

**SOCIO-ECONOMIC SURVEYS
OF TRUST VILLAGES**

OK-FLY SOCIAL MONITORING PROJECT REPORT No. 11

for Ok Tedi Mining Limited

Original publication details:

David King
Department of Geography
James Cook University
Townsville
QLD 4811 Australia

General editor:

John Burton
12 Lilley Street
O'Connor
ACT 2602 Australia

Unisearch PNG Pty Ltd
Box 320 UNIVERSITY
NCD
Papua New Guinea

Reprint publication details:

David King
Director, Centre for Disaster Studies
Department of Tropical Environment Studies and
Geography
James Cook University
Townsville Q 4811 Australia

General editor:

John Burton
Resource Management in Asia-Pacific Program
Research School of Pacific and Asian Studies
Australian National University
ACT 0200 Australia

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EDITOR'S PREFACE

This volume is the eleventh in a series of reports for the Ok-Fly Social Monitoring Project. Colin Filer's *Baseline documentation. OFSMP Report No. 1* and my own *The Ningerum LGC area. OFSMP Report No. 2*, appeared in 1991. My *Advance report summary for Ningerum-Awin area study. OFSMP Report No. 3*, David King's *Statistical geography of the Fly River Development Trust. OFSMP Report No. 4*, and the two major studies from the 1992 fieldwork, Stuart Kirsch's *The Yonggom people of the Ok Tedi and Moian Census Divisions: an area study. OFSMP Report No. 5* and my *Development in the North Fly and Ningerum-Awin area study. OFSMP Report No. 6*, were completed in 1993. I gave a precis of our findings to 1993 in *Social monitoring at the Ok Tedi project. Summary report to mid-1993. OFSMP Report No. 7*.

In 1994, a final round of fieldwork studies was undertaken; this work has been summarised in *Interim findings for 1994. OFSMP Report No. 8*. David Lawrence's *Lower Fly area study OFSMP Report No. 9* appeared in May 1995 and my own *Middle Fly and North Morehead area study. OFSMP Report No. 10* and Budai Tapari's *Development or deterioration? Socio-economic change in the Morehead District. OFSMP Report No. 12* appear concurrently with this volume.

David King presents the results of his village surveys across the whole of the river system. King's brief was not to 'computerise the Trust' but to show the value of collecting quantitative, comparative data from the villages. However, with a scaling up to the whole system and with a re-planning of the involvement of Community Relations in the activities of the Trust, I believe just this could be done and it would be a worthwhile annual exercise as a part of the annual reporting of Trust operations.

This will be a part of our final recommendations.

John Burton, Canberra

SUMMARY

Two periods of fieldwork were undertaken for the study: a short visit to the Middle Fly in February 1994, followed by a survey trip to six villages in different parts of the Lower Ok Tedi-Fly River Development Trust area in June 1994.

The economic lifestyle in many areas is essentially unchanged from colonial times. Hoped-for benefits from the presence of the mine in the province have fallen far short of the expectations of both the people and the planners of the late 1970s. In general, government stations are run down and starved of operating funds, and budgetted money is wastefully used at the provincial level because of poor human resources and political interference in the planning process. The only infrastructural developments of note in many areas are those created recently by the Trust.

Cash generating opportunities at village level are very limited and all villages poor by developing country standards. The mean fortnightly earnings was K31 for a household averaging about four people, or a per capita income of about K200 p.a.

Commercial fishing, rubber growing, and crocodile farming all have potential, but are bound by limited grower or management skills, and village organisational problems.

The Trust has now made substantial capital investments in villages, but all the items put in place are dependent on the company for their upkeep and maintenance. While many items meet urgent needs, such as water supplies, there is no evidence that sustainable economic development is happening in the Trust villages or the province generally. This is not likely to change in the near future unless a dramatic improvement occurs in education and technical training at the village level, and communications access to the villages. The average school grade reached amongst adults was Grade 4.

Villagers rarely made environmental complaints their first topic of discussion. However, all informants were concerned about water quality in the river system and many went further with specific claims. For example, people pointed to mine-related sedimentation as a cause of side-channel aggradation in the Middle Fly and increased erosion of levees. Bosset villagers blamed OTML for the silting and drying out of Lake Wam (Bosset Lagoon) in 1993. Many there also believed that ill health and maternal mortality were caused by tailings pollution. At Wogam, near Ningerum, and confounding the effort put into environmental awareness programmes, people said OTML itself was the source of warnings to the effect that the river was a danger to life and that even riverbank firewood was unsafe to be burnt.

The villagers' development priorities in all places were improved infrastructure and access to service centres: the construction of roads, or better communication by sea or river. All villagers said raising income from cash activities was their primary aim.

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TERMS AND ABBREVIATIONS

CRC	Christian Revival Crusade. A small evangelical church.
DAL	Department of Agriculture and Livestock, the national primary industry department.
DPI	Department of Primary Industry, provincial primary industry department.
ECP	Evangelical Church of Papua. The national headquarters are at Halengoali, Tari, and, in Western Province, at Balimo.
FRPG	Fly River Provincial Government, referring specifically to the political half of 'the provincial government'. The administrative half is the Department of Western, a public service department.
LGC	Local Government Council. The formal third tier of government in Papua New Guinea, operating through Provincial Affairs departments and funded through a line in provincial budgets. (Some provinces operate a Community Government system instead.)
OTML	Ok Tedi Mining Limited. The operator of the Ok Tedi mine project. The successor to the discoverer, Kennecott (until March 1975), the Ok Tedi Development Company (March 1975 to March 1976), and Dampier Mining/BHP (March 1976 to February 1981). Until recently, the shareholders were BHP, Amoco, a consortium of German metal mining institutions, and the Papua New Guinea government
SSG	Special Support Grant. An ex-gratia payment, nominally set at 1% of the province's mine exports, given to a mining province by the national government to assist with infrastructure improvements.
Trust village	Village in the Lower Ok Tedi-Fly River Development Trust.
Trust, the	Lower Ok Tedi-Fly River Development Trust, 'the Trust'.
VDF	Village Development Fund. Grants of money made as part of the Trust budget to each person recorded by annual census as living in a Trust village.

CHAPTER 1

PRE-SURVEY TRIP TO LAKE MURRAY DISTRICT

I visited several Middle Fly villages in February 1994, prior to doing the more structured village survey. The purpose of this was to aid in the design of the quantitative work and to get a feeling for the development problems of the region as a whole. I stayed at Lake Murray station, Bosset and Manda on this trip, and at Obo/Kaviananga and Komovai in June 1994 during the formal survey.

People, history, land use and water

Burton (1995) discusses the cultural background of the Middle Fly, drawing on the work of Busse (1987), Williams (1936) and others. Apart from passing expeditions from the 1870s to the 1930s, the North Fly was essentially opened up from Lake Murray. The patrol post was established there because it provided access to flying boats. This period in the early development of Western Province gave Lake Murray a momentary advantage that it has never regained. At the same time as Lake Murray began to be the base for the opening up of the North Fly, the Dutch were very active in West Papua. Dutch missionaries serviced a significant population of the Middle Fly until the end of the 1950s, as border inaccuracies placed villages like Bosset in the parish of Bupul and, for administrative purposes, in the Onderafdeling of Merauke (see Busse 1987:130-160).

Both of these early advantages for development in the Middle Fly have subsequently been lost. Australian colonial administrators moved their base north to Kiunga, where the population was much greater, and more densely concentrated. Kiunga and Lake Murray District gradually shifted activities away from Lake Murray, which consequently became increasingly peripheral (see also King, McGregor and Miskaram 1990).

The 1960 Australian-Dutch Conference on Survey and Mapping and the subsequent placement of border markers on the Fly at Angamarut and Domongi in 1962 put an end to Dutch missionary activity (van de Veur 1966:192ff.) and the Montfort Catholic Mission took over Bosset station in 1963. After the Indonesian invasion of West Papua traditional cross-border movements were not initially impeded, but with a surge of OPM activity in the early 1980s and the mass migration of refugees to Papua New Guinea, the border was closed from 1984. This spelled an end to any possibility of trade or close economic ties with centres like Merauke and Mindiptanah on the West Papuan side.

According to Middle Fly informants a no-mans-land now exists on the other side of the border, into which it is too dangerous for anyone to stray. This political situation puts the Middle Fly into an even more peripheral situation. Peaceful relations and an open river are the priorities for the Papua New Guinea government. There is neither official nor tacit support for the OPM. It may be in Papua New Guinea's national interests for the border to be closed, but it is not in the best interests of border dwellers who have lost access to traditional lands and resources.

The Middle Fly is a seasonal wetland fed by perennial rivers. It is thus an area of extremes in which water controls resource use, settlement, access and land. Relatively dry land can only be found at some distance from the lakes and rivers. These slight ridges and rises in the landscape are thickly forested, contain many of the sago swamps and are remote from the main waterways. During the dry season these forests contain the only water outside of the main river system. Thus people had developed a resource use that shifted between the lakes and rivers during the wet season, and the more remote inland forests and ridges during the dry. The system is an adaptation to the diverse resources of water and forest, between seasons. It does not favour either permanent settlement or cultivation. Thus the people of the Middle Fly are primarily hunters, fishers and gatherers who practise farming as a marginal activity, mostly along the levee banks.

As the river increased in importance as a transport route, and government services required accessibility and concentration, villages and people relocated towards riverside sites. However, if the river is not used for drinking water, such centralised sites remain vulnerable to the drying up of the creeks, lakes and back swamps. Most settlement sites cannot be sustained throughout the dry season without storage of water. This has prompted the Trust construction of tanks and pumps. A secure water supply is essential for permanent settlement, which is itself a basis for any kind of community development. However, sago stands remain distant and extended trips are still needed to sago camps out in the swamps.

Dependence on the waterways means dependence on canoes. It is likely that all families own some kind of canoe. A few have outboard motors. They vary in size from single person, or child sized craft to magnificent craft that will carry a score of people and their baggage. They are a work of art and technology, carrying towards the next millennium an ancient craft and skill, that has already been lost in most other parts of the world. These are not over-statements. The canoes of the Fly and Ok Tedi rivers are superbly designed watercraft. Some are constructed of softwoods, which thus take a few days for a team to dig out and seal. Some, however, are constructed from timbers as valuable as rosewood, take much longer to build and will last much longer. The range in time effort and value that goes into canoe construction is considerable. (In Dome, I once saw a canoe that was being built for an aggrieved husband by an adulterer, as a community punishment and recompense).

The loss of canoes from the wash created by ships and barges represents a very real economic impact and even a physical danger. Canoes that are capsized and damaged can be compensated. Those that are lost from their moorings are not compensated. It is therefore a strange behaviour to continue to tie canoes to flimsy moorings with flimsy ropes, given the extent of knowledge about the effect of ships waves. This is another area where education and information would be valuable.

Environmental perceptions

There was an interesting contrast in environmental attitudes between people at Bosset and people at Manda. Bosset saw the river and lake as being seriously polluted, with loss of fish species, decline in numbers and detrimental impacts on health; increased sickness, increased maternal mortality and malnutrition in children. At the same time this village seemed relatively divided, dependant on the mission, critical of the company, unable to utilise Trust payments efficiently or in a united manner, and unable to sustain the operations of the fish freezer project. At Manda the freezer project was much more successful, and the village

apparently more united than at Bosset. Numbers of nets had increased, catch had increased, and the project had run quite well for two years. When asked about environmental damage, informants stated that they had netted a fish with 'boils' on it in 1992. However, they did add that sediment was increasing on the banks and cutting off creek access. A Bosset response to Manda success was that Manda was overfishing, and taking all of their catch, as well as stealing their nets. Jealousies influence environmental perceptions and attitudes.

Water is the basis of resource use in the Middle Fly. Impacts on the water have a direct effect on the people. People are quick to point to increased sediment loads when discussing the clearance in small channels, the erosion of levee banks, silting of back swamps and the condition and quantity of fish. Informants at Bosset went further in also attributing the drying up of their lake, and resulting choking of the water by grass, to an increase in sediment carried by the Fly.

Despite the fact that similar processes were observable on Lake Murray, away from the Fly, the perception by the villagers is that the river is poisoned and that mine sediment is the cause of an extensive range of natural phenomena. Even if mine personnel go to explain and measure what is happening, some people are still obviously going to see the company as the source of all evil and trouble. However, there is clearly more scope for education and information. Dealing with perceptions and prejudices is as important as measuring the real impact. In fact perception of environmental damage and change is a real impact.

Lake Murray station

Lake Murray, its government station and villages, has been bypassed by history and development. No development has occurred there since the 1960s. The station is run down, understaffed and under-funded. It is therefore incapable of carrying out any extension or development work. At the time of my visit, the station generator had just broken down, but would not be looked at until the annual Elcom visit in six months time. During the previous dry season the draining of the lake had resulted in a total drought on the station, such that it was virtually closed down. Government employees at Lake Murray felt themselves to be forgotten and ignored. Resources could only be attracted through absence from the station in Kiunga. There had therefore been no patrols to villages by public servants from Lake Murray station. In the villages themselves the isolation was even greater. The public servants attributed the lack of interest and development to the ineptitude of the Provincial Government. They consequently had a positive attitude towards OTML, who they saw as the only development agency (apart from missions) working in the villages for which they were responsible.¹

Crocodiles

Both in Lake Murray villages and in the Trust villages crocodile projects had existed since before the days of the mine and continued to involve a small number of households or

¹ [The Porgera Joint Venture has a more direct involvement at Lake Murray than OTML. In 1994, its Business Development Section was intending to support the Kubabaiva Pty fishery there under the Infrastructure Tax Credit Scheme. Ed.]

business groups. Manda had one project operating, and four more starting up. They required a small amount of investment for construction of the holding pens. No skins had been sold from existing projects, although the oldest project, which had been started in 1991, had 50 animals, which were being fed three times a day. If the crocodiles had been fed on barramundi at its going rate, the amount of fish to get a crocodile up to maximum size would have been worth three to five times the value of the crocodile skin. However, they were being fed non-commercial fish species or equivalents in meat, such as deer or wild pig.

Crocodiles have been commercially hunted in the wild since the 1950s, but had not been domesticated until the government restricted hunting by imposing a skin limit of 21 inches. Thus the projects buy 6 or 7 inch wild crocodiles which they then breed until they reach 20 inches. The last time a Manda project had sold a 20 inch skin, to Northern Trading, it had fetched K156. It seems unlikely that a crocodile in a village project will reach 20 inches in less than three years, or that it will fetch more than K250. Estimates are that an average price will be K180 to K210. Most projects contained only 15 to 50 animals, at various stages of development. Crocodile projects are of not of great economic significance, considered for the development needs of the region as a whole, but they have the advantage for the individual that (a) they can be operated with minimal inputs, requiring no power and only simple infrastructure, (b) production is wholly owned by the farmer and his family, and (c) skins can be stored until a buyer visits, or skinning left until shortly before the buyers visit. Crocodile projects are sustainable without the mine, as long as the crocodile populations and habitats are left in a sustainable state. Likely earnings from crocodile projects are comparable with average rubber or fishing earnings. These all bring small amounts to producer households; crocodile projects bring it most directly to the individual household.

Fishing projects

Manda's Komaizi Fishing Project buys black bass and barramundi from Manda and Mipan villagers, which it sells through the OTML Business Development section to Poons (the mess caterers) and other outlets like Cloudlands at Tabubil. The fishermen bring their catch direct to the freezer where it is filleted and frozen. Freezer door prices were 40t/kg in 1992, 45t in 1993 and 60t/kg in 1994. Fish were then sold on in 1994 for K3.50/kg for bass and K4.50/kg for barramundi. The size of fish ranged between 1 kg, or 3 kg in the case of barramundi and bass, the minimum acceptable, to a mean of around 7 kg. Total sales earnings for the business group in 1993 came to K18,124, of which only K46.80 was paid out to Mipan villagers. However, the sales price includes no more freight charges. This has to be borne by the buyers. Furthermore the freezer uses 730 gallons of fuel a year (about 17 drums) which is currently supplied by the Trust. Nets had increased from 11 to 15. Some are owned by the project and used by villagers when they go fishing; others are bought by individually. Freezers were bought by the Trust; some other items were bought using VDF money. Profits from the freezer then go to the bank into a village trust fund.²

² [The exact figure for Manda's fish sales in 1993 was 2860 kg of fillets (data courtesy of J. Ransley, see Burton 1995). At K4.50/kg, this would have been worth considerably less than the figure given to King here. In point of fact, the Trust's support to the Manda, Bosset and Obo fisheries was broader than King indicates; it included free maintenance, fuel, account keeping, and guaranteed purchase and air uplift of the catch. The village trust fund mentioned by King—the account has multiple signatories from among various Business development and government officers at Tabubil—is argued by me to be a central problem of

The Obo project was working well in 1994, Manda's not so well (partly due to problems with the freezer), and Bosset's was not functioning at all due to a mixture of natural disasters—the lagoon, Bosset's means of access to the Fly fishing grounds, was dry for several months of 1993, mechanical breakdown, internal dispute and—in the villagers' claim—a withdrawal of Trust support.³ Wam Fishing has may also have been affected by the villagers' preference to divide up their VDF funds by household rather than invest it together (however this may be a preference formed from past experience with Wam Fishing). Few sales of fish have been made recently, though there was some attempt to temporarily market deer meat. Records were incomplete at Bosset. (See Burton 1995 for more information.)

Sustainable Development

The crocodile projects are capable of sustained production after the mine has closed. The freezers probably are not, because they depend on the mine as market, provider of technical support and subsidiser of freight. Bosset freezer was originally set up with church support, while the Department of Commerce continued to administer these projects until the Trust took responsibility. However, the poor showing from the Provincial Government in any kind of development project does not allow confidence that these freezers may be able to operate in the long term. Apart from these projects there is little else happening in the way of economic development. The water supply problem has not been solved, although it has certainly been eased temporarily, nomadism remains an important of the way of life and hunting, fishing and gathering continue to dominate the local economy.

A quotation from Busse sums up the lack of development in the Middle Fly:

In the early 1980s work began on the Ok Tedi copper and gold mine in the mountains to the north of Kiunga. This multimillion dollar, multinational project has been watched anxiously from a distance by the Wamek who as residents of the Middle Fly fall into the official Papua New Guinea impact area. All of the equipment for this project has been taken up the Fly River on barges to Kiunga and from there it has been trucked to the mine site. Thus for several years, the Wamek have watched an almost unbelievable amount of wealth float by them on the river. The Wamek and the members of the other tribes in the Middle Fly had hoped that Ok Tedi would provide employment for large numbers of men from the Middle Fly. To date, this has not happened. Some men have gone to work in Kiunga, either for the mining company itself or for one of the businesses that have sprung up to support the mine. Ok Tedi has provided a good market for the fish that the Wamek catch and freeze as part of the village's fishing project, but cash continues to be scarce.

Some people have been successful in the new economy. Several people from Bosset have completed high school and some of those people have attended teachers' college or nursing school and work in other parts of Papua New Guinea. One man from Bosset is a major and a lawyer in the Papua New Guinea Defence Force.

Nonetheless, many things have not changed in the Middle Fly. Daily life continues to revolve around traditional subsistence pursuits—hunting, fishing, foraging, and sago making—and the production of

these and similar group projects; everyone considers they own the project and wants a dividend, not a wage income, but satisfying this expectation inevitably means dividing up the business capital. See Burton (1995). Ed.]

³ [I also discuss this. There was no withdrawal of support for Wam Fishing; indeed a major investment had been made there. Ed.]

objects for everyday use. Most hunting is still done with bow and arrows, and the only innovation in sago making has been the use of short pieces of pipe, rather than bamboo nodes, on the ends of sago choppers. Most food is still wrapped in leaves, or placed in bamboo, and cooked on an open fire. Houses now have walls and raised floors (innovations introduced by the Dutch), but they are still made entirely from materials found in the local environment. Men still cut dugout canoes and make paddles, albeit with steel, rather than stone, tools, and women spend their leisure time weaving sleeping mats and the baskets in which they wash sago and carry their babies. Indeed, other than a few tin plates and cups, a metal cooking pot, some ragged Western clothes, a couple of mosquito nets, a bush knife, an axe, and occasionally a kerosene lamp, the average family has nothing that they have not produced themselves (Busse 1987:165-166).

The most fundamental problems faced now by the Middle Fly, and which will continue to constrain development for the long term, are its vastness, its extremely small population, extreme sparsity of population density, extreme climatic regime that limits infrastructural development, its absolute remoteness and its inaccessibility. There is very little that can overcome these physical and environmental constraints. It suffers an absolute tyranny of distance.

CHAPTER 2

SELECTION OF VILLAGES AND VILLAGE INVENTORIES

Village selection

Eight villages were selected by me and J. Burton along the Ok Tedi and Fly Rivers as representative examples of Trust Villages. They were selected by area in a deliberate manner: technically this is 'purposive' sampling by 'strata', the regions that the 102 Trust villages naturally fall into (see Appendix B for discussion). The eight comprised two Ningerum villages, one with access to school and road, one Awin village (in reality a roadside corner at Matkonnai, where all but a handful of Demasuke village had moved for access to the road and school), a Yonggom village, Komokpin, one Gumakan village in the Middle Fly, with access to the main waterways, but not to a school, and two Kiwai villages, one with a school and good access to Daru, and one with poor access to both, and finally a corner in Kiunga with residents from (a) Middle Fly Trust village(s).

In the event, in the two week survey period I conducted the survey in six villages with my field assistant, Junne Cosmas. I avoided the Yonggom village at the time of the fieldwork, primarily because a Community Relations team from OTML was about to begin agricultural and land use studies in these villages, and I lost a day at Obo making it impossible to stay in Kiunga for long enough to survey one of the corners there. Table 1 compares intention with reality.

Nominated sampling 'strata'	Nominated villages	Means of access to villages	What happened in actual survey
Kasuwa (north) Ningerum	1	By road to Ok Ma settlement	exact village surveyed
Alice (south) Ningerum	1	Road, ferry, walk 6km	exact village surveyed
Awin (West Awin CD)	1	Road	more appropriate village
Yonggom (Lower Ok Tedi)	1	Helicopter	cut (avoid overlap with Public Affairs staff)
Gumakan (Middle Fly)	1	Southwest Air, canoe 2hrs	exact village surveyed
Middle Fly corner at Kiunga	1	Town	cut (aircraft delay)
Kiwai (South Fly)	2	Dinghy charter 1hr / 8hrs	alternate villages surveyed (bad weather)
Total	8		6

Table 1. Comparison of the planned and actual itinerary.

The point of the inventory of the villages was to record as fully as possible, the state of development in each village. While economic development is clearly perceived as the main indicator, there is a wide range of other sorts of indicators which illustrate both the preparedness of the population as well as aspects of the standard of living and quality of life. Survey instruments were adapted from similar studies that had been carried out in other parts of the country. Some of these were part of rapid rural appraisal; others were base line or impact studies in mining areas elsewhere in the country. Consequently the survey instruments contained many more questions and categories than applied to the Trust villages. This, in a very real sense, is part of the measure of underdevelopment in the region. It would have been very useful to have had the same kind of data collected in the baseline

studies done by various authors in the North Fly villages before the mine began (see Jackson 1977; Tapari 1978). I and my students did have that opportunity after a fashion, but most of our surveys in 1979 and 1983 were in Kiunga, especially its corners (see King 1983).

What strikes me in carrying out what should have been a baseline study fifteen years ago, is that the surveys in these villages essentially *are* a baseline study. Materially, little has changed or developed in many of the villages visited. Most of the questions that would have prompted full and detailed answers in coastal or island villages in the eastern part of Papua New Guinea, remain empty of change-oriented data, because that development has not yet happened.

The two survey instruments were a village inventory, conducted in an open meeting, to record all of the structures, institutions and developments that exist in the village, and a sample household survey. The open meeting tended to be dominated by the men in each village, but as the household interviewer was female, slightly more balance was achieved through the household surveys, many of which were answered by the wife of the male household head. A disadvantage of the wife answering the household survey was her imperfect knowledge of cash earnings that accrued to her husband. In the same way the village inventory meeting tended to play down the part played by women in the life of the village.

The inventory was structured in a number of categories that were there principally as a prompt to issues, but which also ensured that the same things were covered in each case. The household survey dealt with most aspects of the household as a unit. This has some problems in that many households were multi-family, usually consisting of children of the household head, with their spouses and children. In a general sense these were extended family households, but it is likely that there was more independence of these sub family units than the questionnaire suggested. A significant part of the questionnaire thus consisted of a census. A limited number of questions were asked of the children under the age of fifteen years, with all questions being asked of the remaining adults. Again it is likely that information on previous jobs of less closely related members of the extended family may not have been accurately known.

A sample of families was selected in each village, intended to be 15-20% of the families in each of the villages. In reality the proportion wavered on either side of this intended sample. In all 39 households were interviewed in the six villages. The administration of the questionnaires took a fairly long time because of the detail. Given the small numbers from each area, it is not possible to compare one village or language group with another statistically at the present time. However, if the Trust takes up the idea of maintaining a similar kind of documentation for the 102 villages, preferably using a computerised village database, this may be possible at a later date. In the tables below, data from all 39 households have been aggregated.

VILLAGE 1. OK MA 11 - BOLIWOGAM CORNER

Boliwogam lies about two and a half hours walk from the corner on the Ok Tedi River. Four houses remain in the village and 12 in the corner. The road was built in 1982-83 and was the reason why the people moved to the corner at Ok Ma 11. Subsequently the construction of the school in 1986 and the aid post in 1987 confirmed this locational decision. Presently the Boliwogam people make gardens on Oktidetau land. There is no dispute between the villages about the use of this land, so that the Boliwogam people are able to sell some of their surplus produce. They claim they would move back to the original village site if the road is extended to the village. In reality it seems likely that some would remain at the corner, as Boliwogam does not have the child population to support its own school.

The people have requested the company for assistance in constructing the road, but the Trust has informed them that both the company and the government must be involved in such a venture. The perception of the villagers is that the Trust is being slow, as they feel that the government will support a road. In the village the Trust has built two houses, a community hall and two tanks, but nothing specifically in the corner, where most of the population lives.

Languages and Literacy

Languages spoken by the people are primarily Ningerum, with Pidgin spoken by many, as well as English, especially spoken by the school children. Motu is also spoken by older men. Literacy is confined to Motu and English, not Ningerum.

Transport and Communications

The corner has access to the road, the village does not. One vehicle is owned by Boliwogam villagers, but it is currently unserviceable. The nearest airstrip, telephone, post office and government station is Tabubil. People mentioned that they would like a telephone link. The town is used frequently by these people. Two families had radios which picked up Kalang and the provincial radio station. There was no access to television and no families had a newspaper at the time of my visit.

Water Supply and Waste Disposal

The government constructed Ok Ma 11 main water tank was used by the people, as well as a number of rain-fed 44 gallon drums. Two additional Trust water tanks are in the village if people return there. There were no standpipes, pumps or wells. Pit latrines were used by people in the corner and the village.

School and Education

There is no tokples skul; the community school has four grades. This is shared by the other Ok Ma residents who are from Oktidetau, Derongo, Bankim, Kumkwit and Ankwit. Presently only one Boliwogam child attends the community school, although three are at Kiunga High School, and one doing CODE. Some young people had previously attended the vocational school in Kiunga, but they have now left. Adult literacy is extended through the

church and the Bible training classes. There were no community health or nutritional training programs.

Power

There was no power in the corner and no supplier of fuel amongst the Boliwogam people.

Land

It is uncertain whether any Boliwogam village land lies within LMP 1, the Ok Tedi lease adjacent to which the Ok Ma settlement is situated, but some members of the village may have personal land holdings within LMP 1.

Health Facilities

An aid post exists at Ok Ma 11, while the nearest hospital is at Tabubil. Clinics visit Ok Ma from Tabubil hospital, for a day about once a month to take blood samples and deal with babies and nutrition. Women from the corner regularly visit Tabubil hospital with their children.

Village Organisation

Onya village council represents Boliwogam, Walawam, Wurimkanatgo and Haidawogam, with three committee representatives. There is no government officer or village clerk. A CRC church is sited in the village and a Baptist Church at Ok Ma. There are two church workers, but no other church facilities beside the church buildings themselves. The church committee has 12 members and the church activities, besides services includes pidgin education and Sunday School.

Environmental Issues

Environmental damage is claimed to have occurred on the land at the village site. People reported that sago and gardens are not doing well, the vegetation has been damaged and animals have run away from the area. These complaints have been taken to the company, but this village has not involved itself in the current litigation against BHP.

Cash Crops

There are no cash crops, but most of the women sell surplus vegetables in Tabubil market on Fridays. A few take food there on most days. People complained that their requests to be given seeds had been denied.

Businesses

Three trade stores exist in the village and one at Boliwogam corner. There are no fuel retailers, no other business groups, and no sawmilling activities.

Mining

The only connection with the mine is through VDF funds. The Trust built houses at the village, plus a community hall and two rain tanks.

Community Buildings

There are no community buildings at Boliwogam Corner.

Law and Order

There is no Peace Officer, but a Peace and Good Order Committee had just started. People stated that there is no rascal problem there.

Social, Sporting and Political Groups

There is a Women's group that is currently doing little, a general Ok Ma Youth Group that helps people in their gardens etc. And sports teams in basketball, and volleyball. They go out to Tabubil to play. There are two youth leaders with the youth group, one of whom is from Boliwogam, and there is a projects committee organised under the council, although they have not yet developed any projects.

Border Issues

None.

Social Problems

There is no gambling and no alcohol in the corner and the village.

Construction and Machinery

The people own three sewing machines and obtain building materials from waste in Tabubil.

General Comments

The principal informants were committee members Jokuan and Dixon, assisted and informed by most of the rest of the corner.

VILLAGE 2. WOGAM.

The village contained 212 people living in 59 houses.

Languages and Literacy

A small number are literate in Ningerum (presumably to be able to read religious tracts), many older men are literate in Motu, and the small number who have been to school in English.

Transport and Communications

Wogam is situated on the west bank of the Ok Tedi and is linked to the Tabubil-Ningerum highway by a pontoon ferry crossing and a road passable by tractor in the dry season. People regularly travel to Tabubil to shop, to sell produce in the market and to visit relatives, but they must usually make the journey to the highway on foot. As this restricts what they may carry out in the way of cash crops the people are very keen to have a bridge built at the present pontoon site. Not only would this serve Wogam, but it would also improve road access to another 28 villages (named by the Wogam villagers) on the western side of the Ok Tedi.⁴

No vehicle or outboard motor is owned by any Wogam villager, although there are four large canoes on the Alice. The nearest airstrip, telephone and government station are at Ningerum, while the post office is in Kiunga, or Tabubil. People have watched satellite television in Tabubil, but nobody in Wogam had any newspaper. There were three radios in the village, which could pick up NBC and provincial radio.

Water Supply and Waste Disposal

A Trust tank is at the aid post and two other Trust rainwater tanks elsewhere in the village. There was also one 44 gallon drum and people utilised stream water as well. There were no standpipes and every house claimed to have its own pit latrine.

School and Education

There is a tokples school, with nine students. The community school is at some distance at Kolebon, with three teachers covering the six grades. From Wogam villages five children attend Tenkim community school, 11 are at Kolebon and 15 at Ningerum. A further two are at Kiunga High School, but none at vocational school. There are no other kinds of literacy or educational programs operating in the village or involving Wogam people.

⁴ [I wrote a special case study of this highly desirable bridge in 1993 (Burton 1993:49-50 and Appendix D). An Awini Tamaro landowner—on the highway side of the river—wrote to OTML, the DMP, the and the OIC, Ningerum Station in 1992 with a demand for K250,000 compensation for alleged damage to trees and soil around the proposed bridge footings. Ed.]

Power

There is no power source at Wogam, but one villager supplies kerosene.

Land

No land has been alienated or registered.

Health Facilities

The Trust has built the village an aid post. The nearest hospital is Kiunga, with a Health SubCentre in Ningerum. A clinic visits the village from Ningerum once a year for pre-natal and baby health.

Village Organisation

There is a village council and a village clerk, but no government officer. There are two churches, United and ECP, with three church workers, and a church committee, but the buildings are of bush materials only, with no other facilities. Apart from services, church activities involve sport, visits to Ningerum and evangelical patrols.

Environmental Issues

Of all the villages surveyed, Wogam reported the greatest problems in relation to the environment. They claim problems began in 1983 in both the Ok Tedi (Alice) and the Ok Ma, as damage occurred to riverside gardens, sago swamps, and fish diminished as a result of increasing pollution. They claim that there is less protein as their source of fish has been restricted, and that as a consequence children grow very slowly. They do not draw water from the vicinity of the main rivers and have been warned by OTML not to use wood or sago from along the Ok Tedi. As sago swamps were polluted there has been a decrease in sago leaves for house construction, resulting in a shortage of housing and consequent overcrowding. They also claim that pigs that grazed alongside the river began dying after 1983, so they stopped keeping them.

The Wogam people did admit that infant mortality had decreased with better health facilities, even though they felt that their children were not growing fast. The perception of pollution of the river is strong, and has been added to by OTML information, such that more recent reassurances from the company that all is not as bad as it seems, face a level of cynicism.

Cash Crops

There are no cash crops and the village lies in a quarantine zone. Vegetables are sold in Tabubil market by a number of villagers.

Businesses

There are three trade stores and one kerosene retailer.

Mining

The village receives payments from the Trust, but no other mining related income.

Community Buildings

There are two churches, a haus win, an aid post, two water tanks and a community hall.

Law and Order

There is no peace officer, no law and order committee and no crime.

Social, Sporting and Political Groups

There is a church women's group, a youth group, as well as soccer, basketball, volleyball and rugby teams that play between villages and in Ningerum. The women's and youth groups help people generally, chop firewood and make gardens. There are no literacy activities. A cultural group was formed but has now ceased. The women's group has a chairman and there are three youth leaders.

Border Issues

Because the village is inside the border quarantine zone, they are not allowed to plant rubber or keep cattle. They have wantoks on the other side of the border, but there is no crossing because of the danger.

Social Problems

There is no alcohol supplied in the village and no gambling takes place.

Construction and Machinery

There are six sewing machines. Most building material is obtained locally. Only six houses have iron roofs.

General Comments

Information was supplied in a general meeting held at the aid post. The aid post orderly, Mopnan Kenong assisted and helped in translation.

VILLAGE 3. DEMASUKE.

Demasuke village and its land is down by the Alice River, but only a couple of families reside there. Most of the people live in Demasuke corner, which is on Matkomnai land opposite Matkomnai village. The population is small, but apparently many people died in the old village as a consequence of sorcery (any death outside infancy and old age, according to Kirsch), around 1969/70. The general feeling is that fewer children are dying now. The Matkomnai people are clearly jealous of the preferential treatment the Demasuke people receive through their status as a Trust village, and will not allow the Demasukes permission to farm on their land or to carry out any business in the corner. Consequently all projects are being established in the village, although they intend to hold onto the corner for the sake of those families and children who use the school. The government is due to complete the road to the village in the future, which will allow much easier access. Three of the Demasuke people are working in Kiunga, two at the rubber factory. One other is teaching at Yenkenai.

VDF money is banked at the moment. Rex Imu, the Trust supervisor since 1991 was the main informant and came across as a fairly dominant individual who may be a part of the conflict between Demasuke and Matkomnai. He has a connection by marriage to Rex Dagi who is leading the litigation against BHP, and claims to be closely involved with him, on behalf of all the Trust villages, who he said had all been approached and were all in support.

Languages and Literacy

The people speak Awin, some English, a few pidgin and most Motu. There is no literacy amongst them in either Awin or Motu, but those who have attended school are literate in English.

Transport and Communications

The village is two kilometres from the highway, with no vehicle access. Two vehicles were owned by families at the corner. The nearest airstrip is Ningerum which is the nearest government station. Most families owned a radio and were able to receive NBC, but not clearly the Provincial radio. The nearest telephone is also at Ningerum but there is a post office agency in Matkomnai. The neighbouring corner possesses a TV and video, so that television viewing is within the occasional experience of these villagers. Two families regularly bought newspapers when visiting Kiunga, and the most recent paper in the corners was only a few days old.

Water Supply and Waste Disposal

When it is dry people use the creeks for water supply, but there is a Trust rain tank at the corner and two in the village (all Trust constructed). Each house has a pit latrine.

School and Education

There is no tokples school, but there are six grades at Matkomnai. Six or seven of the Demasuke children attend primary school, four are at high school, two doing CODE and one

at vocational school. There are no literacy programs, but every two months a clinic visits to deal with child health, family planning and nutrition. DAL visits very rarely for rubber extension work.

Power

There is no electricity, but a kerosene supplier sells at a neighbouring corner.

Land

No traditional land has been alienated or registered.

Health Facilities

There is an aid post at Matkomnai, the nearest hospital is Rumginae, and a Health SubCentre at Matkomnai from which a mission based clinic goes out every two months. People regularly use the Matkomnai facilities

Village Organisation

Each corner has its own committee with a representative for both the corner and the village attending the Iwo council. There is no government officer and no church, as they attend the catholic church at Matkomnai. There are no church workers, but the mission provides the church building, community school, Health SubCentre, a women's club as well as nurses and teachers houses.

Environmental Issues

Demasuke is closely involved in the compensation claim for damage caused by sediment covering gardens, creeks and swamps. A stated aim of the claim against BHP is to use much of the money to build a tailings dam.

Cash Crops

There are no cash crops at the moment, but there is an intention to consider rubber cultivation once the road has been built. Only two or three families are interested in rubber cultivation and the same ones are presently involved in vegetables sales in Tabubil and Kiunga markets.

Businesses

There are none because of the dispute with Matkomnai. Irregular use is made of one of the vehicles to get to market, but there are no business groups.

Mining

The village receives VDF and Trust projects but no compensation or other payments from the mine.

Community Buildings

There is a village hall, consisting of two haus wins that have been turned into a large community hall, plus rain tanks, all supplied by OTML.

Law and Order

The council looks after law and order. There is no separate village function.

Social, Sporting and Political Groups

The mission has a women's club, which sews and makes bilums. There was a youth group, but it fell apart. There are no formal sports teams, but basketball is played on a casual basis.

Border Issues

None.

Social Problems

No alcohol, but some gambling occurs when people have money.

Construction and Machinery

There are four sewing machines. Some houses use modern materials obtained from Tabubil, but most are of bush materials.

VILLAGE 4. KOMOVAI .

Komovai is remote and severely lacks economic development. The villagers feel that their lifestyle has changed little since pre-Independence times and that there is no future for their children. There is a possibility for rubber, but they are not visited by DAL. They have made a request for a small freezer or ice box to transport fish to Obo, and there is a feeling that there are people in this village who have the mechanical skills to maintain a generator and freezer. The expectation is that the company will assist them in this project. What they described quite eloquently was the need for ongoing, economically sustainable development, rather than buildings and structures that are likely to become idle.

Languages and Literacy

People speak Zimakani and Boazi as well as Motu and English amongst those who have gone to school. Many are literate in Zimakani, and Motu and English.

Transport and Communications

There is no road access, but good river communications. There was one villager who formerly owned a vehicle in Kiunga and there are 11 outboard motors (not necessarily serviceable) in the village, using two large canoes and 11 smaller ones. There is no access to air transport and the nearest government station is OBO. There are seven radios in the village, able to receive South West, NBC, Radio Western, ABC and Melbourne. The nearest telephone is at Kiunga, but there is a radio transmitter in Obo. A few families had newspapers but the most recent was four months old.

Water Supply and Waste Disposal

Water was supplied from five tanks and a solar pump supplied by the Trust. There was also one well. Seven pit latrines served the village.

School and Education

There is no tokples school and the nearest community school, with six grades, is at Kaviananga. Three children attend this school, and their families live there with them, but without any means of support. There are an additional two children at High school, none at vocational school, although some had previously attended, and none in any other kind of formal education.

Power

There is no power supply at Komovai, but solar panels are used to power a water pump. There is one solar panel unit, one kerosene supplier and one supplier of petrol.

Land

Komovai villagers lay a traditional claim to the land where Aiambak Patrol Post is located (see Burton 1995). Otherwise no traditional land has been alienated.

Health Facilities

There is no aid post, the nearest hospital is at Kiunga and the nearest Health SubCentre at Obo. Clinics visit the village from Obo every two months to run a child health clinic and family planning. People from the village do not regularly visit Obo Health SubCentre.

Village Organisation

Komovai is part of a group of nine Boazi/Zimakani villages in the Lake Murray Local Council Area. Fidelis Fili represents the village and is president of the Council. The nearest government officer would be at Aiambak, three hours away, if that post was staffed. The two churches, ECP and CRC, in Komovai are active and both have their own committees. Only the CRC has a church building, but the ECP has five church community workers to the CRC's three. Principal activities involve Bible literacy and evangelism.

Environmental Issues

As in all other villages, environmental concerns were expressed only when prompted. Problems of lack of development and remoteness were the priority in this village. They did, however, complain that OTML Environment section had recently taken samples from the area without informing the people. The said gardens on levees were falling into the river when the water level was high, that crocodiles have declined in numbers, and there are less fish in the river and lake than formerly. They mentioned mullet which have declined over the last two to three years.

Cash Crops

There are no cash crops or fish sales, but they reckoned that if they had nets they would be able to sell fish to Obo Freezer. Occasionally they sell sago, pig, cassowary and deer meat, to Obo/Kaviananga.

Businesses

There are no trade stores, one petrol retailer, no bisnis groups, but there is a small crocodile project that has been running for one year and has ten crocodiles.

Mining

Komovai receives VDF funds that are divided between a village bank account and projects etc.

Tourism

None and no potential at this time, although it is worth noting that the Middle Fly wetlands are a spectacular area of great natural beauty.

Community Buildings

There is a women's club, a large community hall, haus win, five tanks, the CRC church and the old women's club building. The women's club was funded by the government, and the community hall by the Trust, with the structures being built with local labour.

Law and Order

There is no peace officer, but there is a peace and good order committee. Any small law and order problems that arise are dealt with in the village.

Social, Sporting and Political Groups

There is an active women's group which sews for commercial benefit, and a defunct youth group. The women's group has its own committee of five leaders. Komovai has its own rugby league team that goes out to play in other villages. Generally the people felt that there was a lack of government involvement with the village, both from the national and provincial levels, and a consequent lack of development and cash economy. They felt strongly that there was no change occurring, and were in favour of such activities as logging and sawmilling.

Border Issues

Komovai people own no land across the border, but they had directly experienced the impact of Indonesian incursions.

Social Problems

There are no significant social problems.

Construction and Machinery

The women's group owned five sewing machines. There were no other development related pieces of machinery other than those indicated earlier. All houses are built of locally obtained materials, with no tin roofs. Some Komovai villagers do not have houses, as they spend a great deal of their time at Kaviananga, especially those who are there for their children's education.

General Comments

As above.

VILLAGE 5. DEWARE.

Deware contains 32 houses with a population of 260. Many were at Daru at the time of the visit, while others were away fishing - trips that will usually last a few days. The village councillor was one of those who was out at the time of the visit. A plan to establish a crocodile project has been submitted to DAL through the community business group. The trade store is community owned and there is a plan to obtain sewing machines for the women's group. However, despite these plans Deware is a very backward village, with little development beyond those facilities provided by the Trust. Their wish list included such things as a dinghy for sea transport, and roofing iron to increase rainwater catchment into the existing tanks. The contrast of this village with the dynamism of Parama was quite striking. It is possible that these people are not the traditional landowners of this site; that they are subsisting at this site by agreement with the landowners.

Languages and Literacy

All speak Kiwai, many speak Bamu, a few Motu and a few English. Many also claim to be literate in Kiwai, plus a few in English and Motu.

Transport and Communications

Access to transport is entirely by river and sea. People of the village owned 12 large canoes, four small canoes and three outboards. The nearest airport is Daru, which is also the nearest government station. Only four radios were owned by villagers. They picked up the local and NBC radio stations, but it appeared that they were primarily used to play tapes, when batteries are available. The nearest telephone and post office are in Daru and nobody in the village had a newspaper or any other form of communication.

Water Supply and Waste Disposal

There are two rainwater tanks, supplied by the Development Trust, an old well, no pumps, no pit latrines, or septic tanks, but simply use of the bush as a latrine (undoubtedly the village where I picked up hookworm and other parasites; a personal experience which presumably relates to most of the other people of Deware and may be a partial cause of the general lethargy of the place).

School and Education

There is no tokples school, and nearest community school is in neighbouring Sui. This school has three grades and was attended by 11 children from Deware. Nobody was at High or Vocational School. Also there were no literacy programs, community health or nutritional training. Bible training provided some basic classes.

Power

There was no electricity or use of solar panels, but there is a kerosene supplier.

Land

No Deware land has been alienated or registered. The people in the village made no mention of traditional ownership issues; rather it was a Kiwai informant in Daru who claimed that this village was a resettlement site from Kiwai Island and that these people did not own the land that they were living on or farming.

Health Facilities

There is no aid post, the nearest hospital and Health SubCentre is at Daru, no clinics visit the village, but women and children do regularly visit the clinic in Daru.

Village Organisation

Deware is in a village council along with Sui. It has a village clerk, no government officer, and is represented by Manika as councillor. There is one New Apostolic Church, which has its own building, two church workers and a one man committee. The village committee comprises two people, who organise any community activities. The principal activity of the church is a daily afternoon service.

Environmental Issues

People were very vague about environmental problems, but they mentioned problems with food gardens, poor yields with many plants dying, which they attributed to the high tides that flood their land. This was a problem that I had previously identified at Tapila in 1987, before the start of copper production at Ok Tedi.

Cash Crops

The villagers maintain some coconuts on Kiwai Island, which they occasionally harvest for sale in Daru. One family is also involved in selling sago and sweet potato in Daru. No fish sales or any other kind of commercial activity takes place.

Businesses

There is one trade store, inoperative, and no other kind of business venture.

Mining

There is a potential for logging in the area, but no actual activity. The village receives VDF funds which it has invested in fishing nets.

Tourism

No potential whatsoever.

Community Buildings

There is a community hall and a church.

Law and Order

A peace officer resides at Sui. No function exists in Deware.

Social, Sporting and Political Groups

There is a Women's and a Youth Group. The women's group makes small gardens and sells crops in the market. The youth group helps people build houses, and both groups do general community work. They have an inactive cultural group and no sports teams. There are three women's group leaders and two youth leaders. There are no other community organisations.

Border Issues

No applicable.

Social Problems

There are no specific social problems.

Construction and Machinery

The only machine is one sewing machine. All structures are built of local materials except for the Trust community hall.

General Comments

Although Deware is on the Fly River, it is as effectively isolated from urban services as any of the other delta villages. Without motorised transport the journey to Daru is very long, and at times hazardous. Even with an outboard the journey is still three hours and costs a great deal in fuel. Subsistence villagers are therefore not accessible to Daru.

VILLAGE 6. PARAMA.

Parama is the most developed and the largest village that was visited. Although some houses are constructed in a distinctive traditional highset style, many consisted of some or all modern materials including louvre windows. There were many boats, including a large cabin cruiser beached in front of the village. Compared to the other villages visited it was noticeable how much furniture and household equipment and belongings existed in all houses. In a comparative sense Parama gives the impression of being wealthy, although in an absolute sense of course the people are relatively poor and their lifestyle is simple and basic. There are 405 people resident in the village, in 70 houses. Other Parama villagers live in Daru, Torres Strait Islands, Port Moresby and smaller numbers in various other places. There are many skilled people in the village, as well as resources from those living outside, that make the construction of long term developmental projects a viable option for Parama.

Despite, or perhaps because of this higher general level of development, Parama villagers were the most vociferous in their criticisms of OTML generally, the Trust and Community Relations sections specifically, and the provincial and national governments after that. Undoubtedly all of these groups are already perfectly well aware of the feelings of the Parama people as they appeared to be a sophisticated, articulate and well educated group, not the least being their councillor, who had formerly worked for OTML for 11 years. As a member of the Fly River Delta Association, Parama was involved in the litigation against BHP.

Languages and Literacy

All speak Kiwai and a few elderly people are literate in their language. Many speak English and Motu and a few pidgin. Only a few are literate in Motu, but many are literate in English.

Transport and Communications

Despite being an island close to Daru, most households do not own a boat, although there are probably sufficient craft to adequately serve the whole community. Apart from the cabin cruiser there were 11 dinghies, one large canoe and 15 smaller sailing canoes. Parama villagers owned 17 outboard motors. The nearest airstrip is in Daru, as is the government station, along with post office and telephone. There were 30 radios in the village, capable of receiving NBC and Torres Strait stations. Only when prompted people said they picked up the provincial radio station as well, suggesting that few actually listened to it much. There was one television set in the village, with a video. This was operated like a cinema. Nobody had a recent newspaper. Old ones were used for rolling cigarettes, certainly not for reading.

Water Supply and Waste Disposal

The village water supply comes from the four Trust tanks. Five additional tanks paid for from SSG funds have not yet been hooked up. There are no standpipes or pumps and only one old well. Presently there is only one pit latrine in the village, although there are four at the primary school. A submission has been put in for SSG funds to construct proper latrines. Mainly people use the bush and sea.

School and Education

There is no tokples school, but the community school has Grades 1, 3 and 6, attended by about 80 children from the village. Only eight children have gone on to high school during the last eight years (although I am not clear whether this meant completed high school or simply attended). Nobody is at vocational school, there are no adult literacy, community health or nutritional training programs and no-one is taking advantage of CODE. A seekers class for young people in the church provides bible education.

Power

There are three privately owned generators in the village. The South Fly Development Program supplied five solar panel units for street lighting, but they no longer function. Four trade stores supply kerosene to the village.

Land

Only land for the community school has been alienated. The mission ground has been registered and belongs to the church.

Health Facilities

There is an aid post in the village, while the nearest hospital and Health SubCentre is at Daru. Clinics from Daru hospital visit Parama once a year to give vaccinations to children. Mothers and children from the village otherwise go to Daru hospital and clinics regularly.

Village Organisation

Parama is part of the Kiwai Local Government Council, represented by Epesi Dabu as councillor. There is a village recorder, and three school teachers. Additionally there is a 10 member Parama Village Management Committee. One United Church serves the whole village. It has a pastor, a substantial church building and the Women's Group Clubhouse, a church committee, women's club, Youth Group, Seekers Class and Sunday School.

Environmental Issues

The main problems are the build of extensive sand banks, making approach to the island at all but high tide increasingly difficult, and higher tides than normal, causing inundation of the village and some of the gardens. Rather than blaming OTML for all environmental problems the people associated the tidal conditions with stronger south easterlies. The sand banks on the other hand are recognised as a recent phenomenon since the mining period began. As in all the other villages discussion with the villagers began with them volunteering a great deal of information and opinions about development problems, lack of outside interest in their village, and their plans for new projects and developments. No mention was made of environmental issues or problems until I prompted this item.

Cash Crops

The main cash activities are sales of coconuts, fish, turtles and dugongs to Daru market. Some of the fish are taken directly from the sea to Daru, or sold to larger commercial trawlers working in the delta. Crayfish are sold direct to Provex. About 60 families are

involved in cash sales of produce in Daru market, with some sellers from the village going there every day.

Businesses

There are four trade stores and fuel retailers, and two other business groups that operate a community trade store. There are no other business ventures or projects.

Mining

Parama receives VDF funds and has had a number of its people work for OTML.

Tourism

They once approached AIDAB for funding for a floating hotel idea, but interest in any tourism project has waned.

Community Buildings

Community buildings comprise the church, women's club, community hall, two double classrooms, the aid post, community trade store, three teacher's houses and the water tanks.

Law and Order

There is a peace officer, a magistrate and a peace and good order committee.

Social, Sporting and Political Groups

Apart from the Women's Group with eight leaders and the Youth Group also with eight leaders, the church is also involved in some commercial activities. Sports teams include volleyball, rugby league, softball and basketball. The cultural group is registered as the Parama Village Inheritance Cultural Group. It has links with Torres Strait Island cultural groups and participates in festivals in the islands. Other community organisations are the school Board of Governors and the Parents and Citizens Association.

Border Issues

Not applicable.

Social Problems

None identified.

Construction and Machinery

There are 10 personally owned sewing machines, an electric saw, and a lawn mower that is owned by the school. Of the traditional materials used in house construction Nipa leaves have to be brought over from the mainland. Modern materials, obtained in Daru, are mostly bought from the earnings of previous jobs.

CHAPTER 3

THE HOUSEHOLD SURVEYS

Household surveys were carried out in each village. The sampling method was of the 'systematic' selection type, that one in five or one in six of the households in a village were selected. There is a bias in the sample, as people who were out of the village on the day of each visit could not be included and this may act to hide the economically more active householders.

Our method was as follows. As I carried out the village inventory, Junne Cosmas went to selected houses where she mainly interviewed women. This too is a bias, and again may act to understate concerning income and expenditure. Nevertheless, the responses of women do provide a balance to those of the men at the meetings I attended.

Dwelling Structure and Occupancy

The term 'traditional' is used to describe a house that is built entirely of locally obtained material in a style that typifies the general pattern of the village. They may in fact not really be traditional at all as people have adapted their dwellings to other cultural influences and to the standards laid down by the church, government officers and people's perceptions of modern ways. What is definitely not part of a 'traditional' house are non-local materials that

	Built by paid labour	Built by Company	Built by Family Labour	Total
Modern House	1		1	2
Makeshift House			1	1
Traditional House			30	32
Trad./some modern materials	1	2	3	4
Total	2	2	35	39

Table 2. Type of dwelling by method of construction in six Trust Villages: June 1994

may have been purchased, or supplied by government, church or company. However, the fact that 30 of the 39 dwellings are entirely traditional and that 35 of them were built by the occupying family, is an indication of the lack of economic development. Where some modern materials have been incorporated, these were primarily iron roofs, mostly associated with water runoff for the tanks.

	Male	Female	Total	Percent
Visitor		1	1	1%
1 year	24	19	43	27%
2 years	16	17	33	21%
3 years	10	12	22	14%
4 to 7 years	27	19	46	29%
8 or more years	6	8	14	9%

Table 3. Length of time adult household members have lived in present dwelling in six Trust Villages

Household Structure

The mean household size was 7.2 persons, which with 3.8 dependants per household, gives a low dependency ratio of only 1.1 dependants per economically active person. ‘Economically active people’ includes all subsistence gardeners and farmers. Gardens were generally nearby, although sago swamps tended to be much greater distances from the village often necessitating temporary residence at the sago site. Pig herds appear to be in decline. Many households had no pigs and attributed this situation to the nuisance value of pigs. This trend was also noted in other parts of non-highland Papua New Guinea in similar surveys. The significance of the trend to smaller pig herds is the saving of time and energy devoted to pig raising.

The length of time that people have lived in their houses is partly a reflection of the time that houses last, and is partly related to the movement and relocation of villages. Most ‘traditional’ houses are replaced after about five years or so. At the same time, the enormous social changes that have recently taken place in Western Province have introduced an element of residential and settlement instability.

Number per Household	Mean	S.D.	Min	Max
Pigs	0.23	0.81	0	4
Rooms	2.62	1.21	1	5
Dependants	3.82	2.69	0	11
Gardens	4.03	5.09	0	20
Distance from house to garden in minutes	14.94	12.12	3	60

Table 4. Summary household data in six Trust villages

The nuclear family is the dominant social structure, usually combining one or two other relatives, usually close relatives such as aged parents or younger siblings.

Attribute	Number of People	Percent
Nuclear Family	198	74%
Other extended family close relatives	45	17%
Other extended family members	26	10%

Table 5. Household composition in six Trust villages

Household facilities and ownership of material goods

There are villages in PNG that receive electricity and where families own things like televisions and refrigerators etc. In Asia and Africa it is extremely common to find a number of these items in village houses, as well as significant items of furniture. The list of items is thus a representative indicator of village development. For these six Western Province villages it indicates very little development. Radio ownership is probably reasonable, but only 28% use of savings accounts suggests low involvement in the cash economy. The low ownership of vehicles is also understandable and should be considered alongside a much higher ownership of outboard motors. As the villages do not have electricity or piped water it obviously follows that the other items on the list will not be owned. These figures could therefore be used as baseline indicators. However, in previously using this survey instrument as a baseline survey in Biangai and Watut villages near Wau, much higher rates of ownership of household items were recorded. Furthermore, ten years after the mine commenced production and fifteen years after initial construction, this is hardly a baseline study. Baseline censuses that were carried out

sixteen years ago did not record ownership of these items, but none of the households at that time had any furniture or any of these items. Since then the situation has not changed a great deal.

Attribute	Number of Households	Percent of households
Own a radio	20	51.3%
Own a bank savings passbook	11	28.2%
Own a car or truck	2	5.1%
Own a refrigerator	1	2.6%
House has flush toilet	-	-
Own a washing machine	-	-
House has a shower	-	-
Own an electric stove	-	-
Own a television	-	-
Water obtained from rainwater tank	39	100%
Cook with firewood	38	97.4%
Cook with kerosene	1	2.6%

Table 6. Household facilities and ownership of items in six Trust villages

The only significant development in these households is the change to a fixed water supply from rainwater tanks. All other indicators point to a severe lack of development. Table 7 underlines the village background of the bulk of the population. In fact 84% were born in the same village, or its old site, in which they are now resident.

Where born	Number of People	Percent
Born in the Village of Residence or old village site	225	84%
Born in Another Trust Village	24	9%
Born in Another Village in Western Province	11	4%
Born in West Irian	2	1%
Born in an Urban Area	7	3%
Total	269	100%

Table 7. Birthplace of residents in six Trust villages

Employment, education, income and expenditure

The household questionnaires were mainly (around 60%) answered by the female spouses of household heads. It is therefore possible that some of the reported amounts of income, expenditure and lump sum payments were underestimated, through a lack of knowledge on the part of the spouse, and through household head control of finances. On the other hand a female postgraduate student of mine was working in a group of Awin villages (not part of the Trust group) at the same time, and used a variant of this survey instrument in a study that was aimed at assessing the status of women in development. She found that the women were generally well informed of their husband's business affairs and that co-operation existed between the sexes. Without going into too much detail over the reliability of the estimates contained in the following tables, the data may be assumed to be an underestimate. However the probability that these are underestimated even by as much as half of the real figures, is very unlikely. Double any of the numbers and the result would be not only an overestimate of income and expenditure, but the levels of involvement in the cash economy would still be phenomenally low.

Income source	Number of Households/Adults
Earned money from a cash crop in 1994	0
Received lease payments in 1994	0
Received royalty payment in 1994	0
Received compensation in 1994	1
Total compensation received in 1994	K900
Number of adults in wage jobs	4

Table 8. Household and adult lump sum and regular payments in six Trust villages

Of the 39 households one received compensation of 900 Kina in 1994. Only four of the 159 adults in the labour force had wage jobs. The vast majority were subsistence farmers (including subsistence fishing), who made some additional money from the sale of small quantities of surplus produce. Employers of the tiny wage workforce are shown in Table 10. Two of these are not really wage jobs hence the insignificant difference in total numbers. A further 18 adults had received some kind of further training or job experience.

Main occupation	Number of Adults
Progress Factory Worker	1
Subsistence farmer	145
Old and retired	3
Pastor	2
Policeman	1
Student	5
OTML Development Trust Officer	1
Visitor	1

Table 9. Occupations of adults in six Trust villages

	Number of Adults
Church	2
Lake Murray Local Government Council	1
OTML	1
Police force	1
Progress	1
No Employer	152
Grand Total of Adults, aged 15 years or over	159
Adults who have received some former employment and work training	18

Table 10. Employer of adult wage earners in six Trust villages

Table 11 shows the total numbers of people who have reached various grades, including both children and adults. The children also includes those who are not yet of school age. Seventy two children, aged 7 to 15 years and thus of school age, comprise 27% of the population. However, of the population of children that could be attending school, aged between 7 and 18 years, only 45% were attending school, while of 7 to 15 years olds, 57% were attending school. By way of comparison Jackson's 1977 study of Kiunga District showed that only 20% of all children under 18 years were attending school. Out of that larger child population the percentage attending school in the six villages would come down to 37%. Jackson's later 1993 study of the North Fly shows a 127% increase in numbers of children attending school, much of this contributed by both the influx of outsiders to the mine and the provision of new schools. As the six villages of this study were all in more accessible areas of the province, the attendance figures are poor,

suggesting an area for further research. Why are people not sending their children to school, why is the drop out rate so high, and are there strategies of assistance that might be adopted ?

Grade Achieved	Male	Female	Total
None	54	62	116
1	6	6	12
2	2	4	6
3	11	7	18
4	5	5	10
5	2	6	8
6	43	34	77
7	0	1	1
8	4	4	8
9	1	0	1
10	5	6	11
11	0	0	0
12	1	0	1
Total	134	135	269
Now in School	22	19	41

Table 11. Educational levels in six Trust villages

There is significant membership of business groups but many in the Trust villages are not necessarily active. Membership of a group is necessary if funds are to be attracted for a development project, but most neither attract funds nor develop any projects. The Obo Freezer Business Group is successful though, and returns dividends to its members. Unfortunately a category of business group lump payments was omitted from the survey questionnaire. The eight households involved in that group thus earned some money during the year. The five households that are actively involved in their own family business, fuel sales and a tradestore, earned money in a small scale piecemeal way. However, very few earnings were declared by these households for the previous fortnight. While it can be assumed that there has probably been an underestimate in this area, it will not be much as the earnings and savings of the rest of the households are extremely small.

Attribute	Number of Households
Active in a household Business	5
Type of Business: fuel sales	4
Type of Business: trade store	1
Household heads belonging to a business group	10
Belonging to Kathha Constructions Business Group	1
Belonging to Gi Ok Business Group	1
Belonging to Obo Freezer Business Group	8

Table 12. Household business activities in six Trust villages

Table 13 is a summary of an extensive list that itemised expenditure and earnings over the previous fortnight. It is likely that earnings are an underestimate, as the expenditure figure is higher. As the items that had been purchased were recorded in very precise detail it seems likely that the expenditure data is a reasonable reflection of household economy. It does not necessarily follow that the earnings must have been underestimated, as higher earnings from earlier weeks, or reliance on savings and cash in hand, may have contributed to the expenditure pattern. However, an underestimate is still likely. Savings and cash in hand may also have been under reported. Against that possibility is the much earlier question, asked at a different part of the interview, of ownership of a passbook. Only 11 households had a savings account. Thus 28

were probably incapable of holding any savings. That was certainly the impression from the questionnaires, that the majority of households simply had no savings.

The similar survey that I had carried out amongst the Hidden Valley Landowners in the Wau area provides a sharp contrast. Although a baseline study these people had experienced over 60 years of contact and had planted cash crops. The mean earnings last fortnight were K 68.77, more than double that of the Trust villages. Mean expenditure was about the same at K 54.96. Savings however came to an average of K 441.60 per household, ten times the Trust village mean. Amongst the Wau villagers, these savings included super saver accounts and shares, as well as the conventional passbooks.

Source of Income	Value	Percent
Fishing (includes turtles & dugongs) sales	K469	38.4%
Hunting sales	K280	22.9%
Wages, sale of food etc.	K387	31.7%
Ok Tedi Mining Ltd	K5	0.4%
Sewing	K80	6.6%
Total	K1221	100.0%

	Mean value	S.D.
Mean Earnings last fortnight	K31.31	K45.00
Mean Savings and cash in hand last fortnight	K42.23	K121.21
Mean Expenditure last fortnight	K51.38	K74.18

Table 13. Fortnight earnings, savings and expenditure of thirty-nine households in six Trust villages: June 1994

Overall, Table 13 summarises three very important facts about underdevelopment in the Trust villages. Firstly, traditional types of activities dominate earnings. The fact that hunting and fishing account for 61% of declared earnings, while gardening and sales of food items account for most of another 32%, underscores the very undeveloped nature of these villages. Their economy is utterly grounded in the traditional pre-mine system.

Secondly, the standard deviation figures, that relate to the means in Table 13, underscore the extreme inequality between households. Most households recorded no income, no expenditure and no savings. A small number recorded most of these sums. These are further illustrated in Figure 1 and Figure 2. There is a very skewed distribution.

Thirdly, these figures are very small. However great the underestimate may have been, these villages are extremely poor and underdeveloped.

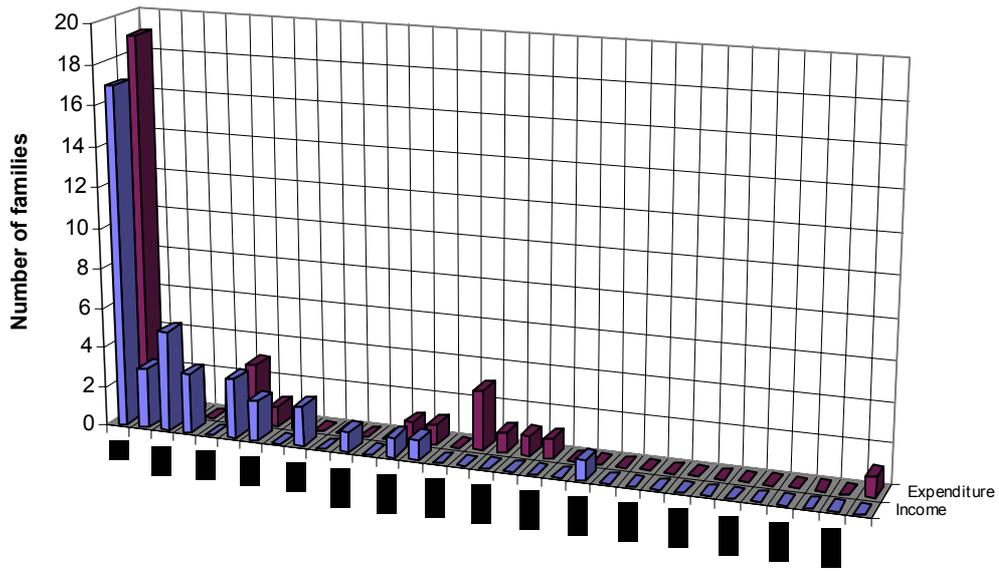


Figure 1. Income and expenditure last fortnight.

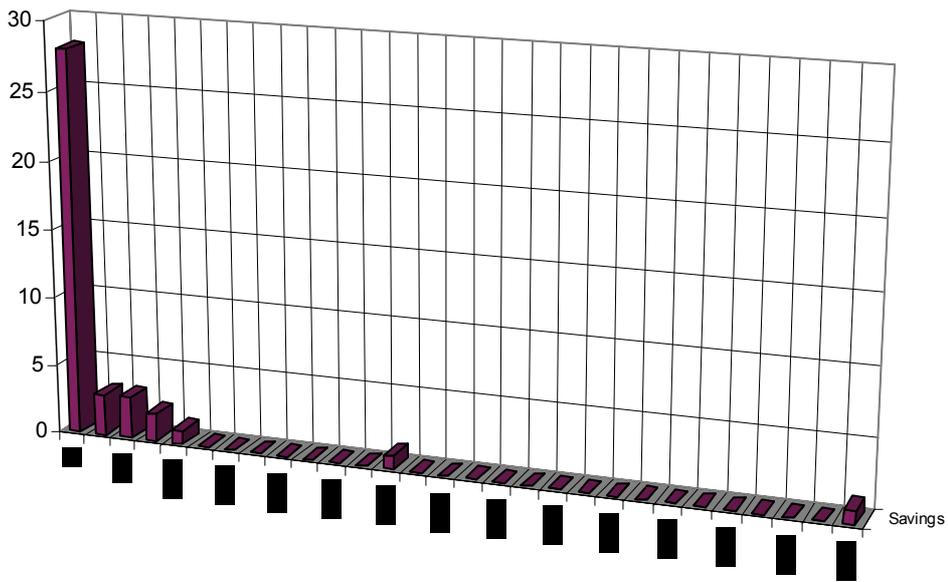


Figure 2. Savings and cash in hand.

CHAPTER 4

CONCLUSIONS: THE STATE OF THE TRUST VILLAGES

Summary of the village inventories

The six villages in the survey are *examples* of Trust villages scattered through the river corridor. They were not intended to be perfect representations of village in the area, because we did not use formal sampling procedures. Nevertheless, I do not think it will be disputed that the levels of development that are seen in these villages is a fair reflection of the river system as a whole.

Development in world perspective

Many North Fly villages are as underdeveloped as Wogam. Few villages in the province are as well developed as Parama, but it is not atypical of its own area, according to Lawrence (1995). In the general context of numerous village studies that I have been involved in throughout Papua New Guinea over a fifteen year period, the Trust villages of Western Province are at the less developed end of the scale. Still, there are many parts of the country that are just as poor. Parama stands out as being better off, but it is still poorly developed in comparison to many coastal villages with close access to the provincial headquarters, such as along the Central Province coast, in some parts of Momase and Milne Bay, and especially in comparison to villages in the islands.

On a world scale a village like Parama is a very poor relation to villages in, say, West Africa (where I did my PhD fieldwork) and Asia. It is the absence of furniture, household belongings, machinery, books and items of communication, as well as the lack of education, a poorly developed cash economy, reliance on subsistence and locally obtained materials for housing, and a severe lack of community physical infrastructure that defines these villages as severely underdeveloped.

Undoubtedly my comparison with other places in the developing world may seem inappropriate, and even offensive to some, but I think it is important to make these broader comparisons. Thus Papua New Guinean villages generally, and these Trust villages specifically, on both a Pacific and a developing world scale, are *severely* underdeveloped.

Causes of underdevelopment in Western Province

We know that the cause of this underdevelopment, particularly in Western Province, lie in problems of remoteness, isolation, the simplicity of material culture in traditional times, the extremely level of development throughout most of colonial times, the extreme tardiness of the colonial administration in attempting to address this problem, and subsequently the problems of high transport costs, comparative disadvantage in all economic activities and declining commodity prices.

However, Western Province has now had the experience of almost fifteen years of co-existence with a very large mine. One might reasonably expect some trickle down of economic benefits to have reached and brought change to the villages in some way that

would be measurable with the kind of survey methods I have used here. The pre-mine round of socio-economic studies predicted that there would be economic benefits, but as Jackson has shown in his recent re-study (1993), this has only been the case on a budgetary level. The presence on the mine has not had nearly the effect on village development that might have been hoped for.

A weakness of the original impact study, and Jackson's analytic approach (in hindsight!), is that it did deal mainly with provincial-level infrastructure and not with the details of or prospects for development in villages (however, see Jackson 1979).

In the late 1970s, the trickle down effect was under serious criticism from some groups of economists. During the 1980s, repeated studies and evaluations of projects throughout the world showed that growth poles and trickle down were not reliable ways of generating rural development. Aspects of this debate are summarised in Todaro and World Bank reports for example. It has thus been a very common experience of project evaluation teams to have to conclude that numerous factors beyond the control of a development project have prevented real development from taking place, that a trickle down from a larger project has failed to reach targeted rural populations, and that relatively little has changed in terms of the physical infrastructure and economic indicators.

From my observations there since 1979, this fits perfectly with the experience of villages in Western Province since the start of the mine. There have been significant changes in the attitudes, organisation and outlook of the people of the province, but very little change in the conditions of their housing, economy, opportunities and lifestyle. Houses that I entered in 1994 were just as sparsely furnished, built of the same materials and in the same style, and containing the same family possessions, as they were in 1979.

The inventory of the six villages itemises this sparsity. It is to the company's credit that the principal externally provided infrastructural items in each village are those supplied through the Trust. The other most common structures are churches and women's clubs, and in a few cases a community school and/or aid post supplied with full or partial government assistance. The principal means of transport for the three villages in the Middle and Lower Fly is the river system. Of the three villages in the North Fly, one had relocated to a corner at the head of a road built as part of the mine's lease-area infrastructure (Boliwogam), one had relocated onto the mine-constructed Tabubil-Kiunga highway (Demasuke), and only Wogam was still 'at home' with a feeder road built using RIP and provincial government funds in the 1970s (Burton 1991:13-15) and indeed was acting as a central place for two other villages: Kwakwi and Wuwungo.

Economic infrastructure

Transport

In all cases improved transport links are an absolute priority for development, and even though several hundred of thousands of kina have appeared in provincial government budgets for road, airstrip and waterway improvement over the past few years (including for roads in the Wogam area), a lack of co-ordination between provincial authorities, the Department of Works, and above all the absence of a provincial plan, means that little has been achieved. Burton (1993, 1995) diagnoses these problems in greater detail.

In villages, most people wanted better boats, more outboard motors, trucks, etc; it was not suggested that these should be supplied by government, though the idea of a provincial government supply ship was mentioned.

Transport was seen as the basic need in order to develop a sustainable economy. In all villages the number one priority was economic development. All thought that this was severely lacking in their village. None of the villages had a serious cash economy, including Parama. Subsistence crops and harvests of the sea and river provided an excess that was marketed, in most cases intermittently. In most cases these villages are inaccessible or too far away from a market to be able to benefit from regular food sales. The general perception was that improved transport would facilitate increased agricultural and cash crop production. For some villages this included the intention to go into, or increase rubber production. For those places that are closer to towns or main transport routes improved access and transport would certainly enable more villagers to take agricultural surpluses more frequently into markets. However, this is an activity that is only sustainable as long as the mine is in operation.

Rubber

Rubber was not being grown in any of the six villages surveyed, but could be cultivated in some of them. In the case of Wogam the people claimed that they were prevented from growing rubber because they were in the border quarantine zone. If this is the case a number of other villages may also be affected. The main perceived limitation was again the lack of transport into their villages, but the availability of suitable land may be another constraint for some communities. Historically, low prices for rubber have deterred production. The establishment of the rubber factory certainly makes rubber cultivation more feasible, but if its transport and the factory are both subsidised by the company then this activity also may not be sustainable after the mine has ceased operations. Rubber might be grown in the Middle Fly, but there the transport costs and comparative disadvantage almost certainly mean that production is only viable while company subsidisation of transport is available. Also there is a very poorly developed agricultural tradition in the middle Fly. The people are predominantly hunters and gatherers and are unlikely to adapt to tree crop cultivation. Besides the only available land would be far from the river anyway.

Commercial fishing

Some villages could enter more actively into fishing, supplemented by hunting. These same activities also increase the suitability of crocodile farming. However, this activity would depend on company support, both as a market and for the long term functioning of a freezer. More riverside villages could enter into production and freezing of fish and venison, and with careful management may be able to sustain such economic activity as long as the mine exists, both as a principal market, and as the provider of technical expertise, capital and subsidised support. Once the mine is gone it is very unlikely that any freezers will stay in business long.

Community infrastructure

Throughout most of Western Province village water supply is a problem. In those places where the dry season is longer, the drought may be so severe as to force the relocation of the community. The implication of the unreliability of the water supply is the unsustainability of

the village itself; the necessity for bilocality. This flows on to unreliability of food production and marketing and the unsustainability of school populations or even of a community school itself.

The Trust has intervened in all of the villages that were surveyed, in providing an improved community water supply. The existence of a fixed and reliable water supply then makes the village itself more sustainable as a permanent settlement, thereby increasing its potential for growth, improved access and further infrastructural development. The water supply has been in the form of storage tanks fed with rainwater and groundwater raised by solar pumps. All components—guttering, pipes, connectors, tanks, tank covers, taps, and pumps—are susceptible to breakdown, and are probably not likely to work without the Trust's effort to maintain them.⁵ Individual households have also been supplied with blue plastic drums to supplement the community tanks (Lawrence 1995:Plate 13).

In some villages the Trust has constructed village halls. Although these were useful, especially for channelling rainwater into tanks, there seemed to be little gratefulness on the part of the villagers for these buildings. In all villages there were churches and often a women's club building. Although these were not present in the corners that were surveyed, general community churches were close by. Generally these are built by the community, of locally obtained materials.

The only other significant structures were aid posts and community schools in central villages. Most structures in villages were therefore residential dwellings, the majority of which were constructed entirely from locally obtained materials. A number of trade stores existed; small structures also built of locally obtained materials. Power is almost universally unavailable, and many houses were even without kerosene lamps. Some places had pit latrines, but there were seldom as many as one per household. Predominantly, people simply used the bush, undoubtedly contributing to the prevalence of parasites.

Health and education

Aid posts are the most basic medical service, playing a greater role in preventative rather than curative care. Remoteness and lack of access put many of the Trust villages outside real medical care. The aid post at Wogam, for example, could only be supplied by portage of supplies. Women and children were the most frequent users of external clinics at the nearest health sub-centres. Similarly, mobile clinics that infrequently visited the villages were mostly concerned with child health, vaccination programs and nutrition. Evacuation of a severely sick individual to hospital is usually left until too late and frequently involves a long and difficult journey. Access to health facilities can basically be described as very poor (see also Burton 1993:24-29; especially 1993:Figure 7).

A similar problem exists with schools. People complained about school fees and their inability to pay them. As the fees are very low this complaint does not really explain non attendance at school, especially when put aside the declared expenditure and savings of villagers. There is no real reason why fees alone should exclude more than a handful of

⁵ [The problems with the first generation of tanks was being addressed by the Trust in 1994. The original design was a bolt-together kit with plastic liner; this was being phased out in favour of a moulded design not available earlier. Ed.]

children. More significant is access to school. Parents are generally unwilling to send their children away to board in another village. There are problems of accommodation, feeding, control, danger of sorcery and illness, and not least the emotional loss of absent children. Consequently, unless there is a school in the village or very close by (involving no more than one hour's travel each way) children are unlikely to be sent to school. This problem is compounded by the small size of many villages that makes them ineligible for the establishment of a community school. The result is fairly severe under-attendance at school, amongst children of school age.

Community organisations

The villages had many organisations, almost to the point of seeming quite bureaucratic. A large number of committees, community groups, sporting groups and churches allows for a great deal of democracy and involvement of all individuals. These organisations provide a potential base for development, co-operation and planning. They also possess the potential for divisiveness and jealousy, features that are evident in some villages. There was also a general lack of business groups, and official or government representatives. The organisational structures of the villages tended towards the informal rather than the formal. The groups therefore represented a potential for development rather than the means by which progress may be achieved. Furthermore, where divisions had grown between community groups, they may be a hindrance to development.

Community activities involve visits and contact with other communities, especially through churches, evangelism, youth groups, women's groups and sports teams.

Environmental issues

While environmental issues are perceived by some observers outside PNG as being the major problem of the Ok Tedi mine and the Fly River system, this was not apparently the view of the villagers. Problems of access and lack of economic development far outweighed concerns over damage to the environment. In all villages, discussion of environmental issues and problems only followed my prompting, while development problems were talked about immediately, without any prompting. This does not diminish the environmental problems of the mine, but it is probably a reflection of the nuisance and limitations imposed by the pollution, when put alongside the enormous difficulties of trying to bring development.

In surveys we carried out in 1979, when we asked people in the corners of Kiunga and surrounding villages a limited range of questions about their feelings about the mine, the response was completely positive and stressed the economic benefits that people expected would come from the mine. The disappointment and frustration felt by people in having missed out on the expected bonanza (whether realistic or not) probably lies at the base of all their complaints. The environmental damage is a symbol of all that has gone wrong, or that has failed to eventuate. While the lack of village development is a complex problem whose causes are difficult to blame on any particular body, (company or government) the pollution of the river can clearly be blamed on the company and compensation (or damages) sought.

There was generally good knowledge of the state of the river, but a dominating perception of the dangers of pollution, and a completely erroneous opinion of who is the source of warnings about the river. At Wogam, for example, people said *OTML staff* had told them not

to drink water from the Ok Tedi, not to eat fish caught in the river, and even not to burn firewood collected along the river bank.

It seems obvious, therefore, that such environmental awareness programmes that OTML has undertaken have fallen on deaf ears. Perhaps villagers simply feel *any* environmental work by OTML is a confirmation of their own fears. Thus there is a basic level of confusion and lack of understanding of the seriousness or otherwise, of the pollution of the Ok Tedi and Fly River and a contributing factor is that the ideas of pollution and poisoning as perceived by the villagers are certainly different than those understood to western science.

List of concerns

However, there are a number of identifiable problems that were stated by people in the villages. Obviously the company is well aware of all of these problems and many more. These were the issues that were identified by the villagers.

1. **'Poison'**—There is a fear of poisons, possibly identified as heavy metals, in the water which discourages some people from drinking the water or eating fish from the river.
2. **Fish numbers**—There is a belief, in some places, that fish numbers have decreased. For example Wogam people are afraid to take anything from the river and they claim that their children are less well nourished in consequence. In the Middle Fly, informants at Bosset ascribed the drying out of the lake, its infestation with grass, and subsequent loss of fish both in the lake and in the river, to the pollution of the river. People at Manda, on the river side, saw no such problem and were quite successful in their commercial fishing. Komovai also complained of a decline in fish stocks, especially mullet, but like Bosset was not successfully involved in commercial fishing. Bosset had the capability, but seemed to be constrained by internal social divisions.
3. **Sedimentation**—Increased sediment levels are seen as the major problem along the whole river system. At the least they make access into and out of the river difficult because of the build up of mud banks. In the delta, people say extensive mud banks restrict access to many areas at low tide, making journeys longer and slower. Between the end of the Ok Tedi gorge and the beginning of the delta, the increased sediment level is causing a silting up of creeks and back swamps, and increased erosion of levee banks. In an area of extensive flood plain swamps, and travel by canoe, the levee banks are extremely significant sites for gardens. There are also a few river side terraces that have been inundated by sediment. Mud banks in the river itself, especially the Ok Tedi, have channelled the water, making the currents stronger and the river more dangerous for travel.
4. **Canoe loss**—Canoes are frequently lost, or capsized and damaged by the passage of large ships. Those boats that are damaged may be brought in for compensation, but those that are lost from their moorings by the wash of the ships cannot be reclaimed. Canoes certainly represent a highly significant investment in time and resources, and are an essential part of the infrastructure of riverside villages. However I was surprised at the continued use of very flimsy mooring ropes tied to insubstantial sticks that were simply jammed into the mud, given the apparent seriousness of the problem of canoe loss.

Interviews with government officers

Interviews with government officers in Kiunga, Lake Murray and Daru amassed a large number of documents and reports concerning village development projects, budgets and infrastructural development. Discussions with the public servants who provided these reports as well as with a large number of non-government workers throughout the province, suggested that the budget had not been spent, that funds had gone astray, and that planned projects had not eventuated. The weak human resources and lack of implementation capacity of the Fly River Provincial Government was largely to blame and this had led to the suspension of the government in late 1992. In 1994 the administration that was put into its

place appeared to fare little better, and the morale of public servants remained very low. There was a feeling that despite their efforts they were unable to initiate development in the province. The political division between north and south in Western Province will probably always thwart development efforts. Anecdotes painted a picture of appalling waste and misuse of funds.

In a situation where plans are not followed, but funds are best obtained through politicians and lobby groups it is hardly surprising that villagers as well as public servants have lost faith in their ability to direct their own development, or to plan for the future. Against a reality of very low, or non-existent earnings from cash activities, political activity and lobbying is a real and valid money-making activity. Some families and villages have undoubtedly gained far more money from the Provincial Government rorts lottery than they could possibly have earned through cash cropping and orthodox business projects. A consequence of this is an accentuation of a hand-out mentality that re-enforces dependency on both government and non-government institutions, including OTML.

Summary of interview with the FRPG A/Works and Planning Officer, Daru

Against a background of inefficiency and mismanagement the new works officer at the beginning of 1994 came into the job with reforming zeal. His performance is less important in the context of this report than his attitudes and opinions on development and the government's relationship with OTML. These attitudes fairly sum up the comments and general attitude of public servants, especially those in Daru. It is probably fair to say that public servants in Daru were more set against OTML than those in Kiunga. The accuracy or fairness of the following comments is not the issue here, but it is rather a snapshot of the provincial government views and attitude towards development.⁶

Daru wants to re-establish the South Fly Development Program, which would include cattle and nutrition projects as new initiatives, to balance the uneven development that favours the north.

Provincial government projects are better than those of OTML. For example the Southern Cross tanks do not work. They are not seated properly and have suffered from fungal growth. The solar pumps break down too easily. The Provincial Government regards the Trust projects as impermanent, but accepts that this may be a response to the erosion problem, and prefers temporary buildings itself. The government would prefer to work with OTML on Trust type development projects.

Royalties on Production. Any reduction in production means a fall in income, the lowest monthly royalty having been K 20,000, the highest K 300,000. It is claimed that it always falls short of the promised K 5 million.

Neither the Provincial Government nor OTML adequately monitor businesses. In 1994 the budget shifted its emphasis away from commerce and business groups to infrastructure, in order to break away from 'ghost' projects.

Provincial Government outboard motors and dinghies all broke down in 1991, and were little better in 1992, especially in the south Fly.

The North Fly is generally better co-ordinated than the south, but there remains excessive centralisation on Daru and Kiunga.

⁶ [At this point King pleads for the comments to be taken as quotations from his informants. He stresses the views are theirs and are not to be taken to indicate his own. Note that the informant refers to Southern Cross tanks; this brand is not used by the Trust. Ed.]

A major problem for both the Provincial Government and village producers, is marketing of produce. The size and lack of development of the province are severe constraints.

Rubber production figures

Rubber has been grown in Western Province since the mid-1960s, long before the mine began. It was the first significant cash activity for the people of the North Fly. Throughout its history though, rubber production has been plagued by poor marketing and high transport costs. Production fluctuated widely in relation to marketing failures, the attraction of employment with the company during the construction period of the mine, and fluctuation in world commodity prices.

A major difficulty until has been the need for growers to treat their production using the smoked latex sheet process. The recent introduction of the 'cup lump' method of collection and processing has greatly simplified matters, and is better suited to the village pace of life. Cup lump rubber is easy to store and needs no special care in transport.

New, higher yielding varieties are also a convenience for the growers as more latex is produced for the same tapping effort. (On the other hand, other world producers are bound to be ahead in improving yields and the price could even fall in real terms.)

The construction of a rubber factory in Kiunga in a joint venture between the Progress Company and the Trust represents a significant step forwards, but it should be tempered by a sober analysis of the economics of transportation in the province. The factory was paying a slightly subsidised price of 25t/kg dry weight in 1994 and the Trust was undertaking to supply transport from as far away as the Nakaku scheme at Suki. Without this assistance, the viability of the industry is marginal unless prices pick up permanently. For example, (unsubsidised) freight from Lake Murray to Kiunga is about 20t/kg.

In 1995 the rubber price has temporarily risen to 42t/kg. There may be a long-term scheme for a freight subsidy from the Department of Agriculture and Livestock and it may be possible to create a price stabilisation scheme. Obviously, for rubber to be a success it must be possible to be self-sustaining once subsidies from the Trust, or anyone else, are withdrawn.

A significant problem for extension work is a villager attitude, prevalent in some places, of expecting payment to plant their own trees plus free tapping equipment. Thus there may be some lag in uptake and production by villagers.

DPI figures are available for rubber production for 1991 (Table 14) and I was able to obtain more detailed information for the North Fly from the Progress Rubber Company (data in Appendix A). There is a slight difference between the two: Progress had a 1991 total for North Fly of 23,759 kilograms, compared to DPI's 24,987 kilograms.

Kiunga's production in 1993 has increased dramatically, reflecting the better access to the new factory. In 1993 in Kiunga the mean production was 572 kilos per grower. At 25t/kg, that is an annual income of K143. At the 1995 level of 42t/kg, income for the same production would be K240. Of course, the price may have stimulated growers to bring more trees into production and to tap existing ones more diligently. Nevertheless, this is hardly likely to be a bonanza.

District	Number of		Area under cultivation			1991
	Villages	Growers	Untapped	Tapped	Total	Production.
Daru	32	227	104 ha	78 ha	182 ha	9311 kg
Balimo	23	669	192 ha	347 ha	539 ha	72,992 kg
Suki	3	174	16 ha	124 ha	140 ha	-
Lake Murray	18	288	137 ha	159 ha	296 ha	16,800 kg
Kiunga	43	588	226 ha	493 ha	719 ha	24,987 kg
Nomad	8	74	48 ha	41 ha	89 ha	124 kg
Total	127	2020	723 ha	1242 ha	1965 ha	124,144 kg

**Table 14. Smallholder rubber statistics in Western Province, 1991
(from provincial DPI).**

Responsiveness to price fluctuations

Rubber growers have been shown to extremely responsive to price, for example by Hulme (1984) for Cape Rodney (see also Burton 1993:19-21, Fig. 6). However, the villagers of Western Province may not react in a fully elastic way because they are not full-time growers and they operate within the constraints of various social and cultural factors. If the price goes down, the response of growers is to cease tapping because it is not worth it. If the price goes high, people will initially raise output to cash in on a good thing. They do this mainly by bringing more of their existing, but currently untapped, trees into production. But if it goes higher still, output might not be raised further because (a) the time available for rubber growing in the weekly round of village life may be all used up, (b) they have no more old trees to tap, (c) land available for new planting is fixed (e.g. in blocks at Nakaku) or cannot be released from other customary uses, or (d) growers find it simple enough to meet their needs with less production.

This is also seen in the coffee industry. Small-holders have far more trees than they harvest, and often maintain plots in a poor condition. High prices coax them into harvesting more of the existing trees, harvesting and drying the crop more carefully, weeding better, and so on. Few take the next step of obtaining agriculture bank loans and developing medium scale blocks and thus to make the transition from part-time cash-cropper to full-time grower.

The factory will not sustain lower prices. In particular it will not be able to pass on freight costs to the producers, given that it has no control over the global price. The present operation is therefore probably not sustainable without subsidised freight, and thus may not be sustainable beyond the life of the mine. Two developments may make the factory more viable through economies of scale. Presently production in the South Fly is bought by Kwahito, based in Balimo, and sold to Sipef at Doa plantation in Central Province. With continued freight subsidies Progress could undercut Sipef's price and direct South Fly rubber to Kiunga. Table 14 shows that there is considerable potential in the rest of Western Province.

The second development that could put the Kiunga factory on a very sound footing would be involvement of the refugees at the East Awin camp in rubber production. It is unlikely that they will be persuaded to return to West Papua in the medium term, and the enterprises in which they have so far been involved show that they have high levels of motivation. But as is well known, the problems of land compensation to East Awin landowners, and the political status of the refugees would need to be settled first, and may be irreconcilable. But if the refugees could become rubber producers their involvement would provide guaranteed production and may be enough to make the operation viable in the long term, even when prices are low.

APPENDIX A

NORTH FLY SMALLHOLDER RUBBER PRODUCTION 1987-93 (DATA FROM PROGRESS RUBBER COMPANY, KIUNGA)

South Awin	Growers	Area (ha)	Trees	Potential	1987	1988	1989	1990	1991	1992	1993
Mepu	10	10	3754	11000	2457	483	3059	364	216	0	1720
Timindemasuk	19	31	11290	34100	8768	21614	22119	3165	6687	17585	37591
Grengas	22	15	5566	16500	2405	6305	9661	0	348	3659	18389
Gi	27	22	8051	24200	16950	10580	9143	4792	1672	7821	49443
Tiomnai	11	14	5070	15400	10205	10169	5789	1372	254	650	12249
Gre	11	8	2917	8800	8907	4509	1919	81	1534	1378	8409
Miasomrae	12	7	2497	7700	853	4926	5968	0	0	0	12605
Ralengre	13	5	1891	5500	5349	2674	9167	297	264	77	29498
Briompenai	17	8	3039	8800	4071	2306	1808	564	1037	615	11893
Rumginae	1	1	545	1100	848	504	0	0	0	0	0
Menumsore	16	19	7148	20900	6420	8626	7702	970	674	45	11171
DPL.Samogos	0	2	848	2200	2668	1532	5145	645	0	39	155
Mean		0.9	326								
Total	159	142	51768	154000	69901	74228	81480	12250	12686	31869	193123

West Awin	Growers	Area (ha)	Trees	Potential	1987	1988	1989	1990	1991	1992	1993
Bige	12	16	5928	17600	4211	368	1432	1483	1089	2562	10211
Konkonda	21	27	10012	29700	6335	2305	468	399	485	0	5738
Kwiapae	11	15	5741	16500	4471	1041	4031	1343	684	1035	9288
Senamrae	13	19	7139	20900	1930	513	776	0	74	0	11744
Dande	18	16	5816	17600	17799	11233	10486	124	339	0	24002
Holpenai	5	5	1847	5500	902	1802	1264	0	0	0	1373
Ipoknae	18	9	3236	9900	5697	4468	4221	263	165	513	7887
Grehorsore	7	3	1009	3300	1581	1436	1437	0	0	0	4413
Matkomnai	19	7	2555	7700	398	875	774	444	12	0	1672
Miamrai	12	20	7452	22000	5208	509	2080	356	0	0	3132
Mean		0.99	373								
Total	136	137	50735	150700	48532	24550	26969	4412	2848	4110	79460

East Awin	Growers	Area (ha)	Trees	Potential	1987	1988	1989	1990	1991	1992	1993
Drimdemasuk	29	28	10457	30800	220	2019	7543	266	0	6186	29225
Gusiore	10	10	3661	11000	530	3170	5085	0	0	0	7833
Guretmin	13	11	3965	12100	0	0	3934	0	0	0	2476
Giponai	14	7	2445	7700	951	298	771	0	0	0	304
Timingondok	11	13	4659	14300	483	3778	1888	0	0	316	13131
Drimgas	12	12	4531	13200	0	0	935	0	0	0	7542
Mean		0.9	334								
Total	89	81	29718	89100	2184	9265	20156	266	0	6502	60511

South Ok Tedi CD	Growers	Area (ha)	Trees	Potential	1987	1988	1989	1990	1991	1992	1993
Aran/Atkamba	41	61	22532	67100	35864	36563	29696	2863	0	0	0
Bongabun	7	9	3257	9900	4594	5014	3506	0	0	0	0
Ieran	13	18	6717	19800	5190	6849	8297	1434	0	0	0
Dome	10	17	6448	18700	10675	2671	6063	1426	5083	0	1320
Yogi	10	12	4404	13200	12915	7546	4114	0	1574	0	0
Mean		1.44	535								
Total	81	117	43358	128700	69238	58643	51676	5723	6657	0	1320

Moian CD	Growers	Area (ha)	Trees	Potential	1987	1988	1989	1990	1991	1992	1993
Yulawas	17	23	8652	25300	0	566	0	0	0	0	0
Moian No.1	18	33	12089	36300	1582	1733	11405	1232	1152	1501	1355
Moian No.2	9	10	3828	11000	0	0	0	0	0	0	0
Kawok	7	11	4055	12100	1964	3196	2722	1233	0	0	167
Erekta	21	26	9629	28600	1970	538	568	1081	0	0	0
Kukujaba	12	12	4331	13200	0	626	386	0	0	0	0
Membok	20	39	14526	42900	200	590	1013	0	0	99	0
Karengo	19	36	13441	39600	261	2421	2252	2005	416	357	496
Mean		1.54	574								
Total	123	190	70551	209000	5977	9670	18346	5551	1568	1957	2018

All North Fly
Actual/potential output

1987	1988	1989	1990	1991	1992	1993
27%	24%	27%	4%	3%	6%	46%

APPENDIX B

SURVEY METHODOLOGY

Note: re-printed from Burton et al. (1994:4-6). Passages in italics by J. Burton.

David King's June-July fieldwork

King's second field visit for this round of work took place over the period 19 June-2 July 1994. This time King was to attempt a more formal sampling survey. In theory, Papua New Guinea is a prime candidate for the use of sampling methodology; administrative regions are large and settlements far apart, making it time-consuming and expensive to attempt to survey every community in an area within a reasonable time. But in practice, very few studies have ever used sampling methods because it takes considerable ingenuity to adhere to the simplest assumptions that render sampling valid—that (a) the sample is drawn from a fully known 'sampling frame', and (b) once a sample is drawn, the researcher must stick to the nominated sampling points regardless of travel inconveniences.

In respect of (a), King and I were able, through our earlier visits and of course with the help of information provided by OTML Public Affairs, to build up a reasonable knowledge of the 'sampling frame', namely the disposition of the hundred or so Trust villages, together with their social, cultural and geographic affiliations to each other and to major centres. The frame was not perfectly bounded—in some areas Trust villages had significant interactions with non-Trust villages—but it was possible to pretend it was for the purposes of the survey.

In respect of (b), I had worked out a 'travelling salesman's route' that, if all went well, would take King the length of the Ok Tedi-Fly system over the two weeks he had allowed for, taking in the balance of villages shown in Table 15. In the event, King was predictably held up by the need to spend time finalising travel arrangements, by hours of delay in the arrival of an aircraft (at Obo), and by extremely heavy seas (in the Daru area).

Of course, how journeys turn out is one of the most common ingredients of conversation in Papua New Guinea; in fact, 'journey stories' are such a performance in themselves that it is easy to miss the fact that in social research travel is part of the method. (Most typically, a grant-funded student researcher has few means to travel; single-village studies are the norm, and regional studies are often proposed but seldom carried out successfully.)

With all this said, King was reasonably successful in being able to follow what we had proposed. King shuns the term 'sample survey' and calls his individual village surveys 'case studies'. However, the method we used does have a name; it is 'purposive' sampling, because the 'strata'—the areas chosen for representation—and the particular villages within them—the sampling points—were both nominated by us rather than being selected in some 'fairer', numerically based manner. (I suppose it would be accurate to describe this as 'Claytons's sampling'.)

The field trip

I was assisted throughout this second period by Junne Cosmas, who I made primarily responsible for the household surveys in each village. I diverged from the schedule in two ways:

1. I substituted the corner at Matkomnai belonging to Demasuke, a Trust village, for Kasrenai, a non-Trust village, nominated by Burton [*this was a mistake by me, JB*]
2. I cut a planned trip to Komokpin partly because Public Affairs staff were about to start a garden survey in that area (the overlap might have altered the nature of discussions with villagers) and partly due to shortage of time;
3. I lost just over a day to a delayed Southwest Air flight and bad weather near Daru, causing me to omit a corner settlement at Kiunga and to take alternate villages in South Fly.

I visited six communities in all: the Demasuke corner at Matkomnai, the Boliwogam corner at Ok Ma 11, Wogam, Komovai, Deware and Parama.

Methods

At all villages, I held a meeting with the village councillor (except Deware where he was absent) and his *komiti*. A complete village inventory was carried out at each place and a discussion of development issues and problems was held. At the same time, my assistant, Junne Cosmas, carried out a household survey to complement the information I had obtained from the inventory and discussions.

In all places the people were helpful, good natured and well informed. Discussions were sometimes frank, especially in regard to the quality of some of the Trust projects, but we encountered no resentment or hostility, directed either at us or at OTML (obviously there was plenty of criticism of both OTML and the Fly River Provincial Government—but a point of the visits was to discover how this was expressed.)

Objectives

It was my hypothesis from two previous visits in connection with the project that sustainable economic development had not occurred in the villages of the Ok Tedi and Fly River systems. I designed the present survey to try to measure and quantify this in a consistent manner at points picked out from across the whole area. I would tend to think of the results from each of the six villages I did reach as a *case study* illustrative of the immediate vicinity of the village—because obviously they do not form a representative sample in the very strictest sense.

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