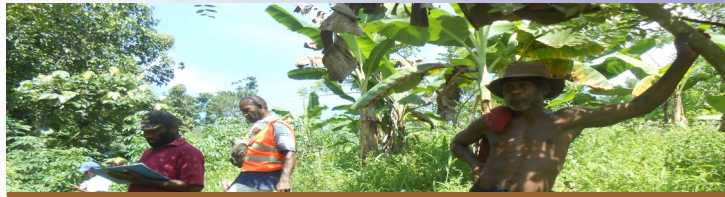




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The Social Cocoa – Nomics

THE IMPACT OF COCOA POD BORER ON FOOD AND INCOME SECURITY AMONG SMALLHOLDERS

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This Technical Note is the second in a series addressing food security among cocoa smallholders. The first in the series defined food security and its four key dimensions. This note will focus on the impact of Cocoa Pod Borer (CPB) (*Conopomorpha cramerella*) on the livelihoods of smallholders in the study sites of East New Britain, (ENB) the Autonomous Region of Bougainville (ARoB) and Milne Bay provinces.

COCOA POD BORER

In 2006 cocoa farmers livelihoods were thrown into disarray when CPB appeared in Papua New Guinea. In the main cocoa producing provinces such as ENB and ARoB, cocoa production dropped by more than 70%. The decimation of the cocoa crop has resulted in a massive fall in smallholder household incomes.

Despite some recent indication that smallholder production is gradually recovering, overall the returns from cocoa are still relatively low and many families continue to struggle to make a living. In the three field-sites of Iris, Kosinamohina and Teobuhin in ARoB more than 68% of surveyed households reported CPB infestation of their cocoa blocks, and in ENB over 58% of households at Lamarainam, Rabagi (#1) and Tavilo indicated CPB present. In Milne Bay, only Boiou villagers reported high incidences of CPB (over 80%), whereas Kaubwaga had just 20% infested and in Siagara no blocks had CPB.

As expected, cocoa yields have fallen at all locations where CPB was present (Figure 1).

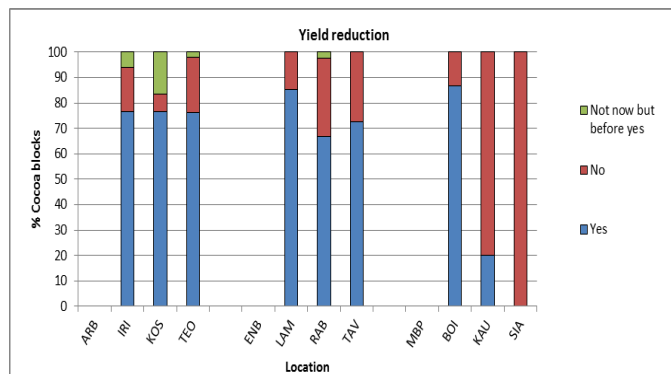


Figure 1. Yield reduction as a result of CPB (% of cocoa blocks).

Controlling CPB

Smallholders were asked how they altered their cocoa block management practices following CPB infestation. Changes ranged from abandoning to semi-abandoning the cocoa block to partially replanting or fully replanting with cocoa trees. Where external support was available and households had sufficient access to labour, the most common practice was for smallholders to fully or partially replant their cocoa

trees. In areas with heavy CPB infestations and smallholders had limited access to labour, extension support and markets, cocoa blocks were abandoned or semi—abandoned.



Plate 1: Damaged cocoa pods

Adoption of CPB management practices is the key to controlling the pest and gradually re-establishing cocoa production. Farmers must adopt a labour intensive management regime which includes among other things weekly harvesting of all mature and CPB-affected pods, centralised pod breaking, the removal and burial of all infested pods, regular pruning and shade control, and insecticide spraying. This type of farm management requires a large increase in the amount of time and labour farmers normally commit to cocoa (including the need to recruit hired labour and making cocoa production a dominant livelihood activity). It also requires financial investments in tools and insecticides. In ENB the adoption of CPB management practices varied between the three field sites, with Tavilo farmers showing the greatest uptake (Figure 2). In contrast there was significantly less uptake of CPB practices in Rabagi.

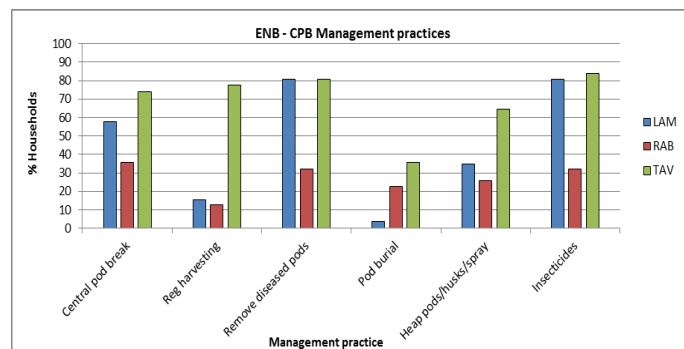


Figure 2. CPB Management Practices by ENB farmers.

Regular harvesting, a critical management technique necessary to control the reproductive cycle of the moth has had little uptake in Lamarainam and Rabagi

Overall adoption rates of CPB management practices by farmers at the three ARoB sites were higher than ENB farmers, with the exception of Tavilo farmers. However, regular weekly harvesting by ARoB farmers in Iris and Teobuhin villages was low and practiced by less than 53% of farmers. The presence of the moth will remain a problem for farmers wishing to improve production and their cocoa incomes.

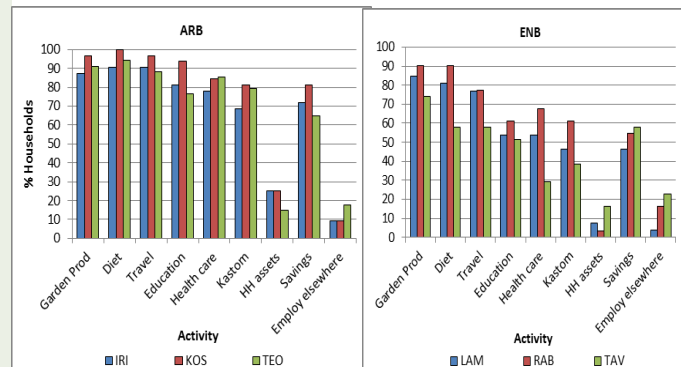
In ENB the impact on the province is probably greater overall than the 1994 volcano that devastated Rabaul

Local level impacts of CPB

The steep declines in cocoa production in ENB and ARoB and the difficulty many farmers have in controlling CPB have undermined the livelihoods of cocoa growers and their families. The ability to earn an income has been constrained making it onerous

to pay for health and education and to maintain a reasonable quality of life.

To ascertain the effects of CPB, smallholders were asked questions relating to food production, diet, income, travel, health and education and participation in traditional activities. The ramifications of CPB on family and community have been most pronounced on ARoB (Figure 3). For more than 60% of households at each site in ARoB, nearly every aspect of family and community life continues to be affected by CPB. Garden production, diets travel were the most commonly affected with over 85% households indicating that these factors had been affected by CPB. Likewise, in ENB, garden production, diet and travel were the most commonly affected, although, not to the extent as in



ARoB.

Figure 3. Percentage of households experiencing some impact on family and community activities as a result of CPB.

In ENB and ARoB, people reported that their diets had changed. There was an increase in consumption of garden foods and less processed food due to less cash to purchase store food. Some households have cut back on customary contributions and there is insufficient income for households to save money.

Changes in household income

CPB has had a considerable impact on those households where cocoa was their main source of income prior to CPB. The percentage of male and female heads of households in ENB and ARoB relying on cocoa as their major source of income is shown below in Tables 1 and 2. Before the arrival of CPB more than 80% of men, with the exception of Rabagi at %, relied on cocoa as their main source of income (Table 1).

Table 1. Percentage of men with cocoa as their primary income source, before and just after CPB and now.

Period in relation to incidence of CPB	ARB			ENB		
	IRI	KOS	TEO	LAM	RAB	TAV
Before	81	94	97	84	60	93
Just after	13	19	21	64	10	39
Now	53	75	70	80	17	79

Women's income was equally affected by CPB. Over 70% of women on ARoB identified cocoa as their primary source of income prior to the arrival of CPB with this being less in ENB with between 50% and 70% identifying it as a major income source (Table 2). With a dramatic loss of cocoa income, smallholders responded by adopting an array of livelihood options which have varied in importance since 2007 when the impact of CPB began to be felt. These responses are discussed in Technical Note 3 in this series.

Table 2. Percentage of women with cocoa as their primary income source, before and just after CPB, and now.

Period in relation to incidence of CPB	ARB			ENB		
	IRI	KOS	TEO	LAM	RAB	TAV
Before	72	80	78	52	55	71
Just after	19	7	19	36	10	39
Now	53	53	59	52	7	61

In 2014 when the data were collected, cocoa was starting to make a comeback. As Table 1 and Table 2 show, the proportion of people with cocoa as their primary income was rebounding with more households now identifying cocoa as their major income source: the exception being women in Rabagi where there has been less uptake of CPB practices. However, the proportions of men and women relying on cocoa as their major income source has not returned to the level



Plate 2: Sorting CPB affected pods

of the period prior to the incidence of CPB though may be increasing as CPB management strategies are implemented. Further, for many smallholders the overall returns from cocoa remain relatively low and many families continue to struggle to make a living.

WHY HAS THE IMPACT OF CPB BEEN SO GREAT?

In this section we briefly look at why CPB has proven so difficult for farmers to overcome. We suggest there are three main factors:

1. Farmers limited access to quality training and support programs to control CPB.
2. The high labour demands required to control CPB.
3. Reluctance to adopt 'modern' farming methods.

Although farmers had abandoned or partially abandoned their cocoa holdings, many had attended CPB management training in the 5 years prior to the study. On ARoB between 52% and 69% of cocoa farmers at the three villages surveyed had received training on CPB. In ENB where CPB has had a major impact, the percentage of households receiving training varied greatly among villages. In Tavilo 87% of households had received information, in Rabagi 58% and in Lamarainam, less than 40%.



Plate 3: Agmark CPB information day for farmers.

Despite the national government's allocation of funds to the main government institutions responsible for cocoa, especially CCIL, PNG Cocoa Board and the ENB provincial DAL, funding has been inadequate and piecemeal. This has hindered the implementation of a long-term, well-coordinated government-led CPB programme for farmers. The private sector was critical in addressing the training needs of farmers, although it remained too small to completely fill the gap. Most Bougainville farmers in the three study sites received CPB training from the private sector, and in ENB the main providers of training and information were CCIL and Agmark. In 2010 a World Bank-funded project commenced in ENB and later in ARoB to improve farmer access to CPB training and farm inputs to assist them in managing and controlling CPB (ACIAR is also investing in cocoa rehabilitation through its TADEP projects).

Another important factor explaining why so many farmers have not returned to cocoa, relates to the increased labour inputs needed to control CPB. As mentioned above, CPB control requires a labour-intensive CPB management regime. This high-input cropping system to control CPB represents a large increase in labour and farming inputs (including investments in tools and insecticides) from the pre-CPB era. Prior to CPB, cocoa farming was based on very low levels of farm inputs, particularly labour. This low-input, low-output cropping system, which we labelled the 'foraging production strategy' (Curry et al., 2007), meant very little labour was allocated to plot maintenance. The characteristics of this low input system of production amongst cocoa growers have been identified in several smallholder farming studies in ENBP since the 1980s when such research began (e.g. Nicholls, 1989; Ghodake et al., 1995; Omuru et al., 2001; Curry et al., 2007). Many farmers have been unable or reluctant to make the transition to intensive CPB management techniques. A central factor explaining this is the limited availability of household labour for cocoa production.

A closely related, and final, factor explaining why many farmers have not returned to cocoa as their primary income source is that many are not prepared to adopt 'modern' farming methods. Cocoa farming in a CPB environment requires more than a large increase in labour inputs; it also requires financial investments in tools, insecticides and other inputs.

These alone require major changes in people's livelihood activity regimes and their cocoa and non-cocoa investment strategies. The low labour input system of cocoa production in PNG developed in the context of competing labour activities that are important for maintaining diverse livelihoods and supporting social and kinship networks. Cocoa production is but one of several social and economic activities undertaken by smallholders. This has meant household labour for cocoa often competed with the labour demands of other livelihood activities. It is why, still, many smallholders have been reluctant or unwilling to adopt the intensive CPB management regime as it often means a trade-off of time and labour in other valued economic, social and cultural activities that make up daily village life.

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