

Making a living: land pressures and changing livelihood strategies among oil palm settlers in Papua New Guinea.

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The full reference for this article is: Koczberski, G. & Curry, G.N. (2005). Making a living: land pressures and changing livelihood strategies among oil palm settlers in Papua New Guinea. *Agricultural Systems* 85 (3), 324-339.

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Abstract

Since the establishment of oil palm land settlement schemes (LSSs) in West New Britain Province, Papua New Guinea, the settler population has increased significantly as second-generation settlers marry and raise families on their parents' blocks. We explore how settlers are responding to demographic and socio-economic change in an environment in which opportunities for land-use change are limited. In the context of rising population pressure, LSS smallholders are developing innovative livelihood strategies by pursuing non-farm income sources, increasing food production, acquiring additional land and migration. The type of migration or land accumulation strategy depends on household access to various resources, especially social and kinship networks, and capital. Agricultural extension and rural development policies have not yet responded to this socio-agronomic transformation. We conclude that economic diversification amongst smallholders creates new opportunities for the oil palm industry to formulate more innovative and sustainable policies that strengthen the oil palm industry in PNG while facilitating broad-based rural development.

Key words

Smallholder production, income diversification, agricultural change, rural development policy, Melanesia.

1. Introduction

Papua New Guinea (PNG), like other developing countries in the 1950s and 1960s, established land settlement schemes (LSSs) to promote agricultural and economic development. The LSSs were an attempt to shift settlers from a dependence on subsistence production to a reliance on export cash crop income where smallholder households would become intensive agriculturalists working their own land. Not

imagined were the population and economic pressures and broader societal changes that would emerge over time on the LSSs. In the highly regulated oil palm LSSs with individual leases over fixed areas of land, settlers' options for agricultural change have been limited.

This paper explores how oil palm smallholders on the LSSs maintain agricultural production, household economic security and social stability in the context of population growth, limited opportunities for land-use change and fluctuating commodity prices. Drawing on fieldwork conducted as part of a socio-economic study among oil palm smallholders in West New Britain Province (WNB), PNG, we emphasise the agricultural and non-agricultural responses to the various pressures and opportunities present in smallholders' everyday lives and highlight the extent to which smallholder livelihoods are increasingly reliant on a range of income sources. The diversification of livelihood strategies occurring on the LSSs together with the associated changes in household structures and social relations is a major socio-agronomic transformation that has implications for smallholder extension policies and rural development more generally. We conclude by discussing the policy implications of this rural transformation.

2. Rural livelihoods

That Papua New Guinean smallholders diversify their incomes and livelihood strategies is not a new theme in the rural development literature. There is now an extensive literature acknowledging the income diversity of rural households in developing countries (e.g., Haggblade et al., 1989; Boomgaard and White, 1991; Koppel and Williams, 1994; Reardon, 1997; Dorsey, 1999; Bebbington, 2000; Ellis, 2000; de Janvry and Sadoulet, 2001; Rigg and Nattapoolwat, 2001). Much of this literature highlights the importance of off-farm income for household economic and food security, and for financing farm investments. An early study by Anderson and Leiserson (1980) reported that off-farm income was increasing rapidly as a proportion of total employment in rural regions in Africa, Asia and Latin America. Reardon's (1997) review of 25 studies of income diversification among rural households in Africa shows convincingly that rural non-farm wage labour as a share of total household income was significant, and on average made up 45% of rural household incomes. Whilst there were insufficient data to determine if the non-farm sector was increasing in importance in rural household earnings, some studies have pointed to increases over time (see Reardon, 1997).

Complementing these studies is recent research on de-agrarianisation in parts of Southeast Asia and Africa (Bryceson and Jamal, 1997; Ellis, 1998; Rigg and Nattapoolwat, 2001), where rural people are abandoning agriculture to take up more lucrative non-agricultural income opportunities emerging at the local, regional or international levels. Rigg and Nattapoolwat's (2001) work in Northern Thailand describes both the diversification of rural livelihoods and the severe shortages of agricultural labour arising in areas where new non-farm income opportunities are drawing labour away from agriculture. Rural economic landscapes are becoming more variegated, complex and less visibly agricultural.

The above studies have stimulated the emergence of new policy and analytical approaches in rural development, resource management and poverty alleviation. More recent approaches, such as the sustainable rural livelihoods approach, recognise the heterogeneity within rural communities, the diversity of economic and agricultural strategies, and peoples' access to resources and assets in creating and sustaining livelihoods (see Chambers and Conway, 1992; Scoones, 1998; Bebbington, 1999; DFID, 1999; Birch-Thomsen et al., 2001; Stocking, 2002).

Whilst there is increasing research on the diversification of rural livelihoods in many parts of Africa, South America and Southeast Asia, such work is absent in the South Pacific. Generally, the current smallholder policy environment in PNG, renders smallholders as unidimensional characters, that is, merely as oil palm, cocoa or coffee growers, who are all too often distracted from commodity production by customary activities and subsistence production. This narrow focus fails to contextualise commodity production in smallholders' everyday lives in terms of how it is embedded in a broader set of household livelihood and social strategies. However, if we view commodity production as one of several inter-related socio-economic and agricultural strategies pursued by smallholders, then the heterogeneity and adaptability of smallholder households become apparent, and rural development policies can incorporate and build on the diversity of economic activities in which smallholders are engaged.

Before presenting our discussion on smallholder livelihood strategies, we provide a brief description of the study area and methods.

3. Study sites

The Hoskins and Bialla oil palm schemes in WNB were established in 1968 and 1972 respectively (Figure 1). Both are based on a nucleus estate model whereby land settlement subdivisions are located near private estate plantations. The estate companies service smallholders by supplying planting material, extension services and transport to cart smallholder fruit to the company mills for processing.

FIGURE 1 HERE

Settlers were recruited to the LSSs from other provinces and were allocated individual leasehold blocks of 6-6.5 ha of which 4 ha were planted to oil palm, with 2 ha at the rear of the block reserved for food production (Hulme, 1984). As the industry expanded, villagers surrounding the nucleus estates were encouraged to plant 2 ha plots of oil palm as part of the Village Oil Palm (VOP) scheme.

Estate company trucks collect smallholder fruit on a 14-day harvesting cycle. Each block receives two payments per month: one payment for fresh fruit bunches (FFB) paid to the leaseholder; and a second payment for 'loose fruit' (ripe fruitlets dislodged from the main bunch during harvesting) collected by women and usually paid to the wife of

the male leaseholder (Koczberski, 2002). Biialla and Hoskins smallholders contribute approximately 54% and 34% to total company production in their respective schemes.

Since the oil palm schemes were established, significant population and demographic change has occurred. Between 1980 and 2000, WNB's annual population growth of 3.7%, was amongst the highest in the country (National Statistical Office, 2001). Population density on the Hoskins LSS scheme has risen from 5.9 persons per block in the early 1970s to 13.3 persons per block (222 persons km⁻²) in 2000, and in 2002 the Biialla LSS averaged 11.1 persons per block (187 persons km⁻²).

PNG's high unemployment rate and the opposition of most provincial governments to informal urban settlements (Koczberski et al., 2001b; Connell, 2003) means that it is difficult for the adult offspring to establish themselves away from the LSSs. Settlers' off-block residence options are further constrained by the difficulties they now experience in returning 'home', and this partly explains the substantial population growth on the Hoskins LSS from 1990 to 2000.

Claims to their 'home' village resources have weakened because most settlers have lived away for long periods (> 25 years), their children were born in WNB and learned Melanesian Pidgin rather than their home languages, and many settlers were recruited from land-short areas (Curry and Koczberski, 1998). Previously, the maintenance of indigenous exchange relationships with kin residing at 'home' (e.g., contributions to brideprices and mortuary payments) ensured that migrants and their children's tenure rights to village resources remained intact. However, as land shortages worsen in migrant source areas, village relatives are contesting the resource claims of returning migrants, particularly those who have lived away for long periods or who were born and raised elsewhere (Curry and Koczberski, 1999; Curry, 2003; see also Carrier and Carrier, 1989 on long-term urban migrants returning home).

At the schemes' inception, a 6.0-6.5 ha LSS block was deemed sufficient for the needs of a single family (C. Benton pers. comm.). Today, however, the single household is being supplemented by co-resident households as sons (and sometimes daughters) marry and raise their own children on the block. Commonly, three generations now share the resources of one, 6 ha block. The original settler timber house now sits amongst several houses, and the 2 ha reserve food garden area supports several households. Further, the two oil palm payments received monthly from the milling company are spread across several households of varying age, status and household needs.

4. Methods

Fieldwork was undertaken in 2000-2002 amongst oil palm smallholders at Hoskins and Biialla. A qualitative assessment involving ethnographic techniques of in-depth interviewing formed the basis of the fieldwork: at Hoskins 12 families were interviewed weekly for six weeks in 2000, and at Biialla 57 families were interviewed once or twice over an eight week period.

For the qualitative survey, repeat visits of about one to two hours were considered the most appropriate means to develop family case studies that explored household social dynamics, livelihood strategies and income distribution. Questions were interspersed in general conversation, and informants were not discouraged from digressing to related issues or other matters that had arisen in the week since the previous interview. This often uncovered new information that would not have been revealed through the use of more standardised surveys.

These qualitative data informed the design of a larger quantitative socio-economic and demographic survey of 100 smallholder blocks at Hoskins in February-March 2001 and 100 blocks at Bialla in May-June 2002. The survey recorded household holdings of oil palm, tenure arrangements, demographic characteristics, subsistence production, income sources, and labour supply issues and agronomic practices associated with oil palm production (for a fuller description of methods, see Koczberski et al., 2001a; Koczberski and Curry, 2003).

5. Results

Multiple household blocks often experience economic and social pressures that lead to tensions and conflicts between co-residents. Yet, opportunities for agricultural change are limited on the LSSs. Leases are over fixed land areas (6-6.5 ha), and regulations specify the areas planted to oil palm (4 ha) and reserved for food production (2 ha), though this latter restriction has not been enforced in recent years. In response to such pressures, smallholders have developed several strategies to secure their livelihoods, including new oil palm production practices (Curry and Koczberski, in press) and non-oil palm livelihood strategies.

Non-oil palm livelihood strategies fall into three main categories: subsistence production to maintain food security; income diversification to reduce economic risk; and local and long-distance migration to enhance access to resources such as land and capital.

5.1 Subsistence production

Smallholders rely on the cultivation of food crops, both for household consumption and cash income. Overall, smallholders spend considerably more time in food gardening than they do in oil palm-related work, especially women who allocate almost 2.5 times as much of their labour to food gardening than to oil palm. Men allocate about equal amounts of time to each activity.

Access to land for food gardens reduces smallholders' vulnerability to fluctuating oil palm prices. The importance of subsistence production for food security was apparent in a dietary recall survey conducted with smallholders on the Hoskins scheme between September and November 2000 (Koczberski et al., 2001a). We compared the role of household food gardens in daily diets of LSS smallholders at Kavui with nearby VOP smallholders at Gaungo Village.

The survey revealed that LSS smallholders were much more dependent on food gardens than village smallholders. Almost 80% of meal ingredients at Kavui LSS subdivision were from subsistence gardens compared with about 50% of meal ingredients at Gaungo Village. Further, village smallholders had more varied diets as two-thirds of all the meals they consumed contained at least one non-garden ingredient compared with 23% of meals of LSS smallholders at Kavui.

Root crops, green vegetables and bananas dominated meal ingredients for settlers, whereas village smallholders consumed more meat and fish and store bought foods (Figure 2). Nineteen per cent of all meals at Gaungo Village contained either “fresh meat/fish” or “tinned fish”, compared with only 6% of settlers’ meals. Several PNG studies have reported improved nutritional outcomes when traditional diets are supplemented with purchased foods like tinned fish/meat, rice and fresh fish/meat which are higher in protein, zinc and energy than local staples (e.g., Ohtsuka et al., 1984; Heywood and Hide, 1994; Mueller et al., 2001). Therefore, during the survey period when oil palm prices were relatively low, it is probable that Gaungo villagers had better quality diets than LSS settlers.

FIGURE 2 HERE

The differences in diet quality between LSS and village smallholders partly reflect the wider range of commodity export crops held by village smallholders and the population pressure on the LSSs, where falling per capita oil palm income is increasing settlers’ dependence on subsistence food production. It must be noted, however, that the dietary survey was undertaken during a period of depressed oil palm prices (K50-70/tonne; K1 = US\$0.31, November 2004), and many LSS smallholders stressed that they relied more heavily on gardens when oil palm prices were low. It is likely, therefore, LSS smallholders’ dependence on subsistence food production has declined since then because prices have risen (K130-K140 t⁻¹ in mid 2002).

5.2 *Income diversification strategies*

The economic pressure on densely populated LSS blocks to develop supplementary income sources is reflected in the increasing number of non-oil palm income sources as mean block population rises (Table 1). The most common sources of non-oil palm income include the local marketing of garden produce, the cultivation of high value cash crops, small business enterprises, and, to a limited extent, off-block employment (Figures 3 and 4).

TABLE 1 HERE

FIGURE 3 HERE

FIGURE 4 HERE

Garden food production provides an additional income source for families. Many households, in addition to cultivating food gardens primarily for their own consumption, have established additional food gardens for the production of foods for sale at local

markets. The latter are often planted as monocultures of high value crops such as peanuts and sweet potato. Fruits such as pineapples, pawpaw, watermelon and banana are also grown for sale at local markets.

Most market sellers are women, and the majority of LSS women market regularly (at least once a week). Fifty-four per cent of women sellers at town and roadside markets were from the LSS schemes (Table 2). LSS women were disproportionately over-represented in local markets in the values of food items for sale, and dominated sales of “garden” produce both in monetary value and in their proportional share of the quantities of these items on sale (Figure 5). Marketing is the primary source of income for some households on highly populated LSS blocks, and provides an important income between the monthly oil palm cheques.

TABLE 2 HERE

FIGURE 5 HERE

Recently, some limited cash crop diversification has occurred. In the past few years, Hoskins and Bialla LSS and VOP smallholders have planted vanilla (Figures 3 and 4). Vanilla is attractive to smallholders because it can be cultivated on hilly areas unsuitable for oil palm, requires less labour than oil palm, and does not need much land.

Betel nut (*Areca catechu*) plantings have also expanded to commercial levels among some smallholders. Betel nut has long been sold at local markets, but the nature of its production, marketing and trade is changing. Some smallholders now view betel nut as another cash crop and have established smallholdings for bulk wholesaling. Often they are planted in dense stands around houses, and therefore do not take land out of oil palm production. In 2002, 17% of smallholder households in Bialla reported betel nut sales as their second or third most important income after oil palm.

A limited amount of diversification of non-cash crop income is occurring. Commercial enterprises operated by smallholders vary in size and turnover, and include transport (public motor vehicles – PMVs), tradestores, kerosene sales and the raising and marketing of poultry and pigs (Figures 3 and 4). Tradestores are typically small, stock a limited range of goods and operate on narrow profit margins. As more highly populated blocks adopt a rotational production strategy in oil palm, where each household receives a few oil palm payments per year, it is becoming necessary to develop non-oil palm income sources. At Hoskins, 100% of LSS blocks earn income from local markets and 62% of blocks have another income source in addition to oil palm and income from local marketing. Should a business prove successful, the household managing it may opt out of oil palm production entirely to allow co-resident households more frequent access to oil palm income. Smallholders refer to this practice as ‘*givem spes long ol*’ (giving room/opportunities to others).

Another strategy to reduce pressure on oil palm income on highly populated blocks is for some block residents (usually men) to seek off-farm wage employment, most of which is as plantation labour. Off-farm employment is often cyclical and fluctuates in response to family circumstances, oil palm prices and levels of family conflict. At

Hoskins in 2001, 12% of LSS blocks had men working away (13% of LSS blocks at Bialla in 2002). Access to off-farm wage employment can add significantly to material standards of living on LSS blocks. Indeed, family members in full-time employment from highly populated blocks often provide considerable income support to other block residents, and are a source of capital for farm inputs. They frequently meet large expenses such as school fees, farm inputs, customary payments (e.g., brideprices), and provide start-up capital for small businesses. Permanent houses, water tanks and other substantial assets purchased in the recent past have mostly been financed from off-farm employment.

Income diversification demonstrates the adaptability of smallholders to adjust their labour and land use strategies to respond to changes and exploit economic opportunities as they arise. Despite the rigid institutional and commercial framework that governs the LSSs, smallholders exhibit a considerable degree of agency in developing new combinations of livelihood strategies. However, as the next section reveals, for some smallholders their livelihood choices are constrained and they are sometimes compelled to adopt strategies with doubtful long-term viability.

5.3 Migration and land accumulation strategies

One strategy to relieve economic or population pressure is for a household, or a household member, to migrate temporarily, for several months to a year or more. This appears more common when oil palm prices are low and may involve returning to one's 'home' village or visiting relatives in other parts of the country. When block residents leave, per capita oil palm income rises for remaining residents, and a higher proportion of garden produce can be diverted for sale at local markets, further raising per capita incomes.

However, as noted above, returning to one's village is no longer possible for many LSS smallholders. For LSS smallholders unable or unwilling to return home, population pressure may be eased by pursuing land accumulation strategies such as illegally occupying land, or 'purchasing' customary owned land. In January 2001, the oil palm extension agency at Hoskins identified 30 blocks illegally planted to oil palm on state and company land. The 'squatters' were young married men from the densely populated blocks in a nearby land settlement subdivision.

Second generation LSS smallholders with sufficient capital (usually raised from off-block employment), may 'purchase' customary land to plant oil palm, while a select few may purchase an LSS block. The latter option is expensive with 2002 prices at Hoskins ranging from K15,000 to K30,000. The purchase of an LSS block is the only land accumulation strategy that provides legal security of tenure. Other land accumulation strategies carry risks of eviction, as some settlers 'purchasing' customary land are experiencing to their dismay (Koczberski and Curry, 2004). The 'sale' of communally held village land to non-clan members ('outsiders') by clan leaders is a recent phenomenon, and is sometimes vigorously contested by other members of the customary landholding group. That some LSS settlers are willing to pursue this high risk strategy is indicative of the social and economic stresses on their blocks.

The particular type of migration or land accumulation strategy that a household pursues reflects how access to various kinds of resources – social and kinship networks, and capital – influences people’s capacity to develop viable livelihoods. For those without the necessary resources and social networks, responding to income and economic pressures may require strategies that ultimately increase their vulnerability to livelihood breakdown, such as when they are compelled to become squatters on state land or ‘purchase’ customary land with insecure tenure.

6. Discussion and conclusion: Sustaining productivity and livelihoods

While the economic diversification occurring on the LSSs in PNG follows trends observed in many parts of Africa, Latin America and Southeast Asia (see Section 2 for references), there are important differences. Off-farm and non-agricultural incomes are less significant in the PNG context than in other areas studied. Also, farm income (from oil palm production) remains the dominant livelihood strategy for the majority of settlers with only a tiny minority deriving the bulk of their income from other sources. Unlike many Southeast Asian countries, international labour migration from PNG remains undeveloped and there are limited employment opportunities in PNG’s urban industrial sector. Hence, employment prospects are much lower for PNG smallholders migrating to urban areas or to their home areas. Despite the lower probability of finding work, the migration option is viable because it temporarily relieves pressure on family members remaining on the block as the cost of supporting an LSS family member is shifted to urban or village-based relatives. This can be contrasted to the Malaysian situation where rapid industrialisation has created attractive employment opportunities for the residents of land settlement schemes, especially young people. An ageing population on these schemes has necessitated the recruitment of workers from Indonesia and the Philippines to make up labour shortfalls (Fold, 2000).

There is limited acknowledgment in the industry of the importance of non-oil palm activities to the livelihoods of smallholders. Indeed, non-oil palm activities are often viewed as distractions drawing smallholders’ time and energy away from oil palm production. In a recent report commissioned by the World Bank on the future development of the smallholder oil palm sector in PNG, the diversification of income, particularly diversification of commodity cash crops by landowners, was noted negatively. The report concluded:

“Although diversification of investments reduces risk, it is not always appropriate at the farm level. Oil palm smallholders whose main activity is oil palm should focus their attention on being as efficient and productive as possible with this crop. The recommendation is that Government should recognise this and lessen the resources applied for initiatives to diversify cash cropping activities of oil palm smallholders” (ADS, 2001, 92).

The report did not recognise that for many oil palm smallholders supplementary income is now essential for household economic security. Rather than ignoring income diversification, smallholder development policies and the region’s long-term development plans could be improved by recognising and building on the diverse range

of livelihood strategies now pursued by smallholders. It is probable that as population and land pressures continue to rise on the LSSs, an increasing proportion of settlers will be engaged in non-oil palm income activities, both on and off-farm.

In this final section we sketch some potential policy directions that acknowledge the new and diverse rural economies emerging in the oil palm regions of PNG. Economic diversification opens up opportunities for the oil palm industry to formulate innovative and sustainable smallholder policies. The view of smallholders as solely oil palm producers limits the range of potential interventions to increase production and overcome other farm management 'problems'. For instance, a major constraint on smallholder productivity is their reluctance to poison and replant senile palms. Several inter-related factors explain their reluctance to replant (Koczberski and Curry, 2003), but a significant disincentive is the financial burden of poisoning old palms and purchasing new seedlings and the loss of income for almost two years as they wait for immature palms to come into production (Curry and Koczberski, 2004). Smallholders are required to go into debt at the same time as their capacity to repay loans is reduced through the loss of income.

Such risks could be reduced through supporting and promoting alternative income streams during replanting. Given that smallholders show a willingness to diversify income sources, there are opportunities for the industry to assist smallholders to establish small businesses such as the repair of wheelbarrows and tools and to support other oil palm-related businesses. The latter could include the devolvement to smallholders of small-scale enterprises currently managed by the milling companies or agricultural extension organisation. Such economic activities include sales and deliveries of fertiliser and tools, and some transport businesses. Extension support could also be provided for the cultivation of high value market crops inter-planted with oil palm seedlings. Inter-cropping is occurring on some replanted blocks and could be further encouraged.

Income diversification, particularly off-farm income, is associated with higher levels of farm investment and innovation. Evans and Ngau (1991) reported that rural households with access to non-farm incomes in Kenya were more accepting of the risks associated with innovation. They were more likely to invest in their farms through hiring labour, purchasing farm inputs or acquiring additional land. Evans and Ngau (1991) acknowledge that production decisions are enmeshed in a myriad factors, but a key determinant is the extent to which farming households can diversify their incomes, and their capacity to do so depends to a considerable extent on the wider non-agricultural/urban context. Thus, an understanding of how smallholder agricultural production and livelihood choices interact with broader non-agricultural economic opportunities is useful for developing more appropriate smallholder policies.

Recognition and understanding of smallholder livelihood strategies would also enable the industry to avoid initiatives detrimental to smallholders, and which may ultimately reduce oil palm productivity. For example, there is a risk that some LSS smallholders may be affected adversely by the current 'infill' land use policy of encouraging them to plant oil palm in their 2 ha garden reserve land, a policy recently endorsed by a World Bank commissioned report (ADS, 2001). This policy does not recognise that food

production, whether for household consumption or sale at local markets, is a fundamental component of the livelihood strategies of the vast majority of LSS smallholders. The long-term viability of the LSSs depends to a large extent on the food and income security provided by access to gardening land, especially when oil palm prices are low.

Income diversification among smallholders also has relevance for provincial and regional policies of development. In the absence of effective family planning programmes, it is probable that as population and land pressures continue to rise on the LSSs, an increasing proportion of settlers will be engaged in non-oil palm income activities, both on and off-farm. There is little doubt that population growth contains both risks and opportunities for the industry. On the LSSs continued population growth in the absence of a corresponding growth in income and employment opportunities is likely to lead to greater social instability. Indeed, a persistent feature of PNG's economic development has been the inability of employment growth to keep pace with population growth (McMurray, 1995). However, the high concentration of capital assets (human, financial and social) in the oil palm growing areas of PNG means that there is potential to develop a strong broad-based economy. This broadening of the region's economic base could begin by strengthening the informal economy and reinforcing income diversification in extension messages as well as promoting new forms of non-farm employment. Such strategies might include the upgrading of facilities at roadside markets, training in bookkeeping for small business, the devolvement of some milling company and extension agency roles to smallholders such as small-scale workshops and the sale and transport of farm inputs, and the intercropping of newly planted oil palm with high value cash crops like spices.

This could be achieved by strengthening the linkages between the farm and non-farm sectors. The labour intensiveness of the oil palm industry (compared, say, with mining) means that considerable amounts of cash are widely dispersed amongst the populations and local economies of Biella and Hoskins as payments to smallholders and as wages to plantation labourers. The broad distribution of income in local economies, the willingness of smallholders to diversify their income sources and the reasonable level of infrastructure compared with most other areas of PNG mean that the conditions are present for more broadly-based economic development. Oil palm growing regions could become 'hubs' of economic development where the local economies are broadened by strengthening the linkages between the agricultural and non-agricultural sectors to create new forms of enterprise and employment.

By drawing attention to processes of livelihood diversification, we have sought to highlight the adaptability of smallholders in responding to socio-demographic and economic change. The general picture is one of smallholders actively seeking solutions and finding new ways to maintain their livelihoods and household well-being. While the development of new livelihood strategies partly reflect a level of social and economic stress on the LSSs, particularly densely populated blocks, a significant rural change is in progress. The challenge for extension services and provincial development authorities is to consolidate and build on these changes through innovative policies that strengthen linkages between the smallholder sector and the broader regional economy.

7. Acknowledgements

This paper draws on a collaborative project with the Australian National University (K. Gibson), PNG Oil Palm Research Association (OPRA) and Curtin University, with funding from the Australian Centre for International Agricultural Research. We are grateful for research assistance from Normal Konimor and Pauline Hore of OPRA, and the co-operation and support of staff of the PNG Oil Palm Industry Corporation (OPIC). OPIC staff assisted with the local market surveys in 2000 and the smallholder surveys in Biialla in 2002. The paper was presented initially at the “International Conference on Local Land Use Strategies in a Globalizing World: Shaping Sustainable Social and Natural Environments”. Institute of Geography, University of Copenhagen, 21-23 August, 2003. We thank the editors of this issue and the referees for their constructive criticisms.

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Table 1. Mean block population by numbers of non-oil palm income sources at Hoskins and Bialla Land Settlement Schemes.

Numbers of non-oil palm income sources per block	MEAN POPULATION PER BLOCK	
	HOSKINS	BIALLA
One non-oil palm income source	11.2	9.4
Two non-oil palm income sources	13.1	10.1
Three or more non-oil palm income sources	15.9	12.2

Table 2. Numbers and percentages (in brackets) of settler women marketing in October 2000 from Land Settlement Scheme (LSS) subdivisions or residing on Village Oil Palm (VOP) land*.

	MARKET						
	BULUMA	HOSKINS	KAPORE	KIMBE	MOSA	NAHAVIO	TOTAL
LSS	16 (50)	7 (54)	21 (95)	49 (45)	29 (67)	14 (41)	136 (54)
VOP SETTLER			1 (5)	6 (5)		13 (38)	20 (8)
OTHER**	16 (50)	6 (46)		54 (50)	14 (33)	7 (21)	97 (38)
TOTALS	32 (100)	13 (100)	22 (100)	109 (100)	43 (100)	34 (100)	253 (100)

* The market survey was undertaken with staff of the Oil Palm Industry Corporation in October 2000.

** "Other" is made up of women residing in town, company or government compounds, and village women from customary landowning groups.

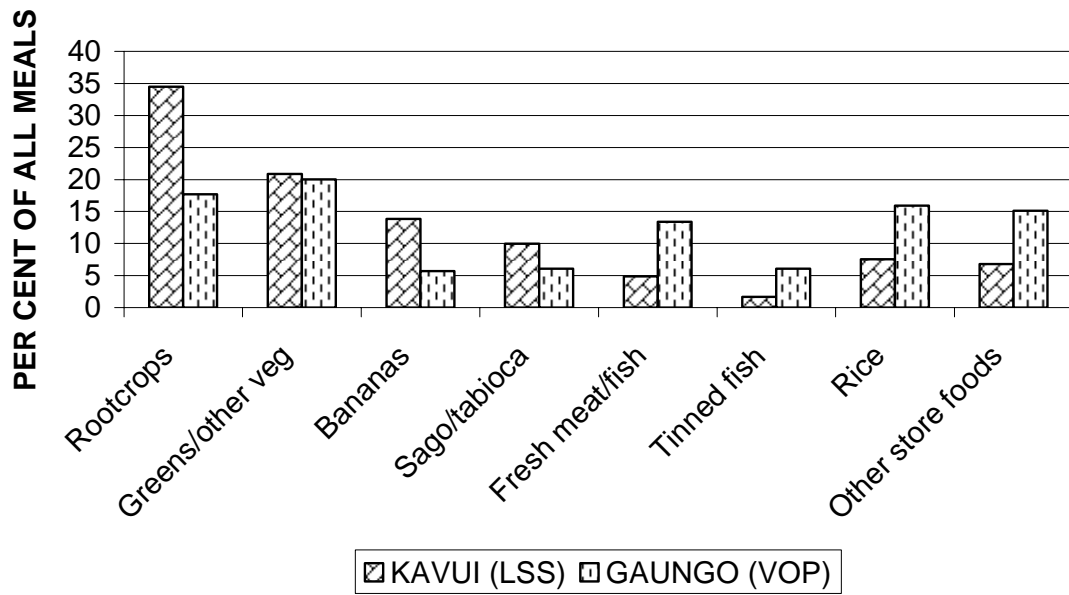


Figure 2. Meal ingredients as percentages of all meals.

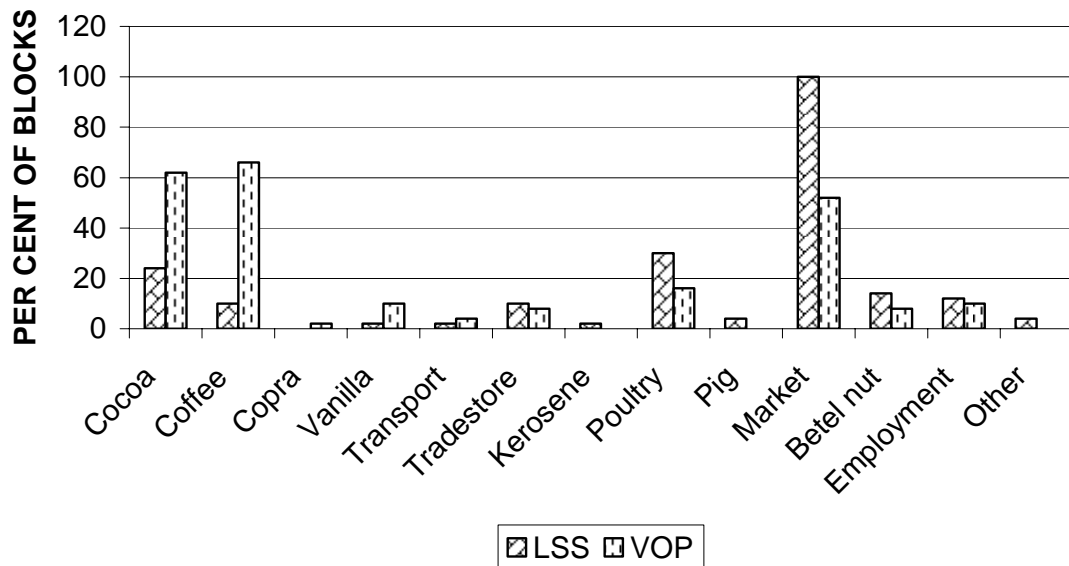


Figure 3. Non-oil palm income sources for Hoskins Land Settlement Scheme (LSS) and Village Oil Palm (VOP) growers.

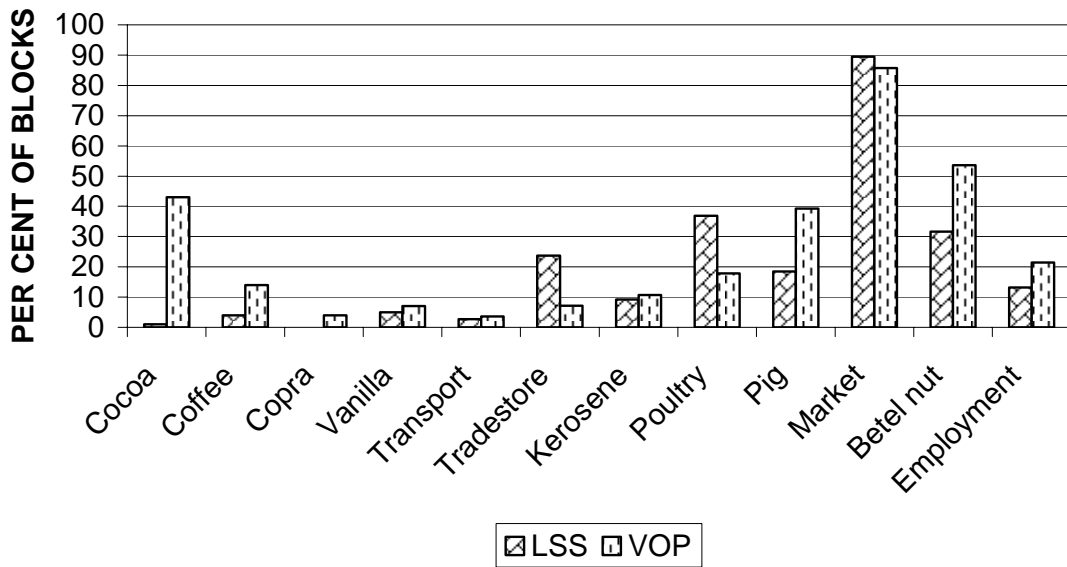


Figure 4. Non-oil palm income sources for Bialla Land Settlement Scheme (LSS) and Village Oil Palm (VOP) growers.

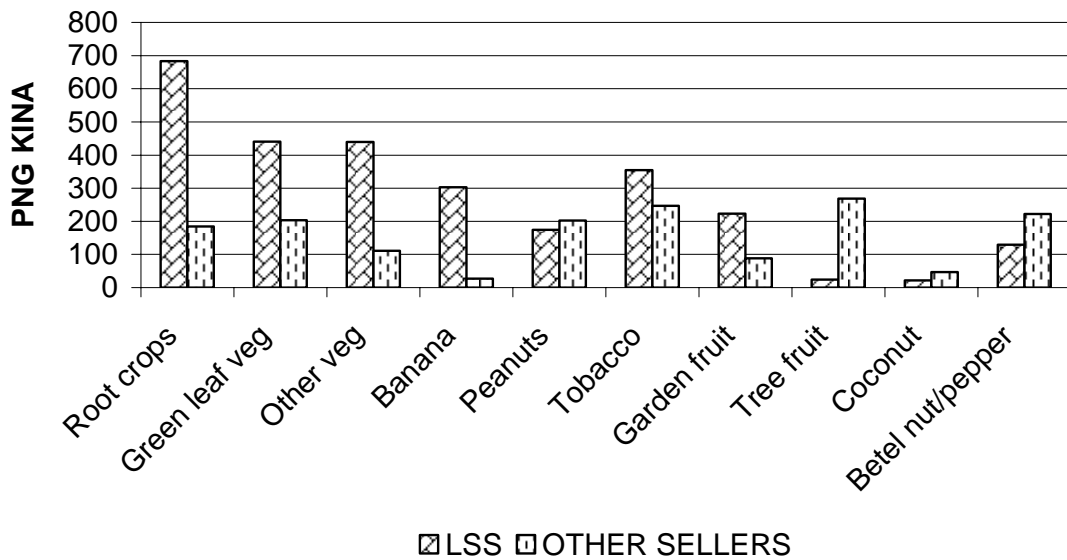


Figure 5. Values of categories of garden items on sale at local markets in Hoskins-Kimbe area.