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**Food vs nutrition security: feed the people, well.  
Nutritional challenges of a developing nation**

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*Paper prepared for presentation at the “Ethics, Efficiency and Food Security” The Crawford Fund 2014 Annual Parliamentary Conference, Parliament House Canberra ACT, Australia  
26-28 August 2014*

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# Food vs nutrition security: feed the people, well. Nutritional challenges of a developing nation

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## Abstract



Nutritional security is often not adequately considered and addressed in agricultural research and development (R&D) projects, despite the widespread occurrence of malnutrition. In many countries malnutrition constitutes a 'double burden', with under-nutrition and increasing obesity happening at the same time. Nutritional insecurity occurs either as a result of choice, of not knowing the nutritive values of food and their importance in diet, and/or as a result of 'force' through deficiencies in food supply systems. An assessment of the smallholder farming environment in Papua New Guinea revealed environments that are vulnerable to food and nutrition insecurity. While attempts had been made to increase productivity of commodities in demand in these areas, less attention had been given to nutrition. This disconnect can be addressed by considering nutrition in initial stages of R&D planning; and by developing projects that focus on both productivity and nutrition. It may be possible to boost use of traditional vegetables through building nutrition indicators into projects' monitoring and evaluation systems, and by working with women groups and community organisations to create awareness, with training in schools and health clinics (targeting women) in areas where research projects are implemented.

This paper covers three points on nutritional challenges in Papua New Guinea (PNG). First, the major staple food crops in PNG, their variable nutritional quality and effects on nutrition. Second, the social relationships, culture, beliefs and attitudes to food in rural or local communities and their effects on nutrition. Third, the environmental challenges, especially where food is grown, and access to markets and income.

## Staple food crops

PNG is rich with diversity in crops such as sweet potato, banana, taro and yam. These crops have become staple food for the majority of the people in the country; however, their nutritional qualities are variable (Table I). All of these staples have low concentrations of protein, iron, vitamin A and other minerals,

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<sup>1</sup> This paper was written by Norah Omot and Birte Komolong and presented by Dr Norah Omot.

Table 1. Some food crops and their nutritional composition (Dignan *et al.* 2004).

Name	Protein (g/100g edible portion)	Iron (g/100g edible portion)	Vit A (ug/100g edible portion)
Sweet potato ( <i>Ipomea batatas</i> )	1.1	0.9	185.5
Banana ( <i>Musa cultivar</i> )	0.9	0.6	15
Taro ( <i>Colocasia esculenta</i> )	2.2	1.2	2
Yam ( <i>Disocorea rotundata</i> )	1.4	0.6	40
Karakap, ( <i>Solanum nigrum</i> )	5.0	19.0	NA
Tulip ( <i>Gnetum gnemon</i> )	5.3	3.7	296



except for sweet potato which is rich in Vitamin A. For many families in rural areas, these crops would often be easy to access, and daily would constitute a large portion of any meal eaten, larger than vegetables, protein and fruit. Meals would often be unbalanced resulting in under-nutrition. In contrast, some food in PNG such as the traditional vegetables have high nutritional qualities, as shown in the bottom two rows in Table 1, but they are often eaten in smaller amounts in meals. Evidence from research throughout PNG shows undernutrition.

### Beliefs, lifestyle and culture

People’s beliefs, attitudes to food, social relationships, lifestyles and culture also influence nutrition. Here are some examples.

The orange sweet potato, which is now promoted in some African countries, is also grown in PNG. This variety is nutritionally of better quality than the other varieties, but in PNG we find that a lot of people want to eat the other varieties and not the orange varieties. The reason is that the orange varieties are soft when they are cooked, and people find they quickly get hungry again after eating them. As is the nature in villages and rural areas, families often have only two meals a day. In between breakfast and dinner they have ‘snack food’ of fruit and nuts if available. Hence they would prefer to feel full for a longer time if they have a meal of sweet potato in the morning.

As another example, some people express dislike for nutritious foods such as the traditional vegetables in Table 1. Although they are high in nutritional quality, some people see them as of low status: they consider vegetables like these to be ‘village’ food, and do not want to eat them. Also, some of these vegetables have a distinct taste that people do not like.

In other words, people have access to good quality foodstuffs but they choose not to eat them because of their negative attitudes towards those foods.

Another aspect of people’s attitudes is the preference for processed food. Lifestyles in PNG are increasingly changing because of urbanisation and

modernisation, and this tends to change food preferences and to shift demand away from local fresh food towards manufactured food. As a result we are also seeing increasing rates of non-communicable diseases such as those related to the heart and high blood pressure.

There is also ignorance about food value. In rural areas many people are not educated and they do not understand the value of food. In one study (Muntwiler and Shelton 2001) in a rural village in the highlands of PNG a researcher asked villagers and people who were working in the health clinics what they thought of noodles: whether noodles are an energy food or a protein food or a protective food. Thirty-seven people were interviewed and 76% of them said noodles were a protein food, and that was because the packet showed pictures of prawns and beef and chicken.

Finally on this second point, in many cultures in PNG men are given the best food and are served first. This means that in general women, and largely those in rural areas, miss out on good food and they are greatly affected nutritionally. Any good food that remains after the men have had their share is either divided between the children and women or given to the children, and the women eat whatever is left over.

### **Environment challenges, markets and income**

Turning now to environment challenges, especially where food is grown, and access to markets and income, three aspects are discussed here: (i) the smallholder farming environment and food security status; (ii) the interventions that have been identified to address some of the problems of productivity in these farming environments; and (iii) the gaps found in addressing productivity and nutrition and some suggestions to bridge them.

Seven years ago my organisation ran a project, with funding support from AusAID (Australian Agency for International Development), to try to define the smallholder farming environment. We used geographic information systems to define areas of land that had similar social and geographical characteristics. We called these areas Agricultural Development Domains, or ADDs. We identified 22 ADDs which were grouped into eight clusters. Each ADD was defined based on its agricultural potential, the access to markets and services, and the population density there. Therefore each ADD represents areas where there are or could be similar problems or opportunities in agricultural development, and where similar strategic and investment opportunities or viable sets of opportunities can be worked out.

The map (Figure 1) shows the eight ADD clusters in eight different colours. Areas coloured deep green on the map are the cluster HHH: they are places where agricultural potential is high, access to markets and services is high, and population density is also high. In these areas, because of the potential for agricultural production, a lot of the commodity crops such as coffee, cocoa, coconut and oil palm are grown, and also a lot of high value crops. Market systems are well established in these areas. In contrast, the areas shown as brown or yellow on the map are farming environments that are high in

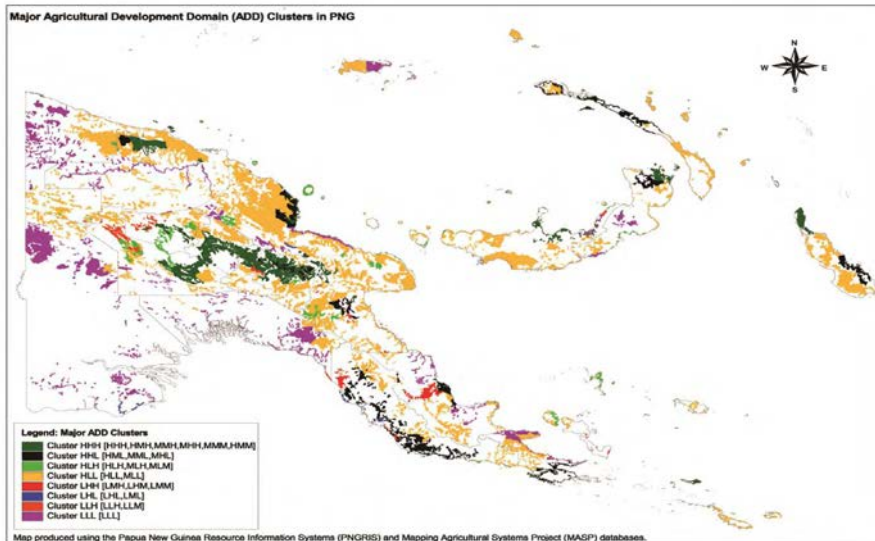


Figure 1. The smallholder farming environment in PNG, based on databases of the PNG Resource Information Systems and Mapping Agricultural Systems Project. Areas in purple or red (southern): low agricultural potential and low market access. Areas in brown or red (northern): low agricultural potential but some access or even good access to markets, or high agricultural potential but poor access to markets. Areas in black or dark green: good market access and high agricultural potential.

agricultural potential but have poor market access and small population density.

We used this map to identify the food and nutrition security status of the smallholder farming environments, and we found that there were three levels of vulnerability within all these different clusters. The most vulnerable areas are those that have low agricultural potential and low access, and they are the areas coloured purple and the red areas towards the southern part of the country on the map.

The next most vulnerable areas are those that have low agricultural potential but have some access or even good access to markets, or they have high agricultural potential but poor access to markets. These are mostly areas in brown and light green, and the red areas towards the northern part of the country. As mentioned above, the least vulnerable areas are those where there is good market access and high agricultural potential, and they are coloured black and dark green on the map.

This mapping showed places with production constraints, and we tried to identify interventions to address them. Most effort would be directed towards R&D, addressing productivity and efficiency, with some interventions focusing on:

- seed systems, crop improvement, marketing systems;
- value adding, abiotic threats, climate change;

- land and soil fertility management, biotic threats;
- pests and diseases, farm mechanisation, market opportunities.

These are broad areas and so there were a number of projects and research topics within them. However, we found that we had not adequately considered nutrition security when we were doing that planning – not on purpose; rather it was an oversight. At that time we had not realised the importance of impacts on nutritional security.

In future this disconnect between productivity and nutrition can be addressed in a number of ways, including by considering nutrition in the initial stages of planning, and by developing projects that focus on both productivity and nutrition. In existing projects we can emphasise the need to focus on nutrition in the implementation plans. Instead of only working within agricultural research we can also link up with other relevant sectors, such as the Health sector.

Another possibility is to work with traditional vegetables: we can improve productivity with new varieties, and we can promote the use of traditional varieties of vegetables to enhance people's nutrition. This could be through building nutrition indicators into projects' monitoring and evaluation systems, and by working with women groups and community organisations to create awareness, with training in schools and health clinics (targeting women) in areas where research projects are implemented.

### Summary

In summary, PNG has nutritional challenges of various types, including those related to food consumption, habits, culture and access to food. Assessment of the smallholder farming environment has revealed areas that are vulnerable in terms of food security and nutrition security. While attempts have been made to increase productivity, less attention has been given to nutrition, and we have identified a series of possible ways of remedying that gap.

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Dr Omot is the Director of the Enabling Environment Programme with the Papua New Guinea (PNG) National Agricultural Research Institute (NARI). She is an agricultural economist with research interest in policies, market systems and value chains, social cultural

studies and innovation systems. Dr Omot has been involved in two ACIAR projects through the PNG NARI. One project, 'Improving the marketing systems for fresh produce in the highlands of PNG', focused on developing supply-chains for the exportation of produce through improved postharvest management and buyer–seller relationships. The second project targeted constraints to women's participation in market-systems, aiming to improve their livelihoods by developing their business acumen. Work on these projects led to Dr Omot being awarded a John Allwright Fellowship, sponsored by ACIAR. Subsequently she received a PhD from University of Canberra. Her studies identified weaknesses in the process of bringing the vegetables from production to market in PNG. Dr Omot is now running the NARI program 'Enabling environment', which is identifying the socio-economic barriers to sustainable agricultural development in PNG. Dr Omot also works closely with the National Office of the PNG Women in Agriculture.

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