

SURVEY ON SUBSISTENCE AGRICULTURE IN SOME PROVINCES OF PAPUA NEW GUINEA

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Introduction

The largest component of economic activity in Papua New Guinea is subsistence agriculture, but because there is so little information on it in a national sense, its importance, and its linkages with the monetary economy, are frequently underestimated (SHAW, 1985). Therefore, the Kagoshima University Research Center for the South Pacific has been conducting surveys to try to determine the magnitude and importance of subsistence agriculture of PNG. In 1983 HAYASHI *et al.* carried out a survey in Lae, Rabaul and Port Moresby in which they reported the coexistence of subsistence farming and plantations, and suggested that an efficient coexistence system of food gardens and cash crops fields is a prerequisite for the development in agriculture production (KISHIMOTO, 1985).

The present survey had for objectives the measurement of the agricultural development since 1983 until 1991 of Morobe, part of Eastern Highland and East Sepik Provinces of Papua New Guinea (PNG). To reach this objective we developed a survey questionnaire that was carried out through direct interviews and personal visits to farms in 7 localities in Morobe, 3 in Eastern Highlands and 10 in East Sepik Provinces. The questionnaire covered two major aspects of the PNG's subsistence agriculture : 1) General information of the farmers, and ; 2) their actual agricultural status.

Methods

The first part of the questionnaire covered topics relevant to the number of family members ; the educational level of the farmer and their respective children ; farm size and land tenure (ownership) ; animal and machinery tenure ; and use of agrochemicals in general. The second part of it considered the overall agricultural information available at the farm level, *i.e.* cultivated area with annual and perennial plants, yield, cost, value of the produce, etc.

Seven localities were surveyed in Morobe Province and three in Eastern Highland Province. These localities were chosen randomly in the surroundings of Lae and Wau, and Goroka respectively. These areas and their respective cities are important trade centers in the province and therefore it was considered that they play an important role in the development of the agriculture of the province. Furthermore, the three main locations have different climatic and environmental conditions, being Lae a flat- low-grass dominated area ; Wau a more hilly area with an average altitude of proximately 800 m over sea level ; and Goroka a high forest- high altitude (prox. 1500 m) mountain dominated area.

Results and Discussions

Morobe and Eastern Highland Provinces

A total of 14 surveys were carried out in the 10 localities, reaching to 73 persons, out of which 36 were males and 37 females. The educational level of the people interviewed varied according to the area where they lived, the size of land that they owned, the availability of schools in the area, and the educational level of the parents. In general we could state that the majority of the interviewed people attended elementary school, some junior high school and a few had any higher educational level. Our findings are in accordance with the 1980 National Population Census which states that out of 41,379 persons less than 26 years old, only 6,465 persons, or roughly a 15% of the population of the province attended school (National Statistical Office, Port Moresby, 1985 A).

All the visited areas, were good to relatively good communicated with roads, most of which were permanent roads covered with asphalt or with a relatively good transitability. Except for the localities of Wandome, located at 15 Km of Wau, Public Motor Vehicles (PMV) serviced the areas with transport of persons and produce. The frequency at which PMVs run through the localities varied upon the size of the community, being the small communities affected most hence few PMVs serve the area and the price for transportation of produce was relatively higher than that of the larger communities.

A traditional land ownership still remains in most of the visited province's land. This is to say that most of the land is still tribe owned, yet each individual clan and therefore any member of the clan is entitled to use the land at will as long as the land is not being use by somebody else and is inside the clan and family borders. Depending upon the clan's (or the tribe) custom, land will be inherited in a patrilineal or matrilineal system. Clan land cannot be commercialized without the consent of the clan elders, and we learned that commercialization of land is almost none existing. Hence registration of land is not required in PNG, it was difficult to determine the size of land owned or else cultivated by each one of the interviewed families, except for those families who rented land from the government or from the church, and for those that bought their land. Throughout the interviews we found that individual land tenure or rented land ranged from as little as 0.5 ha to over 250 ha, and that clan owned, but individually farmed, land ranged between 6-7 ha in the low land to 30-40 ha in the highlands.

The raising of animals was not an uncommon practice observed among the farmers, yet except two of the interviewed families, the raising of animals was done in the open space. No feed nor shelter were provided to the animals on a continuous basis, even though we learn that most of the sweet potato that is not sellable are fed to the pigs. However in the localities of Gadmazung and Situm, located near to Lae, we observed fairly well organized poultry and pig farms. These farms were family owned and even though they had a relatively small lay out, their organization and technology were fulfilling. The market for their product was Lae and feed and other supplies were also bought in Lae.

The tenure of machinery was restricted to those farmers that rented or bought their land. Farmers that lived in clan owned land in general have not nor use machinery. The use of agrochemicals was also restricted to the large plantations or estates and to two vegetable producers in the area of Wau (these farmers used only fertilizers).

The agricultural production in the visited areas varied considerably one from the other.

In the area surrounding Lae two different types of gardening were seen : 1) In Gadmazung the gardens were generally small scale mixed crop gardens in which many crops were planted together in a fairly disorganized manner at the same time. Gardens were made continuously throughout the year to ensure a continuous production of food. The most planted crops were bananas (the staple food of the area), taro, corn, cassava, peanuts, sweet potato, aibika, and other typical vegetables. Among the perennial crops we learned that almost 1/3 of the families are planting cacao as a replacement of coffee that did not produced as expected. Betel nut, on the other hand, is taking over the production of coconuts due to price advantage. The coconut trees are not being cut down, but because of the low price of copra, they are not being harvested and the nuts that are not used for food are left to rot in the floor. In this village work in the garden was done on a communal base, to say, everybody worked together in the preparation of the gardens and everybody received a share of the produce. 2) In Situm the agriculture technics were different to the extent that the work was done only by the family. The gardens had the same characteristics as the previous ones but were done on a larger scale and more market oriented. The land was rented from the government varying in size from 14 to 55 ha. It was mostly under perennial crops cultivation – cacao, coconuts, betel nut and coffee – although we found a farmer that besides raising pigs commercially was cultivating pineapple in large scale. In this locality as in any locality we visited in PNG the production of gardens was basically done to feed the family and only sell the surplus of the product.

In our way to the highlands we observed a gradual change in the agricultural techniques which was confirmed once we arrived to the area surrounding Goroka and Kainantu. In Yata community, we observed that their agriculture is based on a polyculture system. The gardens were small to medium size and the cultivation was done in a more organized way than in the low lands. Here the staple food is sweet potato, but large areas of peanuts, corn and other vegetables were cultivated. Rotation of crops was practiced allowing the land to fallow for 6 to 10 years. The lack of enough flat land has force the habitants of this area to cultivate in relatively steep slopes, but erosion problems were not seen. Because the conditions are ideal for growing coffee, we observed that most of the farmers are planting it as a cash crop. Therefore, it was not surprising to find the largest coffee plantation of the province nearby.

In the localities around Wau we saw a similar pattern in the cultivation of food gardens, however they were done on a larger scale. Besides the traditional products, the farmers in the area, under the influence and direction of the Ecological Institute, were cultivating non-traditional vegetables *i.e.* Cabbage, lettuce, tomato, etc. as cash crops. Here we could observe severe insect infestations to those gardens where only these introduced vegetables were cultivated as monocrops, yet in those farms where the vegetables were polycultured with the traditional crops the attack of insects was considerably less. According to the farmers of Wandome, vegetables are not considered an enterprise because of the difficulties in their commercialization. It is worth saying that the commercialization of the bulk of vegetables has to be done either in Lae or in Port Moresby hence they are the major markets of PNG, and that transport of vegetables to these markets has to be done either by plane to Port Moresby or by PMVs to Lae, either of which are out of the reach of the common farmer for their high cost.

East Sepik Province

The total number of persons that we reached with this survey was of 72, out of which 41 were males and 31 females. The educational level in the area was surprisingly low around the Sepik river area, while it was fairly well in the other areas. According to the 1980 National Population Census, in East Sepik Province the citizen population less than 26 years old that attended school was roughly 14% of the total, having a high peak of 40-45% between the ages of 10-14 (National Statistics Office, Port Moresby, 1985 B).

The visited areas communicate with Wewak, the provincial capital, only through roads, which are mostly gravel roads of good to regular and sometimes poor transitability. Transportation of persons and produce is through the use of PMVs which run with certain frequency. For communities that are located along the Sepik river, canoeing is the only transportation system available.

In this province we could observe that the traditional method of clan land ownership is prevalent. Out of the 13 surveys only 1 person owned his own land while another one rented the land from the government, otherwise the land was clan owned land and its inheritance is done mostly through patrilineal methods. The sizes of individual farm land varied greatly upon the area. It ranged from 2-100 ha of land, including tillable and non tillable land.

Even though no commercial animal farms were visited, almost every family raised their own pigs and poultry in the open space. The tenure of machinery was restricted to a few cacao fermentaries and the use of agrochemicals was not reported.

A wide variety of crops are cultivated in the province. The staple foods are either yams, sweet potatoes or sago, depending upon the area. In Maprik, a highly populated area, a mix of traditional and modern agriculture was seen. While in one community farmers are putting a great effort to produce perfect giant yams, in an other community farmers are debating on how to increase the yield of rice, a non traditional product. Giant yams, even though they are commercialized in good prices, are not produced for solely the economic return, but are produced for the status gain, while rice is produced as a cash crop only. These two different approaches will off course lead to different agricultural practices. Besides this products, we could observe that farmers are also planting taro, aibika, bananas and other typical vegetables for their own consumption as well as cash crops like peanuts, coffee and cacao.

Along the Sepik river the agriculture practices were somehow different. The gardens were much smaller in size and mix cropping was a common practice. Cash crops were produced only in small scale because of the difficulties in their commercialization. We did not observe large estates. On the other hand, in communities located along the main road between Angoram and Wewak, but still close to the Sepik river, the agriculture practices were mostly directed for cash crops, namely rubber and cacao. Traditional gardens were of course cultivated but in a much smaller size. Here the land was mostly rented or privately owned.

The last area visited in this province was an area located between 40 to 80 Km. north west of Wewak. The land ownership in this area was completely clan owned land, and the sizes of the farms vary from 2 to 100 ha. The gardens were cultivated on a small scale mix cropping system with a variety of crops to fulfill the food requirement of the family and sell the surplus in Wewak or in the road markets. Cacao is the most important cash crop for which a series of fermentaries were build mostly on family basis. Coconuts were to some

extent interplanted with the cacao plants, even though here also copra was not being produce due to its low price.

From the above explanations and from our observations while in PNG the following conclusions could be pointed.

Even though the agricultural systems, the staple food eaten, the tenure of tillable land, and the educational level of the farmer varied according to the area, the following similarities were found among the visited gardens ; 1) All the labour is done by hand using bought or self made implements ; 2) Polyculture cropping is practiced with some areas using better techniques than others ; 3) Field rotation and fallow is a common practice, depending upon land and population pressure ; 4) The use of agrochemicals is restricted to large estates and to a few individual farmers ; 5) Women play an important role in the maintenance of the gardens and the commercialization of the produce ; 6) Transport of the produce is one of the major limitations for the commercialization of the produce and it causes an indirect rise in the final price.

As could be seen in Figs. 1 and 2, the total agriculture and food production indices of PNG has had a continuous increase since 1980 until 1991. When compared this indices with those of Oceania and even with the world total it can be seen that Papua New Guinea's agriculture is increasing in its total output. However, when making an analysis of the per caput out put, it can be seen that it has not change considerably in the last 10 years. This could be explained if we considered that since 1980 until 1990 there has been a 22.5% population increase in the country, and that the diet of the people is changing gradually from traditional products to rice, canned fish, and other better storable goods.

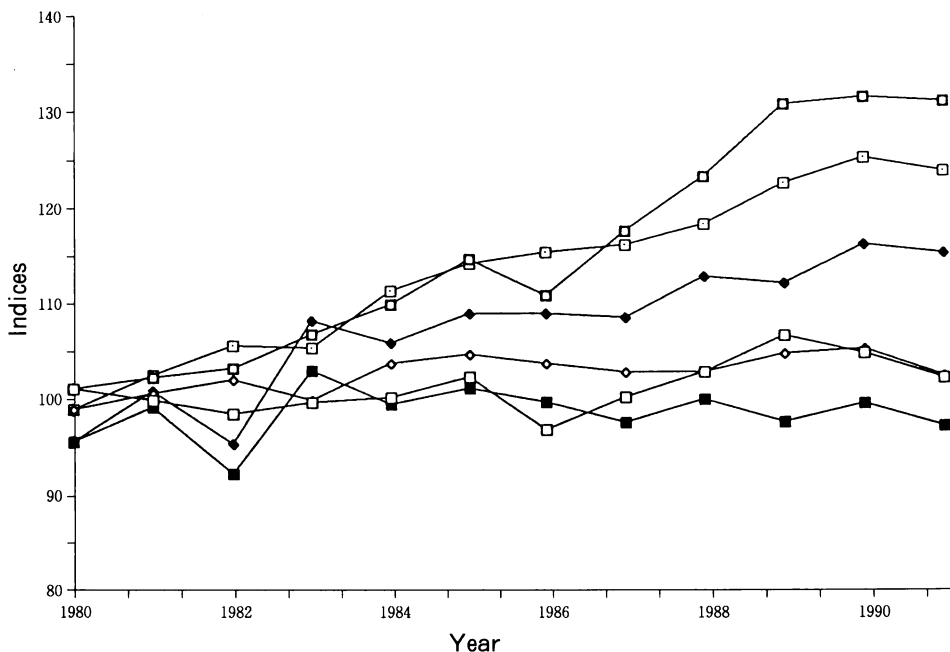


Fig. 1 FAO Indices of agriculture production Prod. Indices 1979-81=100 (FAO Prod. Book)

—□— WORLD TOTAL, —◆— OCEANIA TOTAL, —□— PNG TOTAL, —◇— World/CAPUT,
 —■— Oceania/CAPUT, —□— PNG/CAPUT.

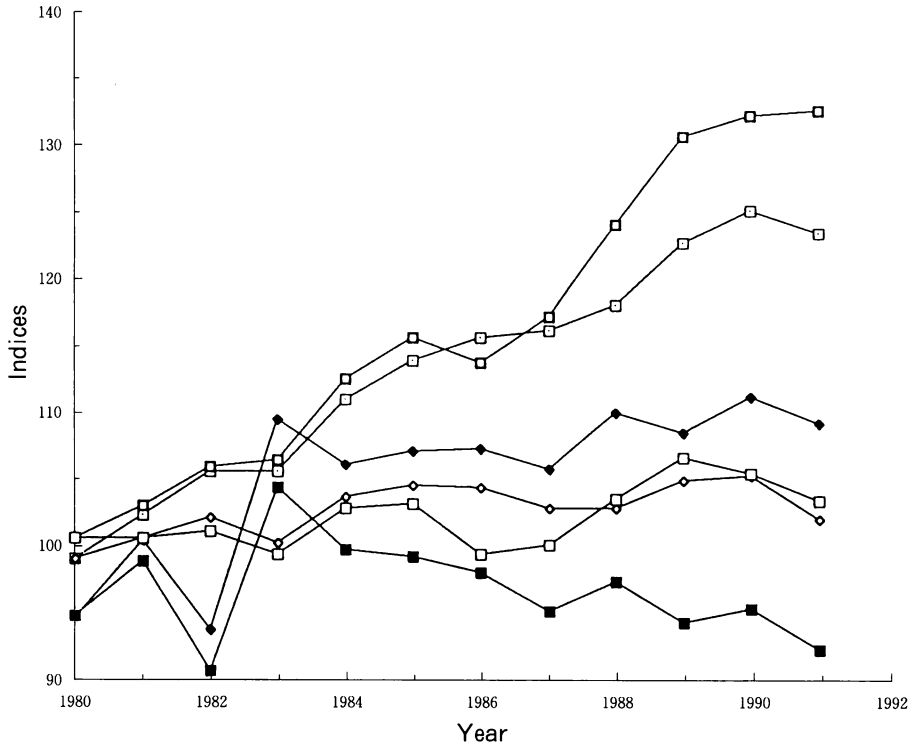


Fig. 2 Food Production Indices. Prod. Ind. 1979-81=100 (FAO Prod. Book)
 —□— WORLD TOTAL, —◆— OCEANIA TOTAL, —□— PNG TOTAL, —◇— World/CAPUT,
 —■— Oceania/CAPUT, —□— PNG/CAPUT.

The lack of land registration makes difficult to determine the size of land owned by an individual farmer. Furthermore the mixture of subsistence and cash crops agricultural systems make difficult to determine the production cost of any individual product. This in turn makes difficult to evaluate whether the farmers are doing economically well or not. Barry SHAW (1985) reported that returns to small holders in terms of net profit per day worked appear to be the greatest determinant of success or failure. Generally, those returning less than the minimum rural wage have done poorly. Since the majority of house holds in the three visited provinces are, to a varying degree, involved in agriculture, the price paid for the typical products — sweet potato, banana, yam, taro, etc. — is and will remain low compared to the prices paid for other goods like vegetables (Fig. 3) and rice. According to a DPI official in Morobe the consumer price index is determined by betel nut price, and that the price of vegetables depends mostly on the price of store goods, namely canned fish and rice. If prices of either of this three products rises, vegetable prices rise.

From this figure we can see that the price of highly perishable vegetables is extremely high compared with those that can stand storage under ambient conditions for longer periods of time. It can also be seen that the price of green vegetables in general are higher than the prices of tubers or roots. One of the explanations for this is that perishable vegetables are produced in smaller quantities than green vegetables because of transport problems. This was the case for the small farmers around Wau who did not have appropriate storage

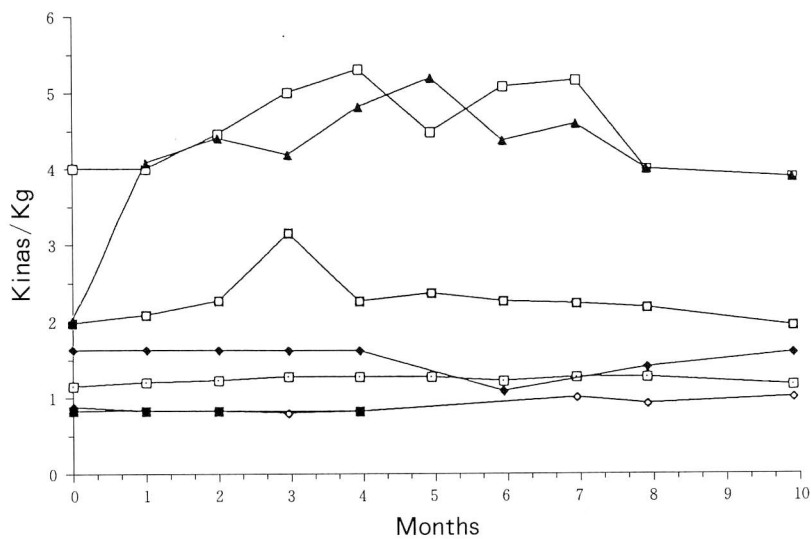


Fig. 3 Market prices of some vegetables on a monthly basis from October 1990 to August 1991 (Fresh Produce News)

POTATOES,
 AIBIKA,
 CABBAGE,
 SWEET POTATOES,

TARO,
 TOMATOES,
 LETTUCE.

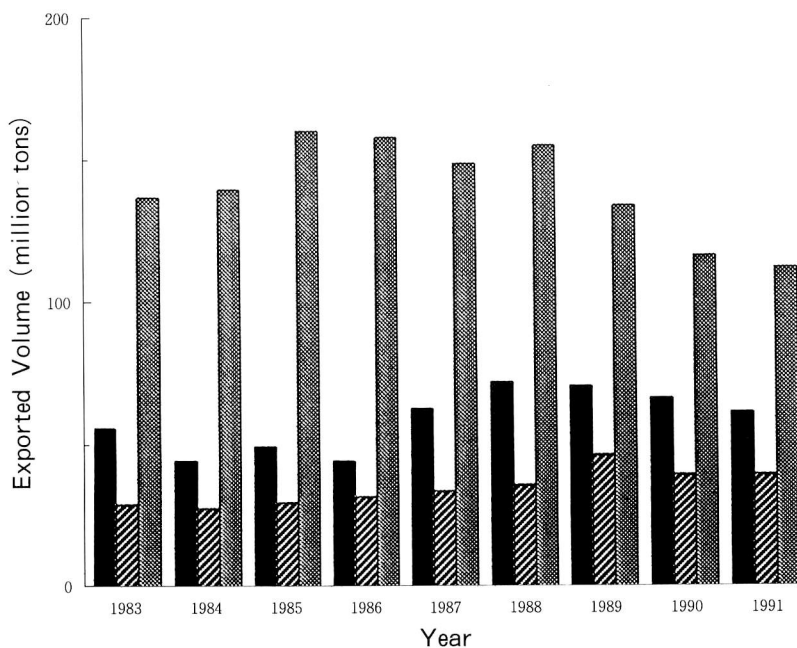


Fig.4 Export volume of major export crops of PNG 1983-1991 (FAO Production Book)

COPRA,
 CACAO,
 COFFEE.

infrastructure nor good transportation systems. With respect to the price difference between the green vegetables and the tubers or roots, it is simply that the formers need much more labor per unit out put than the latter, and that are more prone to insects attack.

The lowering in prices of the major export crops of PNG – copra, coffee, cacao and rubber –, made the farmers loose interest in expanding their plantations and in some cases we could see that the plantations were abandoned to return into natural forest. This is specially true for the copra industry ; the farmers found out that it is economically better to let the coconuts to rot than to extract copra. According to the Copra Marketing Board, PNG was exporting a total of 120,000 tones by the year 1988 and that this figure dropped to 90,000 tones in 1990-91. However, with the steady recovery of its price since the middle of 1991, the Board expects to cover their export quotas again (Post-Courier, January 6,1992). A similar trend was seen in the production of coffee and cacao (Fig.4).

Most, if not all, of the farmers are engaged in the production of staple foods as a base of their subsistence agriculture and sell the surplus produce in the local markets. When we visited the town markets (Lae and Wewak), we were surprised to see the wide variety of produce available. This clearly shows that the farmers are doing relatively well in their production capacity of a wide variety of products. But it does not necessarily mean that they are receiving a good economic return for their labor, because the small demand of the products (almost everybody is producing) lowers the prices. Furthermore, the increase in cash money is causing a change in the eating habits of the city dwellers which prefer rice over traditional crops.

The immediate need of cash money beyond of their daily needs does not seem to be as important as it is in other developing or developed countries. This implies that even though PNG is gradually becoming a capitalistic country, their agriculture is still based and run the traditional way, except for the large estates. As long as subsistence agriculture is a major economic component in the PNG's economy, agriculture development will be slow and not a lucrative enterprise.

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