PART OF THE REASON WHY FOOD CROPS AND LIVESTOCK EXTENSION IN PNG IS DECLINING

R. Chris Dekuku
Department of Agriculture and Livestock, P. O. Box 2033, Port Moresby

ABSTRACT

Food Crops and Livestock production and productivity is at a standstill and declining for some components in Papua New Guinea, and part of the blame is attributed to failing extension delivery among other factors. This paper reasons that part of the failures in agricultural extension are due to the low number of extension staff and low financial resource allocation to support extension. In a country so diversified, and having poor road and transport and marketing infrastructure and in addition to relatively high illiteracy rate, increased investment in agriculture is needed for addressing rural food security, income and rural poverty.

Key Words: *Agricultural production, agricultural extension, gross domestic product, farmer extension officer ratio, farm households to extension officer ratio*

INTRODUCTION

Majority of Papua New Guineans are engaged in agriculture; 82.3% are employed by **occupation** in agriculture, animal and fishery work and 71.1% are employed by **industry** in agriculture, hunting and forestry [NSO 2000 Census report].Yet Papua New Guinea is one of 83 countries classified by the Food and Agriculture Organization [FAO] of the United Nations as a Low Income and Food Deficit Country [LIFDC]. This is based on increasing food import volumes. This reflects decline in food production and / or lack of access to food and income to buy food. With population growth rate of 3.1%, agriculture is estimated to be growing between 1-1.6% only [NADSH 2002]. Unless a drastic action is taken, to improve on agricultural growth, agriculture would continue to lag behind population growth, and this would further aggravate the issues of food insecurity, hunger and malnutrition and affect the sustainable livelihood of many citizens in the future. The decentralization of Agricultural Extension after Independence has been identified as one of the major contributing factors in the decline of agricultural production and productivity in PNG.

Agricultural extension is to provide information, advice and assistance to farmers to help them identify and analyze their production, processing, packaging, storage and marketing problems and to become aware of opportunities and options. In developing countries such as PNG, the important role of agricultural extension can not be overlooked, as it is the major source of agricultural information to the majority [82.3%] of the rural and agricultural population. This paper would discuss the failures from the points of extension staff numbers and resource allocations based on information from eleven provinces.

Background on PNG's Agricultural Extension Services

Prior to Independence in 1975 and up to 1977, agricultural extension was unified and was the responsibility of the Department of [stocks] and Primary Industries [DPI] now called the Department of Agriculture and Livestock. The DPI operates from Port Moresby with the help of four Regional Officers [Controllers]. The Extension services had well qualified and disciplined staff, well funded and managed.

The Organic Law on Provincial Governments enacted in 1997, led to the creation of 19 Provinces and Governments and the delegation **[relegation?]** of responsibility of agricultural extension to them. The establishment of Provincial Administrations and supporting staff and responsibilities had absorbed a high share of staff capacity, funds and time previously devoted to agricultural extension. This coupled with exodus of experienced and expatriate staff had led to declining and inexperienced agricultural extension staff numbers and had begun the decline in the extension services. Links with research stations and information became less and less with increasing distances from the sources in the major cities. Younger and inexperienced extension staff had difficulties of being accepted and trusted by farmers. Since many officers operate in regions and areas where they have kinship ties, this in some cases had also contributed to reduced performances. Without directions and proper guidance and management, and in addition to issues mentioned above, the provincial extension services began to decline after 1977.

Reports by Mc Killop [1982,], ANZDEC [1990] Bammann *et al* [1997], Dekuku [1998,2001], Dekuku

et al. [2001] and Caven and McKillop 2001 indicated that agricultural extension services in PNG has constraints and had declined since independence and are relatively inefficient and ineffective. Indications are that agricultural extension as at now has gone from 'bad to worse since independence' [Kagena 2001].

Over the years since independence, the agriculture sector's contribution to the GDP has declined from a high of 36.7% in 1977 to 23.9% in 1999, and rose slightly to 25.1% in 2000 and decline again in 2001 [Table 1]. The downward trend is partly a consequence of the sector's performance as dictated by declining productivity and production, fluctuating world market prices for agricultural commodities [as well as increases in non-agricultural exports, such as crude oil and minerals].

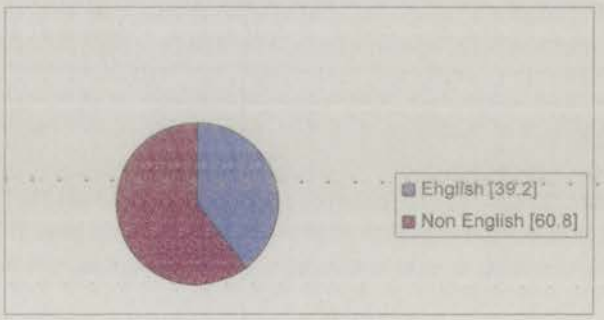
Agricultural extension and literacy

According to the 2000 Census, English literacy in PNG is only 39.2% [Fig. 1], and we do not expect any significant change in the very near future, because a relatively high number of school age citizen [44%] not attending school [Table 2]. Yet the majority of agricultural extension materials are in English. This means that, the best way to address the greater numbers of the rural people, [assumed relatively English illiterate], is through an effective extension system, where extension officers would use the local dialects in communicating the needed extension information and technologies to them. It is high time that relevant extension information / technologies be written or translated into the local languages for relevance to a wider audience.

Table 1. **Percent contribution of agriculture to gross domestic product in PNG**

Year	Agriculture as % of GDP	Year	Agriculture as % of GDP	Year	Agriculture as % of GDP
1974	26.2	1983	30.7	1992	24.7
1975	26.7	1984	33.5	1993	25.8
1976	26.6	1985	33.3	1994	25.7
1977	**36.7**	1986	32.2	1995	26.8
1978	35.2	1987	29.9	1996	26.5
1979	33.9	1988	29.1	1997	27.4
1980	33.7	1989	28.1	1998	24.4
1981	33.6	1990	28.2	1999	23.9
1982	33	1991	26	2000	25.1

Figure 1. **PNG citizen 10 years and over in private dwelling by english literacy in 2000.**



A look at numerical Aspects of Agricultural Extension in Selected Provinces in PNG

Eleven Provinces from which agricultural budget allocation data was provided to the author are highlighted in this study. The 2002 Census data for these Provinces were also consulted and utilised for the analysis reported here. The Provinces are;

Table 2. **PNG citizen population aged 5-29 years in private dwelling by school attendance in 2000.**

Classification	Number	Percentage
Attending school now [26%]	727,888	26
Attended in the past [28.4%]	794,045	28
Never attended [44.1%]	1,233,629	44
Not stated [1.5%]	42,750	2
Total	2,798,312	

Manus and New Ireland covering the Islands Region, Madang, Morobe, East and West Sepik for Morobe, Central, Milne Bay and Northern for Southern Region and Chimbu and Enga for Highlands region.

Number of Households in Agriculture and Fisheries

A look and analysis of the 2002 Census data indicated that, of the total number of households surveyed, 77.7% [New Ireland] to 89.2% [West Sepik] are engaged in agriculture, animal and fisheries work [Table 3]. This is a considerable high number of the population. Improving the lives of these rural people may result in significant improvement in the rural and national economy. For this to happen, PNG needs to invest highly in agricultural extension. This is even more important, if we take into consideration, the poor road and transport infrastructure, poor communication, diverse and difficult to reach terrains, location and environments, also relatively moderate to high illiteracy.

Budget Allocation to Agricultural Extension in Selected Provinces

Government Budget allocations to agricultural extension [DPI'S] in the various Provinces,[as supplied by them] for the period 1997 to 2002 indicated very low amounts[Table 4]., relative to the population engaged and to be addressed in agriculture [Table 5].

In Kina value, on the average, Morobe Province provided the highest funding to agricultural extension, K1,253, 000 /year, while the lowest were Chimbu K250,000/year and Manus K117,300 / year [Table 4].

Table 3. PNG citizen households in private dwellings by agricultural/fisheries activity in selected provinces, based on 2000 census

Category	Manus	New Ireland	East Sepik	Madang	Morobe	West Sepik	Central	Milne Bay	North-ern	Chimbu	Enga
Agriculture Animal and Fishery workers	12,547	34,787	121,056	128,029	185,019	67,528	72,121	82,044	49,211	125,880	140,550
Total Households Surveyed	15,437	44,880	137,858	151,294	234,814	75,704	83,124	96,812	57,164	142,636	162,433
Percent households [%], of Agric. Animal & Fishery	81.3	77.5	87.8	84.6	78.8	89.2	86.8	84.7	86.1	88.25	86.53

Table 4. **Budget allocation to selected provincial agricultural programs from 1997 to 2002 [in K'000]***

Province	1997	1998	1999	2000	2001	2002	Province Total	Average/year
Central	450	424	430	450	482	450	**2686**	**447.7**
Milne Bay	205	225	235	238	425.1	717.2	**2045.3**	**340.9**
Northern	505.7	533.7	548.7	578.1	604.9	482.9	**3254**	**542.3**
Enga	71	337.56	110	1,024.40	843.2		**2386.16**	**397.7**
Chimbu	85.2	44.6	185.9	216.6	120.3	347.9	**1000.5**	**250**
Morobe	1,057	855.9	1,193.80	1,433.70	1,488.80	1,488.80	**7,518**	**1253**
Madang	664.1	406.6	266.6	486.5	85	545.5	**2454.3**	**409**
East Sepik	1,226	428.9	193.5	373	213.6	466.4	**2,901**	**483**
West Sepik	108.5	89.5	112.2	67.7	238.7	89.5	**706.1**	**117.7**
Manus	105	166.3	170.5	189	105	175	**910.8**	**151.8**
New Ireland	461	141.89	197.2	158.7	748.2	617.5	**2324.49**	**387.4**
Year Total	**4938.5**	**3653.95**	**3643.4**	**5215.7**	**5354.8**	**5380.7**	**28187.05**	**427.1**

* Derived from budget allocation figures provided by Provinces in June 2002

Since agricultural extension is targeted at helping farmers, one would expect that in allocating funds, the number of farmers in the Provinces would be taken into consideration. This paper would look at funding to agricultural extension versus the farm population in eleven Provinces in PNG, as a component of the extension delivery system.

The Number of Extension Staff in the Selected Provinces as at June 2002 and the ratio of Extension staff to Agricultural Food Production Households and Farmers

The number of agricultural extension staff as at June 2002 in the Provinces [table 5] ranged from 19 [Manus] to 68 [Morobe], with an average of 32.

The Number of Households engaged in various agricultural activities provided indicated that, the highest numbers were involved in Food crops and vegetable production [Table 5], as compared to Livestock and Poultry production.

In order to work out the number of extension staff and households ratio, the author made the following assumptions;

1.That most households are engaged in multiple farming activities. That is, that some of the food crop/ vegetable producers **are the same people** engaged in livestock and poultry production. This is based on the general knowledge that food production is the first agricultural activity of rural households. Thus taking the **number of food and vegetable producers** would approximate to the **Agricultural Food Producers** [food crops/ vegetables, livestock and poultry] in each Province.
2. That most of the extension staffs are predominantly engaged in Agricultural Food Production extension. Although a few may provide export tree crop extension occasionally in some provinces that lack adequate numbers of export tree crop staff, they in addition also provide extension to Agricultural Food Producers.

Ratio of Extension Staff to Agricultural Food Producing Households per Province

Based on the above assumptions, the number of **Agricultural Food Production Households** to **an extension staff** in each Province was calculated, as;

c = a/b, ——————————————— **i**

where a = Food Crops and Vegetable Households,
b = number of extension staff , and
c = is the number of Agricultural Food Production Households to One Extension Staff.

Table 5, indicated very high number of households per One Extension Staff. Manus has the lowest or best [1: 285], and Chimbu, the highest or worst ratio [1: 2,213]..
In simple terms, this means that one extension staff needs to address the needs of 286 households in Manus, while in Chimbu, the number of households is 2, 213..

The Figures for the Provinces, from relatively best to relatively worst are; Manus [285] New Ireland [570], Northern [571], Central [658], West Sepik [793], Enga [962], Morobe [974], Milne Bay [1290], Madang [1362], East Sepik [1829], Chimbu [2213]

With the low funds allocated to agriculture, the difficult road and transport and other infrastructure, poor literacy, one wonders as to how extension officers would be effective with these relatively high number of households per extension officer.

Ratio of Extension Staff to Agricultural Food Producing Farmers per Extension Staff in the Provinces

The Household size per province indicated the average of 5 or 6 persons per Province [table 5]. If we assume that two people in each household are not engaged in agriculture [doing other activities or too young] then the assumed Active Agricultural population per household is 3 or 4 depending on the Province [table 5]. Using these figures [Table 5], we could also work out the number of Active Agricultural population per One Extension Staff or **Number of Food Producing Farmers** per One Extension Staff for each Province as follows;

e = c x d ——————————————— **ii**

Where **e** = Number of Food Producing Farmers per one Extension Staff, **c** = the number of Agricultural Food Producing Households to one Extension Staff, and **d** = active agricultural population per household

Table 5, indicated that the **Number of Food Producing Farmers** to be addressed by each extension officer is so high in all the Provinces, and possibly impossible to be achieved effectively unless funding, road and transport infrastructure are adequate'.

The corresponding figures are; Manus [855] New Ireland [1710], Northern [2284], Central [2632], West Sepik [3172], Enga [3848], Milne Bay [3870], Morobe [3896], Madang [5448], East Sepik [5487] and Chimbu [6639].

Thus, an extension Officer in Manus would have to address 855 farmers, while those in Chimbu would

Table 5. **PNG citizen households in private dwellings by type of agricultural activity in selected provinces, based on 2000 census and number of households and farmers per extension staff in 2001/2002**

Category	Manus	New Ireland	East Sepik	Madang	Morobe	West Sepik	Central	Milne Bay	North-ern	Chimbu	Enga
Livestock households	1,098	7,359	7,028	23,830	33,068	8,064	10,326	14,365	6,105	39,641	35,453
Poultry households	1,377	6,104	12,542	19,371	19,523	6,963	5,404	15,078	5,344	13,967	10,211
Food crops/ vegetables households [a]	**5,409**	**16,549**	**49,378**	**46,322**	**66,240**	**23,808**	**22,386**	**32,251**	**16,014**	**44,250**	**40,391**
Number of Extension Staff in June 2001[b]	**19**	**29**	**27**	**34**	**68**	**30**	**34**	**25**	**28**	**20**	**42**
Number of Food Crops and vegetable Households per extension Officer [c]	**285**	**570**	**1,829**	**1,362**	**974**	**793**	**658**	**1,290**	**571**	**2213**	**962**
Average number of individuals/ household	5	5	5	6	6	6	6	5	6	5	6
Assumed Agriculturally active population per household [d]	3	3	3	4	4	4	4	3	4	3	4
Number of Food Producing Farmers per extension staff [e]	**855**	**1710**	**5487**	**5448**	**3896**	**3172**	**2632**	**3870**	**2284**	**6639**	**3848**

need to address 6639 farmers each per year [table 5].

These high numbers of farmers to extension officer meant that majority of them may not be reached by extension, and if at all very really or irregularly. This leads to lack of appropriate information and technologies in many rural environments and on timely basis and the result may be lack of productivity in those areas.

Government Financial Investment in Agriculture per Each Food Producing Household and Farmer Basis

Government contribution to Agriculture is depicted in Table 4. Using the average contribution per Province for the period 1997 to 2002 alongside the 2002 Census figures on households and farmers in agriculture would give approximate information on financial contribution to agricultural extension by the Government.

Government contribution to Agricultural Extension per Household **[g]** was calculated as such;

g = f / a ——————————— **iii**

Where f = The Mean budget allocated per year, and a = Agricultural Food Production Households per province

Table 6, shows that Government investment in agricultural Extension on household basis ranged from a very low K4.9 / Agricultural Food Producing Household per year in West Sepik to low K33.9 / Agricultural Food Producing Household per year in Northern Province.

If we expand the calculations to **Food Producing Farmers basis** using the formula

i = f /h, ——————————— **iv**

Where **i** = Government Kina Invested in extension per each Food Producing Farmer / year, **f** = The Mean budget allocated per year, and **h** = Number of Food Producing Farmers per Province [where **h = a x d** [table 7]

Government financial contribution to agricultural extension on farmer basis [Table 7] indicated very low financial investment on farmers by Government in all Provinces. West Sepik ranked lowest with only K1,24/ Farmer / year and Manus tops but also with low value of K9.35/farmer / year. This goes to support the case of low government support to agricultural extension.

Since the funding goes to support extension staff salaries and wages, accommodation, repairs and maintenance, transport and fuel, equipment and machinery, field supplies and other extension related items, it is no doubt the DPI systems in the Provinces are under performing. The funding situation is so low that village, farm and field visits by extension staff are seldom done, if at all, to only a few villages. This denies majority of farmers access to new or updated agricultural information and knowledge. This is part of the reason for the observed average poor performance by farmers and their farms.

Implications of the findings

In developing countries, improvement in agriculture is one of the best ways to kick start rural development in rural areas where the majority of the population is engaged.

Table 6. **PNG citizen households in private dwellings in food production and by government extension support per each agricultural food producing household [K/Year] for the period 1997 to 2002**

Category	Manus	New Ireland	East Sepik	Madang	Morobe	West Sepik	Central	Milne Bay	North-ern	Chimbu	Enga
Agricultural Food Producing Households / Province [a]	5,409	16,549	49,378	46,322	66,240	23,808	22,386	32,251	16,014	44,250	40,391
Mean of 6 year Budget allocation K'000 per Province [f]	151.8	387.4	483	409	1253	117.7	447.7	340.9	542.3	250	397.7
Government Kina Invested in extension per each Agricultural Food Producing Household per year [g]	28.1	23.4	9.8	8.8	18.9	4.9	20.0	10.6	33.9	5.6	9.8

Table 7. **Average government kina investment in agricultural extension per each agricultural food producing farmer/ year in selected provinces for the period 1997 to 2002**

Category	Manus	New Ireland	East Sepik	Madang	Morobe	West Sepik	Central	Milne Bay	North -ern	Chimbu	Enga
Agricultural Food Producing Households **[a]**	5,409	16,549	49,378	46,322	66,240	23,808	22,386	32,251	16,014	44,250	40,391
Number of Food Producing Farmers per Household **[d]**	3	3	3	4	4	4	4	3	4	3	4
Number of Food Producing Farmers per Province [h]	**16227**	**49647**	**148134**	**185288**	**264960**	**95232**	**89544**	**96752**	**64056**	**132750**	**61564**
Mean of 6 year Budget allocation K'000 **[f]**	151.8	387.4	483	409	1253	117.7	447.7	340.9	542.3	250	397.7
Government Kina Invested in extension per each Food Producing Farmer **[l]**	**9.35**	**7.80**	**3.26**	**2.21**	**4.73**	**1.24**	**5.0**	**3.52**	**8.47**	**1.88**	**2.46**

Based on the wide gap in agricultural knowledge, many of our farmers have remained subsistence producers. Even in some cases the subsistence production is unable to meet the households' food consumption requirements. Provision of needed information and training of farmers in the various components of agriculture, [production, processing, packaging, storage and marketing] requires the presence and inputs from qualified extension personnel and on timely and regular basis.

Dekuku *et al* 2001, in their report on Constraints Analysis of the Food Industry in Papua New Guinea indicated among other issues that, for **sufficient domestic food production to be achieved**, it is important that adequate research results and technology are available and this needs to be combined with an **effective agricultural extension delivery system.** They also identified that ineffective agricultural extension delivery system results from; high number of farmers to extension officer ratio, low education level of farmers, lack of farmer training, inadequate finance and inappropriate language of technical information. These in turn are influenced greatly by the poor financial support to extension by Districts, Provinces and the National Government.

Agricultural research findings and technologies are useless and not beneficial to farmers if they could not access them or be reached by extension and trained, advised, or demonstrated to on how to apply them successfully. Agricultural extension is the major link between most farmers and the researchers, information and product producers, inventors, investors, processors, packaging and marketing agents, especially in rural areas of developing countries

Failures in agricultural extension delivery in rural areas in developing countries affect production, productivity and also denies the population in those

areas an avenue to improve on and enhance their livelihood.

Failures in agricultural extension in PNG is one of the reasons why the country continues to import food items [crops and livestock produce and products] even for crops and livestock that do well in the country.

The information in this report supports components of the constraints analysis report by Dekuku et al 2001, that, the ratio of farmers or farm households to extension staff is too big, for extension personnel to make serious impact on the majority. Funding to agricultural extension for food [crops and livestock] extension is also grossly very low. Putting the two together; that is the high number of farmers to extension officer and the lack of finance/resources [in a country so dispersed, has poor, transport, storage and marketing infrastructure, and relatively high illiteracy rate] are recipes for low agricultural performance, which is the case of food and livestock production in PNG at the moment.

CONCLUSION

Food crops and livestock extension services in Papua New Guinea lacks funding and manpower as indicated by the analysis. This report suggests that;

1. Agricultural extension needs to be given serious consideration, in terms of numbers for them to play a significant role in PNG's rural development. Staff ratios are not optimum to allow for a good and effective extension delivery system. Vacant staff positions should be filled and /or additional staff ceilings be explored.

2. Financial Support to Food Crops and Livestock Extension programs is too low to promote efficient extension system. This needs to be reviewed.

3. However, since resources [funds and personnel] may not always be adequate, Agricultural Managers also needs to prioritize food and livestock components that this country could make faster gains on [have high financial returns or economic advantage] and help develop and promote these first, instead of spreading thinly and trying to do all things at the same time with limiting resources.

4. In addition, areas like agricultural processing, packaging and marketing needs to be developed to help farmers earn income as well as to be persistent in their production activities. For access to market would help stimulate production and productivity and above all provide income, jobs and employment to rural people.

5. Agricultural extension to consider organizing farmers into groups at village levels, for group extension delivery purposes, for it is easier and more economical to organize extension advice for groups than on one and one basis.

6. Agricultural Extension Managers should develop systems/programs for identifying and training Farmer Leaders, and empower these Leaders to provide extension support to their colleagues in their respective villages and districts. This would help reduce the load on extension officers trying to visit many sites or people which looks impossible at the moment. In addition village people would have their own 'wantok extension managers' as their 'first port of call' when they need extension advice.

7. Consideration should be given to the translation and publishing of relevant extension materials in the major local languages for wider dissemination of information and technologies

8. The Provincial and National Governments need to support food and livestock agricultural extension more than is being done now. Improvement in food and livestock extension would lead to increased productivity and production, which may help the country reduce on its food import bills. Export of the surplus would also earn the country additional revenue. It is no secret that many food crops and livestock grow well here in PNG. We need to empower the extension system, which would stimulate and empower the farmers with information and technologies and help them to deliver the goods.

9. In developing countries, well functioning agricultural extension delivery is very essential for rural development and PNG could benefit from this too. **It is not too late to address the issues. The time is now.**

REFERENCES

ANDZEC LTD. (1989). Agricultural Extension Improvement Study, DAL Consultancy report

BAMMANN, H, DEKUKU, R.C, RISIMIRI, J. (1996). Initial Farming Systems in two pilot districts in Markham Valley, DAL Publications, 122pp

CAVEN, R.D, and McKILLOP, R.F. (2001). Improving agricultural support services in PNG. ACIAR Proceedings No. 99. p 503 – 508

FAO (2000). Food and Agricultural Organization of the United Nations. Low income and food deficit countries. htm

DEKUKU, R. C, BALA A, GWAISEUK, W, WAYI, B,. (2001). Constraints Analysis of the Food Industry in Papua New Guinea.16pp.

NADSH (2002). National Agricultural Development Strategy, Horizon 2002-2012, DAL Publications 102p

NATIONAL STATISTICAL OFFICE, (2000). Census figures for 2000. National and Provincial Summary Reports

KAGENA, V. (2001). Effects of Agricultural Extension Services on Food Production and Human Nutrition: Southern Region Prospective in Food Security for Papua New Guinea. ACIAR Proceedings No. 99. p 494 - 502

McKILLOP, R.F. (1982). DPI Manpower and Training Review. Final Report. Sydney. McKillop, Williamson and Associates