

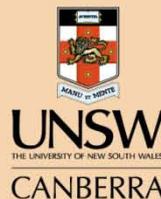
Policies for Improving Food Security

Satish Chand

Charles Yala

School of Business, University of New South Wales at Australian Defence Force Academy, Australia and
The National Research Institute, Port Moresby

In Association with UNSW Canberra



<http://www.nla.gov.au/openpublish/index.php/lmd/index>

Policies for improving food security¹

Satish Chand and Charles Yala

University of New South Wales

Canberra

And

The National Research Institute

Port Moresby

Abstract

Papua New Guinea is rich in natural resources. Yet, nearly a third of the population have income less than the minimal deemed necessary to afford basic needs including food. While figures for food poverty are unavailable and could be lower, policies can be introduced to improve affordability of food. This paper draws on the macroeconomic constraints that have contributed to food poverty and offers lessons on how best to address these. The domestic markets for food can be better integrated to improve food security, reduce price volatility and increase income for the suppliers.

Keynote paper presented at the *Food Security Policy Conference* on the theme “*Macroeconomic Considerations, Policy Issues and Regulatory Mechanisms*” held at the National Research Institute, Port Moresby from 6-8 September 2011.

¹ We are grateful to Aaron Batten, Lindsay Kutan, and Henry Sanday for helpful comments on an earlier draft of this paper and for assistance with data collection. Views expressed are those of the authors only.

1. Introduction

Times are good in Papua New Guinea (PNG). In early 2011, macroeconomic indicators were as healthy as they have been since independence in 1975. Gross Domestic Product (GDP) is estimated to having grown by 8 percent in 2010 and is projected to grow by another 9.5 percent in 2011 (Bakani, 2011). Much of this growth can be attributed to favourable external conditions and the improvements in the terms of trade for PNG in particular. According to the Bank of Papua New Guinea (BPNG), the prices of PNG exports have close to doubled between 2005 and 2008. The Kina is stable; and, the national budget is healthy after recording several consecutive surpluses. However, how much of these healthy macroeconomic conditions are being felt by the citizenry? The short answer to the above is that no one knows! It will have to wait for the yet to be released results of the Household Income and Expenditure Survey (HIES) undertaken by the National Statistics Office in 2010. Nonetheless, many urban residents complain that food-affordability has deteriorated. They could be right! And if so, then what can be done to improve access to food by the poor? This is the issue taken up in some detail in this paper.

Food prices have risen over time. Inflation of March 2011 was recorded at an annualised rate of 9 percent with the recent increases in food and fuel prices being largely responsible for the above (BPNG, 2011). What's more this 9% figure is likely to drastically understate the true level of inflation given the outdated calculation of the CPI e.g excluding housing costs. The rise in price of food and fuel worsen the plight of the urban poor because they spend the bulk of their income on these items. While recent estimate of the level of poverty is not available, the estimate of a decade ago showed that 37 percent of the population lived below the poverty line; anywhere between 30 to 50 percent of rural children are malnourished; and pockets of severe malnutrition are emerging throughout the country (World Bank, 1999). Then, the PNG Department of National Planning and Rural Development (DNPRD) noted that social indicators of development with a life expectancy of 54 years, literacy rate of 64 percent, an infant mortality rate of 64 deaths for every 1000 live births, and a maternal mortality rate of 370 deaths for every 100,000 births were amongst the worst in the Pacific region (DNPRD, 2003). What is the level of poverty now? How much of the growth in GDP is lifting the poor out of their misery? Deficient data remains the reason why these questions cannot be answered. Policies, however, can be instituted to spread the benefits of growth. Improved access to food would be a sure channel for the above.

For the purposes of this paper, food security prevails: “when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life” (FAO, 2011). The household is the unit of analysis in this paper, thus food security prevails when the household has the income to be able to purchase the minimal bundle of food deemed necessary for healthy living for each member in the household. The focus of this paper is on being

able to afford the minimal food bundle thus income security is considered as being of primary importance to the discussion that follows.

Good economic times do not last forever. This raises the importance of capitalising on the prevailing healthy macroeconomic conditions for improving food affordability. It also focuses on the policies that may be instituted to improve access to food by the majority of the citizens of PNG. We identify reform opportunities to improve supply of food to the markets and those that are likely to provide income security. Some regions of the nation have excess supply of food while others are deficient in the above. Linking these markets will improve food supply to urban areas thereby reducing price pressures whilst providing income security for the suppliers of food products. How this may be done is explained later.

The rest of this paper is organised as follows. Section 2 summarises the causal link between economic growth and development. Section 3 provides a succinct summary of policies targeted at food security. Conclusions bring the paper to a close.

2. The link between economic growth and development

Economic growth is a necessary condition for improvements in the wellbeing of the general population, however measured. As an example, improvement in life expectancy requires improved access to nutrition and healthcare services. Such improvements, moreover, do not take place overnight but are a culmination of sustained improvements in access to healthcare, income earning opportunities, and information on how an individual may lead a healthy life style. Conversely, life expectancies may remain weighed down by high infant and maternal mortality and/or through increased deaths from HIV/AIDS. Development, in short, requires both resources and patience. The requisite resources, moreover, need to be generated from within the economy. The latter raises the centrality of economic growth to development.

PNG development policy remains highly interventionist. The public sector is actively engaged in the provision of many goods and services in the economy. However, a clear logic for government involvement in the supply of goods and services within the economy remains to be articulated. Theory suggests that the role of government must be confined to addressing identified market failures. In the main, the role of the State is in creating an environment conducive to private investment. Regulation to ensure competition is central in this regard. The Government, by being active in the supply of goods and services, has compromised its ability to be an impartial regulator of private commerce.

Sustained growth in per capita income over decades, as shown by international experience, is necessary for progress in terms of developmental outcomes. The higher the rate of growth, the shorter the time period required to bring about such change! But, what is the minimal level of growth necessary to bring about discernible change?

The population of PNG has been growing at an annual average of 2.9 percent. Thus, GDP has to grow by at least 2.9 percent each year for per capita GDP to remain stationary. Anything less than the above would imply that per capita GDP would fall over time! Importantly, any improvement in employment opportunities for the growing population requires growth in GDP in excess of 4 percent. This is because technological progress alone accounts for approximately a percentage point of the total growth in GDP.

It is a matter of simple arithmetic to calculate the time it would take for per capita GDP to double at any given rate of growth. As an example, an annual growth rate of per capita GDP of 5 percent which in turn will require aggregate GDP to grow annually at a rate of approximately 8 percent given population growth of 2.9 percent, will lead to a doubling of per capita income in 14 years. Even at this high rate of growth, PNG will be a long way away from being a rich economy by 2020. Per capita income, as of 2006 in US dollars at 2005 prices, was \$1761. This would double to \$3522 by the Year 2020 should aggregate GDP grow annually until then at a rate of 8 percent. If achieved, per capita income in PNG by then will be marginally above the 2006 level in Indonesia (of \$3348), and well below the 2006 levels in Fiji (of \$4408), and Malaysia (of \$12,149).²

Rapid growth in GDP is necessary (i.e. required) but not sufficient (i.e. enough) for poverty reduction. For the latter, the benefits of growth have to reach the poor. This requires the poor to be drawn into production which in turn requires growth of services and agriculture as they are the home to the majority of the population. A large proportion of the population depends on agriculture for their livelihood. Thus, growth in agricultural output and the income of households dependent on agriculture are crucial for the translation of increased GDP into lower levels of poverty. Furthermore, sustained growth of agricultural GDP demands sustainable use of all natural resources. Such growth must draw into production the vast amounts of idle labour and under-utilised land. This is the subject of the next section.

3. Policies to improve food security

In this section, we discuss the policies that may be instituted to improve food security. The first considers means to raising household income; the second highlights opportunities to reducing volatility in food consumption; and, the third focuses on the role of the public sector in providing public goods that help with the above-enumerated.

3.1 Policies to increase households income

Increased investment is necessary for growth in income. Unfortunately much of the discussions on investment in PNG focus narrowly on the large foreign investors. While foreign investment is important, so is investment by locals. The farmer who toils his land, or tends to her livestock collectively accounts

² Data sourced from *World Bank Indicators* (accessed online on 2 September, 2008)

for a larger share of total investment, and potentially makes an even greater contribution to poverty reduction. Thus the subsequent discussion focuses exclusively on the 'small local investors'. These include the indigenous entrepreneurs who grow coffee and cocoa for exports, those who provide garden produce to the urban markets, and those who sell food and beverages in the markets and on road stalls. In recommending policies for growth of investment, we want to know why the above-mentioned are not spending more time on their farms, in their gardens, and at the road stalls.

Smallholders who draw the bulk of their income from the sale of crops face volatile income. Thus, production falls when prices of primary commodities falls or when the costs of production rises. With regards to the price of export crops such as cocoa and coffee, producers are at the mercy of the world market. Local policies, however, have a bearing on the costs of production, transportation, and communications. A bad road, irregular shipping, frequent roadside robberies, and expensive telephone charges all add to the costs of production. PNG remains one of the most expensive places to do business (World Bank, 2011). On the 'Ease of Doing Business', PNG ranks 103rd out of 183 economies. At the regional level, it ranks 7th amongst the 10 participating Pacific Island Countries (PICs). A relevant measure of how costly it can be to invest in the country relates to the time taken to start a new business. The World Bank reports that it takes 51 days to start a business in PNG, compared to 57 days in Solomon Islands, 46 days in Fiji, 39 days in Vanuatu and just 9 days in Samoa (World Bank, 2010).

Markets in PNG are highly fragmented as evidenced by large variations in the prices of very similar goods. A possible reason for this variation is the poor quality of transportation and communications infrastructure. Consequently, excess supply of food in places like the Islands and the Highlands can coexist with excess demand for food in urban areas such as Port Moresby. The net effect of the above is uneven prices across the nation. The challenge is in making this market such that the excess supplies can be channelled to places with demand. As an example, buai is cheap in Buka while expensive at the Gordon's market. Why are entrepreneurs failing to take advantage of the opportunity to bring buai from Bougainville to Port Moresby? Policies have a proven role in lowering the costs of trade within PNG. The cost of telecommunications, as an example, fell precipitously since the opening up of the telecommunications market. Could the same be done with transportation?

Crime remains a major constraint to the integration of the national economy. Road convoys remain the norm in transporting goods and people to and from the Highlands. Costs of transportation spike when the condition of the road deteriorates. These costs are borne by urban consumers in terms of high prices for food and by the suppliers in terms of lost income. Consumers and producers both pay for crime and the poor transportation infrastructure that has fragmented the domestic market for food products. Policy has a role in alleviating these constraints so that the prices are kept stable and incomes for the suppliers secure. The State, in particular, has a role in ensuring that the major trading routes are kept open and that crime on trading routes is contained. This will help to ensure competition in the supply of transportation

and communications services to facilitate internal trade. Similarly, a concerted effort at reducing crime is likely to yield benefits for all (Chand and Levantis, 1997).

A rise in food prices is not necessarily bad for every household. While the rise in prices makes purchasers of food worse off, it raises income of the suppliers. And a rise in the world price for commodities is good for PNG as a whole given that the nation is a net exporter of commodities. As an illustration of the above, consider the case of a household that supplies coffee and cocoa for exports in exchange for imported rice for consumption. We will, for simplicity, ignore costs of transportation, tariffs, and insurance. This household has benefited from the rise in the price of all of the above three products. The world market price of cocoa in July 1991 was US\$997 per metric ton. It rose to US\$3167 by July 2011: an increase in nominal prices of 318 percent relative to the price in 1991. Coffee in contrast fetched US\$0.83 per pound in July 1991 and US\$2.69 in July 2011: an increase of 324 percent. Rice fetched a price of US\$306 per metric ton in July 1991 and US\$546 in July 2011. Thus if cocoa and coffee were traded in exchange for rice in the global marketplace, then these commodities fetched 78 and 82 percent more, respectively, in July 2011 compared to their values in July 1991 as shown in figure 1.

Figure 1 shows two things: (i) the high volatility of the price of the above commodities for the 20 year period to July 2011; and, (ii) the long-term rise in the price of cocoa and coffee. Despite the rise in prices of the two export crops, their supply has been less than responsive. Figure 2 charts out the production of cocoa and coffee over the same period. It shows that the production of neither of the above commodities responded to the rise in prices. Knowing the reasons for the lack of a supply response is critical to the design of policies for income security.

Why does production not respond elastically to the increased price? The reasons for a muted supply response to a rise in food prices are many but in the main include limited access to land. The majority of urban food gardens are small gardens! They lack the scale to be able to respond quickly and effectively to a spike in demand. The ongoing reforms to land tenure, if successful, are likely to lead to increased supply and more stable prices for food. Vagaries of the weather are still likely to have a role in keeping prices for domestically produced food volatile, however.

3.2 Policies to reduce consumption volatility

Volatile prices are not necessarily bad for consumer welfare. Consumption volatility, however, is. Thus, affordability of food is critical to ensuring that the household is not required to cut back on the basic level of consumption when prices spike. Consequently, it is income rather than food security that is critical to consumer welfare. This is demonstrated next.

The income accruing to a food producer (I) is given as:

$$I = P^X \cdot X \quad (1),$$

where P^X denotes the price received and X the quantity of food that is sold (i.e. exported from the household). Similarly, the expenditure on food consumed is given as:

$$E = P^M \cdot M \quad (2)$$

where P^M denotes the price of food consumed and M the quantity of consumption (i.e. 'M' denotes food 'imports' of the household). P^X , P^M , X , and M are vectors with I and E being scalars resulting from the dot product of price and quantity vectors.

Savings (and dis-savings) is given by the difference between income and expenditure; that is,

$$S = I - E = P^X \cdot X - P^M \cdot M \quad (3).$$

Food price, as shown by figure 1, is volatile. The volatility in savings, and thus real income, from equation (3) is given as:

$$\Delta S = \Delta I - \Delta E = P^X X [\Delta P^X / P^X + \Delta X / X] - P^M M [\Delta P^M / P^M + \Delta M / M] \quad (4).$$

where ' Δ ' denotes change.³ The first bracketed term on the far right-hand-side of the equality sign shows that the volatility in income is the sum of the volatility in prices and quantity produced which is scaled by the value of production. Analogously, the volatility in expenditure on food is the sum of the volatility in price and quantity consumed weighted by the value of consumption. Thus, all else equal, the impact on savings and dis-savings is proportional to the value of consumption (and thus family size). Furthermore, changes in the quantity of food consumed and produced can offset changes in prices. Expenditure minimisation requires that consumption of the more expensive items is substituted with cheaper alternatives. For poor urban households, room to cut back on basic consumption may be limited.

Consider the case of an urban household at the margins of poverty that produces no food (i.e. $P^X X = 0$) such that consumption cannot be lowered measurably; that is, $\Delta M / M = 0$. Equation (4) for this household reduces to:

$$\Delta S / E = - [\Delta P^M / P^M] \quad (4a);$$

that is, each percentage point change in the price of food translates to an equi-proportionate fall in savings as a proportion of the food budget. The impact of the above in a rural poor household that grows all its food is different. For them,

$$\Delta S / I = [\Delta P^X / P^X + \Delta X / X] \quad (4b).$$

Income maximisation for this household requires substitution of production to commodities with the higher prices. Room for such substitutions are limited in

³ The price response of the quantity supplied is given as $dI/dP = P[1 + \epsilon_X]$ and that for demand as $dE/dP = P[1 + \epsilon_E]$ where ϵ denotes the price elasticity.

the short term. However, for tree crops such as copra, higher price leads to increased production due to higher inputs of variable inputs such as labour and weedicide.

Equation (4) captures the net impact on real income of a change in prices and quantities of food. This depends on whether the household is a net producer or consumer of food. Furthermore, equation (4) shows what a household may do to ameliorate the impact of a rise in food prices. In the specific case where changes in the quantity produced or consumed are constrained, the impact of price volatility will translate one-for-one on savings as shown by equations (4a) and (4b). In the case where savings are nil and access to credit (i.e. room for dis-savings) absent, then the household can do one or a combination of the following: (i) reduce consumption; (ii) increase production; and, (iii) cut back on non-food outlays thus allowing S in (4) to be negative.

Policies can be targeted at each of the above enumerated. An income subsidy to the poorest household could be provided to offset the effect of a rise in the price of basic food. This can only be a short-term solution given the limited fiscal space for such subsidies. Price control on basic food items, in contrast, would be the wrong policy prescription as it will tax supply as well. The options to increase production of food are considered in the next subsection. Finally, access to the credit market can be enhanced – an issue taken up in detail last. The volatility in the price of primary commodities and the income of those reliant on the above is a well known phenomenon. The policy response in reducing the transmission of volatile prices of food to consumption-volatility requires dampeners (i.e. shock absorbers) of which access to credit is an important one.

3.3 *The role the State in enhancing food security*

Food security can be enhanced through income security. Investment is critical for income security. Investors respond to opportunities for profit. The vanilla boom of 2003 demonstrated that smallholders respond quickly to opportunities for profit.⁴ Thus, the poor supply response to the rising food prices is an indication of the lack of profits despite the high prices. It may also signal input constraints such as limited access to land for cultivation as well as a lack of information on the opportunities available on global agriculture markets. PNG is abundant in land for agriculture, but constrained by the inability to access these for production on a commercial scale. The State is in the process of devising systems so as to allow land under customary title to be released to locals for long-term investment. The above is likely to increase investment and productivity within the smallholder sector (Chand and Yala 2009).

Exchange rate policy is another tool that can be utilised for income security. The local price for tradeable commodities depends on the value of the Kina

⁴ There were reports then of some entrepreneurs selling wild vanilla cuttings as the genuine thing.

relative to the US dollar. The price of cocoa, coffee, palm oil, rice, flour, etc are all determined in the global markets. They are often denominated in US dollars. While global prices are beyond the purview of policymakers in PNG, the value of the Kina can be influenced by the Bank of Papua New Guinea (BPNG). The foreign currency value of the Kina is a function of the current account balance and the rate of inflation in the domestic economy. The value of the Kina vis-à-vis the U.S. dollar (USD) has been stable for the past half a decade but may rise due to two factors; namely, the surge in domestic mining and (ii) the falling value of the USD due to debt problems in the rich world. This will have the effect of making imported food products more affordable but reducing the export competitiveness of PNG's main agricultural exports. Some groups in society will benefit, others will lose.

The policy lessons from the above are threefold. First, producers need the capacity to switch products that give them the highest returns for their effort. Second, it is income rather than food security that determines household welfare. Thus, if real incomes remain stable in the face of food price volatility, then this may not be of concern. Third, households need to be able to save in good times to be able to fund their consumption in periods of low income. The last may result from falls in the terms of trade or adverse weather conditions – a fact that farmers have to live with on a regular basis. Access to the formal financial sector for savings (and dis-savings) will help in smoothing consumption in the face of volatile food prices.

4. Conclusions

The favourable macroeconomic conditions in PNG provide room for policy interventions to translate these into improved wellbeing for the majority of the population. Poverty reduction as one indicator of improvement in wellbeing requires improved affordability of food. While hard evidence on the levels of access to food by the various groups in the community is absent, there is anecdotal evidence to suggest that urban residents are being hurt from the rapid increases in the price of basic food. This paper has considered policy interventions to improve accessibility of food by the majority of the population. An important and an often missed consideration is the primacy of income rather than food production as a means of ensuring food security. A household that maintains its real income will be in a position to access food without having to grow it themselves.

Food prices have historically been volatile (Duncan, 2011). There is little reason to believe that the future will be any different on this count. Thus, households will have to learn to ameliorate the impact of volatile food prices on their real (i.e. inflation-adjusted) expenditures. Access to savings and credit is an effective means to consumption smoothing in the face of volatile income. Households in PNG have leaned on family, friends, and the formal sector for credit in times of need. While family and friends will continue to provide informal insurance, there is a greater role for the formal sector in supplementing these services. Access to banking services is rudimentary

beyond the major urban centres. Improving access to banks can help in improving affordability of food.

A rise in the price of food is not necessarily bad news for all. PNG is a net exporter of food commodities, thus a rise in international food prices leads to increased national income. It is the distribution of this income that creates problems for some and opportunities for others. The State can play a role on both of these fronts. The poor and destitute can be lent assistance during tough times. More importantly, the conditions for investment can be improved such that a rise in prices leads to an increase in real income of the majority of the population.

The market for food in the nation is highly fragmented. This explains why some areas of the nation are abundant in food while others deficient in the above. Integrating these markets through improved transportation and communications infrastructure will improve food affordability in urban areas whilst providing income security to the suppliers of food from rural districts. Furthermore, a clampdown on crime and improved access to land for agriculture will assist with the above.

Finally, little is known about the impact of the recent rise in food prices on the welfare of the population. UNICEF (2011) provides evidence from five Pacific Island Countries (PICs) – namely, Fiji, Kiribati, Solomon Islands, Tuvalu, and Vanuatu – of the adverse consequences of the recent rises in food prices on the urban poor. PNG, the largest of the PICs, is missing from this study. It is time the NRI draws on recent HIES data collected by the National Statistics Office to inform policies that may be instituted for improving food security.

References

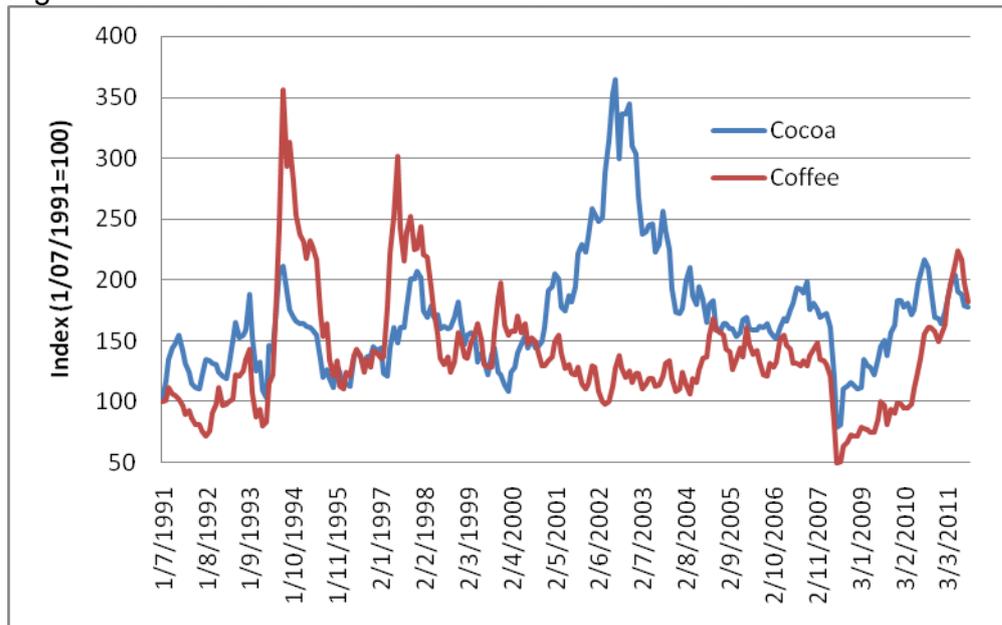
- AusAID (2001), 'Enclaves or Equity – The rural crisis and development choice in PNG', International Development Issues, No. 54.
- Bakani, Loi 2011. "The state of the economy", presentation at the 27th Australia-PNG Business Forum, accessed on 19th August 2011 online at:
http://www.bankpng.gov.pg/images/stories/mediarelease/2011/PNG_Aust_Business_Forum_-_16_May_MADANG.pdf
- , (2007), "Governance for growth: priorities for a reform minded PNG government", Pacific Economic Bulletin 22(1): 70-82.
- Chand, S. and Levantis, T., (1997), "Crime and dutch disease effects of a mineral boom in PNG", Australian Journal of Agricultural and Resource Economics 44(1): 129-146.
- , and Yala, C., (2009), "Land Tenure and Productivity: Farm Level Evidence from Papua New Guinea" *Land Economics* 88 (3): 442-453.
- Duncan, Ronald 2011. "Are Real Food Prices on a Long-term Upward Trend?", mimeo, The Australian National University, Canberra.
- Department of National Planning and Rural Development (DNPRD), (2003), "Medium Term Development Strategy (MTDS) 2003-2007", Draft Technical Paper, May 2003, Port Moresby.
- FAO, 2011. "Food security: concepts and measurement Food security: concepts and measurement", accessed online on 24th August at:
<http://www.fao.org/docrep/005/y4671e/y4671e06.htm>
- UNICEF, 2011. "Food price increases in the Pacific Islands", Working Paper (March), Suva, Fiji.
- World Bank, (2011), 'World Development Indicators Database', [Online], www.worldbank.org.
- World Bank (2010), 'Doing Business 2011', [Online], www.doingbusiness.org

Appendix A — GDP level and growth rate

	GDP per capita, PPP (constant 2005 international \$)	GDP growth (annual %)
1975	..	-0.87988
1976	..	-3.38845
1977	..	0.834816
1978	..	8.54986
1979	..	1.832395
1980	1699.241	-2.30345
1981	1653.564	-0.27483
1982	1617.624	0.352945
1983	1626.744	3.223163
1984	1579.078	-0.35473
1985	1600.21	4.00019
1986	1632.957	4.693057
1987	1636.086	2.770494
1988	1641.554	2.909242
1989	1577.596	-1.41958
1990	1491.314	-3.01217
1991	1592.044	9.546899
1992	1766.147	13.84908
1993	2033.847	18.20229
1994	2098.632	5.942109
1995	1975.746	-3.31245
1996	2072.027	7.733697
1997	1938.026	-3.90439
1998	1815.41	-3.76911
1999	1901.195	7.547861
2000	1829.882	-1.20957
2001	1782.039	-0.1
2002	1734.726	-0.2
2003	1730.507	2.2
2004	1736.201	2.7
2005	1753.693	3.3
2006	1760.997	2.6

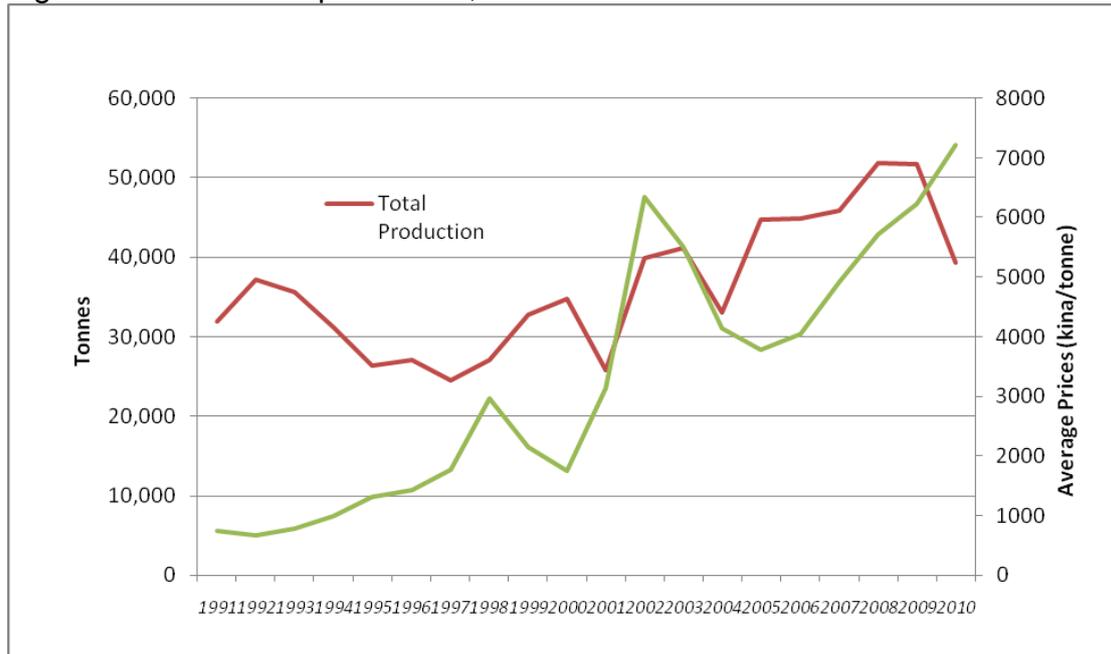
Source: World Bank Indicators (accessed online on 2 September, 2008).

Figure 1: Price of Cocoa and Coffee relative to Rice



Note: Price in US\$ normalised at 100 as of 1st July 1991; Cocoa price is from the International Cocoa Organisation and is the cash price of beans; Coffee price is from the International Coffee Organisation for mild 'Other Arabica'; Rice is 5 percent broken milled Thailand nominal price quote. Data sourced from: <http://www.indexmundi.com/commodities/?commodity=other-mild-arabicas-coffee&months=240> accessed on 19th August 2011.

Figure 2: Total cocoa production, 1991-2010



Data source: Cocoa Marketing Board