

Two independent surveys within the last 20 years found that most of the food consumed in Papua New Guinea (PNG) is produced within PNG. The 1996 PNG Household Survey (Gibson 2001), a consumption survey, found that 84 per cent of calories consumed in rural areas and 50 per cent of calories consumed in urban areas, were produced in PNG. Bourke (2009a) used the Mapping Agriculture Systems in PNG (MASP) data to estimate that 83 per cent of food energy and 76 per cent of protein consumed in PNG was produced in PNG. The very great majority of this food is produced by rural people from their customary land, using their own labour, with almost no external inputs.

Domestic food production in PNG is extremely important. The value of the food produced in 2004 was estimated to be more than 2850 million *kina* per year<sup>1</sup> (Bourke 2009b) — a significant contribution to PNG's balance of payments. It makes the rural village population — over 80 per cent of the total population — largely independent of fluctuations in political and economic conditions for most of their staples, and contributes to political and social stability within the country. Local sales of fresh food provides more rural people with a cash income than any other cash-earning activity, including the sale of coffee and cocoa. Income from the sale of fresh food in 1990–95 was estimated at 44 million *kina*.

The cash incomes earned by rural people and imported food have enabled significant dietary changes in many parts of PNG since 1945. An early nutrition survey (Hipsley and Clements 1947) found PNG village diets were adequate but often imbalanced, with too many calories from carbohydrates and not enough from fats and proteins. Protein levels were 'markedly inadequate'. The lack of protein was especially concerning in children. However, few signs of clinical malnutrition were observed in adults. By 2006, approximately 17 per cent of the calories and 24 per cent of the protein consumed in PNG were imported. Where it is not

possible to earn cash to buy imported food, diets remain inadequate. Additionally, during periodic shortages, people earning cash can supplement their food supply with purchased food, whereas those who cannot earn cash cannot.

The greatest threat to this barely satisfactory situation is population growth. The total population of PNG has been increasing at an average rate of around 2.5 per cent per year since 1966. At this rate, the population will double every 30 years. To understand why unrestrained population growth threatens food security, the rest of this In Brief will look at how food is produced in PNG.

PNG food production systems are shifting cultivation systems, in which soil fertility is maintained by the use of fallows. During a fallow, crops are not planted, and naturally occurring plants grow on the previously cultivated site. The length of the fallow is important because it influences the amount of vegetative material that can be cut down at the end of it and returned to the soil as nutrients for the crops. Cultivated food plants draw nutrients from the soils, and if these are not replaced, crop yields will eventually decline and food production may become inadequate. A growing population requires increased food production. In PNG, widespread malnutrition has not been observed, so it follows that more food has been produced.

However, land use studies by the CSIRO found from 1975 to 1996, when the population increased by 50 per cent, the area of land used for agriculture increased by only 11 per cent (McAlpine and Freyne 2001). Possible explanations are: fallow lengths are getting shorter, the length of time land is planted in crops is getting longer, or people have changed to food crops that are more productive in declining soil fertility situations.

Between 1990 and 1995, the MASP project systematically observed how the challenge to produce more food was being met. Changes included the adoption of more productive staples; the adoption of new cultivars of existing staples; shortened

fallows; extended cropping; and techniques that enhance soil fertility, such as green manuring, planting nitrogen-fixing trees, and rotations of sweet potato with leguminous crops (Allen 2001; Bourke 2001).

Some parts of PNG are more vulnerable to population pressure than others. They include: isolated small islands and atolls with poor access to markets; the highlands between 1500 metres and 2000 metres above sea level, where there is no alternative staple to sweet potato; and high altitude areas above 2000 metres, with no alternative staples and poor access to markets. These places were also identified as 'disadvantaged' by two surveys (Gibson et al. 2005; Hanson et al. 2001). They were found in the far west of PNG, down both sides of the main mountain ranges from the highlands to Milne Bay; along the Adelbert, Finisterre, and Saruwaget mountains; and the south side of New Britain. It is 20 years since the MASP surveys visited these areas, and little recent information exists about how rural people are managing to feed their share of the over 2 million people that have been added to the PNG population since 1995.

So the answer to the question, 'Will PNG be able to feed itself in 2050?' is we do not know. We know where problems will probably appear first, but PNG presently has no means of systematically collecting and analysing information that would indicate when a rural community is in difficulty. Nor does it have an effective family planning program, despite reports of widespread demand by rural women for fertility management (Lesley and O'Connor 2010). It is not suggested that a MASP-type nationwide survey be repeated, but that MASP be used to identify at-risk areas, and rapid but systematic appraisals be undertaken in these areas. An organisation — perhaps the PNG National Agricultural Research Institute — could be given the responsibility and funding to carry out the surveys and manage the data.

### Author Notes

*Bryant Allen is a visiting fellow in SSGM. Valuable comments were received on an earlier draft from Mike Bourke and two anonymous referees.*

### Endnote

1. This is the 2004 value of the rice that would have had to have been imported to replace just the staple foods produced domestically. It does not take into account green vegetables, fruits, nuts, fish or meat.

### References

- Allen, B.J. 2001. Dimensions of PNG Village Agriculture. In R.M. Bourke, M.G. Allen, and J.G. Salisbury (eds). *Food Security for Papua New Guinea: Proceedings of the PNG Food and Nutrition 2000 Conference*. ACIAR Proceedings no. 99, 529–53.
- Bourke, R.M. 2001. Intensification of Agriculture Systems in Papua New Guinea. *Asia-Pacific Viewpoint* 42(2/3):219–36.
- Bourke, R.M. 2009a. Food Production in Papua New Guinea: An Overview. In R.M. Bourke and T. Harwood (eds). *Food and Agriculture in Papua New Guinea*. Canberra: ANU Press, 130–37.
- Bourke, R.M. 2009b. Staple Food Crop Production. In R.M. Bourke and T. Harwood (eds). *Food and Agriculture in Papua New Guinea*, 138–46.
- Gibson, J. 2001. The Economic and Nutritional Importance of Household Food Production in PNG. In R.M. Bourke, M.G. Allen and J.G. Salisbury (eds). *Food Security for Papua New Guinea*, 37–44.
- Gibson, J., G. Datt, B.J. Allen, V. Hwang, R.M. Bourke and D. Parajuli 2005. Mapping Poverty in Rural Papua New Guinea. *Pacific Economic Bulletin* 20(1):27–43.
- Hanson, L.W., B.J. Allen, R.M. Bourke and T.J. McCarthy 2001. *Papua New Guinea Rural Development Handbook*. Canberra: Land Management Group, ANU.
- Hipsley E.H. and F.W. Clements 1947. Report of the New Guinea Nutrition Survey Expedition. Sydney: Government Printer.
- Lesley, L. and M. O'Connor 2010. *Barriers to Family Planning in Papua New Guinea: Supply and Demand — Report and Recommendations*. Port Moresby: H4 Group (UNICEF, WHO, UNFPA, The World Bank).
- McAlpine, J.R. and D. Freyne 2001. Land Use and Intensification in Papua New Guinea. *Asia-Pacific Viewpoint* 42(2/3):209–18.

