

**AN OVERVIEW OF THE
AGRICULTURE AND LIVESTOCK SECTOR
IN PAPUA NEW GUINEA**

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FOREWORD

The Country Program of Japan International Cooperation Agency (JICA) in PNG emphasizes assistance in the Primary Industry (agriculture) sector. The main objective of this program is to improve the sustenance of this sector in PNG by providing the necessary infrastructure support and technical assistance to all key stakeholders.

As outlined in the National Food Security Policy (NFSP), 'the primary objective of the PNGNFSP is to create awareness and seek support to increase and diversify food production in order to achieve greater self-sufficiency in food and attain for security at the national, provincial, district and household levels by the year 2015'.

Therefore, all key stakeholders especially the Government of PNG and donor agencies are required to pull in their scarce resources together for an effective delivery of goods and services. This will in turn increase productivity and sustainability of high agricultural yield, income earning opportunities through down-stream processing resulting in value added goods, and ultimately a rise in the living standard.

From this study, it can be deduced that JICA and other donors have made significant improvements to the agriculture sector through various assisted projects and programs. However, a better coordination among the donors is desired to provide effective and stable support to this sector both in the short and long term basis.

Having fully appreciated the exchange of views and ideas with the Government of PNG, other donor agencies and non-government service providers, JICA PNG Office hereby compiles this "Overview of Agriculture Sector in Papua New Guinea" as part of our contribution to donor coordination by reviewing of agriculture projects and programs in PNG. I hope that this overview report will be of great assistance to promote much collaborative activity of all stakeholders involved in the administration and implementation of the agriculture sector of PNG.

March, 2001

岩崎 薫

Mr. IWASAKI Kaoru
Resident Representative
JICA PNG Office

LIST OF ABBREVIATIONS

ACIAR	Australian Centre for International Agricultural Research
ADB	Asian Development Bank
AusAID	Australian Agency for International Development
CB	Cocoa Board of Papua New Guinea
CCEA	Cocoa and Coconut Extension Agency
CCRI	Cocoa and Coconut Research Institute
CIC	Coffee Industry Corporation
CMB	Copra Marketing Board of Papua New Guinea
DPI	Division of Primary Industry (Provincial)
EU	European Union
FAO	Food and Agriculture Organisation of the United Nations
FPDC	Fresh Produce Development Company
GDP	Gross Domestic Product
GOJ	Government of Japan
GOPNG	Government of Papua New Guinea
IFAD	International for Agricultural Development
JBIC	Japan Bank for International Cooperation
JICA	Japan International Cooperation Agency
LDC	Livestock Development Corporation
NAQIA	National Agricultural Quarantine and Inspection Authority
NARI	National Agricultural Research Institute
NDAL	National Department of Agriculture and Livestock
NFSP	National Food Security Policy
NZODA	New Zealand Overseas Development Assistance
OPIC	Oil Palm Industry Corporation
OPRA	Oil Palm Research Association
PNG	Papua New Guinea
PRC	People's Republic of China
RDB	Rural Development Bank
ROC	Republic of China (On Taiwan)
UNITECH	Papua New Guinea University of Technology
UPNG	University of Papua New Guinea
VUC	Vudal University College
WB	World Bank

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EXECUTIVE SUMMARY

- Agriculture provides income, employment and livelihood for over 75 percent of PNG's population, and over the last decade (1990-99) contributed over 26 percent of the country's annual GDP and 15 percent of its annual export revenues. It will remain to be an important sector, and a vital engine for economic growth in the medium term.
- The sector is characterised by a large subsistence and semi-subsistence subsector, which produces all the domestically produced food, and 60-70 percent of all the cash crops exported. The smallholders have lower overhead costs, but produce lower yields than those in the plantation subsector. However, the potential to make productivity gains is higher in the smallholder subsector, and this is where future growth will occur.
- Past public support for agricultural development has concentrated on the tree crops sector, which has resulted in notable increases in production of coffee and oil palm over the last decade. Conversely, the food crops and livestock subsectors have been neglected for many years, and there is an urgency to address this imbalance. The policy drive to achieve national food security by 2015 makes this a priority agenda.
- External donor assistance has constituted between 60-80 percent of Government's development budgets since Independence. On average, external aid to PNG over the last decade (1990-1999) has constituted about 15-20 percent of the Government's annual budgets. It is obvious, that PNG will continue to depend on external aid to boost its economy over the medium term. The Medium Term Development Strategy provides the framework for channeling this support in the key sectors of the economy.
- In agriculture, the future growth depends on mobilising the smallholder sector, and the provision of essential support services to lift production levels of smallholders, and widen their business opportunities. The strengthening of the provincial and district extension programmes through improved linkages with technical and national agencies, would increase smallholders' knowledge base, and their overall output.
- The dependence on exports of agriculture commodities in their primary form has deprived PNG from making gains in secondary, or value-added products. Opportunities for downstream processing of all export crops must therefore be explored to improve the competitiveness of PNG's tradeables on the regional and international markets.
- A key issue for agriculture is improving the skills of farmers, extension workers, and all relevant development agents. A substantial effort in developing human skills in all aspects of agriculture will pave way for greater commercialisation of agriculture, and the modernisation of this vital sector of the economy.

I. AN OVERVIEW OF THE AGRICULTURE AND LIVESTOCK SECTOR IN PAPUA NEW GUINEA

1. INTRODUCTION

1.1 The Resource Base

Papua New Guinea (PNG) is a country endowed with renewable and non-renewable resources. These include its vast tropical forests, rich marine life and huge tracts of arable land, and significant deposits of gold, copper, nickel, petroleum, gas and other minerals. Since Independence, the national economy has been dependent on the exploitation of these natural resources. Hence, in one way or another, the bulk of the rural population has continued to derive its livelihood from these resources; whether from subsistence or market-oriented agricultural production, or royalty payments for timber, mining and petroleum resources.

As a developing country, PNG is also a recipient of external donor assistance that is considered generous by international standards. Much of this assistance is channeled through the annual budget process, based on standing bilateral and multilateral agreements with the PNG Government (GOPNG). On a per capita basis, PNG enjoys one of the highest level of aid among the lower middle income economies and a level higher than 80 percent of the low-income economies (Economic Insights, 1998). In 1996 foreign aid was estimated to be equivalent to 8 percent of gross domestic product (GDP) and aid per person was equivalent to US\$87. In 2000, the total external donor assistance constituted 80 percent of the total development budget of the Government (GOPNG, 1999a). The estimated contribution by external donors in 2001 will see a notable reduction after many years, but at 63 percent of the total; the donor community remains a significant source of support to the national purse. On average, external aid to PNG over the last decade (1990-1999) has constituted about 15-20 percent of the annual budgets.

Despite its abundant natural wealth, and a healthy external assistance programme, PNG's overall economic and social development since Independence is disappointingly low. The PNG Human Development Report published by the National Planning Office in 1999, indicated that the country still lags well behind neighbouring developing countries in life expectancy and adult literacy rates (GOPNG, 1999b). The Report also showed high inter-regional/provincial disparities in economic and human development indices (see Annex 1). The varying levels of development across provinces and regions are due to several compounding factors. Firstly, the poor infrastructure network in the rural areas makes the delivery of essential services difficult, and ultimately results in poor accessibility to markets and raises costs of production inputs. Secondly, a serious law and order problem constitutes a significant restriction on economic activity and personal security nation wide. Lastly, but not least, a cost-ineffective public service and poor private sector participation in the economy has not promoted entrepreneurship and business growth in nearly all levels of PNG society. This is obvious in the rural sector, where nearly 80 percent of the rural population are active semi-subsistence farmers and fishermen.

1.2 The Agricultural Economy

Despite the emergence of a small modern enclave sector of the economy, based on mineral resources extraction and commercial logging, agriculture is by far, the most important sector of the economy, whose contribution has remained undiminished over the years. Agriculture provides income, employment and livelihood for over 75 percent of the PNG's population, and over the last decade (1990-99), has contributed over 26 percent of the country's annual GDP and 15 percent of its annual export revenues.

The growth of the GDP

Throughout the 1980s, the agricultural GDP grew only about 1.7 percent per annum, while the population steadily grew by 2.5-3.0 percent per annum (QEB, 1999). In the 1990s, the sector GDP experienced a stronger recovery, with an annual average growth of over 10 percent by the decade's end (Table 1). Windfall increases in the world prices of PNG's major export crops contributed to this improved performance. While the impact of the El Nino in 1997 was seriously felt in the subsistence food sector, the drought had little effect on the 1997/98 coffee crop (CIC, 1997), and most other tree crops. By mid 1999, prices of all commodities had improved markedly over previous years, and prices of copra, copra oil and palm oil fetched all-time highs¹(see also Annex 8).

The relative growth in agricultural exports

The value of exports from the major tree crops since 1992 is shown in Table 2. By the end of 1999, the relative value of the agricultural sector had increased substantially, with three-fold growth in export earnings over the 1994-99 period. As a result of good prices and increased production (particularly from the smallholders), the sector in 1999 accounted for 23 percent of the total export earnings. While the prices of coffee and cocoa had steadied in 2000, the prices of copra, copra oil and palm oil took a severe dive in the second part of that year.

The importance of the smallholder sector

Although, windfall gains in the world market prices of the major crops have triggered the recent surge in agricultural GDP growth, the growth in the smallholder cash crop subsector has also been a significant development. Since 1991, smallholder production in coffee, cocoa, copra, oil palm and rubber, have constituted almost 70 percent of the total annual output from the tree crops sector. The plantation subsector's contribution has been on a decline since the 1980s, and the situation is unlikely to improve in the foreseeable future. Figure 1 shows that in 1998, plantations contributed only 10 percent to agricultural GDP. With increasing labour and overhead costs, plantations will eventually become uneconomic units of production. Smallholder system of agriculture therefore holds the key to further growth of the sector in PNG.

¹ Source: QEB, 2000: Per tonne FOB: K 1047 for copra; K 1918 for copra oil; K 1331 for palm oil.

Table 1: Contribution of the Economic Sectors to the Gross Domestic Product, 1991-1999 (Kina millions, at current prices)

Economic Sector	1991	1992	1993	1994	1995	1996	1997	1998	1999
Agriculture	936.5	1021.0	1334.6	1419.9	1692.6	1831.9	1872.1	1884.5	2036.7
Mining, quarrying	612.9	924.5	634.6	918.8	1086.1	836.2	665.3	1284.8	1504.1
Petroleum	-	-	745.8	745.0	707.5	916.3	728.5	722.4	937.1
Manufacturing	345.1	390.3	411.0	467.5	496.6	602.9	647.5	693.4	759.1
Electricity, others	59.2	65.1	66.3	74.6	80.2	90.0	91.6	103.5	113.3
Constructions	224.0	210.0	189.9	215.6	196.0	384.1	361.4	457.9	532.3
Commerce	358.5	387.1	417.3	412.9	520.9	607.3	668.7	693.1	737.2
Transport, storage	243.0	233.7	261.2	288.8	318.4	350.2	376.9	408.6	436.3
Finance, property, real estate	35.0	44.5	46.1	53.8	57.3	70.3	76.6	87.1	98.0
Community, social services	588.2	649.6	711.4	793.1	859.0	883.5	963.4	971.4	916.1
Import duties	203.0	213.2	197.8	201.0	294.0	341.3	372.2	406.8	434.9
Gross Domestic Product	3605.5	4139.6	5106.0	5531.0	6308.6	6914.0	6824.2	7713.5	8505.1
Agriculture as % of GDP	26.0	24.7	26.6	25.7	26.8	26.5	27.4	24.4	23.9

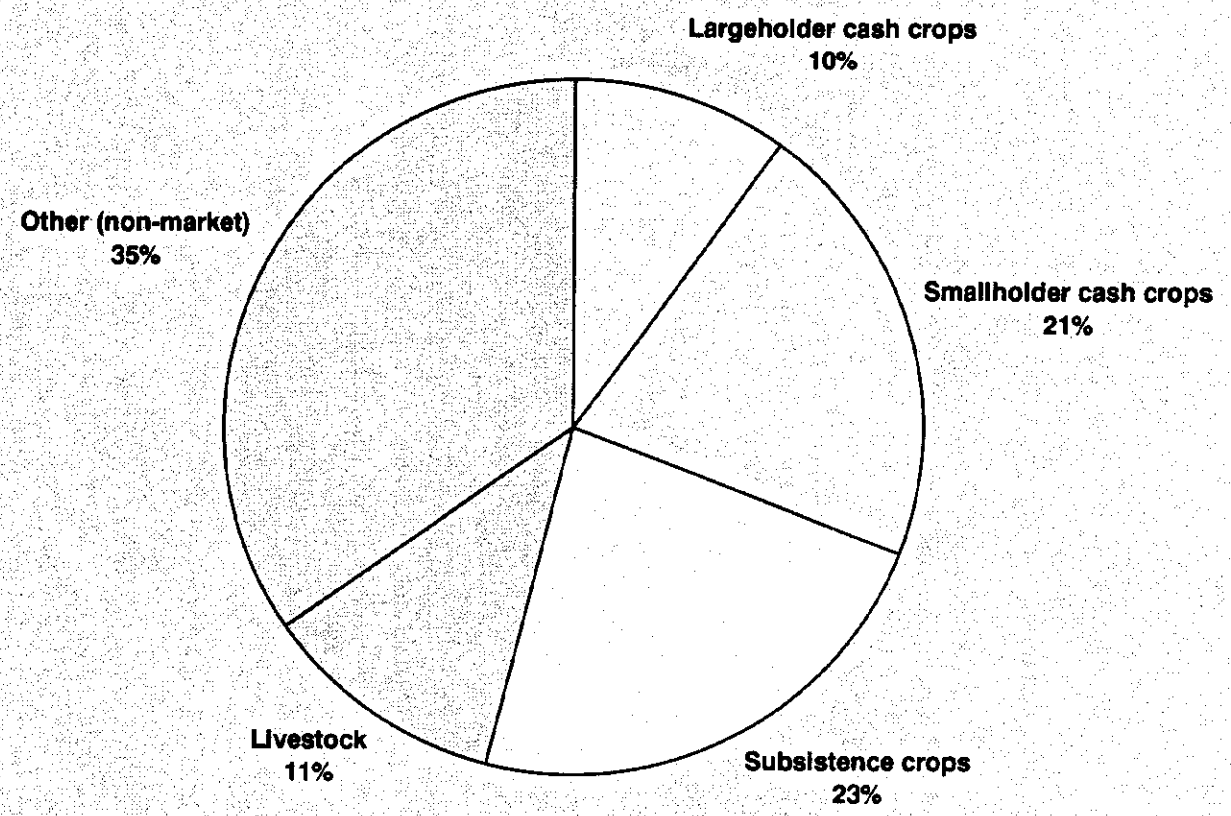
Source: Bank of Papua New Guinea; Department of Agriculture and Livestock

Table 2: The Value of Agricultural Exports (Kina millions) in 1992-1999

Years	Cocoa	Coffee	Tea	Copra	Copra Oil	Palm Oil	Rubber	Others@	Total Agriculture	Total Exports
1992	34.1	68.1	6.6	11.8	24.2	64.2	1.9	12.7	223.6	1862.6
1993	33.1	100.5	7.2	14.2	19.6	79.2	2.6	13.7	270.1	2527.3
1994	29.0	204.8	4.2	14.7	20.1	77.5	2.9	21.4	374.6	2662.0
1995	47.7	214.5	5.4	27.4	29.7	142.2	4.0	31.5	502.4	3399.8
1996	66.2	190.3	12.7	49.0	51.4	182.4	4.1	22.5	578.6	3313.9
1997	73.3	325.9	10.4	47.2	51.1	207.1	6.5	55.7	777.2	3059.3
1998	81.7	476.4	18.9	38.8	69.7	271.9	7.3	55.5	1020.2	3687.7
1999	84.6	417.1	19.0	66.5	95.8	337.9	5.0	139.1	1165.0	4985.3

Source: Bank of Papua New Guinea; @ "Others" include a very small proportion of manufactured goods

Figure 1: Components of Agricultural GDP, 1998 (K 1,884.5 million)



Source: Bank of PNG; Department of Agriculture & Livestock

2. GOVERNMENT POLICY AND PLAN

2.1 Historical Perspective

The formal agriculture sector has its modest beginnings in the 1800s with the establishment of copra plantations by the German settlers in the New Guinea Islands, Madang and Milne Bay areas. These plantations were devastated by the two Wars, and from the 1950s, the Australian Administration vigorously promoted the revitalisation of plantation agriculture under its Returned Servicemen League programme. Previously declared Crown Land became converted to alienated land for agricultural lease. The main crops grown in the earlier years were coconut, cocoa, coffee and rubber.

Diversification of the plantation agriculture commenced in the 1960s, with the introduction of other tree crops such as tea and oil palm. By then, the tree crops had truly become the priority focus in agricultural development. As basis for pioneer industries, these perennial crops (coconut, cocoa, coffee, tea, and oil palm) also became targets for public and private investment. In the ensuing years, smallholder participation in plantation crops was promoted by extension programmes, and today both large and smallholdings of these crops occupy over 350,000 hectares of land area.

The emphasis on export tree crops was in line with a policy to establish an export-oriented economy in PNG, based on oil and beverage crops that can thrive well under its lush tropical environments. Most of the cash crops introduced to PNG at the beginning of the last century were relatively free from the major exotic pests and diseases of these crops found elsewhere in the world. The crop pest/disease free status of PNG has given growers of these crops the competitive edge over those in many neighboring countries.

The livestock production was promoted hand in hand with plantation agriculture. Cattle grazing was introduced under coconuts, and formed a suitable dual production system in most coastal areas. Smallholder cattle production was promoted under a World Bank subvention in 1960s, and this led to expansion of pasture areas in Madang and Morobe, central Highlands, and the Papuan coasts. Village livestock consisted of pigs and poultry, which supplemented diet and income in all rural areas.

2.1.1 The effects of macro-economic policies

Since Independence, the PNG's economic development policies have aimed at achieving economic stability, with nationals taking greater control over key economic activities and resources, and reducing dependencies on imported goods and services. Rural self-employment was promoted as a means to improve livelihood amongst the majority of the population, and the natural resource based enclaves were to be developed to give the Government the means to pursue its development agenda and ensure equitable distribution of wealth. The key policy instruments to promote such objectives included (i) the hard Kina policy; (ii) a CPI indexed minimum wages policy; and (iii) general and selected trade and tariff protection. The way these policies were pursued was bias against agriculture, as they affected the international competitiveness of PNG's exports, and

provided little incentive for domestic production. Some of the macroeconomic policy biases against agriculture have since been removed by the Government's recent policy reforms supporting market-oriented wage determination, devaluation and floating of the Kina since 1994, rationalisation of the trade and tariff policies affecting agriculture, and some liberalisation of domestic price controls. These measures, plus a substantial increase in the world prices of PNG's major export crops since the mid-1990s have improved the incentive regimes and international competitiveness for production of most agricultural tradeables.

2.1.2 Export crop price support and stabilisation schemes

Price stabilisation schemes for agricultural export commodities were first introduced for copra (1952) and later expanded to coffee (1966), cocoa (1974) and oil palm (1983). The basic aim of these schemes was to give growers a bounty during times of low world prices of their export crop, from variable levies collected during periods of high commodity prices. By 1990, all stabilisation funds had been depleted, and the schemes were replaced by Government-assisted export price programs. Although, the price subsidy programs did have a positive impact on production, there were of extremely high cost (K 200 million over 1992-1997), and proved to be unsustainable for PNG. The schemes were phased out in late 1997.

2.1.3 Input and transport subsidies

Most agricultural inputs such as fertilisers, chemicals, seeds, and breeding stock, are traded privately and unsubsidised in PNG. However, since 1992, the Government has allowed the subsidies to be introduced on: (i) coffee pulpers, cocoa fermenting vats, farm tools, and sun-drying equipment used by smallholders (to minimise the impact of low commodity prices and promote improvements in product quality and husbandry practices); (ii) freight subsidies for cash crops and high value crops (spices etc.) marketed from the remote areas (to compensate for high transportation and handling costs); and import of breeding stock (to promote genetic improvements); (iii) transport subsidies for seedlings and fertilisers used by smallholders for oil palm cultivation (new crop introduction); and (iv) free distribution of cocoa and coconut seedlings in East New Britain and North Solomons (disaster relief).

The actual expenditures on these subsidies are not known, but are expected to be minimal. The proposed freight subsidy program did not eventuate mainly because the principles and procedures for its implementation could not be finalised by the Government and key industry organisations. Although the impact of the subsidies that were actually provided have not been studied, the relevant industry groups claim, however, that recent improvements in the production and quality of smallholder coffee and cocoa, and good smallholder response to the cultivation of oil palm were a direct result of subsidies. On the other hand, it is possible that the simultaneous provision of price support and input subsidies for export crops in the 1990s, have highly distorted the incentive regimes for the production of tree crops, as well as the relative profitability between the tree crops and food crops and livestock sub-sectors.

2.2 White Paper on Agriculture

The White Paper on Agriculture – Sectoral Policies 1996-2000, approved by the National Parliament in 1996, was the first sectoral policy document of the Government since Independence (GOPNG, 1996a). The overall policy thrust is to increase production, through improved productivity, and sustainability through appropriate and cost-effective technologies, and improved extension and development approaches. The Paper also defined the main constraints in agriculture, and highlighted a variety of policy issues such as those discussed above, and their implications on development of the sector.

The White Paper was translated by the National Department of Agriculture and Livestock (NDAL) into the Agricultural Sector 5 Year Strategic Development Objectives, 1997-2001 (GOPNG 1996b). In brief, the main guiding policy directives outlined in the White Paper are:

- a) To foster a broadly based agricultural development to generate rural income and employment, reduce rural poverty, and improve food security.
- b) To promote sustainable utilisation of natural resources as basis for ensuring sustainability of agricultural systems.
- c) To encourage environment friendly investments with high returns, in agriculture.
- d) To promote private sector participation and commercialisation of the sector.
- e) To develop human resources for productive occupation in agriculture, and adopt social practices that raise the general rural welfare.
- f) To improve international competitiveness of new and traditional exports through use of efficient production systems and cost-effective technologies.
- g) To promote crop diversification and downstream processing to enhance rural income and widen the export base.

The White Paper and its implementation was recently reviewed by the National Agricultural Council (GOPNG, 2000a). The Council recommended that a new policy framework be established to take into account the new developments since 1996, such as the reforms under the *Organic Law on Provincial and Local Level Governments*, the institutional reforms within the sector, the Structural Adjustment Program and the liberalisation in the global economy.

2.3 National Food Security Policy

PNG is a signatory to the Rome Declaration on World Food Security and has pledged together with all member States of the Food Agriculture Organisation of the United

Nations, to support the implementation of the 1996 World Food Summit Plan of Action. A major requirement of the Action Plan is for member Governments to set out clear national food security policies and objectives that would achieve food security at the national and household level by 2015.

In accordance with the Rome Declaration, the GOPNG approved the adoption of the Action Plan in 1997. The draft National Food Security Policy was deliberated and approved by the National Agriculture Council in 1999 (GOPNG, 1999). The NFS Policy was subsequently passed by National Parliament in May 2000.

The NFS Policy defines the food security goals of the Government, and sets out a strategy to achieve them so that PNG can effectively address the main issue of food insecurity. The primary goal of the National Policy is: “ *to ensure that all people of PNG at all times have access to safe and nutritious food in adequate quality and quantity to maintain a healthy and active life*”. The six underlying sub-goals are:

- 1) To increase food production and to improve access to food at the household level as a means to the eradication of food insecurity and rural poverty.
- 2) To improve the nutritional status and standards of living of the people of PNG.
- 3) To improve production, downstream processing, marketing and utilisation of food.
- 4) To strengthen institutional linkages to ensure that cross-sectoral policies compliment the PNG National Food Security Policy.
- 5) To ensure the integrated management and sustainable use of land, water, fisheries and forest and genetic resources.
- 6) To ensure maximum participation of women in all aspects of agricultural development, including research, extension, policy planning and implementation, education and training, and voluntary and formal organisations.

The National Government has identified food insecurity as a major national concern, and has defined under the Policy, a National Framework for Food Security, which maps out a medium term strategic plan for action with accompanying work programme. International donor partners will be invited by the Government and FAO to co-finance the plan of action. It has recently been estimated that a Work Programme under the National Framework for Food Security would cost K 42.5 million to implement over 10 years (GOPNG, 2000a).

2.4 National Rice Policy

The National Government approved a National Rice Policy in 1998, which outlined a broad policy framework to promote self-sufficiency in rice. The strategic objectives

under this Policy have been incorporated under the Strategic Framework for National Food Security. The broad objective is to improve the national self-sufficiency in rice, grain crops and other associated crops and livestock in PNG, using an integrated farming systems approach. This will require appropriate research, extension, development and processing methods to increase productivity, and production of rice and associated crops.

The programme proposes a development of 100,000 hectares of rain fed lowland rice to target an annual self-sufficiency of 150,000 – 170,000 tonnes of milled rice. Unfortunately, no sizeable area of land is available in one contiguous form in PNG to meet such a requirement. It would also require 10-15 years of land mobilisation and paddy production to totally replace the current level of rice imports.

In 1999, the Government approved a 5-year agreement between the State and the Rice Industries (*Trukai Rice*), for the leading rice importer to support rice research and development (R&D) in PNG. The company has promoted smallholder rice production through on-farm adaptive work, and has established a central processing and packaging plant in Lae, where locally produced paddy rice is purchased and milled into a product called 'roots rais'.

Trukai has also approved a K 4 million R & D budget to support rice development activities being implemented by NDAL. The work programme under this funding is defined by a joint Technical Advisory Committee, with membership from NDAL, Trukai, NARI, UNITECH, and other interested parties (such as ROC Mission and OISCA). The support by Trukai is being expanded nation-wide through the supply of improved seeds and mini-rice mills.

3. LAWS AND ACTS

There is no legislation which establishes a central government body as a lead agency in agriculture. Unlike in health and education sectors where a single 'management' law applies, all agricultural industries and agencies are governed by separate legislation. The NDAL's roles and responsibilities are provided by executive direction under the *Public Service Management Act*. In terms of the administration and management of the sector and its related industries, two main areas of legislation are applicable. The first is the general law for decentralisation of government decision-making and administration – the *Organic Law on Provincial Governments and Local Level Governments*. The second is a body of legislation, which provides for key management activities, such as marketing of commodities, conduct of agricultural research and extension, plant and animal quarantine etc. - by corporate bodies, set up either by or under legislation.

3.1 *The Organic Law on Provincial Governments and Local Level Governments*

The Organic Law was approved by Parliament in 1995 to replace the original, adopted in 1977. It defines the institutional structure for the legislative and executive arms of the Provincial and Local-level Governments, and the institutional structure for the administrative system of the two levels of Government. The Organic Law also allows for

'national functions' such as agricultural related functions to be undertaken under laws legislated at provincial and district level. In absence of these enabling legislation, joint activities by national and provincial/district agencies, such as agricultural extension, can be managed and coordinated through formalised agreements.

3.2 Commodity Boards and Subsidiaries

The laws establishing national bodies to be responsible for various industries are:

<i>Copra Marketing Board Act</i>	-	provides for regulation of the coconut industry and management of copra marketing;
<i>Cocoa Board Act</i>	-	provides for regulation of the cocoa industry;
<i>Coffee Industry Act</i>	-	provides for regulation of the coffee industry;
<i>Rubber Industry Act</i>	-	provides for regulation and promotion of the rubber industry;
<i>Spices Industry Act</i>	-	provides for regulation and promotion of the spice and essential oils industry;
<i>Oil Palm Industry Corporation Act</i>	-	provides for the development of smallholder producers of oil palm and the industry.

Under these bodies, relevant subsidiary institutions have been created under the *Companies Act*, to undertake research and development initiatives for the development of the industries. Those established so far, are :

- Cocoa and Coconut Research Institute;
- Cocoa and Coconut Extension Agency;
- Coffee Research Institute;
- Oil Palm Research Association;
- Livestock Development Corporation; and
- Fresh Produce Development Company.

3.3 Agricultural Technical Institutions

Two technical functions that were recently transferred from NDAL to statutory bodies were: agricultural research and agricultural quarantine. The laws enabling the establishment of national institutions to carry out these essential functions are:

National Agricultural Research Institute Act: to provide for the establishment of the National Agricultural Research Institute (NARI), the conduct a research program in food crops, livestock, and to address the needs of the smallholder sector;

National Agricultural Quarantine and Inspection Authority Act: to provide for the establishment of the National Agricultural Quarantine and Inspection Authority (NAQIA), and define the functions of a national quarantine service for the sector, and regulation of agricultural imports and exports.

4. SERVICE DELIVERY SYSTEM

The Organic Law demarcates areas of jurisdiction in agriculture services provision. Hence, agriculture extension service is a concurrent function of provincial authorities and established agriculture institutions. These are briefly described below.

4.1 National Government Organisations

4.1.1 The Department of Agriculture and Livestock

The NDAL is the lead agency in the sector whose overall role is:

- The strategic planner for the agriculture sector;
- Coordinator, with Provincial and Lower-level Governments, of the planning, budgeting and implementing of agricultural development activities; and
- The monitor and evaluator of the performance of the sector.

The NDAL performs these tasks, in association with the other National Government agencies, Provincial and Low-level Governments, industry bodies, other statutory organisations and the private sector. A new structure of NDAL provides for four (4) regional directorates to be established, and it is through these offices that the Department will link with the provincial and district programmes (see Annex 2).

4.1.2 The Ministry and the National Agricultural Council

NDAL also facilitates an annual policy forum called the National Agricultural Council (NAC), which is chaired by the National Minister for Agriculture and Livestock. The NAC is the apex body for vetting policies in the agriculture sector, and is currently made up of the following:

- The National Minister, as Chairman of the Council;
- Chairpersons of all Commodity Boards;
- Chairpersons of Provincial Committees on Agriculture
- Chairpersons of recognised Farmers Associations
- President of the National Women's Council

In the past, the NAC has considered and approved major policy reforms and programmes for implementation through the annual budget process. The management structure and the linkages within the agriculture sector in PNG are outlined in Annex 3.

4.2 Provincial and Local Government

The main task of Provincial and District administrations is to plan, coordinate and manage agricultural extension programmes at the local Government levels. These activities are defined by annual provincial budgets, or through joint programmes with NDAL or relevant industry bodies. The experience to date indicates that many provinces and districts lack human capacity and capability to effectively carry out these services. This has had a serious negative impact on smallholder productivity, and overall rural output.

4.3 Research

Research is a national function, and is carried out by institutions created by legislation outlined above. The National Agricultural Research Institute (NARI) was created in 1996 to undertake research in the food and livestock sector.

Other research institutions have been established for export tree crops (coffee, cocoa and coconut, oil palm). These bodies are supported by export levies and annual government grants.

4.4 Education and Training

For many years, NDAL was the sole agency responsible for diploma and certificate level agricultural education and training in PNG. The University of Papua New Guinea (UPNG) and the Papua New Guinea University of Technology (UNITECH) are responsible for graduate and post-graduate training in agriculture. In 1994, the Vudal Agricultural College, which was offering diploma courses under NDAL, became a University College (VUC). The institution became a fully-fledged University in 1998, and now offers a degree in tropical agriculture.

NDAL currently provides a two-year Certificate course at the Popondetta Agriculture College, and offers in-service training at the Mt. Hagen Agricultural College.

Agriculture is taught as an optional subject in most Secondary Schools (Grades 7-10) in PNG, and is not rated as a prerequisite for entry into National High Schools (Grades 11-12). However, in some Vocational Schools (after Grade 6), agriculture is a major subject taught for skills training. The recent approval by the Department of Education to award a Diploma in Vocational Teaching with a major in Agriculture will boost training in farming techniques at this level in the future.

There are no organised training programmes at farm level, although NDAL and DPI's have provided short technology courses and skills training in the past, in various aspects of crop husbandry and livestock management for farmers in specific localities. Several farmer-training centres still exist throughout PNG, but are now part of the Districts' infrastructure. Their rehabilitation and utilisation for future farmer training depends on the programmes and priorities in each district.

4.5 Extension

Extension is a concurrent function under the Organic Law, and is offered along commodity lines or by rural development programmes. The activities are focussed at the district and village level, and the success of the programmes is often dependent on availability and quality of resources (both finance and human capital).

The agricultural extension in PNG has been a subject of several reviews since 1982, and many of the recommendations from these studies have remained unimplemented. The only major change is the corporatisation of extension services in the tree crops sector, and the divulging of functional responsibilities from NDAL to industry bodies.

The management and coordination of extension services in the food crops and livestock subsectors, have remained weak, and are important issues for consideration by the national and local level governments. As small farmers produce most of the food for the population, their problems and needs must be given a higher priority in the future.

4.6 Credit Services

The Rural Development Bank (RDB) is the leading agency for provision of credit to the agriculture sector. It has supported tree crops industries and also livestock development projects. Credit support for farmers in the food crops subsector is very minimal due to the difficulty experienced by smallholders in attaining sufficient collateral for required loans. The loan portfolio of the Bank no longer favours agriculture, with 80 percent of the current lending going to the commercial sector (real estates, retailing etc.).

The recent decision by the National Government to privatise the RDB does pose serious implications for the sector, as no suitable alternative source of agriculture credit is available.

In 1996, the Government approved a smallholder agricultural credit scheme to be managed by the RDB, and supervised jointly with established industry extension agencies. The initial support of K 10 million has been depleted, but the Bank was to develop a revolving fund from this project for future lending.

The scheme is also in jeopardy, because of the proposed privatisation and sale of the Bank.

4.7 Private Sector Organisations

Several private and non-governmental organisations have become involved in the delivery of agricultural services. Most of these have been linked to financing institutions, churches, and private individuals, and 5 are described in Table 3.

Table 3: Private sector organisations in agricultural service delivery

Organisation	Parent institution	Type of service delivery
Smallholder Rural Project Management Company	Rural Development Bank	Provide management advice to farmers with loan projects, in both cash crops and livestock. E.g. smallholder cattle projects in the Markham Valley.
Yangpela Didiman	Lutheran Church of PNG	Part of the Lutheran Development Service, with field extension staff helping farmers through vocational or on-site training, and technology transfer. E.g. rabbit farming in Morobe.
Karkar Black Pod Trust	Middleton Estates Ltd	Conduct applied on-farm research into black pod disease in cocoa, and transfer technology for disease control to farmers.
Smallholder Poultry Extension Service	Niugini Table Birds Ltd	Provide extension support to chicken farmers growing birds for Niugini Table Birds processing facility.
Team Rubber	North Fly Rubber Ltd	Provide extension advice and planting material to smallholder rubber growers.

The coverage by the NGOs listed above is narrow, as they focus only on farmers located in the areas of interest to their parent institutions. However, some of these organisations have the scope and flexibility to expand their involvement throughout the country. Given the depleting resources and capacity in the public sector to service needs in the rural sector, the role of private sector organisations in agriculture development will certainly increase in the foreseeable future.

4.8 Cooperatives

In the 1960s, smallholder cocoa and coconut production was promoted by cooperatives. These networks provided for the marketing of village produce, and the wholesale trading of merchandised goods in the rural areas. These cooperatives were successful in some areas, but the general perception was that because the Government provided the management, shareholders could not develop capacity to manage and sustain these businesses themselves. However, the cooperative movement was a means for rural

dwellers in accessing goods and services, and the need for such networking is more urgent now than ever before.

The experiences in other developing countries show that cooperatives, operating as NGOs, have become modern institutions of technology transfer in agriculture. The value of cooperatives in the delivery of services in the rural sector should therefore be reviewed in determining the application of such a framework of cooperation in the future rural development programmes in PNG.

5. BUDGET AND EXPENDITURE

5.1 National Fiscal Strategies

Since the 1997 Budget, the Government's annual expenditure plans have followed the priorities setting defined by the Medium Term Development Strategy (MTDS). The MTDS, which was passed by the National Parliament in 1996, is a rolling 5-year strategy with a medium-term Resource Framework (Avei, 1996). The framework provides policy matrices for each of the priority areas of government activity, and determines the key objectives and activities for Government in each sector and the expenditure implications of those activities.

One of the aims of the framework is to facilitate the integration of planning and budgeting. Hence, the MTDS emphasizes the need to jointly consider recurrent and development expenditure when defining objectives and strategies. The concept of a separate development budget still applies, but both development and recurrent expenditure are linked to strategies and priorities of the Government.

The key priorities identified in the MTDS are health, education, infrastructure and private sector development (which includes the agriculture sector). It is perceived that growth in the agriculture sector can only be driven by developments in the private sector. To realise this, the strategy emphasises access to farm credit, boosting of research, extension and training services, and improving the monitoring of commercial activities of Government. While the intention is good, the allocation for the agriculture sector has not improved since the development of the MTDS, and without this, the development in the private sector which will pave way for growth in agriculture will be minimal in the medium term.

In 1999, the GOPNG proposed a "National Programme for Reconstruction and Development" aimed at 'creating the environment that will enable every citizen to mobilise their own resources - land, labour and skills - as the principal means for bringing about a sustainable improvement in living standards'. This programme is guided by three principles:

- Government must focus on clearly defined core functions and priority activities;
- Government at all levels must form partnerships (with those in civil society) in order to lay down the foundations for effective development; and

- Papua New Guineans themselves must drive the development process.

It provides the foundation of four key objectives:

- Good governance and macroeconomic stability, comprising transparency, accountability and commitment to the national development goals;
- Improved planning and budgetary systems, focusing the resources on development priorities defined in the MTDS;
- An efficient service delivery system; and
- Income earning opportunities, particularly in rural areas.

A Structural Reform Programme was introduced in August 1999, aimed at restoring macroeconomic stability and the structural adjustments necessary for sustained, broad-based economic growth, with the view to containing public demand while reallocating public expenditure towards development priorities. On the whole, the identified external financial assistance (a World Bank loan) was to be used to address domestic debt reduction, including domestic arrears. The expected outcomes are to be a contribution to restored private sector confidence and to the reorientation of public expenditure to the key priority sectors on a sustainable basis.

5.2 Agriculture Sector Budgets

It is generally considered that any significant progress in PNG's economic development will depend on accelerating growth in the agricultural sector. However, despite the importance of agriculture, economic policies and public investments in the past two decades have focussed on the growth of the non-renewable resources sector (mining and petroleum), and gave little attention to fostering a broad-based development of the agriculture sector. Consequently, agriculture's growth was dismal in the 1980s, and it was only due to windfall gains in commodity prices in the 1990s, that the sector GDP has achieved a sizeable of growth over the last 5 years.

The annual budgetary support for the sector has averaged about K 120 million over the last decade and the half (1980-1995). However, much of this support has largely been towards the development of tree crops, and almost 50 percent of which were spent on price support. If price support was excluded, the total public expenditure for crops and livestock development during 1990-95 has averaged K 59 million; equivalent to about 1.2 percent of the national GDP, or 4.2 percent of agricultural GDP, and 3.6 percent of total expenditure.

The lack of support for the food crops and livestock programmes has kept these subsectors as the least developed in PNG agriculture. Also because nearly 90 percent of public expenditures have traditionally been incurred through the national agencies, the front-line agencies for delivery of agricultural support services have received only meagre resources.

5.2.1 National Government Organisations

The levels of budgetary support to the sector through the various national agencies over 1998-2000 period are given in Annex 4. These tables indicate a very sad state of affairs for the agriculture and livestock sector. Amongst the economic sectors, agriculture and livestock sector was allocated 6.7 percent of the total funding over the last 3 years. Of the total development budget, the sector was allocated only 3.1 percent of the total funds under the public investment programme over the same period. Of the total 1998-2000 expenditure budget (recurrent + development), agriculture and livestock sector on average, received less than 1 percent funding from the Government.

The recent decline in public funding of agricultural agencies did coincide with the sectoral reforms, particularly those under the Organic Law. Hence, the decline in NDAL's annual development budget from K 20 million in 1996 to K 4.9 million in 2000, is due to the termination of public investment programmes that linked the Department to provinces. Its annual recurrent budgets over the 1990s have averaged K 15 million, but in 2000, NDAL received only K 4.4 million for its operational programmes. NDAL is therefore not well funded to effectively undertake its role as the supervisor of the sector. It has recently undergone a reorganisation of its structure, and a reduction in staffing levels may improve its operational budget, but the Department's ability to undertake more development work will depend on new project financing.

5.2.2 Provincial and District Administrations

The budgets for agriculture at provincial and district level are difficult to ascertain, but some earlier estimates (ADB, 1994) put the total annual agricultural budget in the 18 provinces (excluding Bougainville) at K 11 million. Unfortunately, 90 percent of this budget is for salaries and wages, and a similar state of affairs in NDAL (*vis-à-vis* lack of operational support) applies to the provinces as well.

In the past, Provincial Departments were not involved with direct management of public investment programmes in agriculture. However, with the full implementation of the provincial reforms, more development funding are expected to be channeled directly to the districts and local level governments. This support is currently being managed by the Office of Rural Development, through the local Parliamentarians and their rural development funds (K 1.5 million annually).

6. EXTERNAL INPUT AND EXPERIENCES

It has been shown that intervention by external donors through well-targeted programmes has raised productivity in the tree crops subsector (coffee, cocoa, copra, tea, rubber and oil palm). Unfortunately, the same cannot be said of the informal food crops and livestock subsectors, as these areas have been grossly neglected by the Government and hence, have received relatively little external assistance over the last two decades.

Part II of this report provides an inventory of immediate past, and on-going agricultural development projects supported by external donor assistance since 1990. The 32 projects summarised in the report have a total value of K 300 million, and the majority were planned for implementation over five years and have appeared in the annual budgets. Some of the projects were supported by grants, and these were financed separately outside of the budget. Of the total funds allocated, K 164 million was targeted towards supporting the tree crops subsector; K 72 million for food crops and livestock; and K 64 million went towards strengthening national institutions and sectoral agencies.

Since Independence, the Government has directed much of the external donor assistance towards the tree crops subsector, through three modes of development in agriculture: integrated rural development; agricultural financing; and institutional strengthening. The experiences in these areas are briefly outlined below.

6.1 Integrated Rural Development

Immediately after Independence, the Government vigorously pursued a strategy to open up areas of the country with relatively low income and of poor nutritional status, through integrated rural development programmes (IRDP). These IRDPs adopted an area development approach, by undertaking rapid rural appraisals of the communities to be covered, and developing programmes for implementation based on constraints and the opportunities established in the target areas. From the mid-1970s to mid-1980s, much of the external donor assistance to agriculture was tied up in IRDPs in East Sepik, Southern Highlands, Simbu, West New Britain, and Central Province. These projects promoted rubber and cocoa (Sepik, Central), oil palm (West New Britain) and coffee, and integrated food crops and livestock (North and South Simbu, Southern Highlands). Because IRDPs were concentrated on State-owned or alienated land, the projects also promoted the concept of resettlement schemes, where the landless could lease land over 25 to 90 years, and establish blocks of 10-15 hectares as a farm and homestead. The projects also had capital works components which allowed road infrastructure to be developed, linking the farming communities to central marketing and processing facilities and communal amenities.

The main donors promoting IRDPs were the World Bank, the International Fund for Agricultural Development, and the Asian Development Bank. The ADB did continue its support for IRDPs until the end of 1980s, with a project in East New Britain to rehabilitate cocoa and coconut smallholdings.

Because of lack records of the earlier IRDPs, these have not been evaluated for inclusion with the project summaries presented in this report. However, the terminal report by ADB on the East New Britain Cocoa and Coconut Rehabilitation and Redevelopment Project indicated that because IRDPs required an integrated approach to implementation, components such as capital works, which requires input by other agencies (e.g. Department of Works) were often behind schedule, and this have often affected the project outcomes and the schedules of achieving them. IRDPs also promoted the World Banks' approach of extension called training and visit (T & V) system which tries to

achieve changes in production technologies used by target farmers through assistance from well trained extension agents who have close link with agricultural research. Because T & V system is a top-down extension approach, its relevance and usefulness to PNG farmers is limited. In some of the former IRDP areas such as the Gavien Resettlement Scheme in the Angoram District of East Sepik, farmers have lost interest in their rubber and cocoa blocks because of lack of an effective extension support, and marketing outlets for their produce.

Future large-scale agricultural development along the IRDPs model is dependent on availability of large tracts of land. Private sector participation could also be encouraged if the land issue is effectively addressed. The mobilisation of traditional land under the *Land Groups Incorporation Act* lease-lease-back arrangement² is one way to address this issue. This arrangement is considered acceptable by investors (e.g. in oil palm development) in committing their resources in developing agriculture in PNG.

6.2 Investment Funding

One of the major areas of external donor support to the sector has been the supply of agricultural credit, through the State-owned RDB and the four commercial banks. The Government has supported the RDB since its establishment in 1970, through soft loan arrangements with the World Bank, the Asian Development Bank, and more recently, the then Overseas Economic Cooperation Fund (OECF), and now the Japan Bank for International Cooperation (JBIC). The credit facility of RDB provides loans to smallholders in the IRDPs for developing their oil palm, cocoa or rubber blocks, as well as small cattle ranchers.

In 1994, the RDB had a loan portfolio of K 118 million comprising of 75 percent of funds for pure agricultural lending, with the remainder for commercial and industrial loans (13 percent), hire purchase and equipment finance (10 percent), and others (2 percent). In 1999, the loan portfolio for agriculture was drastically reduced to less than 40 percent of the total. This situation is a reflection of the checkered history of RDB since its inception. Apart from its management problems and political inferences, the Bank has remained poorly capitalised, and has become a high-cost credit supply institution with no savings mobilisation program to support expansion through capital leverage. The Bank has remained financially insolvent and unsustainable. Recently, it was subsumed by a new State owned entity, the Pacific Finance Group in 1999, for privatisation. The eventual demise of the RDB would mean that after three decades of public sector interventions in rural financial intermediation, PNG has not established any sustainable institution and operation for smallholder rural credit.

The commercial banks supported the large plantation sector in the late 1970s and early 1980s through recommendations of the Government and supported by the World Bank. By June 1995, the total plantation debt stood at K 295 million, with 56 percent from

² *Traditional land groups can secure recognition under the law by incorporating under the Act. This then gives them a legal and a management system that will enable them to participate in joint-ventures with investors, with their land being used as part of the capital resources for a development project.*

coffee, 29 percent from cocoa, 12 percent from coconut, and 3 percent from oil palm (QEB, 1995). Due to depressed commodity prices and failed crops during the early 1990s (and the Bougainville crisis), a large part of the plantation debt had to be written off by the banks, except those with clear government guarantees.

By June 2000, the plantation debt stood at K28.6 million with 70 percent to PNG Banking Corporation (QEB, 2000). The difficulties experienced by the commercial banks in recovering loans to the plantation sector would make it almost impossible for any future commercial lending to agriculture.

The recent experiences by two organisations in PNG with micro-credit schemes indicate an opportunity for external donors to support a new mechanism of credit supply to small farmers. The organisations: the Federation of Savings and Loans Societies, and the Abitore Trust and Liklik Dinau³ of Goroka give small loans of K 300-500 to their members with repayment period of 12 months. The Liklik Dinau has proved successful after 6 years of operations, and has recently been selected by PNG Banking Corporation to intermediate credit inputs to farmers involved in the AusAID/IFAD supported North Simbu Rural Development Project. The success of micro-credit schemes in the Asian region (the Grameen Bank of Bangladesh; the Village Banks of Bank Rakyat of Indonesia; Bank for Agriculture and Agricultural Cooperatives of Thailand) give credence to the potential success of the micro-credit schemes in PNG. Efforts in supplying micro-credit should therefore be supported in the future.

6.3 Institutional Strengthening

Public sector institutions to deliver agricultural support services have gone through a number of changes since Independence. Organisational responsibilities for technical, advisory and regulatory services are now spread across many institutions. The first devolution of functions of the NDAL occurred in 1982, when a World Bank funded review recommended that research and extension functions for the tree crops be transferred to industry boards and their institutions. The World Bank followed its recommendations with funding of the Agricultural Support Services Project (ASSP) in 1983-1987, aimed at strengthening NDAL in its new format, and to strengthen industry institutions to become self-sustaining. There were several terminal reports of the ASSP components, but this study was unable to access these from the departmental archives. As NDAL went through several reorganisations in 1987, 1992, and 1996, any impact of the ASSP support would be hardly noticeable today.

The corporatisation of the tree crops sector was a major policy directive of the Government in the early 1990s and by 1993, both CIC (coffee regulation, research and extension) and OPIC (oil palm extension) became statutory institutions in their own right. In 1996 and 1997, NARI and NAQIA were respectively created by legislation to take

³ Abitore Trust is an NGO providing support services to indigenous NGOs working in the microcredit sector and Liklik Dinau, an NGO in Goroka, working specifically in the field of microcredit. Liklik Dinau is based on the Grameen Bank model, and it started by providing service to women only.

over food crops and livestock research and quarantine functions respectively, from NDAL.

The focus of the Government in external donor assistance for agriculture since 1990 has also targeted the strengthening of institutions that make up the sector. The ADB Agricultural Research and Extension Project (AREP I) in 1992 was designed to boost capacity and capability of CIC, Cocoa Board, OPIC and their subsidiaries to carry out effective research and extension programmes. The AusAID projects: Agricultural Quarantine and Inspection Support Project, supporting NAQIA, and Australian Contribution to National Agricultural Research System Project, supporting NARI, were aimed at setting up the new institutions and develop staff and programme management abilities to sustain the organisations. Similarly, the technical and financial assistance by ACIAR in promoting collaborative research between PNG scientists and agricultural research institutions and Australian institutions and universities since the mid-1980s is aimed at strengthening local capacity for technology assessment and transfer. Often these joint research activities provide a two-way process of learning, as they are addressing local production problems but using Australian expertise to find remedies. In this way, effective linkages are established which would help facilitate technology transfer, and enhance local capacity to develop and sustain research effort.

Of all areas of agriculture that have received support through the various institutional support programmes, two areas of apparent neglect have been the food crops and livestock subsectors. Because the food crops sector is dominated by smallholders, it has remain an informal sector with no institutional capacity for extension or development. Although NARI has been entrusted with the responsibility to undertake food crops and livestock research, its link with extension and the farming communities involved in food production remains weak. Consequently, the livestock subsector remains the least developed and contributes no more than 10 percent of the agricultural GDP. The accompanying sets of statistics (Annexes 9-12) indicate that the demand for livestock products, particularly imported beef and sheep meats, is increasing with population growth. Unfortunately, apart from chicken and pork meat supplies, most of the meat demands is met by increasing imports. There is no institution created to address livestock development in PNG, although the Livestock Development Corporation (LDC) exists to manage the government-run abattoirs in Port Moresby, Lae and Goroka. The prospects of strengthening LDC with staff and funding for livestock research and development are not good in the medium term, without any change to its corporate status.

The devolution of functional powers of the lead agency, NDAL, to other sectoral institutions since mid-1980s has certainly weakened its ability to manage and coordinate the sector effectively. Its link with provinces and districts is not well defined, although its recent restructuring has created regional directorates aimed at formalising this linkages through participative planning and implementation of programmes. The Department must be strengthened in this regard, and the new AusAID Human Resources Development Project will hopefully address this requirement.

6.4 Capacity of Implementation

Several reviews of agricultural projects over the last decade have shown that while the growth in the public investment programme for agriculture has remain static, the ability of agencies to draw down on the available donor funds, has been poor. From the inventory of ongoing, past, and future projects given in Part II of this report, it is estimated that over the decade of the 1990s, a total of K 300 million was available from various donor sources listed. Although there are no accurate figures on total usage of donor funds, it is often cited that draw-downs on loan funds in particular, are the slowest. In some cases, only 50 percent of the funds are ever used before the project is wound up (ADB, 1994). One of the key areas of poor implementation is the capital works or infrastructure components of projects, referred to in section 6.1 above. Another source of delay is the limitation on recruitment of staff by the public service ceilings. The lack of counterpart funding from the GOPNG also slows down implementation resulting in poor project impact. The need to boost capacity in project implementation should therefore be a priority area of concern for the sector, and its institutions. Equally important, is the consideration by donors to boost local capacity to plan sound projects that are within institutional capacity of the agencies to fully implement.

7. FUTURE PROSPECTS

The agriculture sector is now at the crossroads. It must address the key issues that stand in the way of its commercialisation and its relative importance as a contributor to the national economy. The sector has been affected by the various reforms, both legal and institutional, over the last two decades. Its fragmentation by subsectors, commodities, political and administration levels does pose a huge management challenge for the Government and the agencies involved. Much of the institutional changes that have occurred were done with the view to achieve efficiency, profitability, sustainability, and ultimately, the modernisation of agriculture in PNG. In the following analysis, some areas for future focus by external donor assistance are outlined, as future prospects for enhancing growth in PNG agriculture. Although, there are other equally important areas of consideration, the following would provide the areas of immediate opportunity to achieve development and progress of the sector in the medium term.

7.1 Institutional Strengthening in the Provinces and Districts

The Organic Law has separated powers of agricultural extension, and field implementation between national agencies such as NDAL, and the provincial and district administrations. Reviews of the reform process since 1996 indicates varying successes in the implementation of political and administrative reforms. Further, agriculture extension is not a clearly demarcated functional area of undertaking at district level, and the resources (staffing and funds) are inadequate to effectively carry out any farmer service support programmes. The industry boards (coffee, cocoa, copra) have subsidiary organisations mandated to provide such support to extension programmes at district and local level, but do not have the financial resources to spread their coverage beyond the

major production areas. As a result, many remote communities have missed out on improved planting material, good husbandry advice, and sustainable sources of markets.

The urgent requirement is to boost capacity and capability at district level to provide essential agricultural business support services to farmers. This includes the provision of marketing advice and outlets, establishment of processing and value adding facilities, and advice on cropping and livestock intensification. Future public investment programmes should focus on the strengthening of linkages (through effective joint programmes) between provinces (perhaps in a region) to key national agencies such as NDAL and commodity boards. For instance, a regional programme on livestock may cover common species that are important to several provinces in that region. Hence, a regional programme on cattle in Momase region would be most appropriate as Morobe, Madang, East Sepik and Sandaun have substantial grassland areas which could be converted to grazing areas for several smallholder projects in any one locality. Such a project should involve the introduction of improved stock and pastures, as well as training support in animal husbandry for village farmers. To be successful, the farmers must also have an outlet for selling their animals timely, and at a profit. All this require an effective coordination of efforts by all relevant bodies to provide all necessities to achieve sound production and good returns to investment.

7.2 Addressing the Smallholder Needs

Smallholders produce virtually all the domestically produced food, and about 65-75 percent of all cash crops (GOPNG, 1996a). However, smallholder yields in PNG are low, and their productivity returns to land and labour are poor by international standards. Significant increases in the smallholders productivity will, therefore, be the most powerful and cost-effective engine for agricultural growth in PNG. However, rapid and sustainable improvements in smallholder agriculture is constrained by poorly functioning public sector support services institutions, and a limited technology and information base for long-term productivity improvements in most crops and subsectors of agriculture.

A comprehensive national policy is therefore required to set out the institutional framework and linkages, operational guidelines, and priorities for delivering and funding smallholder agricultural support services. The ongoing efforts to decentralise the delivery of agricultural support services to the front-line (provincial and district) agencies should be strengthened, deepened and better focused on smallholders. It is obvious, that at farm level, private sector participation can also enhance smallholders productivity. Accordingly, 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.

7.3 Widening the Export Base

PNG currently exports most of its cash crops in their primary form with no domestic downstream processing, except for coconut oil and palm kernel oil. The majority of cash crops grown in PNG suffer from periodic price fluctuations, and as price takers, PNG

growers output are too low to make any gains on the world market. Recent efforts to secure niche markets for organically grown products (e.g. coffee) have had mixed success and greater efforts should be made to increase the volumes of such products. Downstream processing of locally grown crops is therefore an option for future investment, and should be given higher priority by the relevant industries.

High value crops such as spices (chilies, vanilla) and essential oils (Japanese mint, pyrethrum) have been promoted, but have lacked the continuation of funding support and proper marketing strategies. Because of their high value for weight, the production of these commodities should be encouraged in future development programmes. They are suited to smallholder production systems in PNG, and can improve farmers cash flow and expand their sources of revenue.

7.4 Achieving National Food Security

It is estimated that annual domestic production of major food crops amounted to over 4 million tonnes with a farm-gate value of about US\$ 0.86 billion (GOPNG 2000a). Tuber and root crops dominate production, and they constitute 29 percent of the total energy supply, with local animal products contributing 15 percent. In 1993, it was estimated that 24 percent of the total energy supply for the PNG population came in the form of imported cereals. The value of these energy sources (rice and grains) and beef and sheep meat imports reached K 400 million in 1993 (GOPNG, 2000a). The relative decline in the value of the Kina since 1994 would put this import value higher than K 500 million annually.

The strategy to achieve national food security is well articulated in the National Food Security Policy. The framework for achieving the goals must be put to action immediately, and more particularly, at provincial level. Given the diversity of food resource base and the array of staple crops used in PNG, it is desirable that food security programmes be designed to suit the local situations (constraints and opportunities) to ensure sustainability and success. The National Policy provides sufficient guidance for individual provinces and districts to develop food security programmes based on their own resources and needs.

Achieving national food security is the most fundamental challenge for achieving growth in the agriculture sector, and future external interventions must consider this area of need, as a key national agenda.

II. FOREIGN ASSISTED AGRICULTURE AND LIVESTOCK SECTOR PROJECTS

1A: INVENTORY OF ONGOING, PAST AND FUTURE PROJECTS

Donor	Project	Region	Agency	Start	End	Cost	Sum page
AusAID	Cocoa Quality Project	National	CBPNG	1993	1995	K 10.0 mill	27
AusAID	Agricultural Quarantine & Inspection Support	National	NAQIA	1996	2001	K25.0 mill	28
AusAID	Biocontrol of Water hyacinth	Provinces	NDAL	1996	1998	K 1.5 mill	29
AusAID	Australian Contribution to National Agricultural Research System	National	NARI	1998	2001	K11.0 mill	30
AusAID	Human Resources Development	National	NDAL	2000	2003	A\$11.0 mill	31
AusAID	Rehabilitation of Sheep Breeding Stations	Provinces	NDAL	2000	2004	K 3.0 mill	32
ACIAR	Agricultural Research	National	NDAL	1995	2000	K10.0 mill	33
ACIAR	Cocoa Quality Improvement - Extension Phase 1	Provinces	CCRI	1998	2000	K 1.0 mill	34
ADB	Cocoa and Coconut Rehabilitation & Redevelopment	Province	NDAL	1989	1998	K25.0 mill	35
ADB	Oil Palm Extension	Provinces	OPIC	1992	1996	K25.0 mill	36
ADB	Agricultural Research and Extension Phase 1	National	NDAL	1992	1996	K25.0 mill	37
ADB	Provincial Smallholder Support Services	Provinces	NDAL	1999	2003	K16.0 mill	38
EU	Cocoa & Coconut Extension	Provinces	CCEA	1998	2000	K 3.0 mill	39
EU	Oil Palm Research	Provinces	OPRA	1998	2000	K 1.0 mill	40

Sources: Department of Planning and Implementation; Department of Agriculture and Livestock

1B. INVENTORY OF ONGOING, PAST AND FUTURE PROJECTS

Donor	Project	Region	Agency	Start	End	Cost	Sum page
EU	Coffee Quality Research	National	CIC	2000	2003	K 2.5 mill	41
EU	Cocoa and Coconut Research	National	CCRI	1997	1999	K 3.0 mill	42
EU	Coconut Beetle Control	National	CCRI	1999	2001	K 0.5 mill	43
EU	Bougainville Cocoa & Coconut Rehabilitation	Province	CCEA	2000	2002	K 6.3 mill	44
FAO	Special Programme for Food Security – Pilot Phase	Provinces	NDAL	1996	1999	K 1.5 mill	45
FAO	Special Programme for Food Security – Extension Phase	Provinces	NDAL	1999	2001	K 2.5 mill	46
GOJ	2KR	Provinces	NDAL	1996	1999	Yen 100 mill.	47
GOJ	Upgrading University Facilities	National	UNITECH and VUC	1997	1998	Yen 761 million	48
GOJ	Highlands Aquaculture Development Centre	Provinces	EHPA	1997	1999	Yen 200 million	49
NZODA	National Sheep Breeding	Provinces	NDAL	1985	1996	NZ\$15.0 mill	50
NZODA	Women in Agriculture Development Phase 1	National	NDAL	1995	1999	K 3.0 mill	51
NZODA	Agricultural Institution Strengthening	National	NDAL	1995	1999	K 5.0 mill	52
NZODA	Women in Agriculture Development Phase 2	National	NDAL	2000	2003	K 3.0 mill	53
JBIC	Rural Credit On-Lending	Provinces	RDB	1989	1999	K20.0 mill	54
PRC	Kandep Agriculture Station	Province	NDAL	1998	2000	K 3.0 mill	55
ROC	Taiwanese Mission in PNG	Provinces	NDAL	1993	2001	K10.0 mill	56
WB	Oro Oil Palm	Province	OPIC	1996	2000	K20.0 mill	57

Sources: Department of Planning and Implementation; Department of Agriculture and Livestock

2. FOREIGN DONOR ASSISTED AGRICULTURE AND LIVESTOCK PROJECTS SUMMARIES

2.1 SUMMARY OF FOREIGN AID ASSISTED AGRICULTURAL PROJECT

1. Title: Cocoa Quality Project	2. Region(s): National
3. Donor: AusAID	4. Implementing Agency(s): CBPNG
5. Cost: K10.0 million	6. Period: 1993-1995
7. Goal: To expand the international markets for PNG cocoa beans.	8. Purpose: To improve cocoa processing techniques that yield good export quality beans for premium prices.
9. Project Components: a) Cocoa processing studies; b) Publications of recommended techniques and other cocoa extension notes; c) Conduct of cocoa technology courses.	10. Expected Outputs a) Improved cocoa bean fermentation and drying techniques; b) Cocoa extension bulletins; c) Provincial 'trainers of trainers' in all cocoa growing provinces.
11. Beneficiaries: All cocoa growers, processors, and exporters in PNG.	
12. Current Status: The original project was terminated in October 1994, after the volcanic eruption in Rabaul. Only the component on processing was subsumed and continued by CCRI to the present, with European Union funding (see Project 2.16).	
13. Implementation Issues: The processing studies underwent several reviews by CCRI, as a result of staffing changes over the project period. The CCRI Board was also slow in giving this work priority.	

2.2 SUMMARY OF FOREIGN AID ASSISTED AGRICULTURAL PROJECT

1. Title: Agricultural Quarantine & Inspection Support	2. Region(s): National
3. Donor: AusAID	4. Implementing Agency(s): NAQIA
5. Cost : K 25.0 million	6. Period: 1996-2000
7. Goal: To strengthen the national agricultural quarantine and inspection service.	8. Purpose: To review the national quarantine and inspection service, and upgrade facilities, and improve manpower skills, and management of the service.
<p>9. Project Components:</p> <ul style="list-style-type: none"> (a) Upgrading of facilities, offices, and staff housing; (b) Review of quarantine procedures, legislation and regulations; (c) Technical training for staff; (d) Surveillance and control of exotic weeds, pests and diseases; (e) Eradication of feral cattle and buffalo. 	<p>10. Expected Outputs:</p> <ul style="list-style-type: none"> a) Improved technical facilities, offices and staff housing; b) Updated quarantine procedures, legislation and regulations; c) Better trained staff in all aspects of quarantine and inspection; d) Improved surveillance system for exotic weeds, pests and diseases; e) Feral herds of cattle and buffalo eliminated.
11. Beneficiaries: NAQIA and its personnel, farmers, exporters and importers, and agro-industries.	
12. Current Status: The project began under NDAL management. NAQIA subsumed the project on its establishment in 1997, and continued the project implementation to its end in December 2000. There is an option for extension by AusAID.	
13. Implementation Issues: The component on eradication of feral animals could not be implemented because of lack of support from the Department of East Sepik.	

2.3 SUMMARY OF FOREIGN AID ASSISTED AGRICULTURAL PROJECT

1. Title: Biocontrol of Water Hyacinth	2. Region(s): National
3. Donor: AusAID	4. Implementing Agency(s): NDAL
5. Cost: K 1.5 million	6. Period: 1996-1998
7. Goal: To keep PNG free from exotic weeds, pests and diseases.	8. Purpose: To eradicate the exotic Water Hyacinth from river systems of PNG, using biological control agents.
9. Project Components: a) Survey of Water Hyacinth infestations; b) Introduction of bio-agents (weevil and moth); c) Monitoring and evaluation.	10. Expected Outputs: a) Mapping of control areas; b) Control of Water Hyacinth spread throughout PNG; c) Trained staff in weed control.
11. Beneficiaries: The river based populations in the Sepik, Ramu, Purari and Fly River areas.	
12. Current Status: The releases of biological control agents in the main river systems have been done. The project ended in 1998, but monitoring of treated sites are continuing.	
13. Implementation Issues: The project was originally managed by NDAL. It was taken over by NARI in 1998, and has continued the support for monitoring of treated areas.	

2.4 SUMMARY OF FOREIGN AID ASSISTED AGRICULTURAL PROJECT

1. Title: Australian Contribution to the National Agricultural Research System	2. Region(s): National
3. Donor: AusAID	4. Implementing Agency(s): NARI
5. Cost: K 11.0 million	6. Period: 1998-2001
7. Goal: To strengthen the agricultural research management system in Papua New Guinea.	8. Purpose: To assist the development of NARI, its research planning, programme monitoring and evaluation capability, as the prime research institution for food crops and livestock.
9. Project Components: a) Strategic research planning; b) Crops and livestock development; c) Natural resources management; d) Scientific reporting and publication; e) Technical staff training.	10. Expected Outputs: a) A Master Research Plan for NARI; b) A sustainable crops and livestock research, and natural resource management programme; c) A cadre of skilled national scientists.
11. Beneficiaries: The National Agricultural Research System, and the food crops and livestock sub-sectors.	
12. Current Status: The project is on going, and is managed by an AusAID team based at NARI HQ in Lae.	
13. Implementation Issues: The project was affected by the uncertainty of NARI's future in 1999. The continuation of Government funding for the Institute in 2000 has allowed the project becoming fully operational.	

2.5 SUMMARY OF FOREIGN AID ASSISTED AGRICULTURAL PROJECT

1. Title: Human Resource Development	2. Region(s): National
3. Donor: AusAID	4. Implementing Agency(s): NDAL
5. Cost: A\$11.0 million	6. Period: 2000 – 2003
7. Goal: To develop human resource capacity and capability for the development of the agriculture sector in Papua New Guinea.	8. Purpose: To strengthen institutional capacity to develop and manage agricultural training and educational programs on a sustainable basis.
9. Project Component: a) Strengthening DAL capacity for manpower planning, coordination and management of in-service and farmer training; b) Strengthening capacity of Agricultural College and Universities; a) Developing regional and provincial training units for Training of Trainers; b) Management of service providers for HRD programmes.	10. Expected Outputs: a) Enhanced institutional capacity in NDAL and training institutions for HRD planning and programme implementation; b) Adequate supply of Trainers of Trainers at provincial and district level; c) Highly skilled manpower appropriate to needs of the sector; d) Increased productivity of farm labour.
11. Beneficiaries: Agricultural institutions, agricultural workers, farmers and their communities.	
12. Current Status: The project appeared in the 2000 Budget but commencement is deferred to July 2001.	
13. Implementation Issues: The project component may be varied under a current review by AusAID and the Government.	

2.6 SUMMARY OF FOREIGN AID ASSISTED AGRICULTURAL PROJECT

1. Title: Rehabilitation of Sheep Breeding Stations.	2. Region(s): Provinces
3. Donor: AusAID	4. Implementing Agency(s): NDAL
5. Cost: K3.0 million	6. Period: 2000 – 2004
7. Goal: To increase sources of rural income and improve nutritional and living standards of the rural communities.	8. Purpose: To increase distribution of improved breeds of sheep to smallholder farmers in PNG.
<p>9. Project Components:</p> <ul style="list-style-type: none"> (a) Rehabilitate sheep breeding stations at Launakalana (Central), Erap (Morobe) and Menifo (Eastern Highlands); (b) Introduce and quarantine imported eaves from selected countries; (c) Cross breeding and distribution of improve stock; (d) Sheep husbandry training for extension agents and farmers. 	<p>10. Expected Outputs:</p> <ul style="list-style-type: none"> (a) Increased stock for distribution to sheep farmers; (b) Adequate supply of skilled manpower in sheep husbandry practices; (c) Increased farm income; (d) Improved sources of protein in local diets.
11. Beneficiaries: Farmers and their communities.	
12. Current Status: The project is partly funded by AusAID with counterpart funding of K2 million from the European Union.	
13. Implementation Issues: The project is to jointly implement by the NDAL and the Livestock Development Corporation (LDC).	

2.7 SUMMARY OF FOREIGN AID ASSISTED AGRICULTURAL PROJECT

1. Title: Agricultural Research	2. Region(s): National
3. Donor: ACIAR	4. Implementing Agency(s): NARI, NDAL, UNITECH, CRI & NRI
5. Cost: K10.0 million	6. Period: 1995 – 2000
7. Goal: To contribute to solutions of constraints to agricultural production in Papua New Guinea.	8. Purpose: To support agricultural research aimed at addressing key problems in crops, livestock, and natural resource management in Papua New Guinea.
<p>9. Project Components: Currently there are 10 research projects with programmes implemented by the five (5) main institutions. The programs are aimed at:</p> <ul style="list-style-type: none"> (a) Addressing specific production constraints; (b) Provision of training for staff; (c) Promotion of collaboration between PNG and Australia in technical institutions. 	<p>10. Expected Outputs:</p> <ul style="list-style-type: none"> (a) Production constraints solved; (b) Research capacity and capability of the NARS are enhanced; (c) Institutional linkages are improved.
11. Beneficiaries: PNG agricultural research and technical institutions, research workers, farmers and the agricultural sector.	
12. Current Status: The ACIAR programs are funded outside the National Budget. The PNG programme was reviewed in a joint consultation between ACIAR and PNG partners in May 2000. The meeting concluded on new areas of research collaboration over the next 5 years.	
13. Implementation Issues: Projects are implemented jointly by PNG scientists/institutions and Australian Universities and research organisations commissioned by ACIAR.	

2.8 SUMMARY OF FOREIGN AID ASSISTED AGRICULTURAL PROJECT

1. Title: Cocoa Quality Improvement - Extension Phase	2. Region(s): Provinces
3. Donor: ACIAR	4. Implementing Agency(s): CCRI
5. Cost: K1.0 million	6. Period: 1998 – 2000
7. Goal: To enhance farmers' income and livelihood.	8. Purpose: To facilitate the adaptation and adoption of an improved drying technology for cocoa beans by farmers.
<p>9. Project Components:</p> <ul style="list-style-type: none"> (a) Fabrication and on-farm testing of CCRI Solar dryers in ENB and NSP; (b) Assessment of farmers environments and their responses to the new technology; (c) Survey of cocoa bean quality standards using the new solar dryers. 	<p>10. Expected Outputs:</p> <ul style="list-style-type: none"> (a) Confirmation of design type and sizes of solar dryers; (b) Recommendation of producing areas suitable for solar drying; (c) Policy and regulatory recommendations for industry considerations.
11. Beneficiaries: Cocoa farmers and the PNG cocoa industry.	
12. Current Status: ACIAR supplemented the AusAID funding in the original project (see 2.1), under its 'Development' financing arrangement in PNG.	
13. Implementation Issues: ACIAR therefore did not support 'research' into the problem, but facilitated the 'extension' of the technological package in the major cocoa growing provinces.	

2.9 SUMMARY OF FOREIGN AID ASSISTED AGRICULTURAL PROJECT

1. Title: ENB Cocoa/Coconut Rehabilitation Redevelopment	2. Region(s): Province
3. Donor: ADB	4. Implementing Agency(s): NDAL
5. Cost: K25.0 million	6. Period: 1989 – 1998
7. Goal: Improve incomes and livelihood of cocoa and coconut farmers in the East New Britain.	8. Purpose: To rehabilitate and redevelop cocoa and coconut farms in East New Britain to enhance their productivity.
9. Project Components: (a) Establishment of cocoa and coconut nurseries; (b) Rehabilitation of cocoa blocks and replanting; (c) Pest and disease control; (d) Credit financing, (e) Establishment of fermentaries and dryers; (f) Capital works program – extension centres, housing and road maintenance.	10. Expected Outputs: a) Increased cocoa and copra production and export earnings; b) Improve living standards of settlers and block holders; c) Model farmers identified; d) Improved infrastructural support services for farmers.
11. Beneficiaries: Cocoa and coconut farmers in East New Britain, and the two export industries.	
12. Current Status: The project ended in 1998.	
13. Implementation Issues: This project covered Warangoi and Vunapalading settlement schemes and only supported cocoa rehabilitation. The beetle pests of coconuts limited the coconut rehabilitation and redevelopment activities.	

2.10 SUMMARY OF FOREIGN AID ASSISTED AGRICULTURAL PROJECT

1. Title: Oil Palm Extension	2. Region(s): Provinces
3. Donor: ADB	4. Implementing Agency(s): Provinces
5. Cost: K25.0 million	6. Period: 1992 – 1996
7. Goal: Increase farmers' income and improve rural livelihood of villages.	8. Purpose: Provide extension advisory support to smallholder oil palm growers in the West New Britain, New Ireland, Oro and Milne Bay Province.
9. Project Components: a) Rehabilitation of oil palm extension centres in the production areas; b) Facilitate credit supply to small holders; c) Nursery establishment and planting material distribution; d) Management of replanting oil palm blocks; e) Training of extension personnel, capital works; f) Capital works programme – OPIC extension centres	10. Expected Outputs: a) Increased smallholder FFB production and income; b) Establishment of OPIC extension centres; c) Enhanced oil palm exports and revenue; d) Improved infrastructural support services for farmers.
11. Beneficiaries: Smallholder oil palm growers, and the oil palm industry.	
12. Current Status: Ongoing	
13. Implementation Issues: Capital infrastructure development was slow because of difficulties experienced with Department of Works.	

2.11 SUMMARY OF FOREIGN AID ASSISTED AGRICULTURAL PROJECT

1. Title: Agricultural Research and Extension Phase 1	2. Region(s): National
3. Donor: ADB	4. Implementing Agency(s): NDAL
5. Cost: K25.0 million	6. Period: 1992 – 1996
7. Goal: To improve productivity of the tree crops sector in Papua New Guinea.	8. Purpose: To support research and extension efforts in coffee, cocoa and oil palm during period of low commodity prices.
9. Project Components: a) Strengthening research in coffee, cocoa and oil palm; b) Strengthening coffee extension; c) Rehabilitation of research facilities and staff housing; d) Promotion of downstream processing; e) Development of coffee farming system.	11. Expected Outputs: a) Improved research facilities; b) Effective extension programs, c) Increased farmer productivity and income generation; d) Sustainable agricultural export base.
11. Beneficiaries: Coffee, cocoa and oil palm industries.	
12. Current Status: Project ended in 1995. During the project period, a second ADB/TA was commissioned to determine a Phase 2 to the project. ADB did not approve a new project as recommended by the TA study.	
13. Implementation Issues: The project proposed the establishment of a Project Monitoring Unit (PMU) in NDAL to coordinate present and future projects. The ever changing structure of NDAL did not allow a PMU to be created under this project.	

2.12 SUMMARY OF FOREIGN AID ASSISTED AGRICULTURAL PROJECT

1. Title: Provincial Smallholder Support Services	2. Region(s): Provinces
3. Donor: ADB	4. Implementing Agency(s): NDAL
5. Cost: K16.0 million	6. Period: 1999 – 2003
7. Goal: Improve support services to smallholder farmers, and thereby increase their agricultural productivity and income, and help to ensure the sustainability of their farming system.	8. Purpose: To pilot test a novel approach to providing agriculture support services on a contract basis, in Morobe and Eastern Highlands Provinces.
9. Project Components: a) Establishment of a support services contract facility (SSCF) in each of the two provinces to manage performance based service providers; b) Capacity building for agricultural staff at national, provincial, district and LLG levels, as well as for private service providers; c) Project coordination.	10. Expected Outputs: a) Extend contractual arrangements for service providers to other provinces; b) Improved capacity at all levels to provide support services to farmers; c) Formalise roles of service providers to complement Government agencies involved in agricultural development; d) Improve productivity and income of village-based farmers.
11. Beneficiaries: Smallholder household growing crops and livestock on less than 0.5 hectares of land. Other beneficiaries are agricultural staff at different levels, and service providers.	
12. Current Status: The project activities in the two provinces is co-funded by the respective Provincial Governments.	
13. Implementation Issues: A joint Government/ADB team working within NDAL manages the project at national level. A Provincial coordinator supports the management team at the provincial level.	

2.13 SUMMARY OF FOREIGN AID ASSISTED AGRICULTURAL PROJECT

1. Title: Cocoa and Coconut Extension	2. Region(s): Provinces
3. Donor: European Union	4. Implementing Agency(s): CCEA
5. Cost: K3.0 million	6. Period: 1998 – 2000
7. Goal: To increase productivity and levels of income of cocoa and coconut farmers, and contribute to the improvement of lifestyles in rural villages.	8. Purpose: To provide an effective and efficient industry based extension service that maximises rural household income through production of good quality cocoa and copra.
9. Project Components: a) Conduct of crop technology training for extension staff and farmers; b) Coordinate establishment of provincial nurseries and distribution of improved seeds; c) Advice on rehabilitation programmes in old cocoa and coconut stands; d) Advice on improving processing techniques and facilities; e) Facilitation of credit to farmers.	10. Expected Outputs: a) Well trained extension specialists; b) Efficient supply of planting material to farmers in all producing areas; c) Increased replantings with new improved cocoa and coconut material; d) Better processing facilities (dryers) to yield quality cocoa beans and copra; e) Productive cocoa and coconut farms as basis for sustainable smallholder businesses.
11. Beneficiaries: Smallholder cocoa and coconut growers and producers in PNG, and extension personnel of CCEA.	
12. Current Status: The project funding supplements the extension funds (levy) provided by the Cocoa and Copra Boards.	
13. Implementation Issues: The CCEA activities in the Provinces/Districts are co-financed and staffed by respective Provincial administrations through standing MOUs.	

2.14 SUMMARY OF FOREIGN AID ASSISTED AGRICULTURAL PROJECT

1. Title: Oil Palm Research	2. Region(s): Provinces
3. Donor: European Union	4. Implementing Agency(s): OPRA
5. Cost: K1.0 million	6. Period: 1998 – 2000
7. Goal: To improve yields of oil palm in PNG, so as to increase monetary benefits to growers.	8. Purpose: To undertake applied research in oil palm in the following areas: (i) to carry out surveys of pests and diseases of oil palms; and (ii) to determine control measures of these pathogens on palms.
<p>9. Project Components:</p> <p>a) Pests surveys in oil palm areas; b) Pathological surveys and control strategy of Ganoderma root rot disease on palms in Milne Bay.</p>	<p>10. Expected Outputs:</p> <p>a) Strategy for an improved integrated pest management; b) New method of screening resistance to Ganoderma disease; c) Strategy for an integrated disease management method.</p>
11. Beneficiaries: Oil palm growers and producers, and the industry.	
12. Current Status: The project is on-going.	
13. Implementation Issues: The project allowed an OPRA scientist to collaborate with an international laboratory facility, in the search for a control of the pathogen.	

2.15 SUMMARY OF FOREIGN AID ASSISTED AGRICULTURAL PROJECT

1. Title: Coffee Quality Research	2. Region(s): National
3. Donor: European Union	4. Implementing Agency(s): CIC
5. Cost: K2.5 million	6. Period: 2000 – 2003
7. Goal: To improve production and quality of PNG coffee.	8. Purpose: Undertake applied research on crop improvement in coffee, and extend appropriate technological packages to improve coffee quality and productivity.
9. Project Components: a) Catimor varietal evaluation and release; b) Chemical flavour assessment; c) Extension of techniques for achieving high export coffee quality.	10. Expected Outputs: a) Varietal recommendations for smallholder plantings; b) Coffee quality standards set; c) Improved processing techniques and procedures for coffee.
11. Beneficiaries: Coffee growers, and the industry at large.	
12. Current Status: The project is on-going.	
13. Implementation Issues: The activities are implemented by CIC's research arm, the Coffee Research Institute.	

2.16 SUMMARY OF FOREIGN AID ASSISTED AGRICULTURAL PROJECT

1. Title: Cocoa and Coconut Research	2. Region(s): National
3. Donor: European Union	4. Implementing Agency(s): CCRI
5. Cost: K3.0 million	6. Period: 1997 – 1999
7. Goal: To improve productivity and quality of cocoa and copra produced by smallholders in PNG.	8. Purpose: To undertake applied research in: (a) cocoa and copra quality improvement; (b) cocoa and coconut husbandry practices.
9. Project Components: a) Cocoa quality assessment; b) Cocoa and coconut farming systems.	10. Expected Outputs: a) Improved processing technique for quality cocoa beans; b) Improved cocoa and coconut husbandry practices.
11. Beneficiaries: Cocoa and coconut farmers in PNG.	
12. Current Status: The project is on-going and supplements financial support from Cocoa and Copra Boards.	
13. Implementation Issues: The project supports activities commenced in previous projects (see 2.1 and 2.8).	

2.17 SUMMARY OF FOREIGN AID ASSISTED AGRICULTURAL PROJECT

1. Title: Coconut Beetle Control	2. Region(s): National
3. Donor: European Union	4. Implementing Agency(s): CCRI
5. Cost: K0.5 million	6. Period: 1999 – 2001
7. Goal: To alleviate effects of pest incidence on coconut plantings for improved yields and returns to farmers.	8. Purpose: To develop an integrated pest management strategy to reduce the effects of beetle pests on coconuts.
9. Project Components: a) Conduct beetle pest control studies in in-situ and in laboratories; b) Field tests control measures in farmers fields; c) Develop collaboration with international (CIRAD) laboratories.	10. Expected Outputs: a) Integrated pest management strategy for coconut beetle pests; b) Establish long-term linkages with overseas scientific organisations.
11. Beneficiaries: Coconut growers in PNG.	
12. Current Status: This is a major on-going research work. The project supplements funding support from the Copra Marketing Board.	
13. Implementation Issues: The project is being jointly implemented by CCRI scientists and CIRAD experts from France. The results so far indicate that a major break-through has been achieved at CCRI, in reducing the effects of the beetles on coconut palms.	

2.18 SUMMARY OF FOREIGN AID ASSISTED AGRICULTURAL PROJECT

1. Title: Bougainville Cocoa & Coconut Rehabilitation	2. Region(s): Provinces
3. Donor: European Union	4. Implementing Agency(s): CCEA
5. Cost: K6.3 million	6. Period: 2000 – 2002
7. Goal: To improve income-generating opportunities of Bougainvillean farmers in order to sustain their livelihood and contribute to restoration of peace in the communities.	8. Purpose: To rehabilitate cocoa and coconut plantings on Bougainville and improve processing and marketing facilities in all areas.
9. Project Components: a) Rehabilitation and redevelopment programme; b) Farmer training in crop husbandry practices; c) Repair and re-establish copra and cocoa processing facilities; d) Provision of extension services.	10. Expected Outputs: a) Replantings of 20 million cocoa trees, and 1.5 million coconut palms; b) Restoration of over 2,000 cocoa dryers and fermentaries and 1,000 copra dryers; c) Trained staff at all levels of production; d) Provision of an effective extension service.
11. Beneficiaries: The smallholder farmers on Bougainville.	
12. Current Status: The project is part of the on-going EU funded programme for restoration on Bougainville.	
13. Implementation Issues: The project is managed on-site by a Project coordinating team based in Buka. CCEA HQ in Madang provides advisory support and overall monitoring and evaluation.	

2.19 SUMMARY OF FOREIGN AID ASSISTED AGRICULTURAL PROJECT

1. Title: Special Programme for Food Security – Pilot Phase	2. Region(s): Provinces
3. Donor: FAO	4. Implementing Agency(s): NDAL
5. Cost: K1.5 million	6. Period: 1996 – 1999
7. Goal: To improve food security in the PNG households.	8. Purpose: To establish a Special Program for Food Security in the Markham Valley – a Pilot Phase to promotion of food security throughout the nation
<p>9. Project Components:</p> <ul style="list-style-type: none"> a) Constraints analysis of the farming systems; b) Diversification and integration of small livestock/inland fisheries into the local farming systems; c) Construction and development of small irrigation schemes. 	<p>10. Expected Outputs:</p> <ul style="list-style-type: none"> a) Establishment of model farms; b) Farmers, extension officers trained in crop, livestock and inland fish production; c) Portable irrigation systems introduced; d) Mechanised tilling and processing adapted for local crops; e) Increased food supply in rural areas.
11. Beneficiaries: Rural villagers living on their own land.	
12. Current Status: The pilot phase of the Special Food Program for Food Security was reviewed by FAO with recommendations for a follow-up “Extension Phase”.	
13. Implementation Issues: The project sites were venues for the National Celebrations of the World Food Day (16 October) in 1997 and 1998. The project was coordinated by NDAL with technical backstopping provided by FAO and UNDP.	

2.20 SUMMARY OF FOREIGN AID ASSISTED AGRICULTURAL PROJECT

1. Title: Special Programme for Food Security – Extension phase	2. Region(s): Provinces
3. Donor: FAO	4. Implementing Agency(s): NDAL
5. Cost: K2.5 million	6. Period: 1999 – 2001
7. Goal: To improve food security in the PNG households	8. Purpose: To extend the Special Food Program for Food Security to other provinces under the “South-South Cooperation” programme of FAO.
<p>9. Project Components:</p> <ul style="list-style-type: none"> a) Constraints analysis of the local farming systems; b) Diversification and integration of crops and livestock; c) Training of farmers and extension staff for expansion within a province or community. 	<p>10. Expected Outputs:</p> <ul style="list-style-type: none"> a) Establishment of model farms; b) Farmers, extension officers trained in crop and livestock production; c) Portable irrigation systems introduced; d) Mechanised tilling and processing adapted for local crops; e) Increased food supply throughout PNG.
11. Beneficiaries: Rural villages throughout PNG.	
12. Current Status: The Extension Phase would involve the participation of about 100 experts selected from a developing country (Philippines) and located in targeted areas over an initial period of 3 years. FAO would finance the technical backstopping, but the main programme would have to be financed separately. A donor has yet to be secured for the second phase of the PNG program.	
13. Implementation Issues: As more trained personnel are employed in targeted areas, the Program would become localised in the Districts and LLG areas.	

2.21 SUMMARY OF FOREIGN AID ASSISTED AGRICULTURAL PROJECT

1. Title: 2KR	2. Region(s): Provinces
3. Donor: GOJ	4. Implementing Agency(s): NDAL
5. Cost: Yen 100 million	6. Period: 1996 – 1999
7. Goal: To promote food self-sufficiency and well being of rural households.	8. Purpose: To establish a cooperative service among farmers to boost agricultural production.
9. Project Components: a) Sale of imported fertilisers; b) Organisation of farmers.	10. Expected Outputs: a) Organized growers cooperative; b) Provision of service to farmers.
11. Beneficiaries: Farmers in the targeted areas.	
12. Current Status: A total of 1009 metric tonnes of fertiliser were sold, and the total funds of K 401,445.37 were deposited in a Project Trust Fund. The NDAL's efforts to secure additional GOPNG funds to augment 2KR proceeds were to no avail.	
13. Implementation Issues: The original project objectives could not be realised in time due to limited implementation capacity of NDAL and lack of counterpart funds.	

2.23 SUMMARY OF FOREIGN AID ASSISTED AGRICULTURAL PROJECT

1. Title: Upgrading University Facilities	2. Region(s): National
3. Donor: GOJ	4. Implementing Agency(s): UNITECH and VUC
5. Cost: Yen 761 million	6. Period: 1997-1998
7. Goal: Improve university education and human resource development in agriculture.	8. Purpose: Upgrade university facilities and equipment for effective teaching.
9. Project Components: a) Procurement of equipment; b) Supervision of installation.	10. Expected Outputs: a) Improved teaching equipment; b) Enhanced university education.
11. Beneficiaries: The students and staff of UNITECH and VUC.	
12. Current Status: The project was managed by Maruben Corporation of Japan. The installation of equipment at the two tertiary institutions was completed in March 1998.	
13. Implementation Issues: Nil.	

2.24 SUMMARY OF FOREIGN AID ASSISTED AGRICULTURAL PROJECT

1. Title: Highlands Aquaculture Development Centre	2. Region(s): Highland Provinces
3. Donor: GOJ	4. Implementing Agency(s): EHPA
5. Cost: Yen 200 million	6. Period: 1997-1999
11. Goal: To improve human nutrition and rural income.	8. Purpose: To promote aquaculture development in the Highlands region as a way to diversify income sources and achieve balanced nutrition.
<p>9. Project Components:</p> <ul style="list-style-type: none"> a) Establishment of aquaculture facility, b) Introduction of selected fish species; c) Breeding and distribution of fish fingerlings; d) Training of PNG counterpart staff; e) Provision of equipment and vehicle. 	<p>10. Expected Outputs:</p> <ul style="list-style-type: none"> a) Highlands Aquaculture Development Centre established at Aiyura; b) Aquaculture farms established throughout the Highlands region; c) Trained technicians for the development of in-land fisheries; d) Improved rural income and nutrition.
11. Beneficiaries: Rural population of the Highlands region.	
12. Current Status: The project was originally proposed by the then Dept. of Fisheries and Marine resources in 1994. The National Fisheries Authority did not continue with the project, and the Eastern Highlands Provincial Administration (EHPA) assumed responsibility for the project in 1996. Two long-term JICA experts, and 6 short-term technicians were attached to the project until 1998, and 6 national staff trained in Japan and Philippines.	
13. Implementation Issues: The project was implemented under the Mini-Project type technical Cooperation Scheme. Despite its positive outputs documented so far, the project's continuation is hampered by lack of counterpart funding from EHPA. It has been proposed by JICA and DNPI that NDAL and NARI become involved in the future aquaculture activities at Aiyura.	

2.25 SUMMARY OF FOREIGN AID ASSISTED AGRICULTURAL PROJECT

1. Title: Sheep Breeding Programme	2. Region(s): Highlands Provinces
3. Donor: NZODA	4. Implementing Agency(s): NDAL
5. Cost: NZ\$ 15 million	6. Period: 1985-1996
7. Goal: To provide an alternative income source of smallholders, and improve the nutritional status of the village people.	8. Purpose: To improve the genetic breeds of sheep in PNG, and increase the breeding stock for distribution to small farmers.
9. Project Components: a) Importation of 3000 animals from NZ; b) Crossbreeding with and within local breeds; c) Establishment of breeding and stock distribution centres; d) Staff and farmer training in sheep husbandry.	10. Expected Outputs: a) Development of a "Highlands half-bred" dual purpose sheep for meat and wool; b) Increased sheep farming in the Highlands and mid-altitude areas; c) Increased local sheep meat production to reduce imports.
11. Beneficiaries: The rural population in the targeted provinces.	
12. Current Status: The project ended in 1996. It is estimated that the current sheep population in PNG is around 10,000 heads.	
13. Implementation Issues: The project had moderate success. Breeding and distribution of stock from provincial centres was expensive, and extension support was poor. Consequently, farmers trained in New Zealand were unable to adapt knowledge and practices of sheep rearing to the PNG situation.	

2.26 SUMMARY OF FOREIGN AID ASSISTED AGRICULTURAL PROJECT

1. Title: Women in Agriculture Development Phase 1	2. Region(s): National
3. Donor: NZODA	4. Implementing Agency(s): NDAL
5. Cost: K 3.0 million	6. Period: 1995-1999
7. Goal: Enhance women's participation in agricultural development.	8. Purpose: To increase opportunities for women to undertake tertiary education in agriculture.
9. Project Components: a) Provision of scholarships for women to agricultural colleges and Universities; b) Development of curriculum and field training for women farmers.	10. Expected Outputs: a) 30 women with Certificates and Diplomas in Tropical Agriculture annually; b) 5 women with Degrees in Agriculture annually.
11. Beneficiaries: Women in Papua New Guinea	
12. Current Status: NZDOA support ended in 1999. The project is continuing with GOPNG support.	
13. Implementation Issues: The law and order situation in Mt. Hagen lowered the number of potential women scholars enrolling for the Post-Certificate Diploma at Hagen Agricultural College.	

2.27 SUMMARY OF FOREIGN AID ASSISTED AGRICULTURAL PROJECT

1. Title: Agricultural Institutional Strengthening	2. Region(s): National
3. Donor: NZODA	4. Implementing Agency(s): NDAL
5. Cost: K 5.0 million	6. Period: 1995-1999
7. Goal: To develop human resources in the agriculture sector.	8. Purpose: To upgrade training facilities, and improve technical skills of personnel in the agriculture sector.
9. Project Components: a) Curriculum development for inservice training at Hagen Agricultural College; b) Postgraduate training for staff at Vudal University College; c) Redevelopment of the college farms.	10. Expected Outputs: a) Curriculum for inservice training; b) Improved teaching staff at VUC; c) Fully trained farm managers; d) Productive, efficient and profitable college farms.
11. Beneficiaries: Staff, students, and graduates of Hagen Agriculture and Vudal University Colleges.	
12. Current Status: The NZDOA support ended in 1999. The project continued in 2000 with AusAID bridging finance. The VUC components are to continue in 2001.	
13. Implementation Issues: The law and order situation affected the development of the HAC College Farm. The financing of the programme by AusAID was managed by UniQuest of Queensland in 2000.	

2.28 SUMMARY OF FOREIGN AID ASSISTED AGRICULTURAL PROJECT

1. Title: Women in Agriculture Development Phase 2	2. Region(s): National
3. Donor: NZODA	4. Implementing Agency(s): NDAL
5. Cost: K5.0 million	6. Period: 1995 –1999
7. Goal: To promote the importance of the role of women in PNG agriculture.	8. Purpose: To establish a facilitating unit in NDAL to coordinate women interaction and linkages at national, provincial and district level, in an effort to mobilise women participation in all facets of agricultural development.
9. Project Components: a) Conduct national and regional forums for women; b) Establish an action plan for guiding national activities and linkages with provincial programmes; c) Formulate training for women trainers; d) Establish nodal points at provincial level.	10. Expected Outputs: a) A national action plan for women in agricultural development; b) Established liaison offices and key contacts in provinces; c) A fully mapped out training programme for women in agriculture.
11. Beneficiaries: Women involved in agriculture throughout PNG.	
12. Current Status: The project commenced in 1999 but did not achieve any target set. Its continuation is considered a priority by NDAL.	
13. Implementation Issues: A key issue is lack of staff at NDAL. Four positions exist under the project as approved by Department of Personnel Management.	

2.29 SUMMARY OF FOREIGN AID ASSISTED AGRICULTURAL PROJECT

1. Title: Rural Credit On – Lending	2. Region(s): Provinces
3. Donor: JIBC	4. Implementing Agency(s): RDB
5. Cost: K20.0 million	6. Period: 1989 – 1999
7. Goal: To increase agricultural inputs to boost production and productivity of smallholder farmers.	8. Purpose: To provide a credit facility to cocoa and oil palm smallholders in East and West New Britain Provinces.
9. Project Components: a) Provision of credit facility for cocoa and oil palm growers; b) Institutional strengthening of RDB.	10. Expected Outputs: a) Productive smallholder farmers with raised income levels; b) Trained staff in rural credit facilitation and loan recovery.
11. Beneficiaries: Smallholder farmers in East and West New Britain Provinces.	
12. Current Status: JIBC Loan facility expired in April, 1999. The funding was continued by the Bank in 2000, but only for oil palm growers in WNB.	
13. Implementation Issues: The closure of the ADB project – ENB Cocoa and Coconut Rehabilitation and Redevelopment in 1998 (see Project 2.9), terminated access to further credit supply by cocoa and coconut growers in East New Britain.	

2.30 SUMMARY OF FOREIGN AID ASSISTED AGRICULTURAL PROJECT

1. Title: Kandep Agriculture Station	2. Region(s): Province
3. Donor: PRC	4. Implementing Agency(s): NDAL
5. Cost: K3.0 million	6. Period: 1989 – 1999
7. Goal: To expand agricultural opportunities for farmers in the high altitude areas of the Highlands.	8. Purpose: To establish an Agricultural Research and Extension Station to promote potential high altitude crops and livestock to the farming community in the Kandep Valley.
9. Project Components: a) Establishment of the Station with relevant facilities for agricultural production and processing; b) Introduce and test potential food and fruit crops and livestock; c) On-farm production and processing; d) Training for farmers and extension agents.	10. Expected Outputs: a) A modern R & D facility; b) Selected varieties of crops and livestock for distribution in high altitude areas; c) Processing facilities for farmers produce; d) Trained local technicians to take over the Station.
11. Beneficiaries: The rural population in the Kandep Valley, and similar high altitude areas of the PNG Highlands.	
12. Current Status: The project is co-funded by GOPNG and the Open Member of Parliament for Kandep. The project support by the Chinese Government is being reviewed.	
13. Implementation Issues: The capital works programme by the GOPNG was delayed by a year, but all facilities are now established. The project has a resident team of Chinese experts on-site, but NARI is expected to take over the project and the responsibility for funding in 2001.	

2.31 SUMMARY OF FOREIGN AID ASSISTED AGRICULTURAL PROJECT

1. Title: Taiwanese Mission in PNG	2. Region(s): Provinces
3. Donor: ROC	4. Implementing Agency(s): NDAL
5. Cost: K10.0 million	6. Period: 1993 – 2001
7. Goal: To promote commercial agricultural production systems amongst smallholders in PNG, to achieve self-sufficiency and food security.	8. Purpose: To establish model farms in farming communities to increase farmers' participation in commercial agriculture.
9. Project Components: a) Vegetable production systems; b) Rice and grain cultivation; c) Seed multiplication and distribution; d) Processing, packaging and marketing.	10. Expected Outputs: a) Model smallholder commercial farms; b) Release of improved varieties of vegetables, fruits, rice and grains; c) Processed and packaged rice for local consumption.
11. Beneficiaries: Smallholders and villagers in the Markham and Central Provinces	
12. Current Status: The project operates under a series of three-year agreements between ROC (On Taiwan) and GOPNG. The current agreement expires in October 2001.	
13. Implementation Issues: The ROC technical team operates two units; one at Bubia and another at Laloki, but working very much independently of NDAL.	

2.32 SUMMARY OF FOREIGN AID ASSISTED AGRICULTURAL PROJECT

1. Title: Oro Oil Palm	2. Region(s): Provinces
3. Donor: World Bank	4. Implementing Agency(s): OPIC
5. Cost: K20.0 million	6. Period: 1996 – 2000
7. Goal: To expand smallholder oil palm cultivation, create employment and income generation for rural people, as well as providing the basis for increased export income.	8. Purpose: To provide extension support to smallholder oil palm producers, to improve their production capacity, and marketing of their produce.
9. Project Components: a) Supply of improved plating material; b) Field management training for farmers and extension staff; c) Provision of credit for smallholders.	10. Expected Outputs: a) Productive smallholder oil palm blocks; b) Better trained farmers and extension staff; c) Increased income for growers and processors.
11. Beneficiaries: Smallholder oil palm growers and producers in Oro.	
12. Current Status: This project is on-going.	
13. Implementation Issues: OPIC management is supported by the project to render similar services to smallholders in New Ireland and Milne Bay.	

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**IV. ANNEXURES: MAJOR AGRICULTURE AND LIVESTOCK
RELATED STATISTICS**

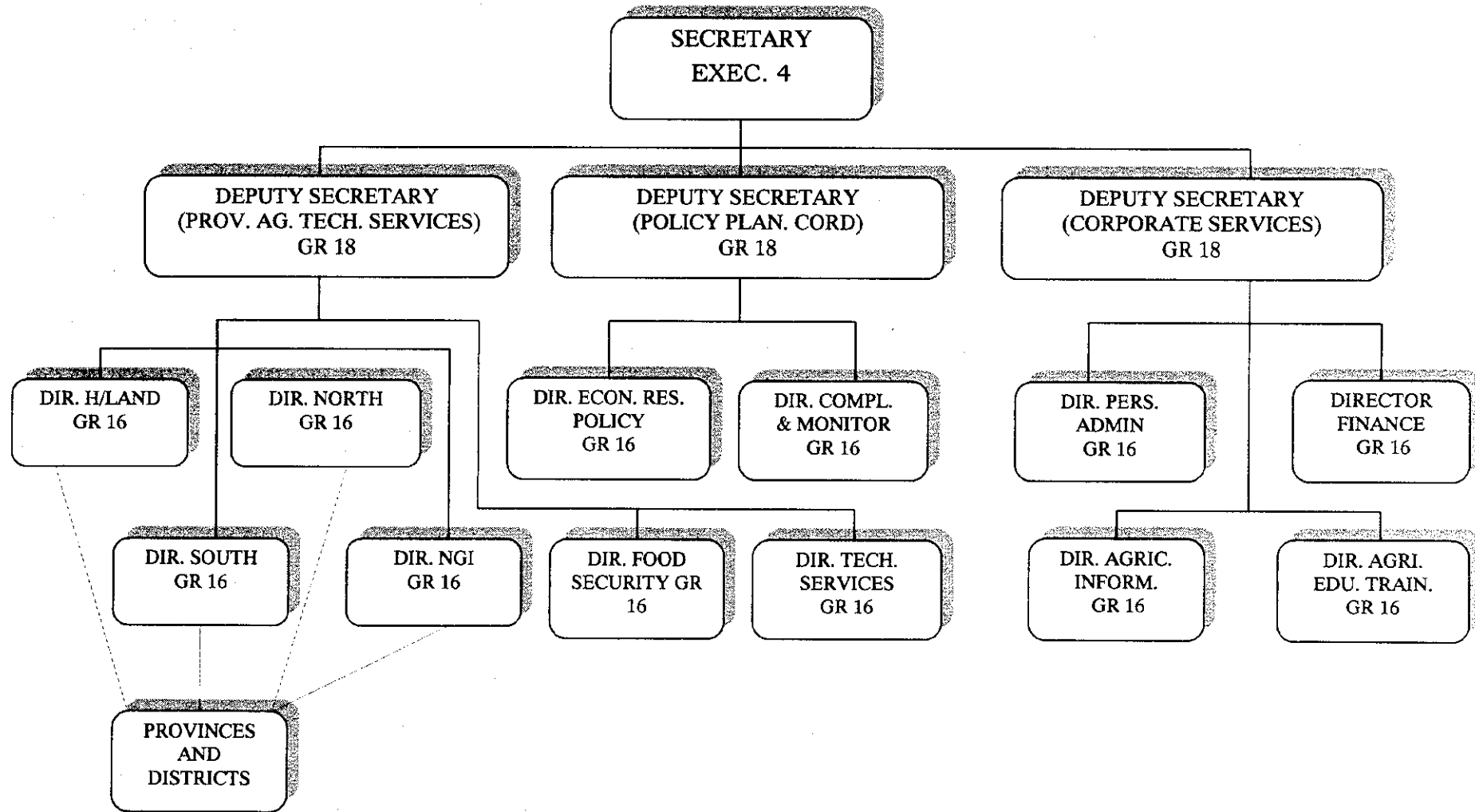
Annex 1: Papua New Guinea Human Development Indices@

	Population 1996	Growth Rate (%)	Life Expectancy (Years)	Gross Enrolment Ratio (Grd 1-12)	Adult Literacy (%)	Real Domestic Factor Income (Kina per capita)	HDI	GDI	GEM	HDepl
Papua New Guinea	4,326,625	2.3	54	47	45	994.0	0.363	0.318	0.177	43.7
Provinces										
Western	135,408	3.5	55	56	67	1,829.0	0.472	0.381	0.187	32.2
Gulf	71,685	0.7	46	56	61	381.0	0.331	0.312	0.196	40.0
Central	152,245	1.9	57	58	66	481.0	0.408	0.384	0.213	30.9
National Capital District	57,732	4.7	60	46	81	6,091.0	0.758	0.506	0.275	14.5
Milne Bay	181,185	2.2	53	51	77	758.0	0.420	0.387	0.204	31.4
Oro	110,107	2.2	56	45	63	532.0	0.386	0.356	0.255	36.5
South Highlands	380,042	3.0	52	36	24	625.0	0.274	0.244	0.132	56.7
Enga	292,356	3.7	51	32	30	737.0	0.283	0.243	0.143	52.4
Western Highlands	388,247	2.4	55	37	23	490.0	0.282	0.261	0.188	55.5
Simbu	187,188	0.3	56	64	26	417.0	0.320	0.298	0.177	54.1
Eastern Highlands	315,431	0.8	56	56	25	709.0	0.325	0.297	0.200	53.9
Morobe	428,581	2.0	53	49	52	1,240.0	0.389	0.330	0.208	39.3
Madang	282,072	1.8	54	47	46	505.0	0.366	0.313	0.199	43.4
East Sepik	276,661	1.4	53	46	36	449.0	0.304	0.282	0.212	47.3
Sandaun	157,756	2.1	46	47	30	607.0	0.262	0.234	0.144	60.0
Manus	37,700	2.3	57	67	63	634.0	0.421	0.393	0.162	39.4
New Ireland	102,914	2.8	57	55	61	493.0	0.396	0.376	0.216	36.6
East New Britain	226,068	3.4	56	52	73	833.0	0.431	0.395	0.203	31.8
West New Britain	163,530	3.9	56	55	61	595.0	0.394	0.368	0.191	31.9
Bougainville	173,717	1.9	-	41	-	-	-	-	-	-

Source: Papua New Guinea Human Development Report, 1998

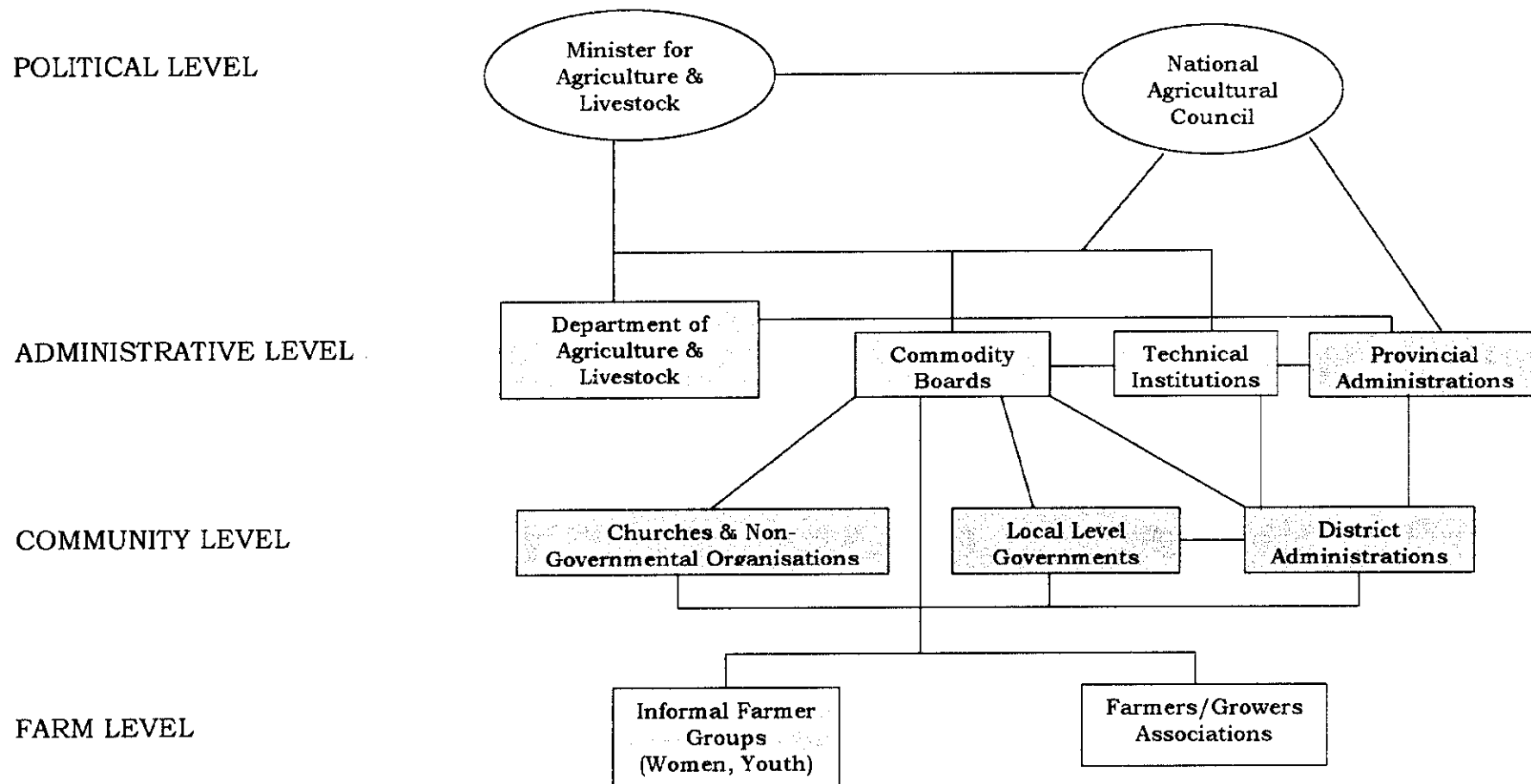
@HDI = Human development index (average of life expectancy index, educational index, and domestic factor income index); GDI = Gender-related Development Index (average of indices as in GDI but income separated for females and males); GEM = Gender Empowerment Measure (relative measure of empowerment of women and men in political and economic spheres of activity); HDepl = Human Deprivation Index (measure of deprivation in three essential elements of human life – longevity, knowledge, and a decent level of living); Gross Enrolment Ratio = (aggregate percentage of students transiting from elementary to primary, and primary to secondary grades); Real Domestic Factor Income = (total income and benefits from public and private sectors, and earnings from subsistence and semi-subsistence activities).

Annex 2: Management Structure of the Department of Agriculture and Livestock (Approved: 18.01.01)



Source: Department of Personnel Management

Annex 3: Management Structure of the Agriculture and Livestock Sector in Papua New Guinea



Source: Department of Agriculture and Livestock

**Annex 4a: Recurrent Expenditure Budget for Agriculture and Livestock Sector
in 1998-2000 (in Millions of Kina)**

Main Programs/Executing Agencies	Actual	Actual	Appropriation
	1998	1999	2000
TOTAL	19.3	8.1	13.2
247 Department of Agriculture & Livestock	8.7	8.1	9.5
543 Rural Development Bank	3.4	0	0
550 Cocoa & Coconut Extension Agency	0	0	0
552 Oil Palm Research Association	0	0	0
553 Fresh Produce Development Company	0	0	0
544 Coffee Industry Corporation	0.7	0	0
555 Cocoa & Coconut Research Institute	0.5	0	1
559 PNG Oil Palm Industry Corporation	1.5	0	0
562 National Agricultural Research Institute	2.8	0	1.9
563 National Agricultural Quarantine & Inspection Authority	1.7	0	0.8
564 Copra Marketing Board	0	0	0
Total Economic Sector	134	81.3	124.7
TOTAL RECURRENT	2964.6	3076.4	3759.4

Source: Department of Treasury

**Annex 4b: Development Expenditure Budget for Agriculture and Livestock
Sector in 1998-2000 (in Millions of Kina)**

Main Programs/Executing Agencies	Actual	Actual	Appropriation
	1998	1999	2000
TOTAL	18.1	26.5	24.6
247 Department of Agriculture & Livestock	2.2	10.4	4.9
543 Rural Development Bank	2.8	0.7	1
550 Cocoa & Coconut Extension Agency	1.4	1	0.8
552 Oil Palm Research Association	0.6	0.3	0.2
553 Fresh Produce Development Company	1.4	1.4	1.3
544 Coffee Industry Corporation	0	0	0.6
555 Cocoa & Coconut Research Institute	0.1	1.2	1.3
559 PNG Oil Palm Industry Corporation	1.1	4.9	3.4
562 National Agricultural Research Institute	4.3	4.5	7.7
563 National Agricultural Quarantine & Inspection Authority	4.2	2	3.4
564 Copra Marketing Board	0	0.1	0
Total Economic Sector	279.4	518.2	290.4
TOTAL DEVELOPMENT	502.3	861.5	903.4
TOTAL EXPENDITURE BUDGET	3466.9	3937.9	4662.8

Source: Department of Treasury

**Annex 4c: Summary of Recurrent Budget of Department of Agriculture & Livestock
by Programs (in Thousands of Kina)**

	Description	Actual	Actual	Appropriation
		1998	1999	2000
M.PROGRAM	AGRICULTURAL AND LIVESTOCK SERVICES	8,717.90	8,000.00	9,492.90
PROGRAM	POLICY FORMULATION & GENERAL ADMINISTRATION	2,824.20	4,870.90	3,736.60
ACTIVITY	Top Management, Auditing and Performance Evaluation	627.6	658	782.5
ACTIVITY	Audit Finance and General Administration Services	1,425.00	3,596.90	2,100.60
ACTIVITY	Planning, Programming and Budgeting	771.5	616	852.4
PROGRAM	TRAINING AND EXTENSION SERVICES SUPPORT	1,080.00	1,813.60	1,409.60
ACTIVITY	Co-ordination Services & Production of Training and Extension Materials	374.1	282.2	381.4
ACTIVITY	Inservice Training Operations	645.7	1,466.40	1,028.10
ACTIVITY	Staff Training and Development	51.2	65	
PROGRAM	RESEARCH	1,309.00		678.4
ACTIVITY	Agricultural Research	1,309.00		678.4
PROGRAM	AGRICULTURAL PROTECTION	1,300.00		959.3
ACTIVITY	Animal and Plant Health Services	975.8		959.3
ACTIVITY	Quarantine Services	324.2		
PROGRAM	FOOD CROPS AND LIVESTOCK EXTENSION AND PROMOTION	694.7	491.5	600.7
ACTIVITY	Food Crops Management and Co-ordination	594.7	491.5	500.7
PROGRAM	EXPORT CROPS PROMOTION AND DEVELOPMENT	1,470.30	730.7	1,879.90
ACTIVITY	Export Crops Management and Co-ordination	395	185.6	941.9
ACTIVITY	Cape Rodney Smallholder Redevelopment	1,075.30	545.1	938
PROGRAM	MINISTERIAL SERVICES	139.7	93.3	329.6
ACTIVITY	Minister's Administrative Support Services	139.7	93.3	329.6
M.PROGRAM	TERTIARY EDUCATION	1377.8		627.8
PROGRAM	AGRICULTURE PRACTICE-ORIENTED EDUCATION	1377.8		627.8
ACTIVITY	Diploma and Certificate Courses	1377.8		527.8
	GRAND TOTAL	10,096.70	8,000.00	10,020.70

Source: Department of Treasury

Annex 4d: Summary of Recurrent Budget of Department of Agriculture and Livestock by Items (in Thousands of Kina)

Expenditure Items	Actual	Actual	Appropriation
	1998	1999	2000
CURRENT EXPENDITURE	10,095.80	7,827.50	10,014.70
Personnel Emoluments	8283.9	6659.9	7032.5
111 Salaries and Allowances	7301.2	6453.4	6091
112 Wages	619.6	89.9	591.1
113 Overtime	30.6		17.2
114 Leave Fares	278.70	56.60	287.20
116 Contract Officers Education Benefits	53.8	60	46
Goods and Other Services	1,307.30	1,067.60	2,095.40
121 Travel and Subsistence Expenses	216.4	199.9	311.8
122 Utilities	386.8	167.6	535.3
123 Office Materials and Supplies	65.3	40.00	303.80
124 Operational Materials and Supplies	62.3	200.1	187.5
125 Transport and Fuel	140	200.6	367.2
127 Rental of Property	222.20	100	100
128 Routine Maintenance Expenses	58.00	59.5	102.8
135 Other Operational Expenses	156.3	99.9	184
136 Training			3
Current Transfers	504.6	100	886.8
141 Retirement Benefits, Pensions, Gratuity and Retrenchments	469.8	100	886.8
142 Membership Fees and Contributions	34.8		25.3
CAPITAL EXPENDITURE		172.5	6
Capital Formation		172.5	6
221 Office Furniture and Equipment		72	6
222 Purchase of Vehicles		100.5	
TOTAL	10,095.80	8,000.00	10,020.70

Source: Department of Treasury

Annex 4e: Summary of Development Budget of Department of Agriculture and Livestock by Programs (in Thousands of Kina)

	Description	Actual	Actual	Appropriation
		1998	1999	2000
M.PROGRAM	AGRICULTURAL & LIVESTOCK SERVICES	2,178.60	10,394.20	4,917.40
PROGRAM	POLICY FORMULATION & GENERAL ADMIN	1,000.00	5,000.00	2,309.00
PROJECT	Agriculture Credit Scheme	1,000.00	5,000.00	
PROJECT	Women in Agriculture Development Unit			642.3
PROJECT	Human Resources Development			1,666.70
PROGRAM	TRAINING & EXTENSION SERVICES SUPPORT	123.1	794.2	369.4
PROJECT	Agricultural Institution Strengthening Project	123.1	369.4	369.4
PROJECT	Women in Agriculture Development		424.80	
PROGRAM	FOOD CROPS & LIVESTOCK EXTENSION & PROMOTION	1066.6	4000	989
PROJECT	Grain and Rice Development	1055.5	4,000.00	800.00
PROJECT	Rehabilitation of National Sheep Breeding Stations			189
PROGRAM	EXPORT CROPS PROMOTION & DEVELOPMENT		600	1260
PROJECT	Provincial Smallholder Support Services Pilot		600	1250
	GRAND TOTAL	2,178.60	10,394.20	4,917.40

Source: Department of Treasury

Annex 4f: Summary of Development Budget of Department of Agriculture & Livestock by Items (Thousands Kina)

Expenditure Items	Actual	Actual	Appropriation
	1998	1999	2000
<u>CURRENT EXPENDITURE</u>	<u>2,160.60</u>	<u>8,284.80</u>	<u>4,428.70</u>
Personnel Emoluments	514.8	710.9	633.8
111 Salaries and Allowances	302.2	416.8	371.8
112 Wages	103.9	177.6	182
114 Leave Fares	108.70	56.50	80.00
116 Contract Officers Education Benefits		60	
Goods and Other Services	543.00	2,064.60	2,696.10
121 Travel and Subsistence Expenses	90.6	213.6	
122 Utilities	50	69.4	
123 Office Materials and Supplies	19.5	24.00	
124 Operational Materials and Supplies	73.6	314.1	
125 Transport and Fuel	104.7	217.7	
126 Administrative Consultancy Fees		50	416.7
127 Rental of Property	40.00	100	
128 Routine Maintenance Expenses	51.90	454.9	
135 Other Operational Expenses	112.7	196	
136 Training		424.8	2,178.40
Current Transfers	1092.8	6509.4	1199.8
141 Retirement Benefits, Pensions, Gratuity and Retrenchments	87.2	82.4	
142 Membership Fees and Contributions		7	
143 Grants and Transfer to Public Authorities	1000	310	1,199.80
144 Grants to Individuals and Non-Profit Organisations		110	
145 Grants and Subsidies to Public & Departmental Enterprises	5.6	5,000.00	
<u>CAPITAL EXPENDITURE</u>	<u>28</u>	<u>1,609.40</u>	<u>488.7</u>
Capital Formation	28	1,609.40	488.7
221 Office Furniture and Equipment		110	
222 Purchase of Vehicles	28.00	459.4	
223 Feasibility Studies, Project preparations and Designs		115	
224 Plant, Equipment and Machinery		305	216.4
225 Construction, Renovation and Improvement		400	
226 Substantial and Specific Maintenance		220	
239 Donor Procurement Category			272.3
<u>OTHER PAYMENTS</u>		<u>600</u>	
Lending		600	
312 Loans to Agencies		500	
TOTAL	2,178.60	10,394.20	4,917.40

Source: Department of Treasury

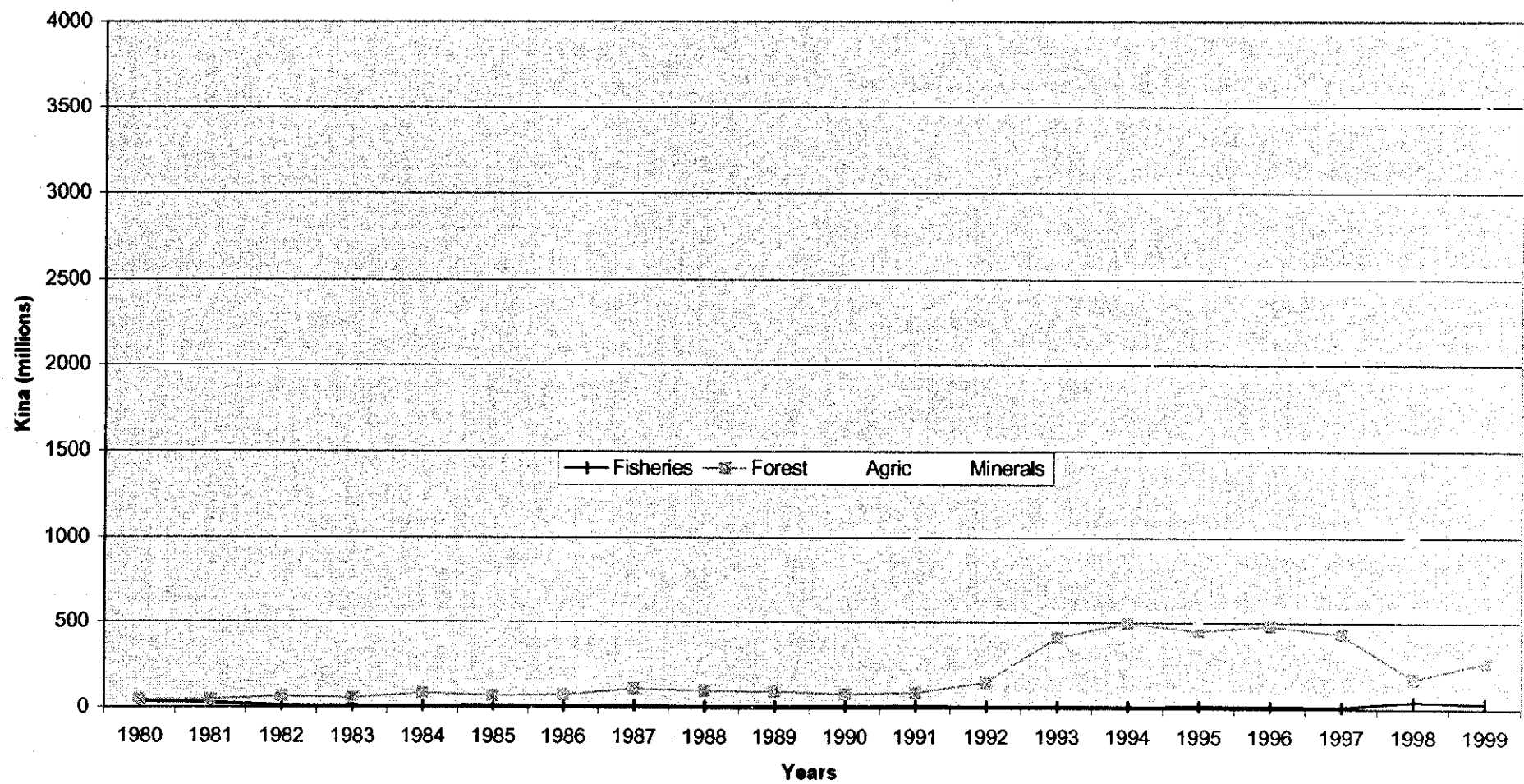
Annex 5: Value of PNG Exports, classified by Commodity Groups – 1980-1999 (Kina millions, FOB)

Year	Coffee	Cocoa	Copra	Copra Oil	Palm Oil	Rubber	Tea	Others ¹	Agriculture Exports	Forestry Products	Marine Products	Crude Oil	Gold	Copper	Total Minerals	Total Exports
1980	18.7	46.4	24.7	14.9	13.8	3.4	8.5	8.5	139.1	45.8	31.7	-	172.9	139.3	322.4	691.8
1981	74.2	34.1	19.3	12.5	14.2	3.4	7.1	10.0	174.8	43.9	27.4	-	158.9	134.6	300.6	565.9
1982	77.8	31.8	12.9	12.1	21.7	1.4	6.7	10.0	174.4	61.7	8.3	-	171.7	122.8	302.1	570.4
1983	94.7	41.4	24.0	20.0	23.7	2.2	10.4	15.1	231.5	54.7	9.1	-	200.9	161.0	373.1	687.4
1984	110.7	67.4	49.1	39.4	75.7	2.4	17.1	18.8	380.6	81.7	10.0	-	185.2	134.2	328.5	823.7
1985	117.5	62.5	33.4	23.7	61.6	3.9	11.5	16.1	330.2	67.3	12.1	-	318.8	164.2	489.9	926.2
1986	208.5	56.4	10.0	10.4	28.3	3.0	7.5	7.8	331.9	74.7	7.9	-	398.5	156.0	561.2	1000.8
1987	134.7	56.2	15.2	14.5	23.9	3.1	5.6	15.7	268.9	110.9	11.0	-	422.9	281.9	714.9	1123.2
1988	113.5	46.0	19.4	17.4	32.9	4.4	6.3	15.3	255.2	97.5	7.5	-	405.1	446.9	861.5	1256.1
1989	140.4	45.2	14.0	15.3	38.3	2.6	6.1	8.3	270.1	96.2	8.1	-	316.9	344.9	676.1	1111.6
1990	103.3	29.9	8.7	11.6	32.7	1.7	6.7	10.0	204.6	79.6	8.2	-	393.2	349.2	757.5	1122.4
1991	79.4	34.0	5.3	11.1	45.1	1.8	2.6	25.3	204.6	90.2	10.4	-	666.9	323.8	1005.3	1390.5
1992	68.1	34.1	11.8	24.2	64.2	1.9	6.6	12.7	223.6	148.2	9.3	301.4	745.9	313.5	1371.5	1862.6
1993	100.5	33.1	14.2	19.6	79.2	2.6	7.2	13.7	270.1	410.4	7.8	817.8	681.6	256.3	1767.8	2527.3
1994	204.8	29.0	14.7	20.1	77.5	2.9	4.2	21.4	374.6	494.4	10.3	702.7	702.3	367.4	1782.7	2662.0
1995	214.5	47.7	27.4	29.7	142.2	4.0	5.4	31.5	502.4	449.7	12.3	827.7	840.1	754.5	2435.4	3399.8
1996	190.3	66.2	49.0	51.4	182.4	4.1	12.7	22.5	578.6	480.3	10.4	1073.9	773.6	387.0	2244.6	3313.9
1997	325.9	73.3	47.2	51.1	207.1	6.5	10.4	55.7	777.2	433.6	9.6	852.2	718.7	259.8	1838.9	3059.3
1998	476.4	81.7	38.8	69.7	271.8	7.3	18.9	55.5	1020.1	173.2	42.2	813.1	1227.8	395.7	2452.1	3687.7
1999	417.1	84.6	66.5	95.8	337.9	5.0	19.0	138.7	1164.6	265.9	29.9	1382.4	1546.1	574.3	3524.0	4985.3

Source: Bank of Papua New Guinea

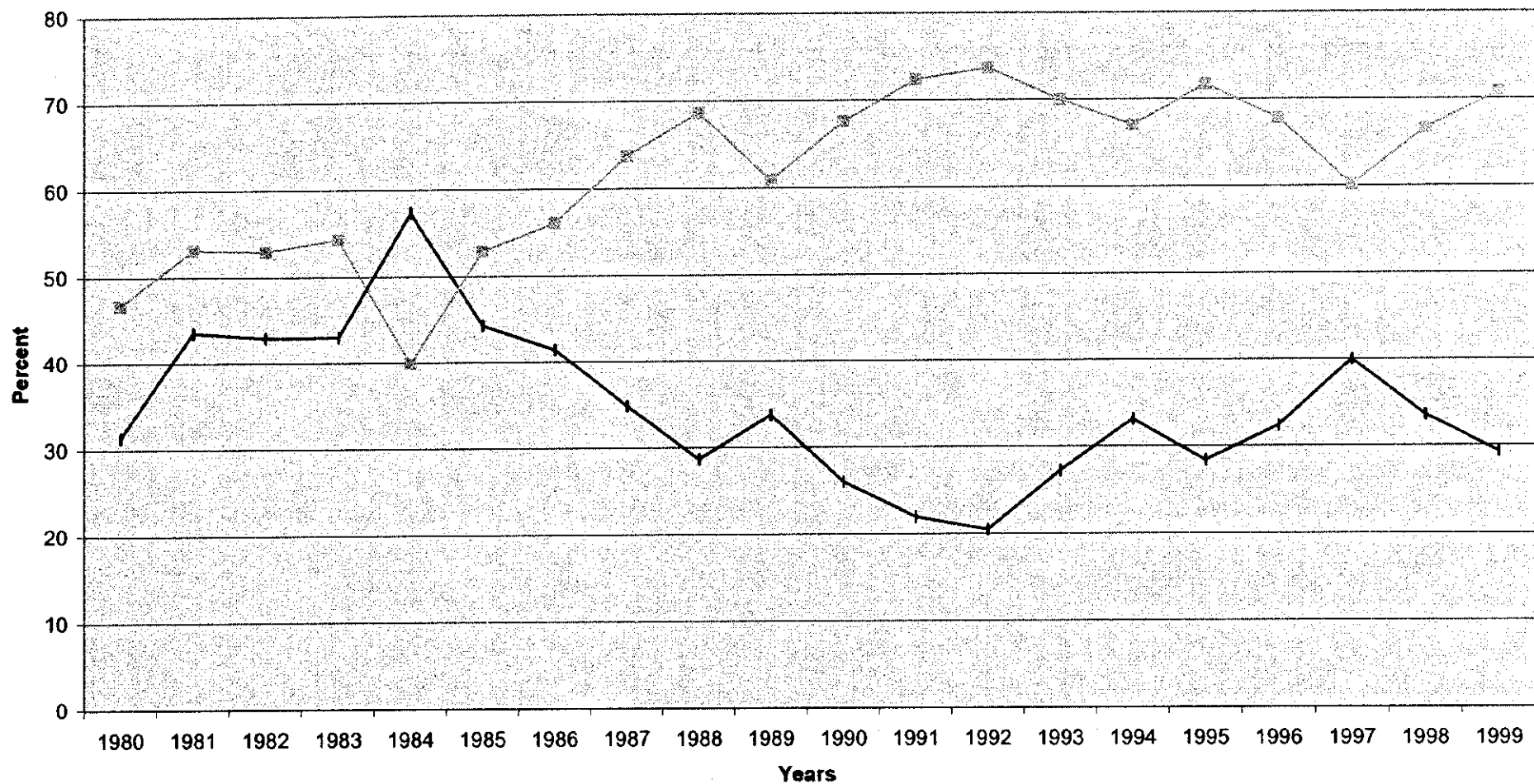
¹ 'Others' include a very small proportion of manufactured goods

Annex 6: Trends of Value of Exports in 1980-1999 (Kina, millions)

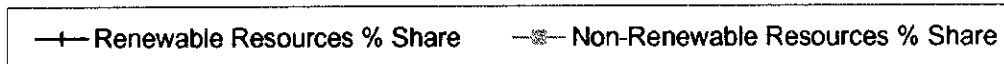


Source: Bank of PNG

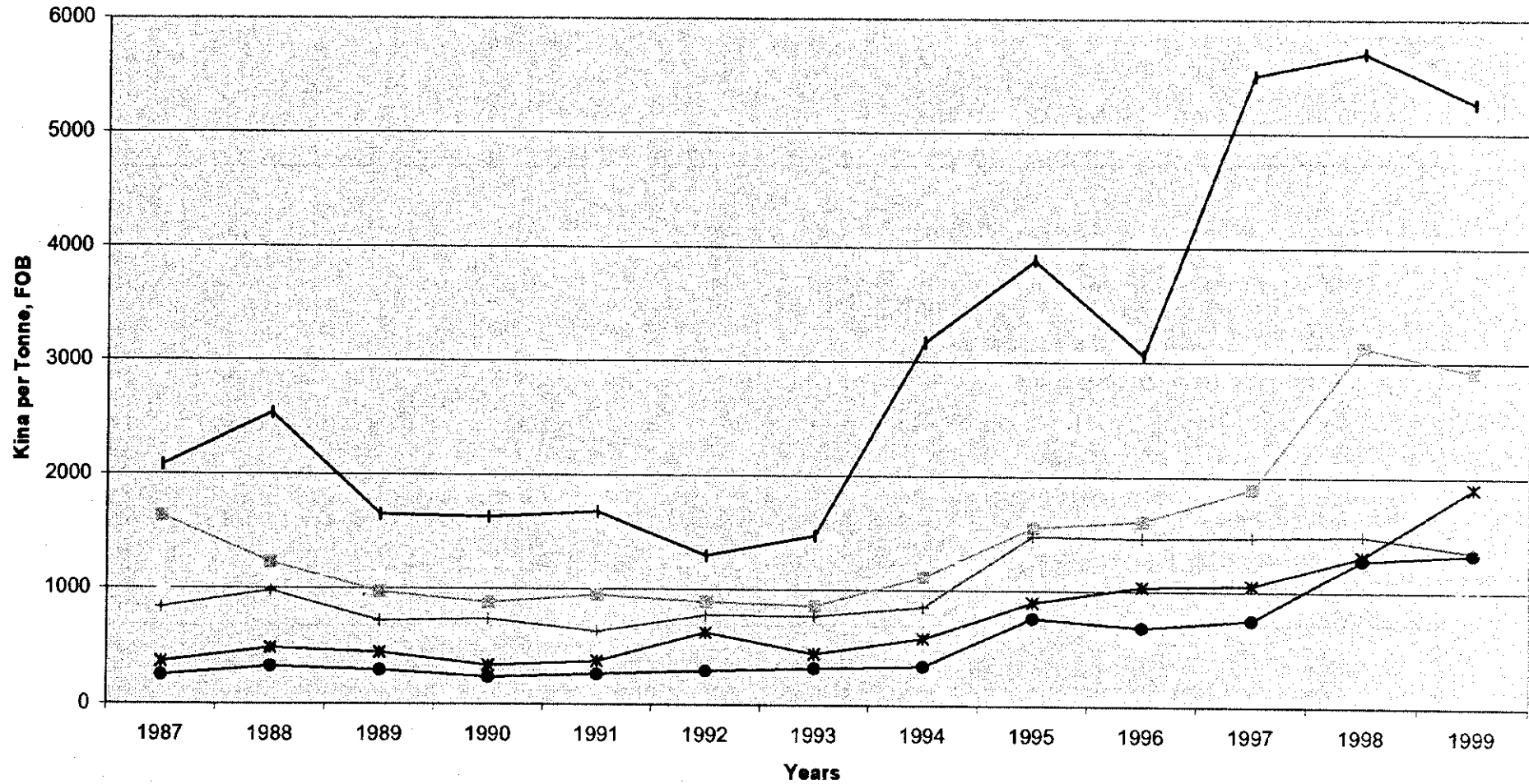
Annex 7: Renewable and Non-Renewable Resources Sectors % Share of Total Exports - 1980:1999



Source: Bank of PNG



Annex 8: Trends in Major Export Commodity Prices: 1987-1999 (Kina per Tonne, FOB)



Source: Bank of PNG

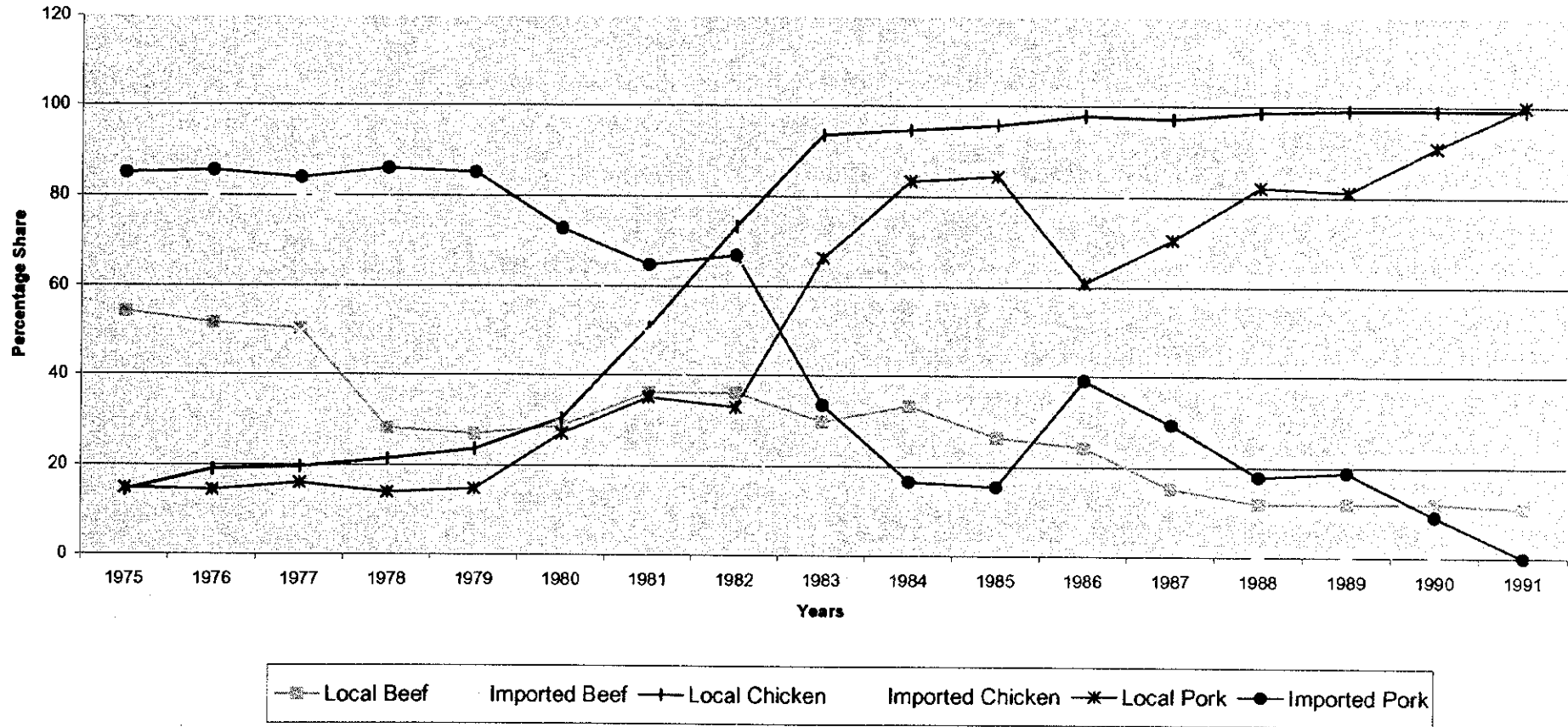
—+— Coffee —■— Cocoa —●— Tea —*— Copra —*— Copra Oil —●— Palm Oil —+— Rubber

Annex 9: Local and Imported Supplies of Meat: 1975-1991 (Tonnes)

Year	Local Beef	Imported Beef	Total Beef	Corned & Canned Beef	Imported Lamb/Mutton	Local Chicken	Imported Chicken	Total Chicken	Local Pork	Imported Pork	Total Pork	Total Meat
1975	2145	1804	3949	6278	1899	815	4817	5632	97	549	646	18,404
1976	2600	2430	5030	6230	1743	1218	5167	6385	85	502	587	19,975
1977	2740	2700	5440	7648	1715	1669	6829	8498	73	381	454	23,755
1978	2400	6071	8471	10370	1686	1915	7035	8950	72	442	514	29,991
1979	2227	6013	8240	7848	3111	2450	7936	10386	103	586	689	30,274
1980	1973	4889	6862	7935	4321	3763	8558	12321	223	600	823	32,362
1981	2145	3779	5924	6762	5182	5868	5675	11543	376	691	1067	30,478
1982	1985	3500	5485	7170	6778	6504	2363	8867	330	670	1000	29,300
1983	1960	4600	6560	7868	7843	7366	511	7877	890	451	1341	31,489
1984	1926	3833	5759	8100	12500	7591	429	8020	858	172	1030	35,409
1985	1682	4678	6360	11343	14300	8448	370	8818	906	167	1073	41,894
1986	2001	6218	8219	7000	14900	9478	200	9678	650	417	1067	40,864
1987	1800	10000	11800	4000	17000	10384	300	10684	1200	500	1700	45,184
1988	1900	14000	15900	2000	19500	11425	145	11570	1150	250	1400	50,370
1989	2100	15500	17600	1000	21700	12144	108	12252	1200	280	1485	54,032
1990	2050	15000	17050	1000	19000	11162	96	11258	1000	100	1100	49,408
1991	2000	16300	18300	-	20300	11198	96	11294	1150	-	1150	51,044

Source: Livestock Development Corporation; Department of Agriculture and Livestock

Annex 10: Percentage Share of Local and Imported Supplies of Meat - 1975-1991



Source: Livestock Development Corporation; Department of Agriculture & Livestock

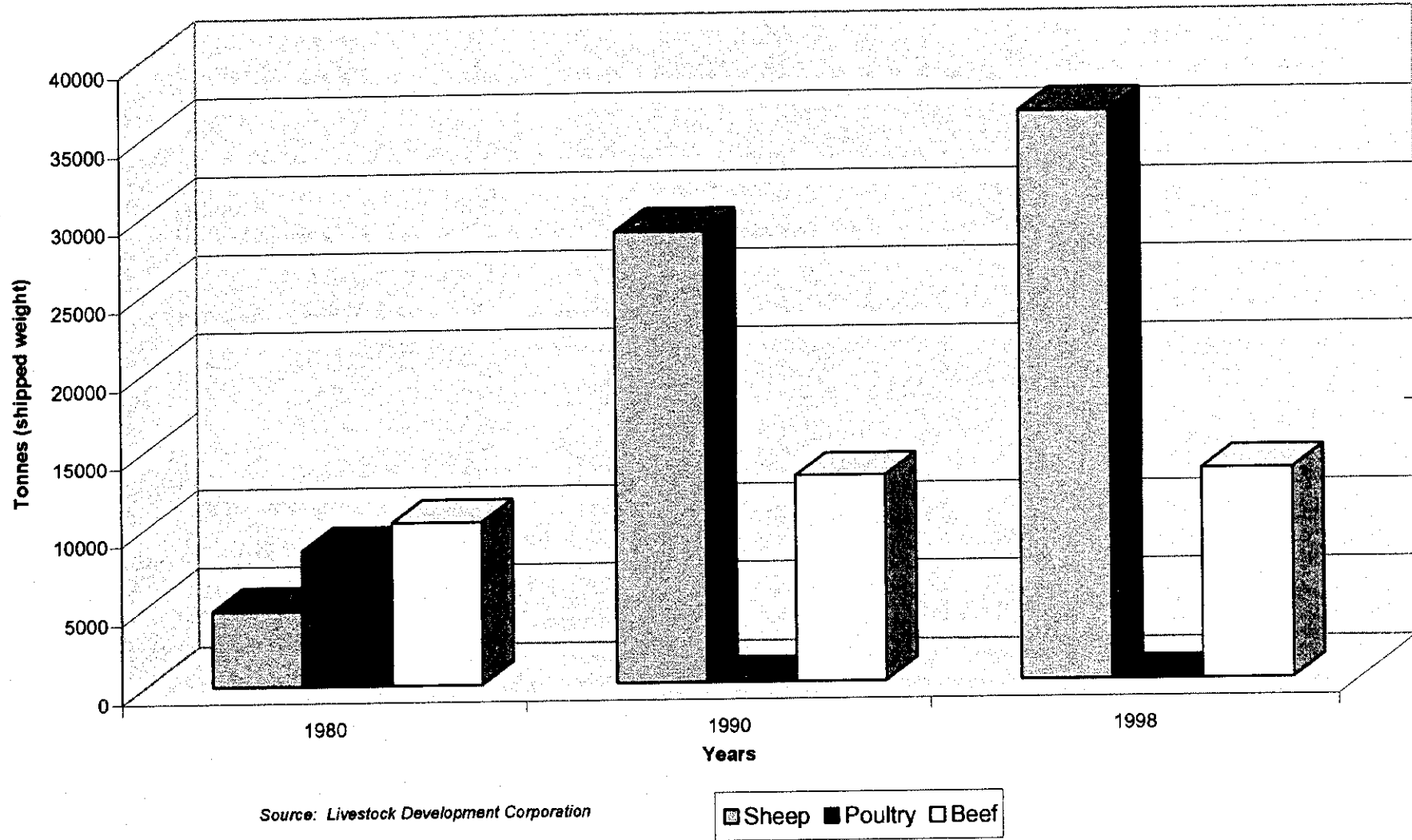
Annex 11: Estimates of Meat production, consumption and trade in PNG *(Extracted from the Red Meat Study)*

	1980	1990	1998
Beef			
Commercial production (tonnes cwe)	1973	2050	2500
Subsistence production (tonnes cwe)	284	295	360
Exports	0	0	0
Imports (tonnes shipped weight)	10293	13050	13350
Total consumption (tonnes cwe)	12550	15100	16210
Self-sufficiency ratio	0.18	0.15	0.18
Sheep Meat			
Commercial production (tonnes cwe)	0	0	0
Subsistence production (tonnes cwe)	5	15	15
Exports	0	0	0
Imports (tonnes shipped weight)	4753	28710	36190
Total consumption (tonnes cwe)	4758	28725	36205
Self-sufficiency ratio	0	0	0
Goat Meat			
Commercial production (tonnes cwe)	0	0	0
Subsistence production (tonnes cwe)	9	9	9
Exports	0	0	0
Imports	0	0	0
Total consumption (tonnes cwe)	9	9	9
Self-sufficiency ratio	1.0	1.0	1.0

Annex 11: Estimates of Meat production, consumption and trade in PNG (*Extracted from the Red Meat Study*) (continued)

	1980	1990	1998
Poultry Meat			
Commercial production (tonnes cwe)	3760	11389	17500
Subsistence production (tonnes cwe)	9520	17149	23260
Exports	0	0	0
Imports (tonnes shipped weight)	8558	96	0
Total consumption (tonnes cwe)	21838	28634	40760
Self-sufficiency ratio	0.61	1.0	1.0
Pig Meat			
Commercial production (tonnes cwe)	223	1000	1013
Subsistence production (tonnes cwe)	5000	5000	5000
Exports	0	0	0
Imports (tonnes shipped weight)	0	0	5
Total consumption (tonnes cwe)	5223	6000	6018
Self-sufficiency ratio	1.0	1.0	1.0
Fish			
Total production (tonnes cwe)	43617	26188	26200
Exports (tonnes shipped weight)	1366	1100	609
Imports (tonnes shipped weight)	0	81	16
Total consumption (tonnes cwe)	42251	25169	25607
Self-sufficiency ratio	1.03	1.04	1.02

Annex 12: Imports of Sheep, Poultry and Beef Meats over 2 Decades (1980-1998)



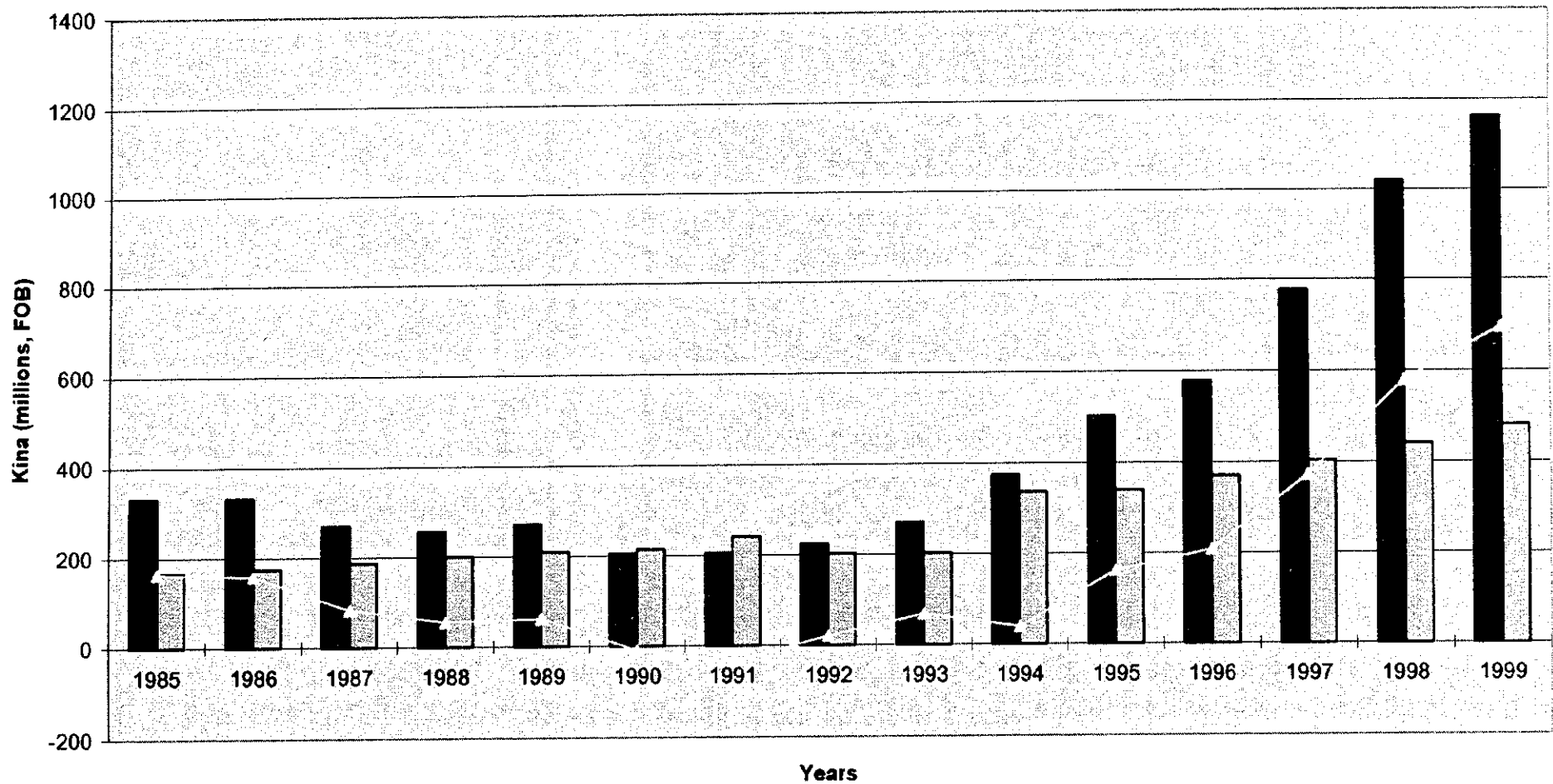
Annex 13: Balance of Trade in Agriculture, 1985-1999

Calendar Year	Agriculture			Total Trade		
	Export	Import	Balance	Export	Import	Balance
1985	330.2	166.4	163.8	917.3	866.6	50.7
1986	331.9	174.6	157.3	1003.2	996.0	7.2
1987	268.9	187.1	81.8	1096.4	1199.0	102.6
1988	255.2	200.5	54.7	1248.2	1152.2	96.0
1989	270.1	209.5	60.9	1212.7	1057.0	156.7
1990	204.6	214.2	-9.6	1174.2	1141.9	32.3
1991	204.6	240.0	-35.4	1549.8	1136.0	413.8
1992	223.6	203.0	20.6	1862.6	1275.0	587.6
1993	270.1	202.6	67.5	2527.3	1110.0	1417.3
1994	374.6	336.1	38.5	2662.0	1336.0	1326.0
1995	502.4	340.4	162.0	3399.8	1620.0	1779.8
1996	578.6	371.0	207.6	3313.9	1996.0	1317.9
1997	777.2	404.4	372.8	3059.3	2129.0	930.3
1998	1020.2	440.8	579.4	3687.7	2231.0	1456.7
1999	1165.0	480.5	695.5	4985.3	-	4985.3

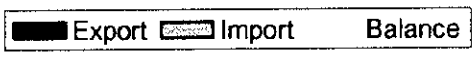
Source: Bank of Papua New Guinea, Department of Agriculture and Livestock, National Statistical Office.

- Note:
1. Agricultural imports include food and live animals, unmanufactured tobacco, animal & vegetable oils and fats.
 2. 1991 to 1995 agricultural import data were estimates, compiled from the records of ABS, Australia; New Zealand High Commission and APEC Trade Statistics Bulletins.
 3. Agricultural exports include cash and minor cash crops only.

Annex 14: Balance of Trade in Agriculture - 1985:1999



Source: Bank of PNG



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