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Becoming unsustainable? Recent trends in the formal sector of insect trading in Papua New Guinea

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Abstract Rising international demand from collectors for the insects of Papua New Guinea (PNG), in particular the endemic birdwing butterflies (*Ornithoptera* spp.), has been met since 1978 by the government-sponsored Insect Farming and Trading Agency (IFTA). Institutions like IFTA have the potential to satisfy markets by legitimate trading, to boost local livelihoods and thus provide conservation incentives, and to satisfy CITES criteria. Until the onset in PNG of large-scale logging and mining in the 1990s, and a crisis of governance, IFTA was widely regarded as a conservation and development success. However, analysis of its trading records for 1995-2002 suggests that this agency is now struggling to provide sustainable payments to village-based insect ranchers and collectors. This failure, combined with the limited number of clients and their restricted geographical spread, casts some doubt on this model of sustainable conservation.

Keywords Butterfly ranching, insect collecting, Papua New Guinea, sustainable use, *Ornithoptera* spp.

In recent years, the sustainable use of wildlife has become a mainstream conservation strategy (Webb, 2002). Because the use of wild living resources remains an essential livelihood strategy for many, use that is biologically sustainable, with the potential to provide incentives for conservation, [it] seems a clear goal for which to strive (Hutton and Leader-Williams, 2003). Sustainable use is exemplified, in Papua New Guinea, by the ranching and trading of butterflies and other insects to international collectors.

Butterfly collectors are prevalent worldwide and the value of the global insect trade is remarkably high. Melisch (2000) gives an example of a pair of birdwings *Ornithoptera meridionalis* selling in Germany for $3400 and worldwide retail sales of butterflies may be as high as $100 million per annum (Parsons, 1992 *in* Slone *et al.* 1997). As most insect collectors live in Europe, Japan or the USA it is hard for them to collect insects personally and many middlemen have established themselves in the trade.

When Papua New Guinea gained independence in 1975 policy makers recognised that there was a need for a flexible conservation strategy, in a country with a mostly rural population and a subsistence economy dependant on forest resources for day-to-day survival. At the extreme the approach to such intensive management is to set up self-sustaining "wildlife breeding farms" for certain important wildlife species (Liam *et al.* 1976). These sustainable use initiatives were envisioned for a range of PNG wildlife including, crocodiles, cassowaries and butterflies.

The late 1970's saw an increasing international demand for Papua New Guinean insects and the Department of Wildlife became concerned over issues of the sustainability, equity and legality of insect collecting. These concerns and the Division of Wildlife's sustainable use policy combined in 1978 with the establishment the Insect Farming and Trading Agency, IFTA..

IFTA was set up in Morobe province and is still operational there. Its purpose was to facilitate the link between overseas buyers and indigenous ranchers, to ensure fixed and reasonable prices are paid to ranchers, and to offer research, training and quality control (Mercer & Clark, 1989).

The butterfly ranching that was refined by IFTA involved the planting of butterfly food plants (typically *Aristolochia* and *Adenia* vines) within village gardens or in secondary forest to enrich the habitat. It was anticipated that butterflies would lay eggs on species specific vines and that subsequently caterpillars would use the vine as a food source until they began to pupate. The resultant pupae could then be taken for sale to IFTA.

In theory this system requires low financial input and wild stocks of butterflies should not be depleted if the rancher leaves half the pupae intact for repopulation. However, it is very difficult for a PNG butterfly rancher to know how many pupae are present and thus how many he should collect: 'this is a very inexact approach to conservation' (Parsons, 1998).

The Agency has been widely mooted as a success story. Comments include: 'Insect [ranching] has proven to be a sound, economically viable rural industry in PNG' (Wambi, 1996); 'In Papua New Guinea, butterfly [ranchers] make as much as 60 times that nation's per capita income' (Hanscom, 1993); and '[IFTA is] a near perfect model of a sustainable development initiative for local people' (Burrows, 2003).

However, there has been no prior analysis of the benefits that IFTA is supposed to have given to insect ranchers and collectors, let alone the rigour of the link between its work and successful conservation.

Since the establishment of IFTA, annual records have been kept of all the Agency's purchases of insects from Papua New Guinean collectors and ranchers. These records detail each seller's name, location, date and amount paid. Records from 1995 to 2002 were examined to analyse 'success'. This period was chosen to provide a continuous time series for thorough analysis, and because (in mid-2004) the records for 2003 were incomplete as IFTA had not fulfilled all its payments for that year. For logistical reasons it was not feasible to go further back than 1995. It should be noted that the purchasing records also include income earned from non-CITES II specimens that were wild caught.

In the 8-year study period individuals in nineteen of Papua New Guinea's twenty provinces earned some income from insect ranching or collecting. In total there were 11,688 purchases made from 4691 ranchers or collectors. The total expenditure by IFTA was 340,577 US Dollars. The average income per rancher or collector over this period was 72.60 USD per annum.

It was found that there has not been a significant decline in the number of villages taking part in this income generation activity. There were 126 villages in 1995, 130 villages in 1998 and 123 villages in 2001. However, there was a sharp decline in the number of provinces that have been supplying insects to IFTA in the 8-year analysis period, from nineteen provinces in 1995 to only nine provinces eight years later.

Overall there has been a decrease in payments to ranchers and collectors. Income levels were highest in Morobe province, which represents IFTA's immediate catchment area. However, even there income levels began to decline significantly between 2000 and 2002, more than halving from 21,619 to 10,652 USD.

Provincial income levels are highly variable. Twelve of the provinces' incomes averaged below 500 USD per annum during the 8-year study period. Six of the provinces had average earnings between 500 and 5000 USD. Only Morobe Province had an annual income that was always above 5000 USD, averaging 29,210 USD per annum.

The distribution of incomes per insect rancher/collector for 2002 is shown in Fig. 1, and shows the wide range of incomes achieved through this activity. The range for 2002 was between 0 and 619.8 USD with a mean income of 42.5 USD.

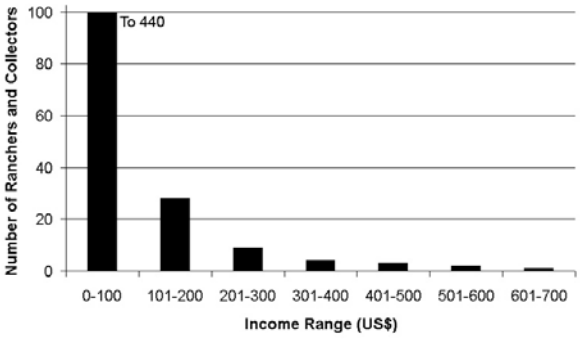

Fig. 1 The range of insect rancher and collector incomes in 2002 for the whole of Papua New Guinea

Fig. 2 shows that there has been an almost continual decline of the number of individuals working as insect ranchers or collectors. Out of the total of 4691 ranchers who sold insects to IFTA from 1999 to 2002, only 14 did so throughout the eight-year period.

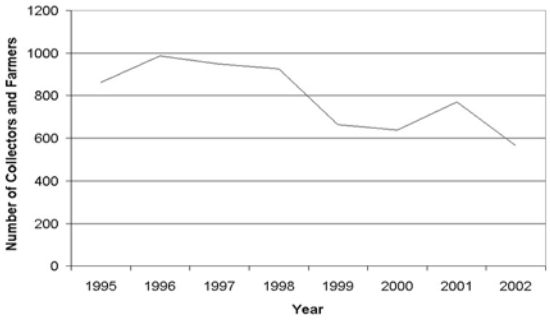

Fig. 2. The number of individuals ranching and collecting between 1995 and 2002

The ranching and collecting of insects has occurred in all but one of Papua New Guinea's Provinces between 1995 and 2002. However, the locations of insect ranchers and collectors are clustered in most provinces. These clusters occurred in the locations where training by IFTA staff has been conducted. This suggests that ranchers and collectors have an informal support network that allows the sharing of skills and techniques, thus sustaining an interest in this income generating activity. From their addresses, it is clear that the bulk of ranchers and collectors live close to main roads. Originally it was hoped that collectors and ranchers would be able to operate in areas only accessible by air, as insects are a low weight to high value commodity, but this has not proved to be the case.

As incomes have varied between practically nothing and several hundred USD per annum there is an indication that this kind of income generating activity can be fitted into a range of livelihood strategies.

The longevity of individuals as ranchers or collectors is low. Only one of the fourteen people who earned an income every year from 1995 to 2002 lived outside of Morobe Province. For most people insect ranching and collecting appears to be attractive for a relatively short period of time. This could be due to a host of factors; ranchers and collectors could have begun other income generating activities, such as vanilla farming in the Sepik, which prove to be more profitable than insect ranching; ranchers and collectors may not receive enough advice or support from IFTA; ranchers and collectors could be selling to other insect buying agencies, such as Wau Ecology Institute which began buying insects in 1994, or to illegal traders. It should also be noted that postage costs in PNG increased sharply through the duration of the study period, limiting the ability of insect ranchers and collectors to cover the costs of mailing their insects to IFTA.

The contraction in geographic spread of collecting and ranching indicates that IFTA now lacks the capacity to maintain regions that are remote from its office in Morobe Province. The only outlying Province that did not see an income decline was the North Solomons. All other remote regions such as Sandaun, New Ireland, New Britain, Gulf, Western and

Manus that have no road link with Morobe, had ceased insect collecting or ranching by 2002.

The implications that insect ranching and collecting has for biodiversity conservation are not well known at present. The data show that the same species have been provided to IFTA from the same places over a 25-year period, which suggests that so far the IFTA project has allowed the sustainable use of butterflies and other insects. The enormous reproductive capacity of most insects, and the logistical problems of physically removing a large percentage of individuals from a population, means that over collecting has seldom posed a genuine threat to butterflies (Pyle in Parsons, 1992). However, there are no data to show whether or not ranching and collecting have eroded the integrity of insect populations. Until this work has been done there can be no conclusive evidence for the biological sustainability of insect ranching. The reality is that it is highly unlikely that biological sustainability could be proved in regard to butterfly ranching, as the butterfly ranchers are located in remote areas of Papua New Guinea, making any form of monitoring utterly impractical.

The image of insect ranching being a perfect way of providing rural incomes is unfounded and there are many problems facing those using it as a means of income. A reassessment and further research into insect ranching and collecting in Papua New Guinea is required. More work needs to be conducted at a village level rather than relying on conjecture. The smaller insect trading agencies that have fallen outside the scope of this paper also need to be investigated, to gain a better overall understanding of the uptake and success of insect ranching and collecting. Recently purchasing data has been found at IFTA and one of its competitors, the Wau Ecology Institute, that include species names and quantities. Once completed, the analysis of these data sets will allow an insight into the collecting and ranching pressure on insect populations over the past decade.

Research is also needed into the dynamics of IFTA as an institution. After initial dynamism in the 1970s and 1980s, IFTA appears to have been rather stagnant in the past decade. The under-performance of the organisation has manifested itself in its lack of capacity to

conduct regular training and an inability to pay ranchers and collectors regularly and on time.

The continued existence of IFTA, albeit in a weakened state, offers an income earning opportunity for the rural poor of Papua New Guinea. The biological sustainability of this activity is in doubt and as such cannot claim to be truly sustainable. What IFTA does offer is a relatively transparent window on the trade of butterflies and other insects in Papua New Guinea. IFTA does have a future but currently it is a precarious one.

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