and oil palm the problems were

exacerbated where rice cultivation was neglected and thus its status in the agriculture sector became negligible.

2.1 Rice Demand and its Impact on People and the Economy

In spite of the past failures in promoting the rice industry, rice has become a major food item in the peoples' diets and import economy of PNG. Per capita consumption of rice ranges from 30 to 40 kg, but this may be higher in some families particularly in towns and cities. At present the common trend is that many people are migrating into the towns and cities in search of employment and various other reasons. The most likely scenario is that rice consumption is expected to increase and expand in these urban areas. Current (2000/2001) rice imports by a major rice importer stand at 146,000 tonnes annually with an estimated retail gate value of K260 million to K300 million annually. This is clearly a significant strain on the country's foreign reserves. It must also be noted that the large portion of the imported rice is not consumed by expatriates who are residing in PNG, but by full-blooded Papua New Guineans. That is, about 99% of the imported rice is consumed by indigenous Papua New Guineans. These facts certainly indicate that the demand for rice is high.

2.2 Emerging Approach for PNG Rice Industry Development

Prior to 2000, the initiatives by the PNG government to promote rice development were carried out only in locations where rice have been grown traditionally or in locations that have been appraised to be suitable for rice production in terms of soil, climate, and market availability or accessibility. After 2000, that approach has changed dramatically. Government agencies and NGOs are now responding to the growing numbers of subsistence farmers who have decided to grow rice at their own initiative in order to meet their own needs. Now, the resources of DAL for rice development are being re-directed to marginal locations where subsistence and semi-commercial growers have demonstrated that they are capable of producing rice as a food crop with little assistance from DAL, district DPI, and NGOs. For the first time, this new approach will probably enable the PNG government to establish a local rice industry that is cost-effective, self-sustaining, and grower-driven.

It is encouraging to note that this new strategy has the full support of most provincial and district administrations, NGOs, overseas aid donors, research and training institutions, private commercial farms, and the business sector. The level of support in each province and districts from these institutions is reflected by the foregoing data in Table 1 on rice production seen in the Provinces. Those districts who do not support this new strategy whose rice promotion programmes rely mainly on government subsidies have lagged behind in rice production as shown in recent production data in this report.

2.3 Government Policy on Rice Development

Generally, the objectives of the rice program are;

- i). to increase household food security and income,
- ii). to reduce food imports, and
- ii). to satisfy the growing demand for rice in the country.

To achieve these objectives, strategies have been put in place to implement the program. These include;

- i) Increase households producing rice,
- ii) increase productivity through irrigation,
- iii) provide assistance in milling rice and,
- iv) assist farmers to have access to seed paddy.

The major focus is to promote smallholder rainfed upland rice farming which aims primarily at satisfying the household requirements. Small-scale irrigated rice production is also promoted to encourage commercial production. Emphasis is on the Provinces where rice has been growing for a longer period of time particularly in Provinces like Morobe, East Sepik, Central and Madang Provinces. Other Provinces, which have been growing rice for a number of years, include Oro, Milne Bay, East and West New Britain and Bougainville.

The newcomer and leading producer of rice for government institutions i.e. high schools, vocational centers and CIS is Simbu Province. It started growing rice with only two kilograms of seeds in 1999. In 2001, institutions and subsistence farm households in Simbu harvested 50 tonnes of paddy rice.

2.4 Current Rice Production

Past and current rice production data from most of the rice growing areas show that with appropriate direction and support, it is possible to further increase the number of farmers growing rice, increase the acreage under rice cultivation and amount of paddy produced.

Table 2.1 shows the number of people involved in rice growing, area under rice cultivation and total paddy yields from the major rice growing Provinces for the years 1998, 1999, 2000 and 2001.

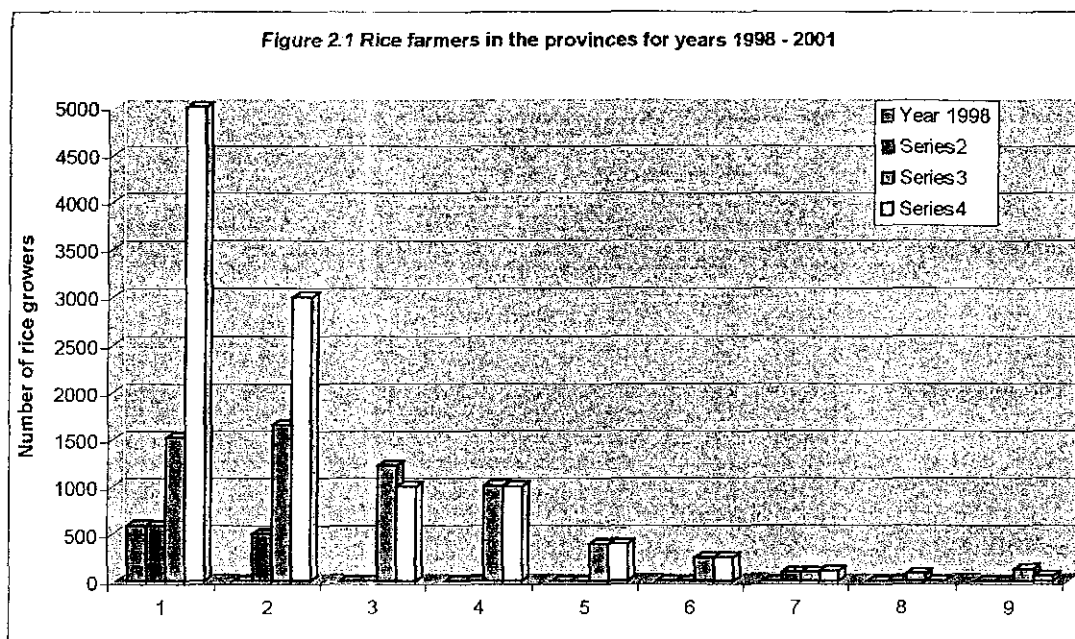
Table 2.1 - Rice Production in the major rice growing Provinces for the years 1998 - 2001

Province	Year	Number of growers	Area planted (Ha)	Paddy yield (t)
Morobe	1998	591	67	207
	1999	588	167	469
	2000	1520	200	550
	2001	5000	1000	1500
East Sepik	1998	N/A	N/A	N/A
	1999	500	100	51.4
	2000	1650	220	650
	2001	3000	600	1772
North Solomons	1998	N/A	N/A	N/A
	1999	N/A	N/A	110
	2000	1220	130	300
	2001	1000	200	461
Madang	1998	N/A	N/A	N/A
	1999	N/A	N/A	N/
	2000	1010	110	250
	2001	1000	200	454
Central	1998	N/A	N/A	N/A
	1999	N/A	N/A	N/A
	2000	390	30	180
	2001	390	19.4	60.5
Oro	1998	N/A	72	144
	1999	N/A	70	95
	2000	250	30	75
East New Britain	1998	N/A	N/A	N/A
	1999	94	N/A	3.2
	2000	95	12	35
	2001	105	19	51
West New Britain	1998	N/A	N/A	4
	1999	N/A	N/A	N/A
	2000	80	10	30
	2001	N/A	N/A	N/A
Sandaun	1998	N/A	15	60
	1999	N/A	N/A	N/A
	2000	130	25	45
	2001	50	10	18

Source: Food Security Branch, DAL

* N/A denotes not available

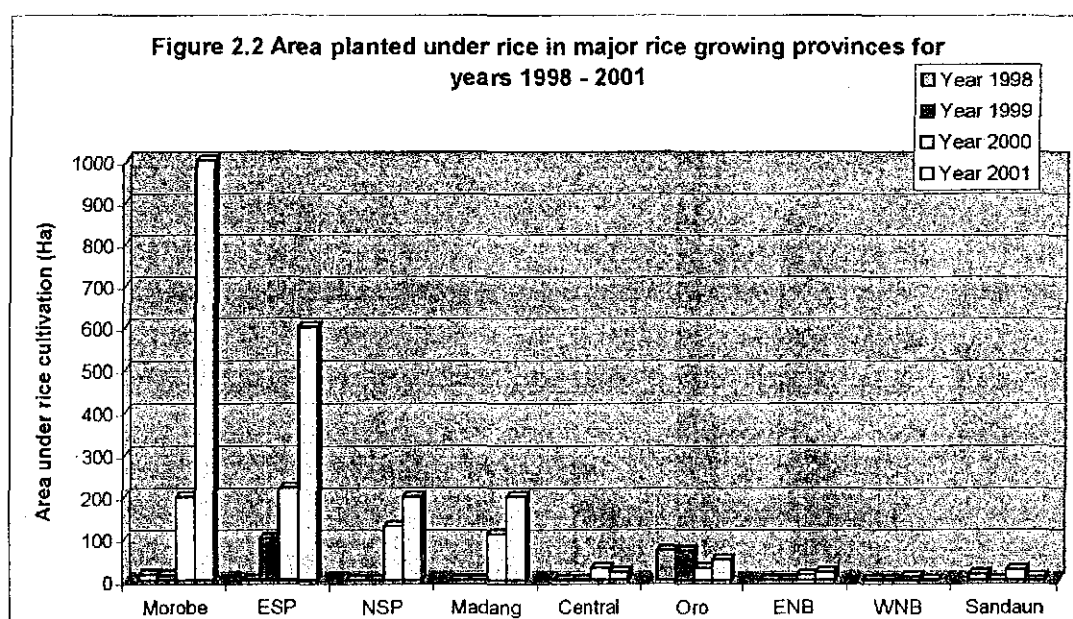
It can be noted that there are missing data for some Provinces for some years. This does not mean that there were no rice productions during those years in those Provinces. This may be due to lack of resources like financial constraints, lack of manpower, lack of accessibility and various other reasons, which may have contributed to poor data collection.



Source: Food Security Branch, DAL

There is a positive trend in rice production where the number of farmers getting into rice production has increased (Table 2.1 and Figure 2.1) in most of the major rice growing Provinces. This is also shown in Figure 2.2 where the total areas under rice cultivation also increased. For example, in the Morobe province the total number of rice growers increased from 1520 in year 2000 to 5000 in year 2001 and in the East Sepik province, the total number of rice growers increased from 500 in year 1999 to 3000 in year 2001 (Table 2.1 and Figure 2.1). This is also shown in the total average number of rice growers (average of 9 Provinces), which was approximately 66 rice farmers in each province in 1999 to 1199 rice farmers in each province in year 2001 (Figure 2.4).

The area cultivated under rice also increased most notably in the Morobe, East Sepik and North Solomons province (Table 2.1 and Figure 2.2).



Source: Food Security Branch, DAL

For example in the Morobe province, the area planted under rice increased from 67 hectares in 1998 to 1000 hectares in 2001. In the East Sepik province, the area under rice cultivation increased from 100 hectares in 1999 to 600 hectares in year 2001. However, in the Central province, there was a decrease in the area under rice cultivation from 30 hectares in year 2000 to 19.4 hectares in year 2001 (Table 2.1 and Figure 2.2). In the *2000 Rice Survey Questionnaire*, many Provinces indicated that lack of milling machinery was one of the reasons why there is a decrease in people growing rice hence less area cultivated under rice. Figure 2.4 shows that the total average area under rice cultivation increased from 18.9 hectares in each province in 1999 to about 233 hectares in each province in year 2001.

Total paddy yield also increased in most of the Provinces particularly in the Morobe, East Sepik, North Solomons and Madang province (Table 2.1 and Figure 2.3). It should be noted that production of rice is mostly from small plots of land ranging from 0.1 to 0.2 hectare per farmer under rainfed upland conditions. The average yields usually range from 1 – 1.5 tonnes of paddy per hectare without fertilization. However, application of the primary minerals (N, P and K) in the Markham valley has shown dramatic increases in rice yields where the average yields obtained ranged from 2.5 to 4.0 tonnes paddy per hectare under good rainfall conditions. This now points to the fact that with the high yielding rice varieties such as the Taichung Sen 10 (TCS 10) which is currently being used widely, the application of N, P and K may be necessary to achieve higher yields. Many studies have shown that higher yielding varieties need high plane of nutrition to exhibit their full genetic potential.

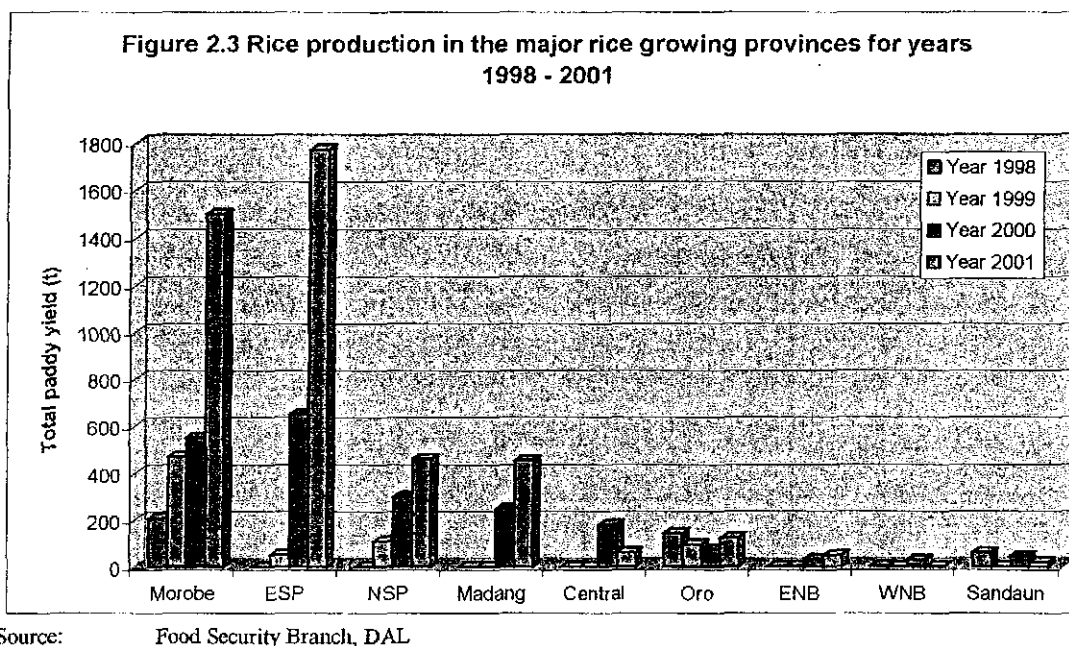
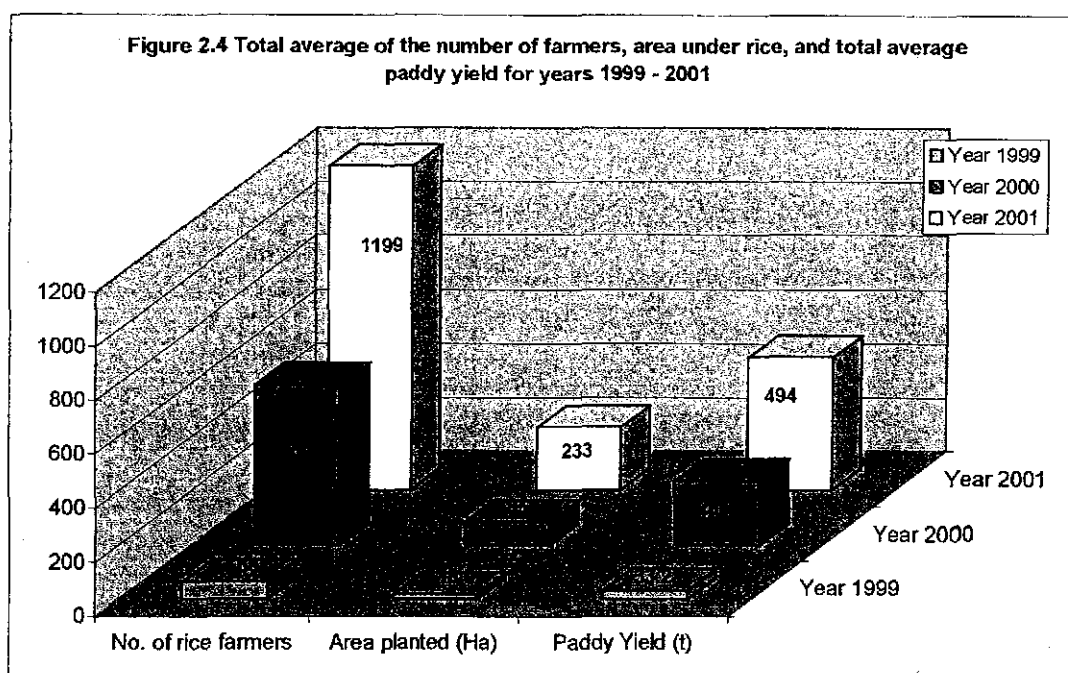


Figure 2.3 indicates that rice production is increasing each year particularly in the Morobe, East Sepik, North Solomons and Madang province (Table 2.1 and Figure 2.3). For example in the Morobe province, rice production increased from 207 tonnes in 1999 to 1500 tonnes in year 2001. For East Sepik province, rice production increased from 51.4 tonnes in 1999 to 1,772 tonnes in year 2001. In the Central province, rice production decreased from 180 tonnes in year 2000 to about 60 tonnes in year 2001 (Table 2.1 and Figure 2.3).

Figure 2.4 shows that the total average paddy yield increased from 33.2 tonnes in 1999 to 235 tonnes in year 2000. In year 2001, the total average paddy yield further increased to about 494 tonnes.



Source: Food Security Branch, DAL

From the above data, it is very clear that the increase in paddy yield was a direct result of the increase in the number of farmers rendering their lands available for rice cultivation. This means that more land is used for rice cultivation, as more people get involved in rice cultivation. Furthermore, it appears at the moment the size of the area of land does not really matter so long as many people are encouraged to grow rice, the total rice production in the Provinces may likely to increase. It is also certain that with improved farming technologies like application of fertilizers and other cultural practices, rice production will increase under these conditions. This was evident in the Markham Valley that when N, P and K fertilizers were applied, average rice yields increased from about 1.5 t/ha without fertilization to about 4.0 t/ha with fertilization.

It has also been realized that in PNG, there are no permanent rice growers. That is the same number of farmers who probably grew rice last year may not be the same this year. This is one of the reasons why collection of data from the same farmer is often difficult and inconsistent.

Needless to say, the picture is quite clear in that there is clear evidence that more people are growing rice. It is also clear that to increase rice production at the household level, more people should be encouraged to grow rice for their own requirements and depending on whatever resources they have. It is also hoped that as more rice mills are made available to farmers, the increase in rice production will be further enhanced.

2.5 Summary - Causes of Recent Increase in Rice Production in PNG

- i). Shift in strategy of promoting rice as a food crop in subsistence gardens.
- ii). Gradual increase in prices of polished rice in supermarkets and trade-stores.
- iii). Access to rice mills provided by government, NGOs, and aid donors.
- iv). Concerted efforts of government agencies, NGOs, aid donors, and business community to promote the rice industry in PNG.
- v). Rice is a durable and compact food item on weight basis.

2.6 Constraints

The major constraint identified is the lack of milling machinery. In areas like Finschhafen, people are still using the mortar and pestle to dehusk their rice (tong tong method). This is because there are no mills in these areas. Lack of training in the area of post-harvest technologies is also one of the major problems. These include, the actual operations of the mill, care and maintenance and identifying faults and so forth.

2.7 Points to Consider

- Every year a questionnaire on the status of rice production in each province should be sent to update the information.
- Recruit or appoint from the existing staff a person whose task would be to collect data from the Provinces. This means that funds should be made available for this purpose every year.
- Assist Provinces/districts in terms of funds to carry out this task every year.