

# Morobe Consolidated Goldfields Limited

## Morobe Gold Project

### Socio-Economic Impact Study

- Volume I**      **Introduction, analysis of social and political risks, recommendations**
- ▶ **Volume II**      **Area study and social mapping**
- Volume III**      **Working Papers**

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## ABBREVIATIONS

AGF	Australian Gold Fields. Purchased EL497 from RGC and EL677 from CRA in 1997, placing the two sets of prospects under one ownership. Went into administration in March 1998.
AP	Aid Post
CHW	Community Health Worker (replaces 'Aid Post Orderly')
CRA	Conzinc Rio Tinto: CRA Minerals' subsidiary Hidden Valley Gold held EL677 and ran the Wau office until the latter's sale to AGF in 1997. (CRA was partnered by Placer Niugini 1991-1993.)
DAL	Department of Agriculture and Livestock. National department with research and extension responsibilities in both commercial and subsistence agriculture (see also NARI).
Division of Health	Provincial department funded from the provincial budget and responsible for the implementation of health service delivery in a province.
Department of Health	National peak department responsible for health in Papua New Guinea. Devises national health policy but leaves implementation with provincial health divisions.
HEO	Health Extension Officer
HVG	Hidden Valley Gold. Subsidiary of CRA Minerals at Wau until renamed to Morobe Consolidated Goldfields after sale to AGF in 1997.
KLS	Katherine Lehmann School
MCG	Morobe Consolidated Goldfields. Renamed Hidden Valley Gold after sale to AGF in 1997.
MCH	Mother-child health. A term used in health extension for a focus on pregnancy, birth and neonatal infants.
NARI	National Agriculture Research Institute. Located at 10 Mile outside Lae, responsible for crop trials etc. (Not part of DAL.)
NO	Nursing Officer
TSS	Tropical splenomegaly: enlarged spleen associated with endemic malaria.
VBA	Village Birth Assistant

# CHAPTER 1

## INTRODUCTION AND COVERAGE OF THE REPORT

The ‘Area Study’ components of this volume collect together areas of description and analysis of the stakeholder environment in a manner that generally goes beyond the immediate identification of landowners, and the analysis of their historical relationships and benefit entitlements given in Volume I.

### **Topics summarily treated here**

#### *Women’s issues and village liaison work*

There are plenty of shortcomings. I acknowledge that neither women’s issues nor the work of the company’s (female) Community Development Officers are properly represented here. But then I do not give a detailed account of any other aspects of the work of the company’s Liaison Department—other than using certain parts of the village assistance programme as a tool to examine the organisation of the landowner community—even though this has now been in place for ten years in a form similar to the present and is a critical resource that has preserved the project in a condition fit enough for a Feasibility Study to be a viable option.

#### *Business development*

Time has also precluded a proper treatment of the small business initiatives that have accompanied the liaison effort over this period, and which have indeed been essential to them. The reason for this is that even a passing acquaintance with the efforts of RGC, CRA, AGF and now MCG in this area reveals the local area business entities to be far from simple service providers, isolated commercially from the rest of Wau history and society. Indeed not: they reflect it, but many have failed and it is important to know why. For this to happen answers cannot be found in a concise account and I have reluctantly decided not to tackle the subject at all at this stage.

It should be noted that a Business Development Plan is a mandatory component of a proposal for development. The company has a Business Development Superintendent who has now taken preliminary steps in planning for business development around the project. As mentioned in Volume I, the key entity is the landowners’ umbrella company, Ravenpol No 70 Pty Ltd. While the public officer and directors of Ravenpol are drawn from the office bearers of the Nakuwi Association, it is the Business Development Superintendent—not an employee of Ravenpol—who runs its day-to-day administration. Further information on this will be given elsewhere.

#### *National political linkages*

I deal with national political linkages only in passing; on the other hand, I place considerable emphasis on governance and the mechanisms and trends of local political decision-making.

To summarise the national scene, Papua New Guinea has a single chamber national parliament sitting in the capital Port Moresby. The country is divided into 19 provinces with Port Moresby in a special administrative area, the National Capital District (NCD). The provinces are further subdivided into between one and twelve districts which, for the purposes of five-yearly national elections, become 'Open Electorates' each returning a single member to the parliament. In addition, electors in the 19 provinces and NCD each cast a second ballot for a 'Regional' (or 'Provincial') seat, making for a total of 109 Members of Parliament.

The second and third tiers of government are those of provincial and local level (usually 'council') governments. Following the *Organic Law on Provincial and Local Level Government* 1995, known as 'the reforms',<sup>1</sup> provincial governments elected from a separate set of provincial constituencies were abolished. Provincial assemblies are now made up of automatic rather than elected members: the national Members of Parliament, the council presidents and, depending on individual provincial constitutions, nominated representatives for women and the churches. By default the Regional Member assumes the position of provincial Governor (replacing the former position of Premier). Other members form into portfolio committees (including in Morobe's case a Mining Committee) each headed by a Chairman.

#### *Primary economy*

I do not investigate the macroeconomic effects of the project (compare the approach of WIRES 1974; and Jackson, Emerson and Welsh 1980).

The most important primary industry sectors in Bulolo District are alluvial and small-scale mechanised mining, coffee and forestry. Coffee is predominantly small-holder but several plantation businesses exist, with various levels of current activity, in the Wau Valley.

- On the basis of Blowers' (2000) analysis of gold buyers' and refinery returns, the income from alluvial mining is about 840 kg, or approximately 26,000 oz, of fine gold a year, worth (at the refinery value of about K21/g) about K17.6 million. Mechanised mining produces another 60kg a year worth about K1.3 million of which a standard tribute rate to local interests is 15%, worth about K190,000. Some of the expenses of the mechanised miners would also be retained in the District. Thus, the value of current gold production in the District is about K18 million a year. A proportion of this is lost to the area in the form of refining costs, the mark-ups of non-local buyers and theft (but see p. 86), leaving perhaps K10 million to K15 million to be spent in sales outlets at Wau and Bulolo, on goods and services available in Lae, and on non-locally receipted services (e.g. Elcom bills, air tickets, etc).
- We are dependent on the results of the 2000 census for even a rough estimate of how many people earn money from coffee in the District. King's July 2000 household survey data indicates a likely average annual family income from coffee of K330 in the Watut villages (Table 13, p. 32) and K550 (Table 15, p. 35) at Kwembu and Winima.

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<sup>1</sup> 'Organic laws' differ from ordinary legislation (e.g. the *Mining Act*) in requiring either a two-thirds or three-quarters majority of all members. They are needed when amendments to the national constitution are required.

According to the Coffee Industry Corporation, PNG's total coffee exports for 1999-2000 were worth K292.1 million; of this 6.3%, or K18.4 million, originated in Morobe. In 2000, three of Papua New Guinea's 21 registered exporters were Lae-based: Niugini Coffee Tea and Spice Company, Kundu Coffee Exports, and Cofex Ltd. Of these only Niugini was involved in the Menyamya and Bulolo Districts. (Kundu only handled plantation coffee from the Kimil area of Western Highlands and the Sepik; Cofex leased out its mill and did no exporting in 2000.)

Any attempt to get closer detail is frustrated by the transportation of coffee bags between different areas by individual growers seeking favourable prices, the concentration of exporters in Goroka, Hagen and Lae at a distance from many growing districts, and not least the smuggling of stolen coffee across borders. Still, it is possible to say that somewhere in the range of K2 million to K5 million is likely to be produced in the Wau Valley and Watut areas, with the remainder coming from Kabwum, Menyamya, Garaina and elsewhere.

- Other major sources of external income are the wages and salaries of public servants— including teachers, health workers, police, district and local government employees and the wages and salaries of employees of the large commercial enterprises in the District, such as PNG Forest Products, the major employer at Bulolo.

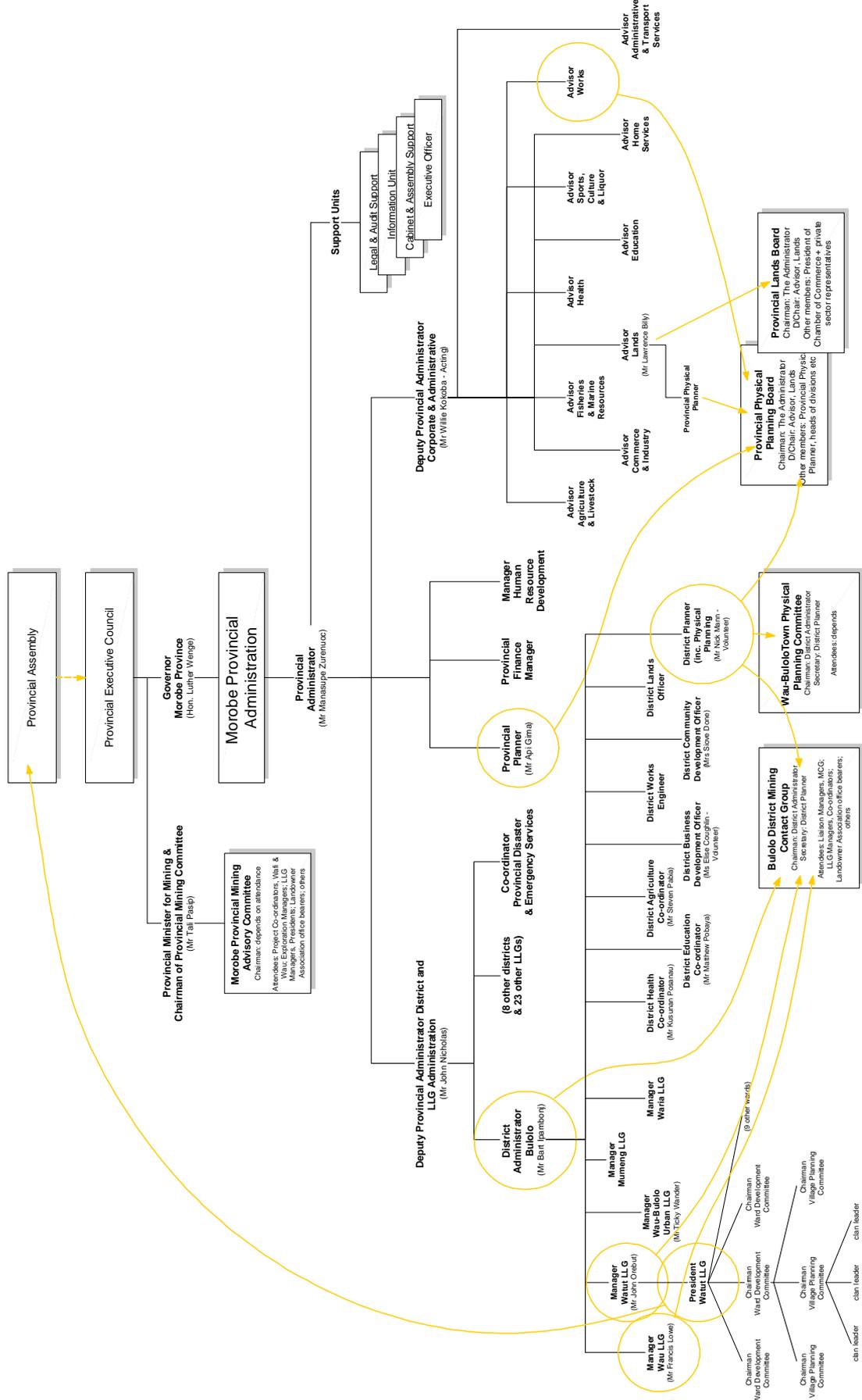
### **Linkages from the project to government**

The national government channel to the project in respect of tenement issues and its external relations is through the DoM Project Liaison section, represented locally by a Project Liaison Officer at the Mines Office in Wau. Other governmental relations depend on the sector that is involved, for example: Department of Labour, Office of Environment and Conservation, Department of Migration and Foreign Affairs.

The Morobe Provincial Administration has several points of contact: the Advisor/Division of Natural Resources, Energy and Environment answering to the Deputy Administrator (Corporate and Administrative).

A Special Projects Officer assigned to the Project for the purpose of lands investigation; and the Morobe Provincial Mining Advisory Committee, which convenes on a quarterly basis.

**Figure 1 Administrative structure of the Morobe Provincial Administration with special reference to physical planning and mining (wallchart, revised January 2001).**



The three councils are all located within Bulolo District. Each has a Council Manager reporting to the District Administrator, who is supported by a District Planner, sectoral co-ordinators, a Works Engineer and others. The formal channel to the Project is the Bulolo District Mining Contact Group which meets bimonthly and is attended by these officers, MCG Liaison staff, Nakuwi Association office bearers, and others as invited.

*Intentions of the reforms in respect of planning and implementation*

The straightforward explanation is that the reforms were borne out of frustration with the former provincial government system, which was perceived as replicating the problems of national politics and bureaucracy at provincial level—and as far away as ever from ‘the village’ where, ideology holds, money must be spent.

Under this cover, according to some analysts, a separate agenda was to legislate out of existence the provincial politicians who were felt by their national counterparts to be eating into the limited pie of political influence at home and undermining their supporter bases when they were away in Waigani. In provinces where this was a major feature of political life, nothing has happened to alter this, although the mechanism has changed.<sup>2</sup>

But in other provinces, like Morobe, where factional groups within the Open Electorates are small and competition among them neutralises their wider influence, national MPs may have few local connections in a particular area. Here the effect of the reforms is to largely remove *elected* politicians from the planning process altogether.

A key objective was that there should be a shift of planning, budgeting and implementation responsibilities away from the provincial headquarters and out to the Districts. Consequently, each District Manager and, within each district, each Council Manager has become responsible for constructing a Five Year Development Plan. A critical problem is that the majority of staff at this level do not have the capabilities to do effective planning.

Plans for the period 1998-2002 do exist, but in reality they are highly schematic documents. In one of the jurisdictions in the Bulolo District (Morobe Provincial Administration 1997), a Zopp planning exercise was held in April 1997, resulting in 64 pages of objectives and flow diagrams, followed by three pages of budget lines. The budget lines are nineteen in number of which eighteen show the same activity (e.g. ‘2 x Teachers House’, ‘100 x Gabbage [sic] Drums + Stands’) repeated five times over. The nineteenth line concerns playing fields and is the only one where the annual expenditure shows a phased programme of improvements. Only two items mention maintenance (in 2001, ‘maintenance of fields’ and in 2002, ‘public toilets maintenance’), and account for just 4% of total expenditure. No quotations have been obtained for construction items all of which are in round multiples of K1000.

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<sup>2</sup> Pre-reforms, the notable case was Western Highlands where PDM governments, led by Paias Wingti, had a long-standing feud with National Party-led provincial administrations during the 1980s. Post-reforms, the suspension of powers in Enga and Southern Highlands by Mekere Morauta’s PDM-led government has a new twist—because the opponents being silenced are not provincial MPAs embattled with national MPs both elected from the same voter base, but party aligned national MPs from different regions struggling with each other for control. [But in a stunning about-face, P. Ipatas, the Governor of Enga, led his followers into the PDM camp in early May 2001.]

In reality, district and council planning is hostage to the release of funds from the national government and provincial administration, both of which may obstruct the flow of budgetted funds.<sup>3</sup> In 1999 and 2000, the Wau-Bulolo Town Council is believed to have received only 50% of its annual allocations of about K280,000.

Two hurdles are getting the annual budget passed by, in the case of the councils, the Ward Members, and getting through the year without unbudgetted outgoings, however urgent. In 2000, an unbudgetted item was K60,000 for engineering work to re-channel the Bulolo River after it jumped its channel close to Bulolo town. In Wau, the upshot is that little infrastructure improvement has actually been achieved: Wau village court (successfully built), one teacher's house (three more expected); no new classrooms (four expected), no public toilets and so on. Similarly, emergency work to the Wau town water supply, originally planned for but inserted in an annual budget, was a casualty of the Bulolo River diversionary work.



**Figure 2** The serviceability of nationally-maintained infrastructure: the Lae-Bulolo road cut by the Watut River between Golden Pine and Widipos, December 2000.

These comments do not mean that matters are getting worse; they simply show that the reforms have shifted the burden of underperformance from one place to another. The result is continuous crisis in the government's ability to keep critical infrastructure in a serviceable condition.

#### *Scope for project involvement in District development*

My sketch of the planning process gives a glimpse of how the government system fails to deliver. The local examples I have given are repeated in sectors whose responsibility lies

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<sup>3</sup> In 1999, the Morobe Provincial Administration failed to receive K22m in grants that it was guaranteed to receive under legislated funding formulas. It sued the national government in 2000 and won an order that the money be paid. It has still not been paid.

at provincial and national level, such as health, education, main roads, and airports. The impact on all residents is heavy. For resource projects, the failure of major infrastructure (Figure 2, Figure 3) at a critical time could spell disaster.

There are therefore compelling arguments as to why a developer should get involved in some aspects of district government. This is all the more so as three new funding streams are made available to a province when it hosts a Special Mining Lease project:

- Special Support Grant (SSG), paid to the Provincial Government;
- Provincial Government's share of royalties;
- Tax Credit Scheme (TCS), available only when a mine operator pays company tax.

Proposals will not be made at this stage, but the key areas are capacity building<sup>4</sup> and assistance with the implementation of projects funded by this new money. Past failures to adopt proper implementation plans for SSG and TCS expenditure has led to considerable waste in Western Province (Burton 1998), Enga and Southern Highlands.

The Development Forum is the place to obtain agreements to incorporate these new funding lines into the District's planning procedures—indeed to create better resources for district planning—specifying sources of funding, and responsibilities for implementation and maintenance.

'Four hundred and fifty five people from Kumalu No. 1 and No. 2 villages are homeless after the Kumalu river burst, spilling mud and debris and burying two villages on Monday afternoon. The entire Mumeng station is now affected by water and the river now runs through the station. Bart Ipambonj, a spokesman from the Bulolo District Administrator's office said on Tuesday he was forced to turned back to Bulolo after part of the road was covered with water, mud and debris. "We were forced to drive back to Bulolo yesterday," said Mr Ipambonj. The police station, forestry, health centre, Lutheran church, market and the pastors house at the north end of the station are now under mud and water.

Figure 3. Excerpt from *The National*, 16 Nov 2000.

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<sup>4</sup> Mr Nick Mann, the AVO District Planner, is working on the next District Development Plan for the next budgetting cycle and this will be much more detailed and included properly researched costings. However, his work cannot address the systemic obstructions to implementation in the Bulolo District.

## CHAPTER 2

### **SOCIAL MAPPING OF LANDOWNER VILLAGES WITH SPECIAL REFERENCE TO DISTRIBUTION**

This chapter presents a selection of the social mapping work I have done at Wau since 1995, specifically the aspects dealing with distribution and village organisation. Other results, covering topics in social organisation, oral history and settlement history in more detail are given in the Working Papers collected in Volume III.

Important social mapping outputs, but which are not presented here are:

- a genealogical database of the project area landowners, using Community Express software;<sup>5</sup>
- more than 80 paper charts of genealogy 24in x 36in in a map hanger in the Liaison Department;
- an electronic map of the cultural landscape, based on the 1:100,000 series topographic series, in AutoCad 2000, containing locations of settlements, place and creek names, and other landscape features and compiled from field visits, archived geology maps, and maps kept by some landowners;<sup>6</sup>
- a collection of scanned documents, including court transcripts, witness statements, and typescripts of oral historical information given to me by landowners and other claimants, on an intranet web site;
- a collection of scanned photographs of landowner visits to sites of special significance also on the intranet web site;
- video of environmental trips with landowners for the purpose of identifying plant species in compensation lists.

Among these, the Community Express database is a significant tool providing support for many aspects of village liaison, and social and medical monitoring. (The precision with which the residents of villages are known has great potential for use in health monitoring and the database should also be used to help spread royalty entitlements fairly.) All tables breaking down statistics by village or lineage of origin in Volume I or shown below were done with searches on the Community Express database.

#### **A note on methods**

Present-day landownership issues in the Wau-Bulolo area are unusually convoluted, even for Papua New Guinea. Introductory remarks are as follows.

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<sup>5</sup> Community Express has its own documentation and licensing arrangements.

<sup>6</sup> Mr Levi Inani drew up two coloured maps of the Biangai area some years ago; they contain detailed creek name information which has proved to be accurate during field checks.

First, it is not possible to make simple assumptions about where people lived much before contact, because traditional life was in a state of remarkable change at the very point at which the indigenous societies of this part of Morobe collided with Western civilisation.

The Germans had a small station at Salamaua in 1901-02 (Thomson 1922), one of six in mainland New Guinea, and it was about this time that alluvial miners coming from the Papuan side of the border began to work their way inland eastwards along the Waria River. Coincidentally, Kukukuku people from the Kapau River area were entering the Upper Watut from the west and staking out its land. The Kapau migration began in the early 1880s, when the first settlement places were established near Menhi at the head of Slate Creek. Watuts began to establish places in the Nauti area around 1900. Armed clashes between Watuts and Biangais in the vicinity of the Bulolo-Watut Divide that we know about probably happened only *after* 1910. The first government patrol came to Wau in 1920.

Second, the impact of the gold rush period (1922-42) on traditional life at Wau and Bulolo was very severe. The war reduced the two towns to ashes and was followed by catastrophic epidemics of dysentery, meningitis, measles and whooping cough that took a heavy toll in the villages and altered patterns of settlement. A case in point is that the original Nautiya population of Nauti prior to WWII was almost extinguished, probably between 1946 and 1947; few of descendants remain alive today and their stories are disjointed and overwhelmed by the weight of information available from groups not so severely affected.

Thirdly, each of three to one dozen principal interest groups in the Wau-Bulolo area and further afield, depending on how they are counted, maintains and interprets its own version of the past. While there really was only one past at which all parties were present, each has built up a different history around itself from the same factual elements and continues to make subtle alterations depending on the state of its relations with the others.

### *Constructed social mapping*

These factors complicate the methods of conventional social mapping. Different approaches are needed in different areas, but in general social mapping relies on the expectation that a reasonable degree of consensus about traditional owners is expected to be found in any given culture area. Given this, the fieldworker usually expects to move freely among communities, keeping confidences, to be sure, but not constantly shadowed by people trying to work out who has said what to whom and making a considerable effort to control who it is that gives information at all.

But around Wau and Bulolo, where so many claimant groups have their own accounts of events and, even within them, there can be several quite incompatible versions. A helpful concept is that we must deal here with ‘constructed social mapping’. As physicists cannot see the behaviour of atoms directly, it is not easy at Wau and Bulolo to examine the cultural landscape at first hand—or, at least, going straight to a place and asking direct questions can result in meaningless answers. A model has to be built up bit by bit: for example, in careful comparison of versions, matching elements that different ones have in common, and in monitoring the ebb and flow of alterations to what each party is saying in relation to the state of their contemporary relations with others. The analogy can be pursued further; as physicists have long realised, the act of observation affects the behaviour of the things being observed. At Wau and Bulolo, no visit to a village, no interview with an elder, no mark in a notebook, and certainly no photograph is snapped without a reaction occurring.

### *Witnessing events*

Practical examples of this problem begin with the very earliest contacts, for example in this probable encounter between the miner Hellmuth Baum and the prewar Nauti luluai, Hatatao:

The Germans built a ladder up a tall tree and climbed up and made a platform on top. They looked up to the head of the Watut River and ... they looked back towards Wau. They worked for a while taking pictures and making a map. Over the area they could see there were no signs of people, except smoke coming up from some places nearby ...

The Germans wrote this story down taking one copy to Germany and giving one copy to Hatatao ... by signs, the Germans indicated that Hatatao was the landowner here and they made him the Luluai of the place (from *History of Nautiya clan*; see Working Paper No. 5).

In reality: a European is exploring the country looking for gold. He climbs up to get a good view, makes notes and perhaps takes a photograph. But in the constructed version, his simple act is loaded with extra meaning. The map, the 'story' written down, and the substance of the communications between the two men all add to the deep meaning read into this chance meeting. It takes on significance as what may be called a 'witnessing event'.

Observation is no less fraught with dangers today. The ethnographer starts work, makes enquiries in a great many places, and interviews all kinds of people. But in Wau, each selection of interviewee and each piece of evidence brought up for discussion is taken as a sign of validation of something.

A typescript I received at Wau in 2000 concludes:

In 16<sup>th</sup> August 1997 Mr John Burton arrived at [writer's village] with a photograph of [writer's ancestor and contact period luluai] taken by Mrs Beatrice Blackwood from England [on] 21 March 1937 and that was the Provincial Records for native land owner as Watut Wau Bulolo.

This is the writer's construction, of course, not mine.

The more common forms of recording, like taking photographs or photocopying documents held by villagers (today all claimant parties keep more or less extensive collections of court papers, extracts from land inquiries and the like) become irritatingly 'significant' to some degree, but this cannot be avoided.

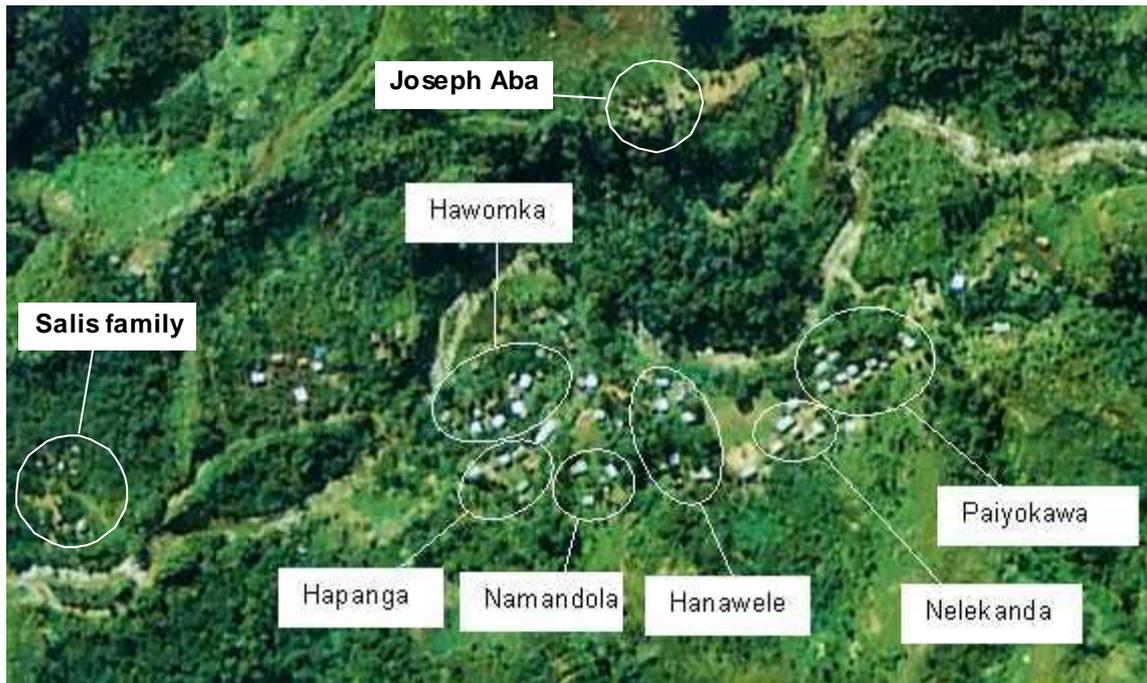
But the greater formality of making a tape or video recording of an informant testimony acts to make this a 'witnessing event' rather too powerful for comfort in most circumstances. I have used video on bush walks with village elders I am close too (and they found it empowered them to participate in what would otherwise be environmental investigations carried out by external consultants). But with both tape and video, it would be inappropriate to make recordings with people other than those who are already clearly identified as primary landowners—this would create 'witnessing events' that would give other parties fits of apoplexy.

As an ethnographer, I want to be able to talk to whoever I want. But this is difficult as a conversation with the 'wrong' person, brings strident accusations of double-dealing from core landowners. After five years of visiting Wau, I was beginning to wonder if I would ever be able to get access to the groups around them, because I cannot easily solicit information or visit their villages without these reactions.

Thankfully my presence has become well enough known that many of the groups I wanted to hear from, but it would be difficult for me to take the initiative and go and meet with, brought me their ‘history papers’ in 2000 without me asking.

## Nauti

I addressed the question of the identity of the ‘Nauti’ in Volume I, showing that in reality ‘Nauti’ stands for the approximately 991 descendants of the *tripela tumbuna*, Yatavo, Qavaingo and Yandiyamango, and that they are residentially scattered all over the Upper Watut. I will now examine the composition of the village itself.



**Figure 4** Nauti from the air, September 2000, showing residential hamlets.

### *How Nauti village was formed*

Settlements in the eastern parts inhabited by Kukukuku all appear to follow the same model. A settlement founder establishes a new ‘place’, perhaps with his brothers and/or perhaps they join him at a later date. Then, maternal relatives, seeking a better situation than they presently have, bring new extended families and accrete onto the core owners of the place.

In first place, Nauti was the dominion of one man, Tainameyo of Nautiya. He founded the first settlement in the area of ‘Nauti Creek’ (Ikellanda Creek) some time around 1900. His sister married Yatavo and was the mother of Yatavo’s five sons. After contact, a close relative, Hatatao, was made the luluai of Nauti. Then in WWII and shortly thereafter, epidemics swept the area killing many people including all Hatatao’s successors among the Nautiya. Qoamiyo, the son of Nandayaito Yatavo, had been stranded in Kavieng during the war, and now returned as a pidgin speaker to create a new Nauti—with the remnants of the Nautiya—in 1946 or 1947 in a new location close to the Watut River. Both groups lived together until about 1954, when living descendants of Yatavo’s five sons and their attached people moved to the present village site, and the few remaining Nautiya families crossed the river where some still live today.

The extended family of Yatavo's descendants ('the Yatavo'), with their wives and husbands, where these reside with them, make up 169 of the 328 current residents of Nauti (six more Yatavo, all married women, live with their husbands in other villages, and one family of thirteen, Askai family, lives at Cliffside near Wau). All but one of the expatriate Yatavo were born at Nauti after the war; the exception is Timbi Meawayato who was born at Sapanda but came to live at Nauti as a grown girl before marrying one of the original Nautiya (see Figure 5).

This, then, accounts for the Yatavo and explains why the many Yatavo have come to displace the rather few Nautiya.

The second side of the Nauti story is that the representatives of other Watut ancestral lines have followed their paths of kinship and joined the settlement founders at each village. The other most substantial source of current Nauti residents is Kanakaimaknga, a place near Okanaiwa on the Kapau River near Aseki. Hangitau Yatavo married two sisters from this place and they were alive when the first modern Nauti was established in 1946 or 1947. The children of their brothers came in the 1960s and accreted onto the Yatavo family core. In this case, the original relatives did not leave their home place; their sons made the move.

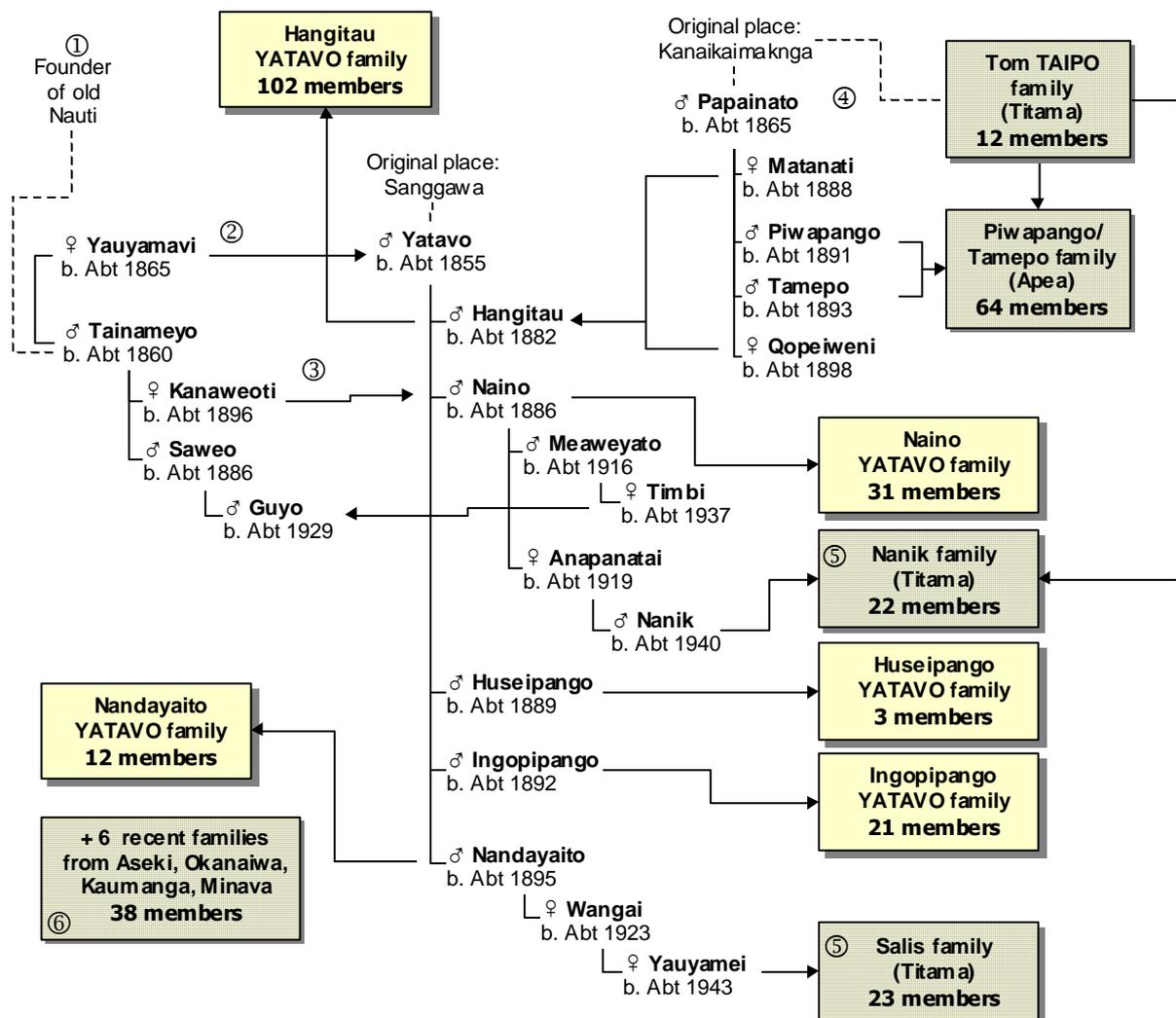
Two other families from other places (Salis from Okanaiwa and Nanik from Paiwini) are connected through the grandchildren of Yatavo. Six small families amounting to 38 people have come in the last 20 years; they have no as-yet-revealed connection to the existing residents.

#### *Population estimates for Nauti*

This very traditional and stable picture contradicts that given by Jackson, who thought that 'in-migration in fairly substantial amount appears to be taking place' (1988: 12) although he appears to have been including Heyu and Hikinangowe with Nauti. Sullivan and Hughes estimated the population at about 320 in 1988 (Sullivan and Hughes 1988: 7). What it actually was then is unknown, and the 1990 census is no use because Nauti was omitted. My surveys since 1995 and King's survey in July 2000 forms the basis for the present analysis; I did not originally include several hamlets of settlers; King's in 2000 did include the settlers—but they are readily identifiable in his data.<sup>7</sup>

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<sup>7</sup> King only counted 178 people at Nauti in his earlier survey in December 1993, but noted that 'complete coverage of all households was not achieved ... in Nauti one extended family group ... refused to co-operate with the village spokesman for personal and political reasons' (King 1994:9). He estimated his shortfall at 15% of households.



**Figure 5 How Nauti families are connected: population of 328 as of July 2000.**

Notes: 1. Tainameyo was the first man to live in the Nauti area. 2. Tainameyo's sister married Yatavo, 3. Tainameyo granted access to Nauti land to his son-in-law Naino and his brothers, then living at Sapanda, from around 1915; Hangitau and Naino were among those known to have made use of this. 4. Hangitau's wives were from Kanaikaimaknga, several extended families have followed. 5. Later, men married Yatavo lineage daughters. 6. Six families have moved to Nauti since the 1970s.

The population of Nauti grew from my count of 258 in 1997 to 285 today (without the settlers) with the addition of 23 births, 5 adoptions, and 11 new wives and 2 new husbands; and the subtraction of 10 deaths, and 2 girls and 1 boy who have married and gone to live with their spouses elsewhere (Table 1).

On the face of it, the population has increased by 10.4% in three years or at 3.4% a year, which would appear to validate Jackson's feeling of rapid increase. But in reality no such rise is likely to have been sustained since 1988, as a back projection at this would place the population then at only 188—at wide variance to Sullivan and Hughes' estimate.

	Natural increase			Migration IN		Migration OUT	Net migration	Settlers added*	Gross change
	Births	Deaths	Net	Adop-tions	Spouses	Spouses			
0-20 yrs	23	4	19	4	3	0	7	21	<b>47</b>
20+ yrs	n/a	6	-6	0	10	3	7	23	<b>24</b>
<b>Totals</b>	<b>23</b>	<b>10</b>	<b>13</b>	<b>5</b>	<b>13</b>	<b>3</b>	<b>15</b>	<b>44</b>	<b>71</b>

**Table 1 Summary of population changes, Nauti village 1 Sep 1997-31 Aug 2000**

Notes: 'indigenous population' on 1 Sep 1997, 258, and on 31 Aug 2000, 285.

\*A further 44 settlers are also present, making 329 in all. They were probably present but not enumerated in 1997 as they were not included among landowners.

The recent rise appears to stem from the net flow of spouses into the village since 1997. Six of these came aged 15-20 years as first wives; five older women came as the second wives of widowers; two men in their 20s came as husbands. In return, only three young people left. If the flow of spouses is equalised, and the 6 children born to the newcomers in the interval adjusted pro rata, a normalised population for 2000 would be 273 and population growth recalculated to be 1.9% a year. A back projection to 1988 is then 218 'indigenous inhabitants', a much more realistic figure.

This assumes the net inflow of spouses is only temporary and that stochastic variation will see an ebb and flow at random. In fact, there are at present 16 unwed girls at Nauti aged 15 to 22 years and 21 unmarried boys aged 17 to 28 years, so a continued importation of women is predictable for the next five years if they all marry.

#### *Watut migration and mining: discussion*

The purpose of going into this in detail may not be immediately evident. However, the literature is full of accounts of massive flows of migrants into the neighbourhood of mining projects and indeed this is certainly a key source of social impact in some places.

It is important, though, not to cry wolf. Hidden Valley Gold (1988: 89), from a reading of Jackson, opined that immigration was a 'major fear' of villagers and 'a greater police presence might become necessary as a result'. It is very true that immigration is a *fear* of villagers around Wau, but it is also true that villagers, both Biangai and Watut, are quite pro-active and capable of controlling the numbers of settlers they allow onto their land.

At Nauti there is meagre evidence of a migrant problem at the moment. On the basis of the evidence just presented, the landowner population is highly structured, has a foundation dating back to the early part of the century and has not undergone a major change in composition for at least 30 years.

The 44 people I classify as 'settlers' (a) account for a small and relatively stable addition to the size of the village and (b) occupy marginalised positions within it. They do not have land rights and if they fall into dispute with their hosts, they may be expected to be evicted. On the other hand, the nature of Watut society is such that it freely allows people to accrete onto existing communities; this may be done where a man has some kin connection to an existing resident whom he will approach. If the sponsor is on good terms with the settlement leadership, he or she will defer to their wishes as regards the acceptability of the new migrants. This means that if the leadership disagrees, the would-

be migrant will be turned away. If, on the other hand, the sponsor has some dispute with the leadership, he may find it in his interest to be the private sponsor of new migrants if he can find a suitable place on his own land. He may, for example, be able to earn tribute from allowing gold miners onto a section of river controlled by himself or a slice of income from coffee planted on land he is not using. This is the case with the Watut River settlements of Heyu, located away from the village on the land of Yateme Yayamdao, and Hikinangowe, whose gardens are on land controlled by Naino Qamio and Vione Anteno and which was founded by men from Yamaiye and Dumauwa, Aseki in 1978.

Thus the village fear of excessive numbers of migrants is really a fear of discord within the village. If the leadership was all in agreement, there would be no private deals with such settler groups. Still, sponsors are generally mindful not to allow their tributors too many rights on their land. Graves, at least not of adults, may not be dug at Hikinangowe; so far there have been few deaths other than of infants, and all bodies of adults were carried to Wau Cemetery for burial.

In the future it may be expected that new migrants will attempt to move onto Nauti land, especially if the Hidden Valley project is developed. My prediction is that if the Yatavo extended family heads are able to maintain harmonious relationships among themselves, migration will be restrained. If conflict arises among them, however, this could well result in a settler problem.

#### *Distribution of compensation at Nauti*

Compensation payments during the CRA period were not large and, at least in the early years, diverted into paying legal bills. Payments made in 2000 (for the end of 1999 and for 1999), were more substantial and were distributed at village level. How this was done gives an insight into customary methods of dealing with shared income and may point to pitfalls that need to be avoided in the future.

Firstly, at Nauti all the payments were allocated to men. No women were identified as primary beneficiaries. For example, neither of the mother or widow of Exodus Papainato, a man who stood in a senior genealogical position within Hangitau family until his death in 1999 was called to receive a payment (his brother Fenis was present to replace him).

The men were divided into five categories: leading spokesmen, secondary spokesmen, leading family heads, secondary family heads, and special representatives. They received K350, K250, K435.70, K400 and K100 respectively. What to do with the (quite small sums of) money after this was their own responsibility and I have not questioned them about it. Nonetheless, the numbers of people in each subfamily in Figure 5 can be used to calculate the approximate amounts of compensation available for distribution per head of population (Table 2).

The table does not take into account sharing that might take place with relatives outside the village and it makes it seem that the families listed are not themselves interrelated, which they are.

Village family	Recipients	Kina	Persons	K/person
<b>Hangitau Yatavo</b>				
• Qamqoeto H	§Fenis Papainato, †Metiu Papainato, ‡Balapas	K1,085.70	35	K31.02
• Ngamalo H	§Koi Ngamalo, †Wesley Ngamalo	K685.70	32	K21.43
• Kepas H	*Kepas Hangitau, *Maxwell Kepas, †Luther Kepas	K1,135.70	35	K32.45
<b>Naino Yatavo</b>	*Vione Anteno, †Esso Vione	K785.70	31	K25.35
<b>Huseipango Yatavo</b>	§Pari Maikopango	K250.00	3	K83.33
<b>Ingopipango Yatavo</b>	§Yateme Yayamtao, †Fax Yateme, ‡Bauwa Wawipo	K1,085.70	21	K51.70
<b>Nadaiyaito Yatavo</b>	*Naino Qamio	K350.00	12	K29.17
<b>Piwapango/Tamepo</b>	§Ken Kawaipango, ‡Kemi Evino, †Felus Kemavi	K1,085.70	64	K16.96
<b>Tom Taipo</b>	‡Tom Taipo	K400.00	12	K33.33
<b>Subtotal</b>		<b>K6,864.20</b>	<b>245</b>	<b>K28.02</b>

<b>Non-village</b>				
Askai Hangitau	*Peter Askai, *Len Askai, †Daniel Askai	K1,136.79	21	K54.13
Ben Joseph	(gift)	K100.00	-	-
J. Eskaia	(gift)	K100.00	-	-
<b>Grand Total</b>				<b>K8200.99</b>

**Table 2 Distribution of compensation at Nauti village, August 2000.**

Notes: men classed as \*Yatavo spokesmen (K350), § secondary spokesmen (K250), † other heads of Yatavo families (K435.70), ‡ heads of supporter families (K400)

The table shows that most of the subfamilies have an amount to allocate that is reasonably close to the mean of K28 per head.

However, the population accounted for here is only 245 of the total 290 who have primary connections to the Yatavo nucleus. The 23 members of Salis family do not appear to have been catered for, nor the 22 members of Nanik family. These families are the descendants of Naino Qamio's and Vione Anteno's and father's sisters respectively—were these two men expected to share their spokesman's payments with them? It is unstated, and it may have been uncertain even to Naino and Vione.

The short-comings of this type of distribution have implications for future royalty sharing agreements (see Volume I).

#### *Distribution of compensation among the Qavaingo*

The compensation payments for 2000 give an insight into the problems faced by the other Watut court parties. Under the Yakaya sharing arrangement (Volume I), the Yatavo, Qavaingo and Yandiyamango are entitled to 20%, 10% and 10% of benefits accruing

from Hidden Valley, with a further 10% to be credited to a joint Yakaya account, adding up to the 50% interest that the court party ‘Nauti’ won in the Provincial Land Court.

Group or lineage (signatory)	Kina	Yokua/ Akikanda		Elsewhere		Total
		A	B	A	B	
<b>Qavaingo a/c</b> (Hendry Contreas)	K255.87					
Wife: Eqamai (Akikanda)						
<b>Hatanaito</b> (Oto Weri)	K255.84	29	13	28	90	160
<b>Nakaminatao</b> (Verson Kelopas)	K255.84	14	17	45	22	98
Wife: Mamatei (Yokua)						
<b>Qemawengetao</b> (Allen Engo)	K255.84	10	16	11	15	52
<b>Pupiyo</b> (Jacksy Koine)	K255.84	1	-	4	5	10
<b>Qoamoioyo</b> (Mick Petrus)	K255.84	39	21	11	82	153
<b>Total</b>	<b>K1 535.07</b>	<b>93</b>	<b>67</b>	<b>99</b>	<b>214</b>	<b>473</b>

**Table 3 Distribution of compensation among descendants of Qavaingo, November 2000**

Notes: there are 459 descendants of Qavaingo; 14 people have more than one connection;  
A = *spia* (agnates), B = *bilum* (connected through women).

The Qavaingo are residentially split between their two main villages Akikanda and Yokua. The split is between the descendants of Qavaingo’s two wives; those descended from Eqamai live at Akikanda while those descended from Mamatei live at Yokua. CRA decided to assist the Qavaingo in 1991 by building its Community Hall at Akikanda, but these figures show the greater number of Qavaingo agnates live at Yokua.<sup>8</sup>

In 2000, the Qavaingo had great difficulty in agreeing how they should divide their small payment for the 10% they hold in the Shared Ownership area at Hidden Valley. The Committee men, representing the descendants of Qavaingo’s five sons, decided to split the money equal ways—but against a protest by the principal Akikanda spokesman, Contreas Kipamono. However, this was the way it was done, with a sixth equal share being for the Qavaingo’s passbook account (to which Contreas is a signatory).

It is not hard to see why a satisfactory method of distribution eludes this group. It is extremely unfair to divide their income between such unequal number of people: Pupiyo ancestor is survived by just 10 people, of whom five are adult males, whereas there are 160 Hatanaitos. But the small sums on hand make it impractical to divide up their cheques among all members of the larger lineages; if this is not causing discontent today, it will do when cheques are much larger.

#### *Distribution of compensation among the Yandiyamango*

A similar situation exist exists with the Yandiyamango and companion groups. Pakieo was the father of five brothers, of which Yandiyamango is the eldest and whose name was put forward during the formation of Yakaya. However, while the other ‘Nauti’ groups only recognise Yandiyamango, this group acknowledges its brother lineages.

<sup>8</sup> My first visit, in 1995, to a Qavaingo meeting attended by both groups, was marked by a strident demand by the Yokua-based members to have a second Community Hall built.

Group or lineage (signatory)	Kina	Own village		Elsewhere		Total
		A	B	A	B	
<b>Yandiyamango group a/c</b> (Maor Mita & Andrew Mera , 20%)	K307.07					
Pakieo's 1 <sup>st</sup> wife						
<b>Yandiyamango</b> (Minava, Daniel Kupa , 14%)	K214.90	26	20	39	108	193
<b>Mdakeko</b> (Akikanda, Lemek David , 14%)	K214.90	23	16	1	4	44
<b>Tupango</b> (Akikanda, Bowas Andrew, 14%)	K214.90	22	2	1	6	31
Spokesman (Maor Mita, 5%)	K76.75					
Pakieo's 2 <sup>nd</sup> wife						
<b>Yamaipango</b> (Minava, Tom Kambio , 14%)	K214.90	32	41	17	91	181
<b>Aqipango</b> (Yokua, Micah Gaima, 14%)	K214.90	33	23	0	9	65
Spokesman (Andrew Mera , 5%)	K76.75					
<b>Total</b>	<b>K1 535.07</b>	<b>136</b>	<b>102</b>	<b>58</b>	<b>218</b>	<b>514</b>

**Table 4 Distribution of compensation among the Yandiyamango and companion groups, September 2000.** Notes: there are 507 descendants of Pakieo; 7 people have more than one connection; A = *spia* (agnates), B = *bilum* (connected through women).

The spokesmen and Committee men agreed the following breakdown: Yandiyamango, 20%; the four companion lineages, 14% each; the two spokesmen, 5% each.

Once again, the inequities of this breakdown are substantial because the five groups have very different numbers of people to accommodate. With the tiny payments involved little harm is done, but this method will be unsatisfactory for large sums of money.

#### *Compensation component for Yakaya*

The last 10% of Hidden Valley compensation is earmarked for Yakaya itself. However, Yakaya has never carried out any activities other than its own administration, so far as is known. At the time of writing (January 2001), its cancelled Westpac passbook languishes in a drawer in the Liaison Office with a cheque for K4000 awaiting deposit in a new account at Bulolo.

#### *Distribution of roofing iron sets among 'the Nauti'*

An early form of assistance to villagers was to start a programme of giving out roofing sheets. A standard set was twenty-two 12 ft sheets and four 8 ft sheets, together with ridge caps, gutters and small tanks.

Location	Yatavo		Qavaingo		Yandiyamango		Others	Total
	Agnates	Others	Agnates	Others	Agnates	Others		
Akikanda			11	1	9	1		22
Andarola						1		1
Gumi					2			2
Kaumanga					3			3
Minava				1	13	3		17
Nauti	32	8						40
Nauti 2						1		1
Planghawa					4			4
Society				1				1
Tontomea			4					4
Yokua			19	4				23
Mainyanda				1				1
Bulolo					1			1
Wau	5	4	8	1		1	15	34
<b>Grand Total</b>	<b>37</b>	<b>12</b>	<b>42</b>	<b>9</b>	<b>32</b>	<b>7</b>	<b>15</b>	<b>154</b>

**Table 5 Distribution of roofing iron sets among the ‘Nauti’ groups, 1991-2000.**

Source: L. Giam, Liaison records. ‘Agnates’ = descendants in male line.

‘Others’ = mother’s people, descendants through women, supporters.

This modest and effective programme unwittingly provides another means of finding out who ‘the Nauti’ really are (Table 5). The three main groups live at Nauti, Akikanda, Yokua and Minava, but the spread of iron sheeting is far wider. In fact only 59% of the sets (91 of 154) were put on houses in the ‘home’ villages. Members of the Qavaingo and Yandiyamango groups live scattered about the Watut area, as do their relatives and what they call ‘supporters’. Nowadays 13% of all three lines live in town along with further supporters.

*‘Nauti’ distribution mechanisms: conclusion*

In some 14 years since they won access to the Shared Ownership area at Hidden Valley, the components of the Watut court party known as ‘Nauti’ have found it extremely traumatic to try and make equitable decisions about their internal sharing arrangements.

In each case, they have fallen back on the names of long dead ancestors to partition their groups into smaller parts so that compensation money can be broken up for distribution. There are two ways of looking at the success of this.

From the first point of view, they have strenuously followed customary law. Watut custom places strong emphasis on the rights conferred on people by virtue of their genealogical position in lineages that are ranked in order of seniority (unlike ‘clan’ organised societies where it is often not known how small lineages connect and each is treated as jurally equal). They have acknowledged the frontline position of the Yatavo, granting them extra benefits and, among the ‘Pakieo’ groups, granting more to the leader, Yandiyamango. Otherwise their method of distribution is very level.

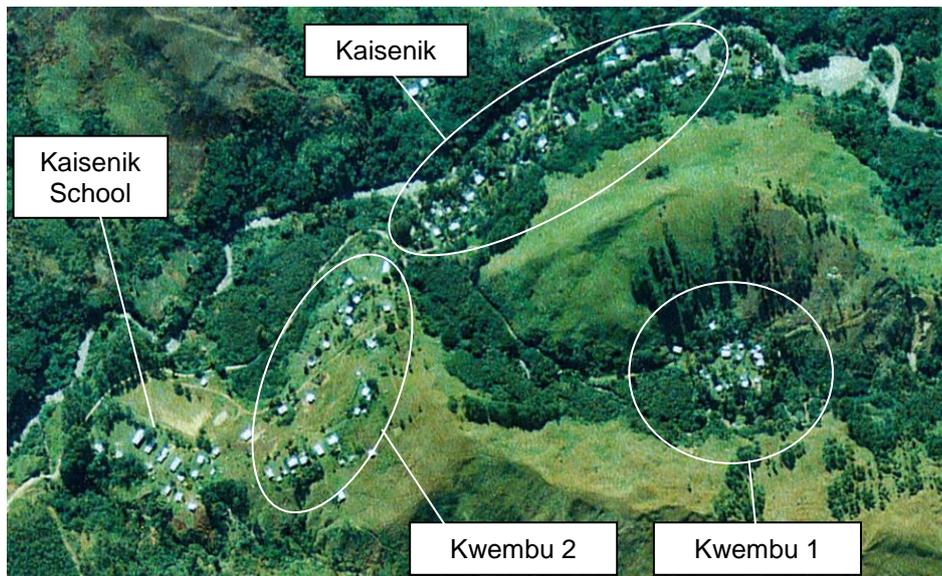
But from the second point of view, they have failed to establish a way of dealing satisfactorily with sums of money that are bigger than the few thousands of kina presently

at their disposal, notably royalty. They are aware of the mathematics of the situation and can see that when a lineage with 181 living members receives the same sum as one with 31 living members, it is not fair.

### **Kwembu and Winima**

Mitio (1981) addressed the problems of determining rights of access to land and the meaning of the group names at Werewere village, and was unable to obtain definitive answers. In other circumstances, that is to say if the names were non-intersecting ‘clans’, the it would be a simple enough matter to proceed from the above information to map out land blocks and to match ‘clan’ names against land blocks. But Biangai have rights of access to the land of several *soloriks* and attempts to walk boundaries or ask people to point out the land of their ‘clan’ is fraught with difficulties.

In Volume I, I discussed the concept of the *solorik*, a term meaning ‘base or trunk of a tree’, essentially meaning the same as ‘family tree’ in English. At Kwembu the *soloriks* are Simani, Kazibu, Kongawe 1 and Kongawe 2, and at Winima, Kayoge, Paro and Igulu. I mentioned that, although not mentioned by the court, only two *soloriks*, Simani and Kayoge are understood to own the land around Hidden Valley. I then showed how many



**Figure 6 Kwembu from the air, September 2000.**

people at the two villages had some connection to either Simani or Kayoge, or both.

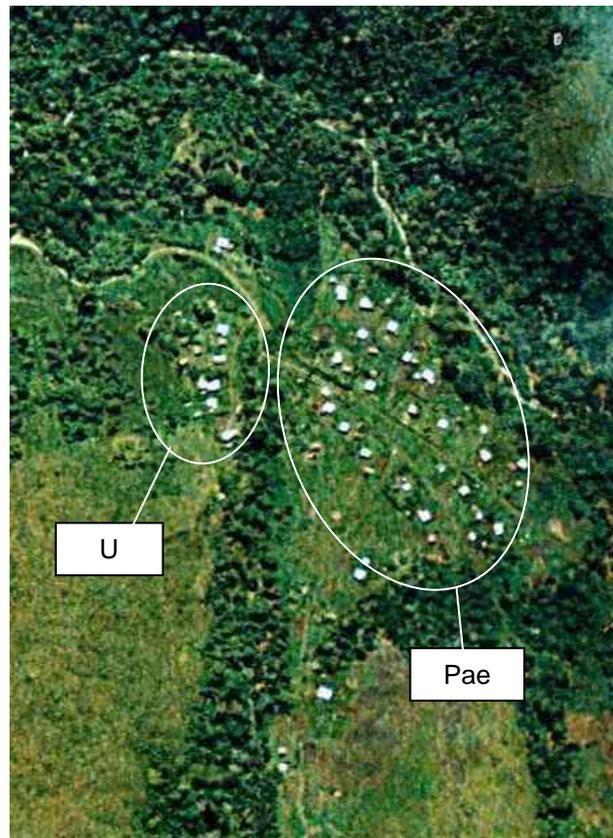
Here I want to break this down further, because it is not just a question of being known as, say, Simani, as would be the case in system of non-overlapping clans. You must be able to trace your genealogy to an ancestor who everyone agrees was a Simani. Thus there is an extra step to take in asserting who you are:

What	Logic
Clan system	1. 'People agree my parents were Jikas' 2. 'I am a Jika'
Solorik system	1. 'People agree Koumu was a Simani' 2. 'I am descended from Koumu' 3. 'I am a Simani'

**Table 6 Onus of proof of membership in the solorik system, compared with a conventional system of non-overlapping clans**

### *Genealogy*

There are believed to be six Simani ancestors who have living descendants today: Saroa, Koumu, Turu, Koromeng, Yogoyok and Naimbiri. A summary of the descendants of one of them, Koumu, is given in Figure 8 and Figure 9.<sup>9</sup>



**Figure 7 Winima from the air, September 2000.**

<sup>9</sup> There are two places to see more: a collection of web pages under the heading 'Biangai genealogy' on \\Nwserver\data\USERS\johnb\Web site home\Index.htm on the MCG Liaison Department intranet site at Wau, and in the 60+ ANSI D sized charts in a map hanger in the Liaison Department.

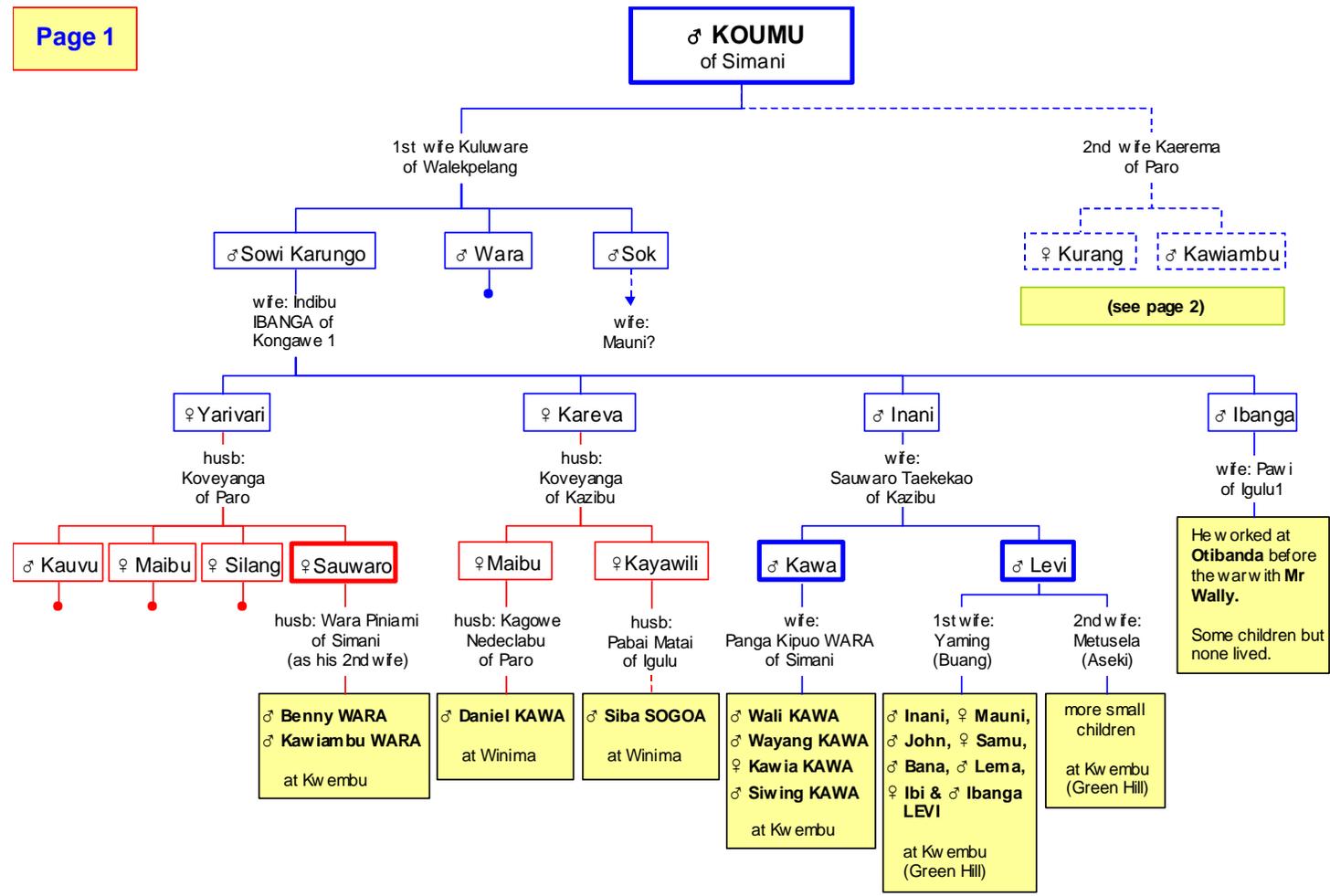


Figure 8 Example of Biangai genealogy: the descendants of Koumu, page 1.

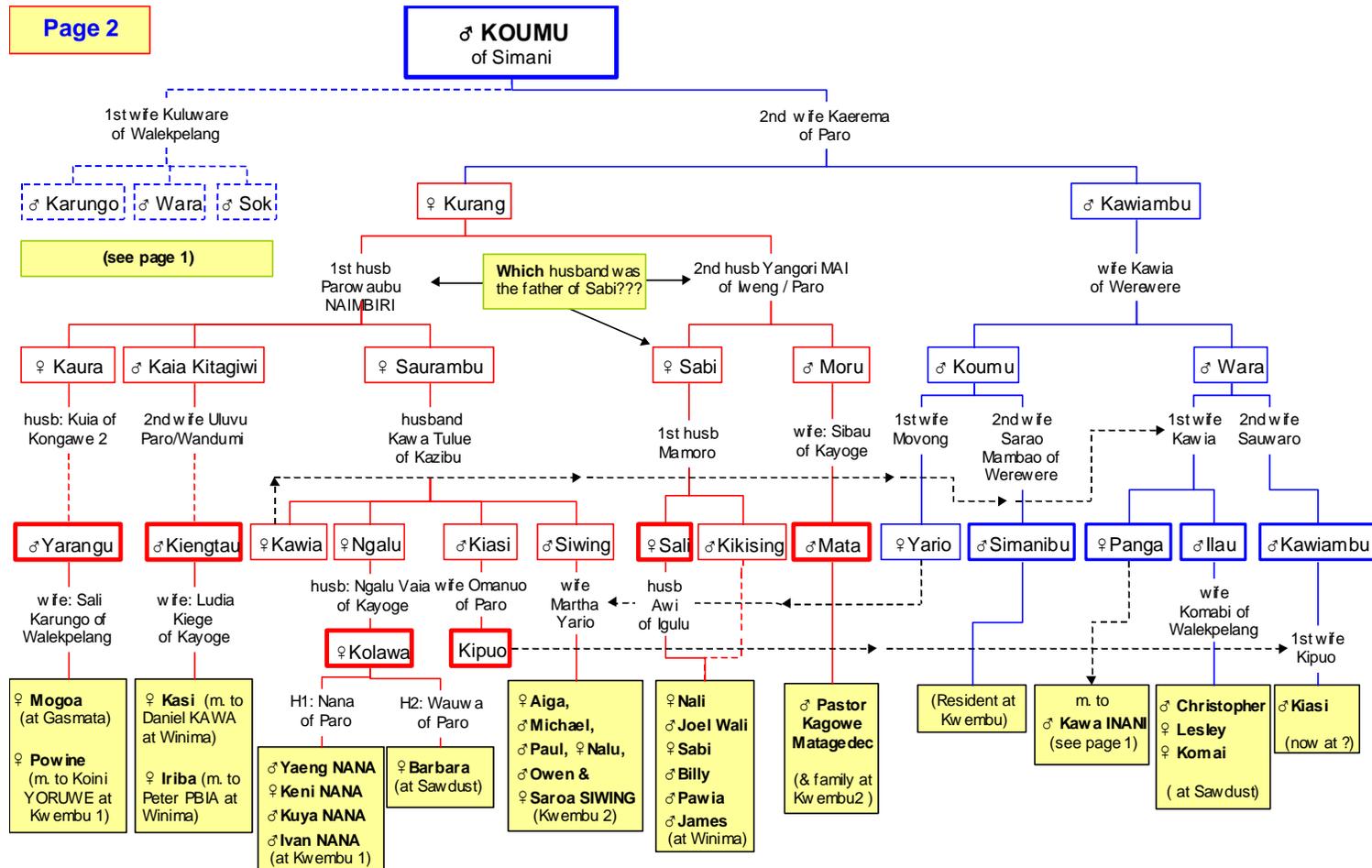
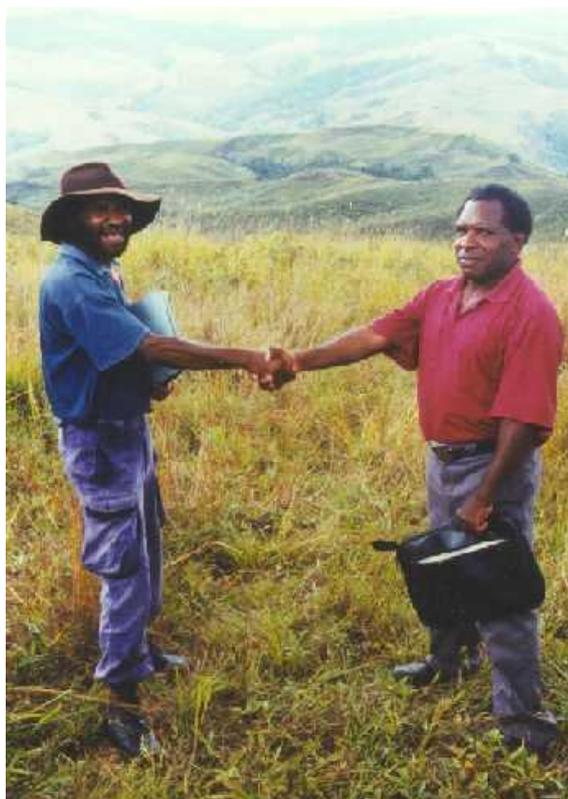


Figure 9 Example of Biangai genealogy: the descendants of Koumu, page 2.

As can be seen there is considerable complexity in the upper generations of the genealogy. An disagreement among informants concerns a Winima woman called Sabi who lived from about 1908 to about 1960. Her mother Kurang's first husband was Yangori KOBULE MAI, an Iweng with relatively few rights at Winima. He second husband was Parowaubu NAIMBIRI, a Simani with many rights at Winima. Some say Sabi's father was the first husband and that her mother ran away from him, perhaps even pregnant, and she was raised by the second husband. Others, including the daughters of Sabi, say her father was the second husband.

This kind of disagreement—there are many others throughout the genealogies—show the typical scope for disputation among the people of Kwembu and Winima. The facts are known as best we can know them, but living people have to come to agreement over their differences of opinion about these pivotal points of interpretation.



**Figure 10** Rex MAURI and Waekesa KAWENA at Simanirang on 5 March 1999. Their fathers argued in 1946 and the village split into Kwembu and Winima.

An area where there is considerable room for confusion is the distribution of *solorik* members across different villages. Earlier I listed Simani as a Kwembu *solorik*, so why did I discuss Parowaubu as a Simani when his descendants live at Winima? The short answer is that Kwembu and Winima did not exist as distinctively separate entities until 1946 when the wartime settlement of Simanirang split in two after an argument between two of the settlement leaders, Mauri KAINI and Kawena WAOROBU (see Figure 10). This is not to say that the constituent groups always lived in one village previously: in some periods they did, in others they did not, as I have traced at length elsewhere (see Working Paper No. 12). The reasons for saying Simani, Kazibu, Kongawe 1 and Kongawe 2 are Kwembu *soloriks* and Kayoge, Paro and Igulu are Winima ones are:

- jural: senior *solorik* elders live at the ‘home’ village;
- statistical: the highest concentration of members is at the ‘home’ village;
- locational: land belonging to the *soloriks* tends to be near the ‘home’ village.

#### *Statistical breakdown of descendants*

There are important limitations. The genealogically most senior person descended from the Simani Saroa ancestor is a woman married and living at Wandumi; the genealogically most senior Naimbiri descendant is a man living at Winima. A total of 1131 separate attachments (individuals may trace to more than one ancestor) to the six Simani ancestors is shown in Table 7; only 479 (42.1%) are to Kwembu residents.

<b>Location</b>	<b>Saroa</b>	<b>Koumu</b>	<b>Koromeng</b>	<b>Turu</b>	<b>Yogoyok</b>	<b>Naimbiri</b>
Biawen	-	-	-	6	74	-
Elauru	-	-	-	-	-	-
Kaisenik	7	7	7	40	12	-
Kwembu	<b>131</b>	<b>124</b>	<b>49</b>	<b>43</b>	<b>33</b>	<b>99</b>
Wandumi	68	4	21	20	12	1
Werewere	-	-	-	-	-	-
Winima	<b>27</b>	<b>71</b>	<b>18</b>	<b>24</b>	<b>28</b>	<b>35</b>
Town	28	15	4	-	28	22
Outside the area	16	9	10	16	12	17
<b>Grand Total</b>	<b>277</b>	<b>223</b>	<b>109</b>	<b>149</b>	<b>199</b>	<b>174</b>

**Table 7** Where the descendants of six Simani ancestors live.

Notes: Saroa and Koumu were brothers; Koromeng and Turu may have been brothers. These columns cannot be added as individuals may trace to more than one ancestor.

Source: Interviews with elders 1995-1999; Community Express database.

Similarly, a total of 659 separate attachments to the four key Kayoge and Walekpelang (Walekpelang are a group ‘next’ to Kayoge or, in some accounts, a section of Kayoge) ancestors is shown in Table 8; only 229 (34.7%) are to Winima residents.

#### *Agnation*

It may be objected that I am not placing enough emphasis on direct descent from the founders in the male line, technically known as *agnation*. This because every description we have of Biangai social organisation emphasises its bilateral (descent through both males and females) nature, but it is true that if agnates exist—that is to say male elders on a direct male line from the founder—they tend to dominate decision-making about resources traced back to the founder. Certainly some direct descent lines are like this; for example, Koumu has 44 agnatic descendants, 38 of whom live at Kwembu.

But many descent lines have hardly any agnates at all. Of 131 Saroa descendants at Kwembu, only one is an agnate; of 106 Inabu descendants at Winima, 9 are agnates; of Seragobu’s 77, 3 are agnates; Naubu has none alive at all; Kagowe Tubageli has one, Susanna Panga. (If the *soloriks* were patrilineal clans they would barely exist.)

Location	Inabu*	Seragobu*	Naubu†	Kagowe Tubageli†
Biawen	8	-	-	-
Elauru	6	-	-	3
Kaisenik	-	40	-	-
Kwembu	<b>76</b>	<b>50</b>	<b>49</b>	-
Wandumi	36	33	-	-
Werewere	5	-	-	-
Winima	<b>106</b>	<b>77</b>	<b>3</b>	<b>43</b>
Town	37	12	9	-
Outside the area	25	24	10	7
<b>Grand Total</b>	<b>299</b>	<b>236</b>	<b>71</b>	<b>53</b>

**Table 8** Where the descendants of four Kayoge\* and Walekpelang† ancestors live.

Notes: These columns cannot be added as individuals may trace to more than one ancestor. Source: Interviews with elders 1995-1999; Community Express database.

### *The villages in relation to land*

The location of the two villages provides only a weak guide to the ownership of land in the high mountains, such as at the head of Big Wau creek, the headwaters of the Bulolo River, and Hidden Valley. The Provincial Land Court magistrate, G. Laphorne, recognised this and specifically said that he would not make any division of rights between the two villages.<sup>10</sup>

### *The villages as face-to-face communities*

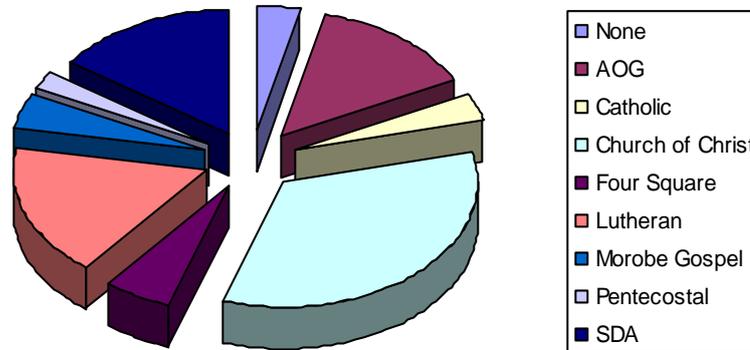
Other indicators do not offer more glimpses of unity in village organisation. An example is church membership. According to David King's July 2000 household survey, Kwembu has 171 church-goers. But they are divided into eight denominations (Figure 11). Winima has 158 church-goers in seven denominations (Figure 12).

Thus, both Kwembu and Winima, and presumably the other five Biangai villages, are characterised by a constant tendency for fragmentation: 'things fall apart' in the idiom. When comes to any participatory activity, schisms develop quickly.

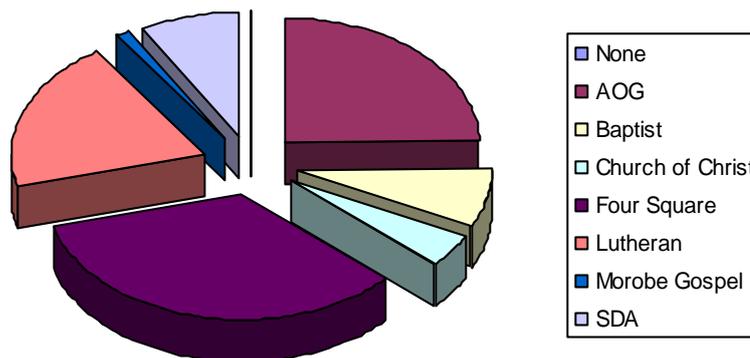
This shows a deep-seated contradiction in the way people think and act. Kwembu and Winima people really do believe in the idea of 'Kwembu-ness' and 'Winima-ness', and they from time to time do things that highlights this. At Winima, most villagers recently moved their houses from where they were clustered around the Community Hall to the

<sup>10</sup> Laphorne also made it clear that that other Biangai villages do *not* have rights at Hidden Valley because, when dismissing the claim of Mr Kilimbu Waimolok of Biawen, he said Mr Waimolok was claiming as a Kayoge, not as a Biawen. Mr Waimolok's claim was the only one from another village. The main thrust of his oral history—he has a folder of typescripts and diagrams—is on a sequence of settlements around Wau and their interrelationships. He does not specifically name the individuals known to Kwembu and Winima people as their ancestors.

site they inhabited at Pae just before WWII. When questioned, people say they moved because the slope was unstable above the Community Hall; but I diagnose another factor.



**Figure 11 Church membership at Kwembu.**<sup>11</sup>  
N = 171. Source: King (2001: Table 33.2)



**Figure 12 Church membership at Winima**  
N = 158. Source: King (2001: Table 33.1)

The villagers start some venture and say they will do it together. Inevitably they argue and a schism occurs. The different parties go different ways with their bits of the venture, one party drops out and the other carries on with it, or they abandon it altogether. This leads people to look for an ‘if only’ explanation for why they cannot work together. In my analysis, the leading ‘if only’ explanation going back through history is ‘if only we lived in the right place, with the settlement correctly configured we would not have disputes’. This is seen in the constant settlement movements in the last 50 years before contact (see Working Paper No. 12). None of the moves was very far; each probably involved a reshuffling of the mix of families who lived at the settlement. At the start, the

<sup>11</sup> The Biangai pattern of multiple church denominations contrasts strongly with other parts of PNG. Across broad swathes of New Ireland, New Britain, Papua, and Madang, depending on the colonial mission field, the great majority of people follow one church—Catholic, Lutheran or United Church—with only a small minority in each village attached to the smaller churches—SDA, Pentecostal, Baptist etc.

Igulu, Paro and Kayoge (as well as the Kwembu groups) lived together, but they split up so that each of the three lived on its own land in their own hilltop camps, and this is where they were at contact on 27 September 1924 when Edward Taylor brought his patrol to the head of Kamize Creek and first met the people we now call ‘Winima’ (see Working Paper No. 13).

Given that all these methods of analysis seem to fail to reveal just what it is that links people together in the modern villages—what makes for ‘Kwembu-ness’ or ‘Winima-ness’—I reluctantly turn to the idea that the essential thing is the people of the same village are simply a ‘face-to-face community’ and that children tend to stay among the people they have grown up among. However, this is a definition by what people are not, rather by what they are, and I will continue to seek some better means of showing how people reside together, act together and own things together.

<b>Location</b>	<b>Kwembu</b>	<b>Winima</b>	<b>Total</b>
Biawen	1		<b>1</b>
Kaisenik	2		<b>2</b>
Kwembu 1	13		<b>13</b>
Kwembu 2	19		<b>19</b>
Kwembu 3	17		<b>17</b>
Wandumi		1	<b>1</b>
Werewere		1	<b>1</b>
Winima (old)		15	<b>15</b>
Winima (Pai)		27	<b>27</b>
Town	4	1	<b>5</b>
<b>Grand Total</b>	<b>56</b>	<b>45</b>	<b>101</b>

**Table 9** Distribution of roofing iron sets at Kwembu and Winima, 1991-2000.

Source: W. Kawa, Liaison records.

#### *Distribution of roofing iron sets*

Like Nauti, Kwembu and Winima received a distribution of roofing iron under CRA’s village development schemes. But where the Nauti roofing sets were very widely distributed to relatives and ‘supporters’, the Kwembu and Winima people built 95% of their houses in their ‘home’ villages or at their blocks in town. The exceptions were at Biawen and Kaisenik, where two families closely associated with Kwembu reside, and Wandumi and Werewere, where two Winima men live with their wives.

## CHAPTER 3

### SUBSISTENCE, ENVIRONMENT AND THE VILLAGE ECONOMY

The traditional inhabitants of the Upper Bulolo and Upper Watut Valleys, the Biangai and the Watut, are primarily dependent on subsistence agriculture and the production of coffee for sale. A small number of Biangai villagers generate extra income through alluvial mining and two families run cattle projects. Watut villagers tend to do more alluvial mining if they have access to gold bearing creeks but few look after livestock. An exception is Guyo Saweo, who has recently started looking after sheep (Figure 13).



**Figure 13 A village sheep project in the Upper Watut.**

The Watut live as swidden (slash-and-burn) gardeners in a mid- to upper-montane rainforest environment (1000-2000m), still have a very comprehensive ethno-pharmacological knowledge and, at least in former times, had a heavy usage of bush resources. Few families include store bought foods in daily meals. Their population density ranges from about 2.0/sq.km in the Nauti area to perhaps 20.0/sq.km in localised parts of Slate Creek.

The Biangai villages of Winima, Elauru and Werewere are located at ecotones between open grassland and rainforest; Wandumi, Biawen, Kaisenik and Kwembu have relocated to valley bottom locations and, while their gardening systems are similar, travel times to

forest edge gardens are longer. Many families in the latter group, who often have one or more members employed in town, now include store bought foods in daily meals.

The agricultural systems of the two areas are distinctive and have recently been described by the Department of Agriculture and Livestock, and ANU and UPNG geographers (Bourke et al. 1997). In this analysis 'systems' are classified nationally on the basis of similar environmental parameters, population density and gardening techniques; the relevant systems in the vicinity of the project are listed in Table 10.

<b>System</b>	<b>Villages included</b>	<b>Characteristics</b>
26	Nauti, Minava, Tontomea, Yokua	Long fallow swidden, sweet potato dominant. Alt: 600-1800m
29	Akikanda, Manki	Shorter fallow swidden, sweet potato dominant. Alt: 900-2000m
32	Cliffside, Askai Wandumi	Short fallow, mounded sweet potato in alluvial gold areas. Alt: 500-700m
35	Elauru, Werewere, Winima	Yams + sweetpotato. Alt: 1000-1800m
36	Nemnem, Wau Settlements	Short fallow, sweetpotato and mixed crops. Alt: 1000-1100m
37	Biawen, Kaisenik, Kwembu	Yams + sweetpotato. Alt: 900-1000m

**Table 10 Agricultural systems in the Wau and Bulolo area**

Notes: Villages are Census Units in the 1980 and 1990 national censuses.

Source: Bourke et al. 1997.

### **Watut agricultural systems**

The villages of the Upper Watut are classed into two groups: those from Yokua southwards into the virgin bush of the Upper Watut, where population density is low (4 persons/sq.km) and fallow periods typically greater than 15 years (system 26), and those of Slate Creek with a higher population density (34 persons/sq.km) and a consequent shorter, 5-15 year fallow period (system 29). According to Bourke et al., there have been few changes in the shorter fallow system for 35 years and in the longer fallow system for over 60 years, indicating stability in the coverage of woody regrowth and forest.

Neither system uses sweet potato mounding, soil retention techniques, mulching, or drainage. Two plantings of sweet potato are made before gardens are allowed to revert to bush. Gardens are unfenced because few pigs are kept: the pig-household ratio is seldom as low as this anywhere in Papua New Guinea (Table 11). In this table, two individuals have been isolated because of their departure from the norm. Pengo Tumotungo gave a figure for 17 pigs in the July 2000 household survey; he is a traditionalist but why he keeps so many more pigs than others is unknown at present. The other exception is a Siassi man at Kaumanga; pig husbandry is a prominent feature of Siassi culture.

These low numbers of pigs are traditional. The Watut social system generates no great need for pigs, because exchange transactions are of little importance (in great contrast to many places in the country).

Village	Households	Pigs	Pigs / household
Akikanda	38	2	0.05
Kaumanga	10	5	0.50
Minava	27	1	0.04
Nauti	59	2	0.03
Yokua	34	3	0.01
Pengo Tumotungo*	1	17	17.00
Abel Timmon§	1	5	5.00

**Table 11 Pig husbandry in Watut villages (Source: D. King survey, July 2000).**

Notes: \* unusual traditionalist at Yokua § Siassi man at Kaumanga.

In the 1982-83 National Nutrition Survey, 50 families in four villages in system 26 and 68 families from 3 villages in system 29 were asked what they eaten the previous day (the villages were probably in the Menyama District). All reported eating sweet potato, 4-7 per cent said *Xanthosoma taro*, 3-4 per cent said taro, 1-6 per cent said banana, 0-13 percent said rice.

Village	Households	Expenditure on food last fortnight	Exp. / household
Akikanda	38	K355	K9.34
Kaumanga	10	K40	K4.00
Minava	27	K417	K15.44
Nauti *	58	K1 706	K29.41
Yokua	35	K532	K15.65
<b>All</b>	<b>168</b>	<b>K3 050</b>	<b>K18.15</b>

**Table 12 Expenditure on store foods in Watut villages (Source: D. King survey, July 2000).**

Notes: \* omits one householder reporting K1600 expenditure on food (?).

The balance of traditional foods is probably the same in Watut villages, but 174 householders surveyed in July 2000 reported that they now make consistent use of store foods with average purchases of K18 per fortnight. (To give an idea of costs, a 10kg rice bag cost about K16 during 2000.)

#### *Village cash incomes*

Arabica coffee was introduced into the area during the 1960s and this remains the mainstay of household incomes. Exact figures for annual coffee sales are not available; *reported* sales are as shown in Table 13. These should be taken as a guide only, as some

qualification must be made for the accuracy of recall, and whether amounts given by particular householders relate to the last year or simply the last sale. Nonetheless, the reported mean sales of K331 a year/household is probably about right. (Households averaged 4.9 persons in this survey.)

Village	Households	Coffee sales in last year	Sales / household
Akikanda	38	K6 638	K174.68
Kaumanga	10	K3 839	K383.90
Minava	27	K9 702	K359.33
Nauti *	59	K26 693	K452.42
Yokua	35	K9 122	K260.63
<b>All</b>	<b>168</b>	<b>K55 994</b>	<b>K331.33</b>

**Table 13 Approximate annual income from coffee sales in Watut villages**  
(Source: D. King survey, July 2000).

Additional sources of cash were less reliably reported to King's survey team. At Nauti three men said they had received a total of K3980 from timber royalties, while one man said he received K1250 from tribute miners on his land. Another received K300 for land rent at Heyu.

Savings were held by only 16 of the 168 families. Only four had businesses: two tradestores at Akikanda and two at Kaumanga.

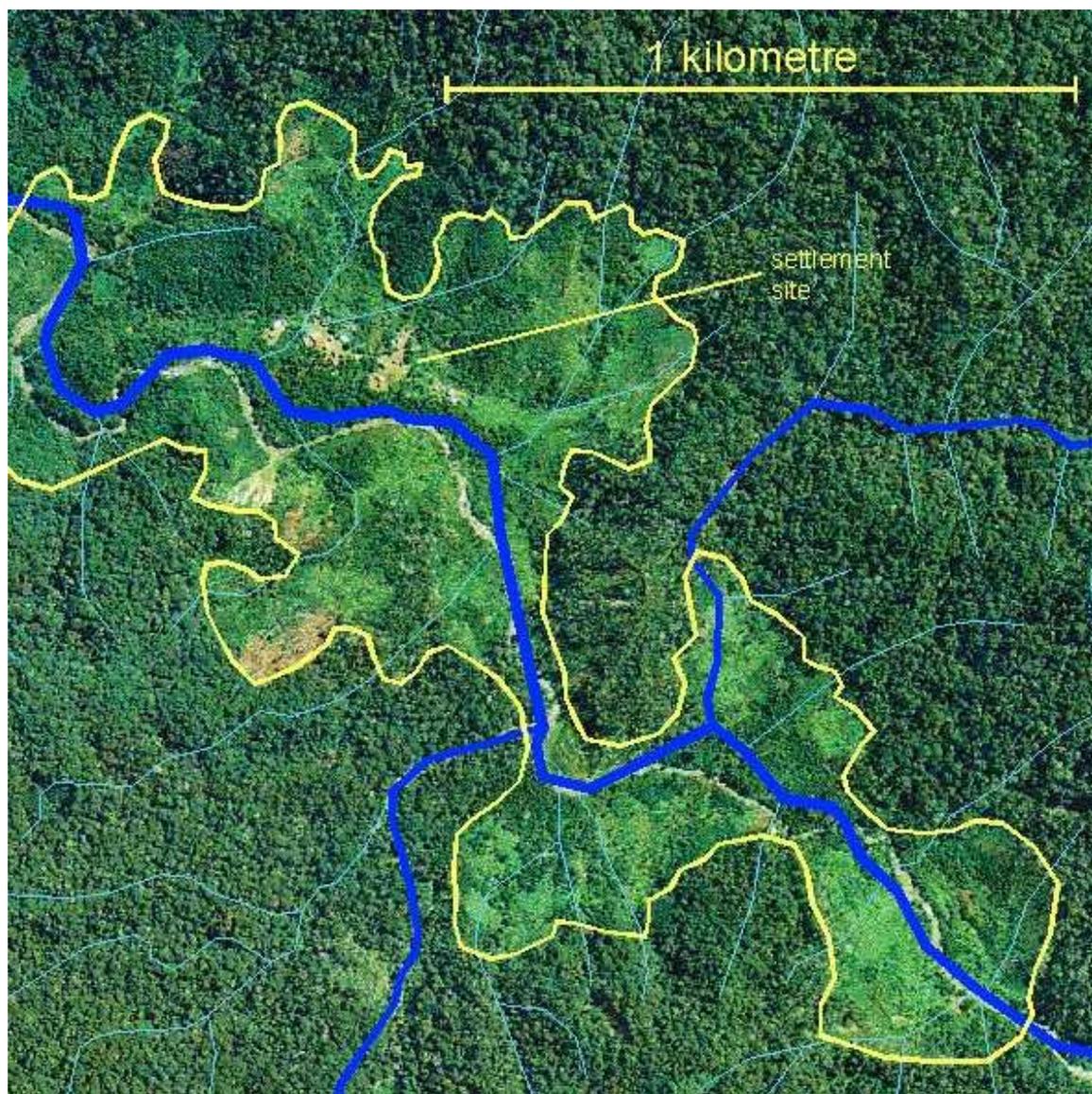
#### *Behaviour in response to social and environmental changes*

The two Watut agricultural systems are very similar, differing only in the length of fallow, the density of population and the amount of forest cover adjacent to villages. Households at four of the villages said their gardens were located about 40 minutes walking time away; at Akikanda the reported average was 60 minutes. It is not suggested here that this measure is very precise, because the actual garden locations were not mapped, but it confirms a picture of a central village having its usable parcels of land spread out in a zone of secondary forest around it, draped across the topography and extending out about 3km at its furthest points. In actual fact, the permanence of contemporary villages means that their populations have grown rather too big for the bush zone around them to sustain according to the system they 'ought' to be classified in. Thus it is likely that the supposedly longer fallows in system 26 have already shortened to be more or less identical to those in system 29.

As an example, the residents of Hikinangowe settlement, with a population 81 in 1996, are located in system 29. They are currently cultivating land at distances up to 1.5km from their houses in a ribbon along the Upper Watut River totalling 0.96 sq. km in extent. At a nominal 84 persons/sq. km this is far higher than the reported density of population for the system of 4 persons/sq. km. Why is this?

The problem for these people is that they are not allowed to venture further into the bush because they are not the customary owners. They were allowed to settle here in 1978 to do alluvial mining and may only use the bush close to the settlement; they may not plant coffee. One hypothesis is that the land is *already insufficient* to feed the 16 families there

and that they supplement their diet with store foods, and to buy these as their numbers grow they are having to work ever harder at alluvial mining to raise the cash income to do this.



**Figure 14** Gardened areas around Hikinangowe settlement: the outlined area of 96.3 hectares is in various stages of cultivation or regrowth.

Notes: The Upper Watut River flows from bottom right to top left in this view (MCG aerial photography 2000).

But even if they were the customary owners, only some of the land beyond the boundaries of existing cultivation would be as productive as what has already been used. Outside the valley bottom, steep slopes pose some problems and, with Hikinangowe already at 1720m, potential garden sites much above the settlement are in a cool zone where crop maturation times are significantly longer.

It would seem an obvious question to ask them what their incomes are and to work out how much of the diet comes from the gardens and how much from trade store purchases. Unfortunately, my visits to Hikinangowe have always taken place in the company of Yatavo men from Nauti to whom they pay tribute; when visiting with M. Blowers and asking about the scale of alluvial mining they downplayed their production to a hard-to-

believe few grams a month. One of the Nauti landowners reported receiving K1250 in tribute from the settlement in 2000.

In this area, neither system 26 or 29 shows a propensity for intensification through technical innovation, such as mounding, the use of soil retention barriers and mulching (as is practiced in similar environments in the highlands at much greater population densities). The response to unfavourable cropping conditions adopted by Watuts is simply relocate to more favourable areas. (Indeed the arrival of the Hikinangowe people from Dumauwa in Aseki may have been just such a move in the first place.)

Bryant Allen comments (pers. comm.) that a wide range of cropping intensities is found in other parts of the Anga area, from very intensive agriculture around Menyamya and Marawaka, to very extensive agriculture along the Eastern Highlands border, meaning that some people in the wider area have been able to intensify with considerable success. However, he also adds, the intensifications, where they occurred, did not take place recently. They reflect long established differences in the farming systems of these areas, noticeable at contact.

As the ecological effects of population growth depend on the capacity of the farming system to accommodate new people through intensification, my characterisation of the Watut systems as intensification-resistant does not bode well for the future. It may seem peripheral to the company's operations to be concerned about this. But if, say, two new settlements of a similar size to Hikinangowe are created in the Upper Watut Valley by Nauti people as a response to land exhaustion around the main village, and augmented by immigrants they themselves have individually invited, at a later date they will be bound to complain of a loss of well-being as what they remember as untouched forest, well-stocked with game and bush products, is progressively converted into environmentally depleted secondary regrowth.

It is therefore highly undesirable that the company's activities *unwittingly* promote the formation of new settlements between Nauti village and Hidden Valley. I suggest several mechanisms by means of which this may happen:

- better access to the Upper Valley from the Bulldog access road may facilitate the creation of satellite settlements;
- an increase in foot traffic because of mine operation at Hidden Valley is likely to lead to damage from bush fires (indeed many square kilometres of bush were accidentally burnt out during the 1997 El Nino drought);
- employment policies currently allow the recruitment of Watuts from distant villages who are the relations of Nauti landowners; this may attract their families to settle at Nauti or at Nauti satellite settlements.

The means of prevention lies in coming to an understanding with the Nauti people to police this themselves (→ *Recommendation 43* → *Recommendation 44*).

### **Biangai agricultural systems**

Sweet potato is also the dominant crop in agricultural systems 35 and 37, to the south of Wau and used by the Biangai. Yam (*D. alata*), however, is a subdominant crop planted in October for harvesting in July/August the next year and this also characteristic of Biaru and the Waria Valley.

The Biangai emphasise the cultural importance of yam planting and can, at some villages, be seen planting yam at sites of cultural significance, such as abandoned settlements in the vicinity of Werewere and Elauru. Bourke et al. (1997:132) draw attention to special practices, such as at Werewere ‘smoking’ the growing yams by lighting fires within the garden; Ngawae Mitio confirms this (pers. comm.).

Village	Households	Pigs	Pigs / household
Kwembu	39	7	0.18
Winima	47	3	0.06

**Table 14 Pig husbandry in Biangai villages (Source: D. King survey, July 2000).**

The mosaic of grassland and forest in the Biangai area means that gardens are generally cut from woody regrowth. Crops are ideally planted in sequence with sweet potatoes planted some months after yams, and peanuts interplanted with yams, which are staked. Fenced yam gardens can be made, in suitable conditions, in grassland adjacent to settlements. Few households keep pigs (Table 14).

In the 1982/83 National Nutrition Survey, eight families from one village in system 37 were asked what they had eaten the previous day. (It is probable that the village was Kwembu, Kaisenik or Biawen.) All reported eating sweet potato, 25 per cent said yam, 75 per cent said rice. None of the households had consumed banana, cassava, Chinese taro or taro.

#### *Village cash incomes*

Coffee is the principal source of village-based income for Biangai families (Table 15). These are significantly higher than seen in the Watut and in the first place probably reflect better access to agricultural extension services and proximity to market more than any greater amount of land under cash cropping.

Village	Households	Coffee sales in last year	Sales / household
Kwembu	39	K22 762	K583.64
Winima	47	K24 734	K526.26
<b>All</b>	<b>86</b>	<b>K47 496</b>	<b>K552.28</b>

**Table 15 Approximate annual income from coffee sales in Biangai villages (Source: D. King survey, July 2000).**

In the second place, Kwembu people, notably, have let several settlements of Kapau River migrants onto their land who pay tribute to them in the form of coffee bags. One Kwembu man reported an income of K5000 in 2000 from coffee; this is unlikely from his own efforts, but it is a feasible amount if this included settler contributions. (I have seen three tonnes of coffee stored in a house at Kwembu in the past.)

Biangai households have a comparatively wide range of business interests: small stores, lawn mowing businesses (in Wau), vegetables sales, kerosene sales and chicken projects. Many households include wage and salary earners and the majority have some savings: 25 Kwembu households had average savings of K760 and 23 Winima households had an average of K915.

All in all, these villages are much more affluent than their Watut counterparts.

#### *Behaviour in response to social and environmental changes*

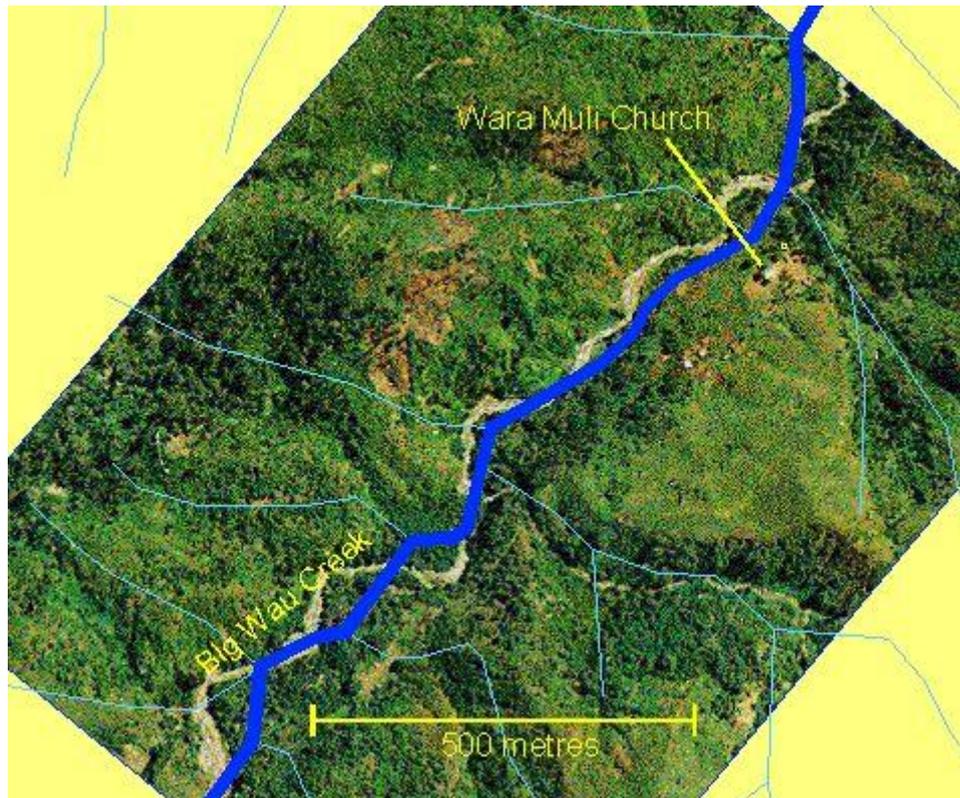
The people of all the Biangai villages have been living in daily contact with both the urban businesses of Wau town and the pastoral and coffee interests of the originally European-run plantations since before WWII. Both Kwembu and Winima villagers started cattle projects in the 1960s when some, for example Levi Inani who has his own brand, went for training at Erap in the Markham Valley. Any discussion of the effects of social change on Biangai subsistence, therefore, are not a matter of speculation about the future, but of what has already taken place. The main development is that the Biangai devote much less time to gardening today than they would have done in former times, because of their wide range of daily activities. Families in the villages closest to town have probably had a high consumption of store foods for at least a generation.

In response to increased population, it is arguable their agricultural system has not been intensified but *disintensified*. A key factor is that the Biangai threw themselves into education from immediately after WWII with the opening of schools at Wandumi (now closed) and Kaisenik, so that it is possible that even with a greater population Biangai gardens are fewer and smaller than they once would have been, because the Biangai have turned to the opportunities of the town and the jobs they are able to take up by virtue of their comparatively high levels of education.

The Hidden Valley project has already provided steady employment for some Kwembu and Winima people. If the next decade sees full time work for many more, agricultural activities may be expected to maintain a cultural importance in village life, but in reality to dwindle as a contributor to daily nutritional needs.

#### **Settler agricultural systems**

The remaining systems of the Wau and Bulolo area, the ones occupied by recent settlers, are organised in a completely different way. Settlers are constrained to utilise only the land they have been granted by the State, in the case of the Kobiak and Nemnem small-holder agricultural leases, or village landowners in the case of settlements on customary land. This means that if the land degrades, they cannot infinitely extend their boundaries of cultivation into virgin forest, leaving their exhausted land to rest. On the contrary they must either abandon their settlements entirely or remain where they are and seek alternative methods of gaining income.



**Figure 15** Typical settlement environment of scattered forest remnants, grassland and woody regrowth at Wara Muli settlement in Big Wau Creek  
(MCG aerial photography 2000)

Alluvial gold is the dominant source of cash income for settlers, at Edie Creek, in the Namie/Koranga area, along Little Wau Creek, in the Sandy and Bamboo Creek areas, or along the Bulolo River below its junction with Little Wau Creek. Details on this are given by M. Blowers elsewhere.

Agricultural practices<sup>12</sup> in system 32 are described by Bourke et al. (1997) as being 'highly variable', but are all characterised by short to medium (~5-15 year) fallow periods. Sweet potato is the dominant crop with banana as a subdominant crop on river terraces. Migrant cultural preferences also alter crop importance. Thus Sepik migrants plant more yams and Madang migrants plant more taro. This system extends past Bulolo and fish appears as a contributor to the diet for the first time.

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<sup>12</sup> System 36 is poorly described for this area even though many Wau settlements are classed as belonging to it.



**Figure 16 Kunimaipa settlers at Wara Muli settlement; they pay land rent to a family at Kwembu village. Few children attend Wau schools on a consistent basis.**  
 (A small dot marks this house adjacent to Wara Muli church in Figure 15).

In the 1982/83 National Nutrition Survey, 20 families from one village were asked what they had eaten the previous day. Ninety-five per cent said sweet potato, 30 per cent banana, 30 per cent taro, 20 per cent yam, 15 per cent Chinese taro, 5 per cent cassava. Seventy-five per cent had eaten rice and 10 per cent had eaten fish.

*Behaviour in response to social and environmental changes*

The settlers have already degraded their environment. The entirety of Big Wau Creek was under primary forest in the 1950s but has now been cleared as far upstream as Wara Muli settlement. As this is located at only 1380m, there is no altitudinal reason why new settlements should not be opened up all the way up the catchment and this may be expected to be the trend if measures to restrict them are not taken.

The key is the manner in which Biangai, notably Kwembu, landowners cooperate with one another in the future to limit encroachment on new land. Families at 'permitted settlements' pay rent to Kwembu families for the right to remain where they are without interference. The possibility of obtaining similar payments are an attractive incentive for particular landowners to let new migrants in, despite the fact that the general feeling at Kwembu is to limit migrants.

When migrants do not obtain permission, a strong reaction can ensue. The Biangai are expert litigants and in 2000 secured an eviction notice against a large religious community at 2100m altitude in the Little Wau headwaters known as 'Samuel's Camp' or 'Sotkat Mission'. When the occupants did not move voluntarily, Kwembu youths 'assisted' local authorities in burning down the approximately forty houses.



**Figure 17** 'Samuel's Camp' in the headwaters of Little Wau Creek, 1997.



**Figure 18** 'Samuel's Camp' after being burnt down in July 2000.

The location of waste dumps at the head of Big Wau Creek and the company's usage of the Bulldog access road from Edie Creek means that care is required to ensure that forest clearance brought about by the agricultural activities of settlers is not accelerated or exacerbated by its activities (→ *Recommendation 45*).

## **Subsistence agriculture summary**

Three broad agricultural systems exist in the project area and each responds in a different way to demographic stress. In summary:

- Watut subsistence farmers probably already live in villages that are too big to support sustainable agriculture using traditional methods but they solve this by either (a) establishing satellite settlements on their own land or that of relatives at greater than regular walking distance from existing villages or (b) staying at home and seeking ways to generate extra cash income;
- Biangai subsistence agriculture is diminishing in importance as a contribution to diet; many families have small business interests in and around Wau and/or incorporate wage and salary earners;
- Settler agriculture is constrained by a limited ability to gain access to more land and garden areas are probably already at the limit of their productivity using current methods; settlers can only respond to demographic stress by working harder at cash earning activities.

The potential for further environmental degradation is great in the Watut and settler systems given current cultivation techniques. Fortunately, government agencies like NARI and the DAL are keen to impart new knowledge about soil conservation and better cropping techniques that can significantly improve land management (→ *Recommendation 46*).

Failure to address these matters does constitute a danger to the project's overall environmental impact. The worst outcome would be for a mining operation with minimal environmental emissions from the leases, but whose presence unwittingly promoted the formation of a deforested zone immediately outside them (→ *Recommendation 47*).

## **Village development and the cash economy**

*King's household surveys, 1993 and 2000*

David King of the University of Townsville conducted a survey of village households in July 2000, with the aid of four students in Communication for Development on work experience; this followed up an earlier survey he had conducted in 1993 (King 1994, 2001). None of the villages that the company deals with are affluent; some are very poor; some have very serious health problems (as discussed in Chapter 4). King used various indicator items, as well as trying to record householders' cash incomes and savings. A shortcoming is that he did not clearly enough distinguish village households from households from the villages living in town. Nevertheless, some basic comparisons can be made between 1993 and 2000, and among the different places.

In terms of basic possessions (Table 16), few village householders owned any furniture; their movable goods are limited to things like radios, sewing machines, a lawn mower or two (used to keep the village clean), and coffee pulpers (the last three augmented by many purchases from CRA's village budget money between 1992 and 1996).

Item	Winima	Kwembu	Nauti	Minava	Akikanda	Yokua
Flush toilet*	5	5	-	-	1	-
Internal shower*	5	5	-	-	1	-
Electric or gas stove*	3	7	-	-	1	-
Refrigerator*	4	4	-	-	1	-
Washing machine*	1	2	-	-	2	-
Television*	4	5	-	-	1	-
Car or truck	3	5	1	-	-	-
Lawn mower†	1	-	-	-	1	-
Sewing machine†	15	18	24	3	4	7
Radio	21	19	20	5	9	15
Bank passbook	33	38	30	14	8	17
Coffee pulper †§	many	many	many	many	many	many
<b>Total no. of households</b>	<b>51</b>	<b>44</b>	<b>60</b>	<b>27</b>	<b>45</b>	<b>46</b>

**Table 16 Ownership of indicator items, July 2000.**

Source: King 2001:Tables 5.1-5.6. Notes: not all households responded to each question, but ‘no response’ answers usually means the item was not present. \* These items in village households living in town; † items acquired from CRA budget money; § coffee pulpers were not included in the survey, but villagers mentioned them as important.



**Figure 19 Coffee pulpers and lawn mower purchased from CRA village budget money, Minava, 1993.**

The comparison between villages is that Kwembu and Winima not only have quite well-off town-dwelling households—though some live in MCG-provided company houses and do not own the appliances listed—they also have absolutely more basic possessions like

sewing machines (or since acquiring them, have retained them) than the Watut villages Nauti, Minava, Akikanda and Yokua.<sup>13</sup>

Item	Winima	Kwembu	Nauti	Minava	Akikanda	Yokua
Mean earnings from coffee 2000	K527	K596	K468	K388	K184	K324
Mean earnings from coffee 1993	K254	K287	K443	K602	K104	K329
Coffee earnings, 1993, CPI adjusted,	K532	K601	K927	K1260	K218	K689
Total passbook savings 2000	K426	K371	K138	K379	K53	K147
<b>Total no. of households</b>	<b>51</b>	<b>44</b>	<b>60</b>	<b>27</b>	<b>45</b>	<b>46</b>

**Table 17 Cash crop earnings and passbook savings, November 1993 and July 2000.**

Source: King 2001:Tables 10.1-10.6. Notes: CPI index multiplication factor 1993-2000 of 2.09 (Bank of Papua New Guinea 2000: Table: 10.3) Coffee price differences not taken into account

### *Cash incomes and savings*

Greater differences are shown in the usage of cash (Table 17). The main source of income in both areas was coffee. In 1993, the Watut villages reported rather greater earnings than Kwembu and Winima, but in 2000 the position was reversed with these two villages having approximately doubled their sales. However, since K1.00 at the end of 1993 was worth about K2.09 in July 2000, there has actually been a *decline* in the value of sales: it was slight for Biangai growers but sales by Watut growers have slumped.

We are unable to compare savings between the two surveys, and 'passbook savings' is not necessarily a good measure of how well off people are; nonetheless, most families do have bank accounts and appear able to keep some money in reserve.<sup>14</sup>

### *Trade stores and businesses*

Few villagers owned a trade store in 1993: Winima 3, Kwembu none, Nauti 1, Akikanda 2, Yokua/Minava/Kaumanga 3. Data were not collected in quite the same way in 2000, but overall there has been little change: Winima 1, Kwembu none, Nauti none, Minava 1, Akikanda none, Yokua/Kaumanga 2.

<sup>13</sup> In the tables, Yokua includes households at the small adjacent village of Kaumanga.

<sup>14</sup> One not necessarily reliable informant told King's interviewers he had many thousands of kina in shares, and some town-dwelling families had much greater savings than the mean.



**Figure 20** Village trade store at Minava.

*The 'CRA Goodwill Money'*

When CRA announced its decision to quit the project in 1996, the four spokesmen for the Hidden Valley landowners resurrected their 1988 claim for K4 million in compensation (see Volume I), following the logic that if the company would recoup its investment, the landowners were entitled to some recompense for having hosted the company on their land for more than ten years.



**Figure 21** Signing of the CRA 'Goodwill' MOU, 1997  
L to R: Nelson Hungabos, Lenny Semiriong, Peter Askai, Ben Joseph.

CRA management decided, on the grounds of fostering the 'goodwill' with which it hoped to sell the company, to make a grant of K200,000 for the purpose of village

development projects, to be shared between the five villages it had been dealing with: Winima, Kwembu, Nauti, Minava and Akikanda (Yokua being classed under Akikanda).

The MOU negotiated to handle the grant, and the expenditure of the money, highlight the deeply entrenched problems that surround all aspects of village development and collective action at community level. The MOU allocated K120,000 of the money to villages and divided among five sectors: roads, electricity supply from mini-hydro schemes, water supply, youth/sports assistance, and health. This was to be 'allocated and shared equally between the five villages'. This would imply that Kwembu, Winima, Nauti, Minava, Akikanda would each receive K24,000.

The four major spokesmen were to share K40,000 'in recognition for their time, effort and perseverance' in representing their people since 1987, and smaller amounts were put towards ensuring continuity in CRA's liaison programmes during the transitional period to a new exploration company (whose identity was not clear at that stage).

<b>Item</b>	<b>Allocation</b>
Kwembu, Winima, Nauti, Minava, Akikanda	K120,000
Four spokesmen	K40,000
Education fees 1997	K10,000
Landowner office, Wau	K30,000
<b>Total</b>	<b>K200,000</b>

**Table 18 Breakdown of 'Goodwill Money'**

Source: CRA Minerals and others (1997).

The spokesmen drew about K25,000 of their allocations straight away, distributing part to village leaders. The five villages spent K2000 each on school fees, covering the shortfall that occurred at the beginning of 1997 when Australian Gold Fields had not yet taken control of the project. A major purchase was K30,000 for a disused service station and house at Wau, from the budget line represented in the agreement as a 'landowner office'. (The Nakuwi Association did open an office in 2000, but it was in an annex of the District Office at Wau, and it was given different grants by the provincial government and MCG to do this. The current ownership and usage of the service station is not clear at the present time).

Apart from these initial outgoings, the village groups have found it very difficult to comply with the requirements for making further disbursements. The account containing the remainder of the money has three signatories: the Bulolo District Manager, MCG's Liaison Manager and an official of the Morobe Provincial Administration. The villagers have been unable to agree on any of the community projects and are some distance from showing that they are likely to fulfil the kinds of conditions spelled out in the MOU:

The people undertake to provide contributions in kind to assist in the implementation process of the project described above. These contributions include providing access to project implementors, labour for the implementation of the projects, hospitality including accommodation and food for implementors, transport and all other forms of assistance necessary for the successful implementation of the projects (CRA Minerals and others 1997: 3).

Some of the categories, for example mini-hydro, are understandably technical and require inputs from specialists. Spending on roads requires matching support from local

government to make any efforts worthwhile and this has been slow in coming; Nauti's road money was spent in patching its existing access via Bulolo forestry but only in 2000 did the provincial government's Works engineer and other officials walk a new and more satisfactory route from Nauti to Nauti Bridge, approximately 6 km distant.

But instead of general support to hasten these projects along,<sup>15</sup> and follow-up action from the spokesmen, individuals or family groups have come forward with unformed business proposals (that is, proposals that have not been worked up to any extent, perhaps with the assistance of the Business Development Officer) and requests for advances to buy or repair personal vehicles. Since the MOU clearly intended for community projects to be funded, further action has been deferred.

Village	Category	Allocation	Spent	Balance
Nauti	Road maintenance	K8000	K6984	K1016
	Mini hydro	K8000	-	K8000
	Water supply	K6000	-	K6000
	Youth/sports	K2000	K1000	K1000
<b>Total</b>		K24,000	K7984	K16,016

**Table 19 Nauti 'Goodwill Money' expenditure to January 1999**

Source: MCG files.

Table 19 shows disbursements for Nauti up to January 1999 after which the balance was transferred to an interest bearing account; the underspend is similar in the other four villages. In the meantime, the balance of the money has depreciated in value and cannot buy what it could have done in 1997-98.

No very profound conclusions can be drawn from this story, except that if village development was an easy matter in rural Papua New Guinea, it would have occurred a long time ago. In reality, all the villages that MCG deals with, whether Watut or Biangai, have deep-seated, culturally-mediated ways of defining relations among villagers that hamper progress in community development, *in addition to their lack of resources and skills*.

As various parties to the Development Forum may make well request commitments to community development, a much better capacity for planning and implementation than the company has had previously is identified as being necessary to made real gains in this area (→ *Recommendation 48*).

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<sup>15</sup> On the subject of 'labour ... hospitality ... accommodation and food', there were complaints at Nauti in 1995 that Liaison visitors were sleeping in the 'wrong' people's houses. CRA responded by asking the villagers to build a guest house, at which it would pay to stay in. After a long delay, CRA built its own house (at a cost inflated by the villagers), and this was able to be used in 1996. In 2000, during D. King's household survey, the company's guest house was now occupied by a Nauti householder (and complaints were again made about the survey team staying in a family house).

## CHAPTER 4

### RURAL HEALTH SERVICES

#### **Introduction**

The health situation in the Bulolo District is representative of many places in rural Papua New Guinea. That is, the institutions charged with the delivery of health services can do a passable job in very standard areas like obstetrics, minor trauma, and non-life threatening infections. However, outreach to the villages is constrained by real and humanly manufactured shortages of resources, the physical infrastructure is run down, and cases of any complexity are referred to a base hospital, in this case Angau Memorial Hospital in Lae.

This chapter attempts to show how the system works, by examining extant reports of health patrols, awareness programmes and the like, and by presenting demographic analysis of data from the company's Community Express database.

#### *Establishments*

The primary institutions in the area are Health Centres at Wau and Bulolo, both government institutions coming under the provincial Division of Health. The senior staff position is the District Health Administrator in Bulolo, who is a Health Extension Officer (HEO); an HEO should also be stationed at Wau, but in reality a senior Nursing Officer is designated as Sister-in-Charge. Bulolo also has pathology staff and the facilities to do blood slides and some other blood tests. Samples for more advanced pathology testing, such as for Hepatitis B and HIV, can be taken at Bulolo but are sent to Port Moresby for analysis. Special programme staff may also exist for specific period of time: for example, in malaria control, mother-child welfare, 'primary health care drives', or HIV-AIDS awareness. Such programmes may originate with the national Department of Health, sometimes with AusAID or other donor funding, but the point of co-ordination in all cases is the Division of Health in Lae.

Each health centre services a network of rural Aid Posts, staffed by Community Health Workers (CHWs),<sup>16</sup> and runs health patrols to villages and settlements. The current status of Wau and Watut Aid Posts is as shown in Table 20 and Table 21. Mainyanda Aid Post has recently been upgraded to Health SubCentre status. The company has files<sup>17</sup> documenting its involvement in health issues back to 1991. The files show that both places have been quite active in using mobile clinics to visit the villages and settlements in those parts of their catchment areas that can be reached by road and do not require overnight stays.

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<sup>16</sup> The Community Health Worker was formerly known by the term Aid Post Orderly (APO).

<sup>17</sup> Susy Bonnell and I requested access to Health Centre files, but very little documentation was forthcoming. Since government memos were copied to the company when joint patrols were mounted, the company files may be more complete.

Where	Staff	Comments
Wau Health Centre	Sr. Kokoya Kebaby (NO)	Visit 25/5/99 by S. Bonnell: problems included 2 HEO positions vacant, the MCH sister on furlough, lab technician(s) retrenched, lack of drugs (haven't had contraceptives for ages), no visits to aid posts, no health patrols, very, very low staff morale.
Kaisenik AP	Sr. Liu Yamu, since 1991.	Visit 1/6/99 by S. Bonnell: proximity to town means better assistance; drugs and supplies were delivered during visit; no contraceptives.
Biawen AP	Kuranu George (CHW, trained Lae School of Nursing), since 1987.	Visit 1/6/99 by S. Bonnell: CHW seeing 15-20 cases/day, mostly malaria and dressings. Twenty women registered for family planning. Only one MCH clinic Jan-Jun 1999. Nil stock or short supply most drugs: amoxycylin, primaquine, contraceptives.
Samuna AP	Don Purumo (CHW, trained Finschhafen), from April 1998.	Visit 31/5/99 by S. Bonnell: CHW seeing ~60 cases/day, mostly malaria, pneumonia, common cold, sores and ulcers. Three outpatient T.B. cases being treated. Nil stock at time of visit of amoxycylin, septrin, primaquine, benedryl, contraceptives (except for out-of-date microlut), bednets. Had never had a visit from HEO, APS or District Health Administrator. Has to walk to town to obtain supplies. Visited again 29/10/99: drug situation improved.
Wandumi AP	Peter Kolok	No assessment visit.

**Table 20 Health institutions at Wau and in Biangai villages.**

Where	Staff	Comments
Bulolo Health Centre	Sr. Rose Bosimbi (NO)	Visit 28/5/99 by S. Bonnell: by contrast with Wau at same time, a very impressive clinic; drugs, contraceptives available; good record-keeping system.
Mainyanda Health SubCentre	Sr. Nama Orebut* (NO)	AP Upgraded to Health SubCentre status in ?1998.
Nauti No. 2 AP		Casual visit by J. Burton, 1997: limited capabilities.
Menhi AP		No assessment visit.
Hawata AP		Casual visit by J. Burton, 1997: limited capabilities.
Andarola AP		No assessment visit.

**Table 21 Health institutions at Bulolo and in Watut villages.**

Notes: \* transferred out of District, 2001

The next two sections give details of extension work carried out from Wau and Bulolo Health Centres into the Biangai and Watut areas over the past decade.

### **General health outreach from Wau Health Centre**

#### *'Primary health care drive' at Wau, 1991*

From 5 September 1991 to 24 November 1991, a report on file details a 'primary health care drive' by the Wau Health Centre. Hidden Valley Gold provided assistance by buying drugs and either making a vehicle available or hiring one. The villages visited were:

Kwembu/Kaisenik/Kaisenik School (three times), Elauru (twice), Werewere (twice), and Winima (twice). The settlements visited were: Maus Koranga (three times), Four Mile, Nemnem, Mt. Kaindi. Each received its first visit in September 1991; second visits were in October 1991; third visits were in November 1991.

However, to the 15 successful patrols must be added 8 that were cancelled. The reasons highlight the ‘situational difficulties’ holding back health improvement (Table 22). Except in the case of Regina Community School, which was never visited, the cancelled patrols were those scheduled in the second and third months.

The ‘Health Drive’ was obviously worth doing but observe the decline in its achievements over time:

- 1<sup>st</sup> month: 8 patrols out of 9 successful
- 2<sup>nd</sup> month: 5 patrols out of 8 successful
- 3<sup>rd</sup> month: 2 patrols out of 5 successful

This tells me that staff know it is their professional duty to maximise the amount of time they spend in the bush, and that they do respond enthusiastically when assistance is provided—at first. But as time goes by, reality catches up, fewer patrols are planned, more are put off, and staff do not try so hard to overcome the local difficulties that are always present.

Date	Destination	Why cancelled
26/9/1991	Regina Community School	School holidays.
23/10/91	Nemnem	Law and order. ‘Eye catching of some unknown people by villagers.’
28/10/91	Four Mile	No staff available.
29/10/91	Mt Kaindi	Law and order. Rumours of planned hold-up.
31/10/91	Regina Community School	Teachers and students attending School Cultural Carnival at Wau Oval.
12/11/91	Elauru	Health staff went to Wau Community School instead.
14/11/91	Werewere	No drugs in stock.
20/11/91	Nemnem	Landslide cut the access road.

**Table 22 Problems that medical patrols faced in the Wau area, 1991.**

*Malaria control in Biangai villages 1994-1996*

Malaria control in the Wau area, using awareness patrols and the distribution of bed nets, is documented from 1993. In this year, HVG purchased 233 nets at K3.00 each and donated them to the Regional Disease Control Unit in Lae, and it may have been these nets that were then distributed to Kwembu and Winima villagers in early 1994 (another 50 were donated in 1996).

The Division of Health ran a malaria awareness campaign over a two-week period in September and October of 1994. Each of the Biangai villages was visited, the Wandumi Forestry Station, and the settlements at Kapin and Wau Ecology. At each place between 100 and 400 people attended. The staff who participated were as follows:

Who	What	Topic covered
Wesley Boti	District Malaria Supervisor	'Malaria and you', the malaria parasite, bednetting.
John Akusong or Garanu George or Joel Yanduk	CHW	Hygiene, signs and symptoms of malaria.
Rapheal Yuijim	Laboratory Technician	Recording of patients.

**Table 23 Malaria awareness campaign, Biangai Census Division, 1994.**

Source: Wesley Boti 14 October 1994.

The meetings were held at night and videos accompanied the talks given by the health staff. HVG helped with fuel for the generator and HVG and the District Secretary provided transport to the various venues. The elaborate nature of this awareness programme should be explained; it is simplistic to assume that handing out bed nets will improve village health. A successful programme must be accompanied by repeated health messages and there must be substantial follow-up to re-treat the nets every six months or so. In practice, this is not within the capabilities of the health services with current resources. Follow-up did occur with one cycle of retreatment taking place in April 1996 (Wesley Boti 21 March 1996). On the other hand, HVG found that the organisation of further bed net distributions was too time consuming and there was none after 1994.<sup>18</sup>

During this period, HVG had access to a Community Health Worker, Thomas Henzi, stationed at CRA's Wafi exploration camp. The company used him from time to time to visit the Biangai and Watut landowner villagers. In February 1996, he visited Kwembu to carry out a typhoid survey. Although he found no obvious cases, he says the villagers complaining of sickness appeared to have malaria; blood tests were ordered (Thomas Henzi February 1996).

#### *Company involvement in health programmes after 1996*

A degree of interruption to company programmes occurred when AGF assumed control in 1996. A short-lived attempt was made to combat spleen enlargement at Nauti village, but it had the limited motivation of the need for sufficient recruits—from Nauti village only—to pass pre-employment health checks for the drilling programme at Hamata (see p. 54).

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<sup>18</sup> No bed nets were distributed in Watut villages as the government's awareness campaign was not extended to the area.



**Figure 22** Dr Laki of Tusa Medical Centre measuring a child's spleen at Nauti, 1997.

Under Aurora's management from 1998, MCG has moved to upgrade its capabilities in line with a more comprehensive Health and Safety Policy. Details are given below (see page 60).

### **The health situation in the Upper Watut**

Watut health, on all measures, is much poorer than Biangai health. For this reason, extended treatment will be given here.

Five aid posts serve the main part of the Watut area (Table 25), a catchment so large that walking times from outlying villages are up to 5 hours. Half the people are over an hour away—a time/distance factor that has been shown to coincide with a rapid drop-off in attendance in health studies in other parts of Papua New Guinea.

<b>Aid Post is ..</b>	<b>Population served</b>	<b>Per cent</b>
At village	2701	34.6%
30 minutes away	938	12.0%
One hour away	366	4.7%
Two hours or more away	3805	47.8%
<b>Total</b>	<b>7810</b>	<b>100.0%</b>

**Table 24** Walking distances to Watut Aid Posts (data from Table 25).

Examination of their clinic books<sup>19</sup> shows that many children in the more distant rural areas are first seen by health staff when their mothers bring them to Health Centres,

<sup>19</sup> The Health Department gives the mother—when seen by a health worker—a record book, or *skelbuk* ('weighing book?'), for each baby to record its birthweight and clinic visits for the first years of life.

perhaps several months after they were born, not during the first month and not during MCH patrolling.

Where	Villages served	Walking time
Mainyanda	Mainyanda Community School pop. 200 Alluvial miners pop. 82 Yawaipo pop. 298 Yeiwahawa pop. 136 Manki pop. 412 Society pop. 246 Saksak Camp pop. 79	- - 3 hours 1 hour 2 hours 30 minutes 20 minutes
Nauti No. 2	Nauti No. 2 pop. 408 Nauti No. 1 pop. 320 Kaumanga pop. 303 Minava pop. 226 Elowa Creek pop. 96 Tontomea pop. 150 Yokua pop. 230	- 3 hours 2 hours 2 hours 2 hours 30 minutes 1 hour
Menhi	Menhi pop. 891 Kieto pop. 78 Nemakaneta pop. 210 Hikiawa pop. 563	- 15 minutes 30 minutes 2 hours
Hawata	Hawata pop. 800 Pararoa pop. 175 Akikanda pop. 102 Gumi pop. 230	- 30 minutes 2 hours 4-5 hours
Andarola	Andarola pop. 320 Wil pop. 219 Planghawa pop. 98 Sapanda pop. 938	- 2 hours 3 hours 4 hours

**Table 25 Aid posts in the Watut area, with populations served in 1997.**

Source: Phillip Posanau to Watut Council Manager, 24 July 1997.

A health assessment as part of the Division of Health's Morobe Women and Children Health Project listed the following additional problems in the area: (i) absence of a tradition of midwifery, (ii) poor village and personal hygiene, (iii) the presence of 'strong beliefs and customs or taboos that operate against ... health education', (iv) poor literacy hampering the uptake of new health programmes, (v) girls beginning their child-bearing years too young and then having children too close together—'when they themselves haven't finished growing (less than 12 years old)' (Phillip Posanau to Watut Council Manager, 24 July 1997).

These factors have not materially altered over the past 40 years for which observations are available. For example, the concern expressed above about early marriage echoes the comments of the very first patrol officer to visit the Watut after WWII:

The question of child marriage was brought up and suitable advice was given. It would appear that child marriages are quite the custom, and a marriage is often consummated when the female is about 12 years of age (H.P. Searle Wau PR 2 of 1949/50).

The demographics of the situation are examined elsewhere (my own data do not support the idea of marriage quite so early, but many village girls are indeed having their first child at 14 or 15 years.)

Health staff have been able to do some of the special extension programmes, but only intermittently. For example, Village Birth Attendant courses were held at Mainyanda for women in Watut villages in 1997 and 1999—but not in 1995 or 1998.

#### *Patrols to Watut villages in CRA times*

Company files document a programme of bimonthly medical patrols to four Watut villages that was started in 1993 in an agreement between HVG and the Bulolo Health Centre. The villages of Yokua, Kaumanga, Akikanda and Sapanda were inaccessible by road at that time.<sup>20</sup> Bulolo was to supply drugs, staff and the staff camping allowance of K13/night, while HVG was to look after transport, rations, accommodation in villages, and payments for carriers. Examination of the reports highlights:

- high enthusiasm among Community Health Workers, but their limited ability to diagnose conditions other than malaria, diarrhoea, ‘upper respiratory tract infections’ etc;
- the absence of any reports of deaths, despite a high death rate in the villages;
- the limitations of the patrol method to accurately report rural health problems over a period of time to improve the standards of rural health;
- the failure of the District Health Administrator’s commitment to the programme agreement.

The first patrol in the programme took place 5-8 April 1993 when Yokua, Kaumanga and Sapanda were visited (Table A1; Miti Yamansang April 1993) and Kaumanga, Sapanda and Akikanda 2-6 August 1993 (Table A2; Janet Wau August 1993). On the latter occasion, no statistics were given but the Community Health Worker noted that ‘60-80%’ of the children in the three villages visited were underweight.

The number of immunisations given in August 1993 are an indication that none can have been done prior to this. My figures suggest that the number of children under five at Akikanda in 1993 would have around 24, and 18 immunisations were given there. This many can only mean one thing: that children of all ages were immunised because no patrol had previously brought them vaccines.

These children’s problems were also more severe than could be solved by immunisation alone. My demographic data show that there was probable total of 44 children under 10 years on 6 August 1993, but that seven, or 16%, of them are now dead. (This is not statistically below the mean death rate of children born in Yakaya villages from 1980 of 20.8%.) This is because the children were predominantly at risk from diseases for which there is no vaccination, such as malaria, pneumonia, and immune system depleting conditions such as malnutrition, intestinal parasites and tropical ulcers.

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<sup>20</sup> Yokua is accessible by road. In 1996-97, the member for Bulolo used his electorate funds to build a road from Yokua to Pararoa via Kaumanga, Waikanda, Sapanda and Akikanda. The road was usable in the extremely dry weather of 1997, but has been out of operation since 1998.

Date	Result	Comments
Feb 1993	Ok	First 'combined foot patrol' in programme to Yokua, Kauamanga, Sapanda and Akikanda. Some immunization only.
Apr 1993	Ok	Routine. Some immunization only.
May/June 1993	Ok	Routine. Some immunization only.
Aug 1993	Ok	First mass immunization of all children under five years. Budget for K13/night staff camping allowances exhausted.
Oct 1993	Ok	Routine. Camping allowances paid by HVG from this point on.
Dec 1993	Cancelled	Staff went on patrol to Yamap area.
Jan 1994	Cancelled	Bulolo Health Centre staff still on Christmas leave or attending courses.
Apr 1994	Ok	Aid Post Supervisor and X-ray assistant went instead of full complement of CHWs. However, OIC 'did not budget for the patrol'.
Jun 1994	Ok	OIC 'not aware of this patrol'. Drug order supplied by HVG.
Aug 1994	Ok	Routine.
Oct 1994	Ok	Routine.
Dec 1994	Cancelled	No funds/cancelled by Bulolo Health Centre.

**Table 26 Medical patrols to Watut villages jointly conducted by HVG and Bulolo Health Centre in 1993-94.**

Yokua, Kaumanga, Sapanda and Akikanda were visited again 5-8 April 1994 (Mon Kelly 10 April 1994). This time immunisation numbers were obviously targetted at babies not previously seen: at Akikanda, a single triple antigen first dose was given, for example. But it is still not clear whether all new babies were covered, as perhaps 8 may have been born since the August 1993 patrol.<sup>21</sup> Inspection of clinic books in villages shows that some mothers independently bring their babies to Bulolo for immunisation. But in June 1994, it seems the vaccines reached the village overheated or not in time to be used: 'immunization – not given at Akikanda because of no proper care taken by carriers' (Titi Pora and James Peter June 1994). There was no vehicle road to Akikanda at this time.

General observations were 'village sanitation appears poor' and 'it was quite overwhelming that a lot of people living in these villages have enlarged spleens', and while it was pointed out that treated bed nets were available at Bulolo Health Centre, villagers were not buying them (Serah Sangau October 1994).

A remark about Kaumanga was:

An interesting observation about this village is that a lot of families seem to have large family size and there seems to be over crowding in many family homes (Serah Sangau October 1994).

Actually the 21 living mothers in this village today that we have information on have only had an average of 2.6 children—appearances can be deceptive.

<sup>21</sup> A total of 12 babies were born at Akikanda in the twelve months from 1/7/93-30/6/94.

In March 1995, Mima Wakimsep held village clinics at Yokua, Kaumanga, Sapanda and Akikanda and had the extra time to inspect Nauti Aid Post and Kaumanga village. The Aid Post water tank had 'broken down years ago', there was no toilet and a shortage of 'most of the basic drugs'. In the village, toilet houses were in a poor state of repair and few had lids over the pits; a nearby stream was contaminated (Mima Wakimsep to District Secretary 28 March 1995).

Support for medical patrols to the off-road Watut villages continued through to 1995, but ceased when AGF took over the project. AGF, however, was forced to confront the issue of poor health in the Watut villages when its drilling contractor brought to its attention the fact that labourers and drill offsiders with enlarged spleens could not safely be employed during exploration at Hamata. Following this 'discovery', the high incidence of enlarged spleens in the Watut villages threatened to cut off the pool of employable labour and AGF brought in doctors from Tusa Medical Centre, Lae, to carry out pre-employment medicals, and to a limited extent examine villagers and administer Fansidar to them (Figure 22).<sup>22</sup> Only Nauti village was visited and Tusa's involvement ceased after a short time.

#### *Failings of the Watut health patrols*

The problems of the health patrols are the principal ones confronting any attempts to improve the standard of health in the Watut area.

Firstly, the patrol system itself was hampered for reasons that should not exist in an effective government system: 'MCH Sister at Madang purchasing health cards', 'staff had not yet back from annual leave' and 'department had allocated budget for three patrols and the budget had been used' (when the agreement was six patrols each year). In 1994, the OIC at Bulolo appears not to have budgetted for any patrols, yet the sums of money involved needed for the camping allowances were very small indeed: from K36 to K156 per patrol. There seemed little will to encourage the programme.

Second, the comments by health staff in each report repeat the same things over and over: poor hygiene, problems of attendance, difficulties in getting health message across because of poor education. It is obvious that this was partly a function of the low frequency of patrols, in turn due to the organisational limitations just mentioned. Health outreach requiring a level of contact that is a step up from this was not contemplated. For example, bed-netting in Watut villages would have brought about a genuine improvement in community health if accompanied by a consistent effort to educate families in their use (see above, page 49). But this was beyond the means made available then and it still has not happened.

Third, the manner in which patients are seen carries an inherent bias towards acute problems such as sores and abscesses, acute malaria, pneumonia and the like. The main problem arises from the amount of time spent travelling to the destination and the difficulty of getting in touch with villagers to tell them a patrol will visit them on a certain day. This means that patients are seen more or less at random, with little chance of reliable follow-up.

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<sup>22</sup> The intention was to reduce the spleen enlargement, but it may have been quite dangerous to give out Fansidar in the absence of an all-round malaria control effort. (On the other hand, villagers may have thrown them away anyway.)

This also greatly hampers health staff from being able to diagnose chronic problems such as anaemia stemming from inadequate diet, the poor weaning of children, non-acute malaria, and TB.

The simplest condition of all to follow is pregnancy; but even this cannot be tracked properly when patients seen once may or may not be relocated later in their terms: 'It was found that not many pregnant mothers attended our clinics. Firstly, follow up visits [to] these women is a problem. Something must be done.' (Mima Wakimsep 28 March 1995).

#### *Village health knowledge and cultural beliefs in the Watut villages*

In the Watut villages, lack of education, together with very strong cultural beliefs in the source of sickness, lies at the heart of the difficulties faced in obtaining successful health outcomes. Most adult Watuts have an unshakable belief in the existence of witchcraft, for which the vernacular term is *pangga*.<sup>23</sup> The witch's prime motive for attacking someone is boiling, but concealed, jealousy which is shrugged off as *sik bilong Watut*, the 'Watut sickness'. So convinced by this are most villagers, that even those with education will argue that malaria is merely a mild fever and that it is *pangga* that is responsible for killing people.

A case in point concerned the deaths of two youths at Nauti village on 29 March 1998. The first, Sana Kemoso, aged 18, lay dying in a house. His close relatives gathered to find out who might be causing his illness. Under close questioning, a youth known with the reputed ability of second sight (Tok Pisin: *tu ai*, 'two eyes'), Peter John, aged 23, confessed to having made a witchcraft attack on the dying boy, and on three other people besides, who had sickened but recovered. Sana then died, at which the mood turned to violent anger and Peter John was set upon and beaten. A blow to the head knocked him down, but a kick to his enlarged spleen was the probable cause of his death. (We know he had an enlarged spleen because both youths were among those given pre-employment tests—which they failed—by Tusa medical staff.)

Another extremely strong belief is that traditional curses can doom particular villages to extinction. For example, Wandini and Kaumanga are villages believed to be cursed in this way and people point to the fact that their populations have dwindled over the years. On the other hand, Sapanda, with its big population and many hamlets is said as having always escaped the problem.

We cannot ignore the effects of these beliefs. A *pangga* attack figures prominently in the early history of Nauti, then in 1946-47 epidemic meningitis, pneumonia, whooping cough and other diseases swept through the whole of Bulolo District (Horrold 1947), having the effect at Nauti of killing every living adult, so far as I can determine; this is interpreted as caused the imposition of a dooming curse, *pangga*, or both. Whatever the medical reality, these two events have effectively determined who the present landowners are (see Working Papers 6 and 7).

The immediate lesson is that bringing health resources to the village is only half of the problem. Some of the sickest villagers genuinely do not see the connection between their high death rate and treatable illnesses. While they will accept treatment if it is given,

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<sup>23</sup> Across Papua New Guinea, the Tok Pisin term is *sanguma*. The exact details vary locally, but a common theme is that witches transform into animal familiars and attack the internal organs of the victims. In some areas, the witch cannot help this behaviour but, in Watut beliefs, *pangga* witches make deliberate attacks.

many often do not continue to take medication after a health team has departed. In respect of the Watut villages, a heavy emphasis must be placed on regular face-to-face contact, the follow-up of sick patients, and health education (→ *Recommendation 49*).

The primary target of health education drives is usually mothers, who are generally regarded as being very receptive to health advice as long as it is followed through. Unfortunately, few women in the Watut who we have contact with have any schooling at all (Table 36). For many years Mainyanda was the only Community School in the area, so that Watut women with any education are most likely to be from families who lived at Wau, Bulolo or whose parents were government or mission employees posted elsewhere when they were growing up, or who were working alluvial gold and had access to schools at Wau.

Highest school grade completed	Winima	Kwembu	Nauti	Minava	Akikanda	Yokua
No education	29	13	54	35	48	39
Grades 1-5	20	11	8	3	4	5
Grade 6	18	26	6	7	1	3
Grade 10	5	10	1	1	0	2
<b>Women interviewed</b>	<b>72</b>	<b>60</b>	<b>69</b>	<b>37</b>	<b>53</b>	<b>49</b>

**Table 27 Highest school grade completed: females aged 18 years and over, July 2000.** Source: D. King's household survey, original worksheets.

Again, this reinforces the need for very intensive follow-up of health issues in the Watut villages.

(Biangai women are better educated all round and are better equipped to understand health messages; however, consistent follow-up is always needed in health extension work, whichever villages are being targeted. See Table 36.)

#### *Selected demographic indicators for Watut villages*

Demographic analysis (Appendix B and Appendix C) is able to quantify mortality in Watut villages. Basic figures that may be quoted are as follows:

- 20.8% of children die in childhood; although the reporting of neonatal deaths has been poor until recently, in the period 1995-2000, children aged 5-19 years appear to have died at approximately twice the rate of children aged 0-4 years; the causes of death are generally *not* the diseases that are prevented by immunisation.
- Deaths among young adult men are high, but women in young to middle adulthood are dying at twice the rate of men.
- Of deaths among adult women between 1995 and 2000, 19 were in women aged 20-49 as against 8 aged 60 years and over; one was a suicide, two definitely died in childbirth and one of complications from pelvic inflammatory disease: multiple infections on top of malaria and other endemic diseases can be suspected among the remainder.
- A provisional estimate of the crude birth rate (CBR) at Nauti is very high at 85 per 1000, but the crude death rate (CDR) matches some of the world's poorest regions at 37 per 1000 (subject to revision).

- Life expectancy appears to be 40.9 years at Nauti for both sexes; this compares with the claimed national average of 58 years. There is a margin of error and the method of calculation is weighted towards health conditions as they were in the past. Nevertheless the mortality rate is factual and errs only on the side of an undercount of infant deaths.
- Treating each sex separately opens up a very significant gap between them: 37 years for females and 46 years for males; this is very unusual among world populations as the life expectancy of females almost always exceeds that of males; it is an indicator of a population still below a first ‘demographic transition’ where the most basic female health problems have not been alleviated.

(Work to document and publish these findings in more detail is in progress.)

The impact of this on a mining operation are worth thinking about. Approximately 20% of adults aged 20-40 years, the age groups likely to be recruited for employment, will die in any ten year interval in village conditions (Table 28). These calculations are for both sexes: because of the differential mortality, 17% of men and 25% of women aged 20-40 years will die in each ten year period.

Age	Expected deaths in next 10 years	Recruits	Expected deaths
20 years	9.4%	20	1.9
25 years	15.0%	20	3.0
30 years	20.4%	20	4.1
35 years	25.2%	20	5.0
40 years	26.8%	20	5.7
<b>Total</b>		<b>100</b>	<b>19.7</b>

**Table 28 Deaths expected among village dwelling Nauti people at the end of 10 years.**

Source:  $q_x$  (probability of dying in the interval) values from life table for Nauti (both sexes).

In reality, by virtue of employment, villagers would:

- face fewer environmental risks than at home;
- find effective medical attention close to hand;
- find medical attention affordable (or provided free of charge);
- be better nourished.

So mine employees will not die at this rate. But the candidacy for the first social development goal of mining is obvious: simply to see that landowners alive at the start of the project are alive at the end of it (→ *Recommendation 50*).

### **Summary of health capabilities in Bulolo District**

The theoretical capabilities of the health centres and what is actually in place are different things. Each year there are unfilled HEO positions at Wau and Bulolo; staff housing and

security are inadequate;<sup>24</sup> drugs are in excellent supply at Aid Posts in some years, but can be completely unavailable in others; there is no X-ray equipment; sterilising equipment no longer functions at Wau.

At least one of the two health centres should have an Aid Post Supervisor and Malaria Supervisor, but in 2000 none was employed. There has in the past been a doctor resident in the District, but this is no longer the case.

Beyond the Wau and Bulolo Valleys, remoter areas have Aid Posts, such as at Biaru and Garaina, but mobile patrols are infrequent. Law and order problems, both in town and in relation to village youths at Aid Posts, swollen rivers, the disconnection or vandalism of the water supply at Wau, have all caused interruptions to services over the years. In 2000, all government staff have left or been withdrawn from Garaina because of a local dispute, and this includes the health staff.

*Statistical reporting: especially STDs and HIV-AIDS*

No statistical information on health in the District was available to Jackson in 1988. Anecdotal evidence suggested at that time that malaria, pneumonia, other respiratory infections, and STDs were the most prevalent health problems, while the 1983 national nutrition survey purported to show that 49.5% of a sample of (the then) Wau District children under five were malnourished.

Bonnell's visits to health facilities have not resulted in the discovery of statistics on STDs, including HIV-AIDS; district capabilities in this area are as limited or worse than for the management of other health problems. AIDS deaths, when they occur in the district, are likely to be underreported as seriously ill patients of all kinds are sent to Lae and die there. But deaths have indeed occurred and as Bonnell states 'it is a common worry at village level' (Bonnell 1999a).



**Figure 23 Donation of tables and chairs to Wau Health Centre for Biaru Aid Post, 18 October 1994**

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<sup>24</sup> In 1998, the female HEO at Wau was raped. She quit; there had been no replacement by the end of 2000.

### *Provincial budgets*

The systemic sickness that pervades all areas of government is the non-release of funds from the national to the provincial government. In health (as in the other sectors), so poor is the fit between budget allocations for the various activities and money actually received, the annual preparation of the provincial budget is often a meaningless exercise.

Company files highlight this problem very clearly. In CRA times, they are full of requests for the company to buy the basic items that should have been ordered from the health budget. Receipts show the company sometimes obliged (generally for supplies needed by Aid Posts and mobile patrols). The lists include: surgical scissors, alcohol swabs, Panadol, contraceptive pills, disposable syringes, Ventolin, various drugs (K1390.64 given to Wau Health Centre, 1991); injections needles, suture needles, latex gloves, elastic plaster, Ventolin, antibiotics and various drugs, stethoscope, bed (K544.16 given to Wau Health Centre 1992); disposable needles, syringes, surgical scissors, latex gloves, Panadol, Mylanta, aspirin, primaquine (K612.15 given to Wau Health Centre 1993); plastic buckets, soap, dish etc for VBA course (Bulolo Health Centre 1997); plastic buckets, soap, dish, cord clamps, scissors, hurricane lamps etc for VBA refresher course (Wau Health Centre 1999).

Almost all of these things were relatively inexpensive, but the health centres either could not buy them or the allocations were spent on something else. An unsatisfactory development is that in 1999 (disposable syringes, scissors, bathroom scale, infant weighing scale, primaquine, amoxil, various drugs given to Wau Health Centre: total value K5,483.00) and again in 2000, the District Health Administrator has taken to turning to the company for *normal supplies*. This is unacceptable and shows incompetence or laziness: the Department of Health has plenty of these items that can be ordered through its own system.

### *Morale and staff motivation*

Lastly, personality issues and staff morale have clearly been a major factor in the overall performance of the health service. This occurs at several levels. Firstly, personal differences between health staff mean that key resources are poorly deployed. The notable example is the ambulance allocated to Wau. When the manager will not release it for patrols and the company assists by providing transport, we can see that in reality the company has provided him with the private use of a vehicle. The fault lies with inadequate management higher up in the Division of Health that allows such abuses to occur.

Secondly, a closer look at extension work shows that it is subject to the ups and downs of staff enthusiasm. There are always obstacles to overcome in rural health, be they of human manufacture, such as law and order problems, or natural occurrence like landslides and washed out bridges. Whether staff overcome them is often a matter of much greater choice than they may admit to. For example, when a monthly MCH patrol to a village is cancelled because staff are deployed on another task or there is a law and order concern, we should question why the other task has taken priority or why bodyguards or police are not found to accompany the patrol. Maintaining a high level of enthusiasm for difficult work and making sure that tasks retain the priority they are given when an extension programme is designed is the hallmark of good management—and we do not see this as often as we should.

## Current and new programmes

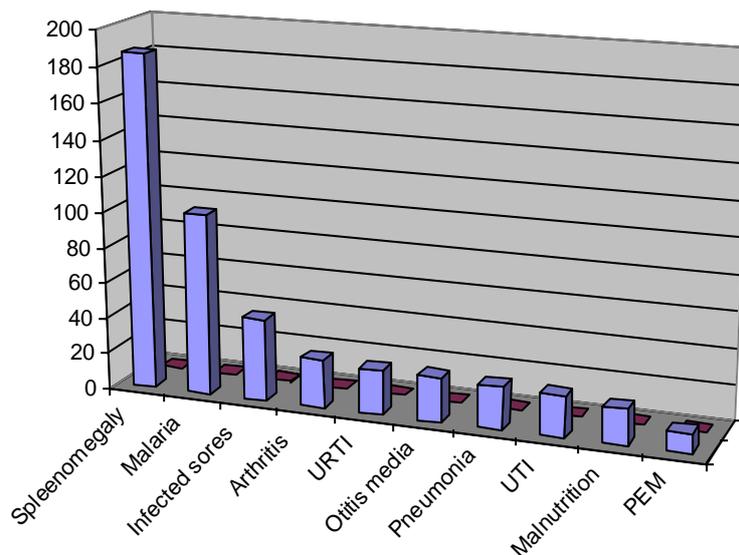
Following the takeover of MCG by Aurora in 1998, company health capabilities were significantly upgraded to include three Health Extension Officers on staff from 1999. This allows one each to be rostered on at Hidden Valley and at the Wau clinic at all times, with the third on field break.

Members of landowner villages attend this clinic, although at times there has been a need to limit visits to certain days of the week. Serious cases are dealt with according to need. Patients are referred to the ANGAU Memorial Hospital in Lae and can be assisted with transport to Lae when a vehicle is available. Very serious cases (for example, a knife wounding in March 2001) have been medivaced to Lae by helicopter.

Access to the company clinic primarily benefits Kwembu and Winima people. Still, despite the availability of treatment, people from the two villages still succumb to malaria. For example, a 38-year-old casual employee from Kwembu, Peter Kuia, collapsed at the village and died in March 1999. Although, the report on his death is correctly critical of the inactivity of those around him after his initial fainting attack a week beforehand (Mima Wakimsep 16 March 1999), the incident really highlights the fact that basic malaria control has probably reached the limit of its effectiveness in the Biangai villages. The next, much more costly, steps lie in making improvements to the style of housing and undertaking more substantial mitigation measures in the village environment.

### *Renewed programme of Joint Medical Patrols*

Prominent among the issues reported on by S. Bonnell from May 1999 was that of health in Watut villages (Bonnell 1999a/b/c, 2000a/b/c). To give equivalent assistance to them as enjoyed by Kwembu and Winima, and following her recommendations, MCG began a new programme of Joint Medical Patrols in 1999.



**Figure 24** Top ten medical conditions seen on patrol to Watut, 19-23 July 1999.

The first patrol of the new programme went to Nauti, Nauti 2, Minava, Yokua and Akikanda 19-23 July 1999, seeing a total of 529 patients. A total of 187 patients, or 32.3%, presented with tropical splenomegaly (TSS) and 101 had malaria (Figure 24; data from Viv Barrett 1999 and Mima Wakimsep 1999). From this point to the present, patrols were monthly in 1999 and have been bi-monthly in 2000 (see bibliography).

Malaria and enlarged spleen is therefore identified as the most important health condition facing Watut villagers. One objective of the new patrols has been to achieve a reduction in spleen sizes.

*Preliminary assessment of the spleen reduction programme*

The treatment regime was: Fansidar (1 tablet weekly), Albendazole (2 tablets weekly), Primaquine (2 tablets weekly), multi-vitamins (2 tablets weekly) and folic acid (2 tablets weekly). On patrol No. 1, three people were noted as having recovered completely with their 25cm spleens reducing to normal since treatment had first been given in 1999 such that ‘the suppressive drugs given were very effective’ (Sr Nama Orebut 3 Apr 2000).

Village	Date of patrol		Identified as attending both patrol clinics
	27-31 Mar 2000	20-24 Nov 2000	
Nauti 1	100	44	8
Nauti 2	75	55	13
Minava	104	34	27
Yokua	104	80	9
Akikanda	27	57	13
<b>Totals</b>	<b>410</b>	<b>270</b>	<b>70</b>

**Table 29 Patients measured for splenomegaly at Watut villages in 2000**

Note: patients first seen and given treatment in 1999; patrols visited these villages in May, August and September 2000 but measurements were not recorded on these occasions.

But statistical comparison of the patient lists for patrols Nos. 1 and 5 in 2000, when spleen measurements were recorded at each village, tells a different story. Firstly, it is obvious that patients are not being seen by each patrol; 381 patients were seen and measured in March and 270 in November, but only 70 patients can be identified as having attended both clinics (Table 29). This is not because the names are unrecognisable in the lists; the lists identify different people.

The spleen measurements for the sample of 70 who did attend both clinics can be directly compared (Table 30). This shows that, on average, adult spleens *did not reduce* as a result of treatment: indeed, they increased slightly. Children’s spleens may have reduced, but the improvement is not statistically significant. (Of the three people mentioned by Sr Nama in April as having normal spleens, two are not in the comparison sample, but one is: his spleen increased in size from 0 cm to 2 cm by November 2000.)

Age group	Mean spleen size		Sample size
	27-31 Mar 2000	20-24 Nov 2000	
Children 0-9 years	7.7 cm	6.8 cm	16
Children 10-19 years	13.5 cm	12.8 cm	10
Adults 20-39 years	10.6 cm	10.8 cm	35
Adults 40-69 years	11.8 cm	15.1 cm	9
<b>Totals</b>			<b>70</b>

**Table 30 Comparison of spleen size measurements in Watut villages over two patrols in 2000**

There are several kinds of explanation for the data in Table 29 and Table 30. The first group dispute the effect purportedly seen in the tables:

- the sample size is too small to show any difference;
- the sample was selective, distorting the true picture;
- 340 of the original of the 410 patients were completely cured by November, and were not re-measured: the 70 in Table 30 were the only ones still under treatment;
- measurement error has distorted the results: there was a change from measuring patients standing up to lying down / different health workers did the measurements / the recording sheets contain transcription errors;

These can be dealt with as follows. The sample size is adequate and the Student's t-test is the appropriate method of testing for the difference between the measurement data for March and November. Student's t, however, fails to reveal a significant difference between any of the pairs of age group means. The sample *was* selective, in that it does not resemble a proper trial where all cases must be followed through and accounted for. But the problem of patient follow-up is intrinsic to the patrol method; it is not an artefact of the analysis. Similarly, it is very unlikely that the patients not recorded in November had already been cured; the comments in the health patrol reports only mention three people whose spleens had returned to normal and the spleen measurements do not heap towards the zero end of the scale as they would if most of the people being treated had zero or near-zero spleen sizes. On the contrary, the adult spleen sizes are heaped around the mean of about 11 cm with a standard deviation of about 4.5 cm.

Measurement errors may well have occurred; nonetheless, the lists are generally neatly completed. The change from one method of examination to another is not likely to have altered the measurements by an amount that would cast doubt on the mean of 11 cm in adults.

The second group of possibilities deals with the method of treatment used to obtain spleen size reduction:

- the drugs used do not work;
- the drugs work, but the patients do not take them;
- the patients do take the drugs they are given, but they do not attend each clinic to get a continuous supply;
- the drugs work and the patients take them, but the environment they live in exposes them to constant re-infection.

Barring some new advice, it may be assumed that the drugs work.<sup>25</sup> Apart from this, it seems very likely that each of the other factors contributes to the lack of success in spleen reduction.

Table 29 gives a fairly clear indication that different people are seen on each patrol. It is most likely—from experience with the attendance at other kinds of meeting—that the ‘old’ patients are simply not present at the time of the next patrol. A contributing factor is undoubtedly the longer than intended period between patrols: in 1999, patrols started in July and went out every 30 days. But the programme finished in November and did not recommence until April, a gap of 140 days. Once started in 2000, the patrol interval was 58 days on average. *This is too long to leave villagers on a complicated treatment regime without supervision.* Joel Yanduk’s last patrol for 2000 highlights this point: ‘The TSS monitoring record shows that [the] majority of the villagers are not up to date with their weekly doses’ (p. 2).

All this aside, the most serious problem that the spleen reduction programme faces is environmental. The disease model for endemic malaria in rural PNG does not resemble its course among people who can return to hospitals or high-standard housing to get better or, in the case of Westerners, who can leave the tropics altogether. The key problem is that the usual place of recovery, namely the home, is at least as dangerous as the place where infection occurred, if this was elsewhere, and may be a lot more dangerous. There can be no assumption that patients are not constantly re-infected during the course of normal treatment.

The lessons in the above reinforce earlier statements about cultural attitudes to health in the Watut area: constant follow-up is required and much greater amount of face-to-face contact (→ *Recommendation 49*). The company has now contacted a specialist from the Medical Faculty of the University of Papua New Guinea; a proper evaluation of Watut health will now be done (see also Bonnell 2000c).

#### *New government initiative: Village Birth Assistant programme*

It is a long-term ideal to enable all mothers to give birth at a health facility of at least Health SubCentre standard. This is not unrealistic in rural areas and by way of proof more than 70% of deliveries in the Lihir group of islands took place in the church health centre *prior to the mine development*. This was achieved in the context of a comparatively high level of support for women and families through church networks. Expectant mothers from outlying villages went to stay with relatives near the clinic in their last weeks of pregnancy and well in advance of the likely onset of labour.

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<sup>25</sup> The main qualification that health experts generally make is that treatment should not seek to make the population malaria-free as the reduction in immunity can see an increase in mortality. But given the lack of spleen reduction so far, a malaria-free Watut is not an immediate prospect.



**Figure 25 Women performing a drama—a mother has died in childbirth—at Mainyanda during Village Birth Assistant course closing on 8 August 1997**

An alternative is the Village Birth Assistant (VBA) programme initiated by the Morobe Women and Children Health Project in the Provincial Health Division. This recognises that:

- this kind of network support does not yet exist in many areas of rural Papua New Guinea, and takes many years to create where it does not;
- traditionally attended childbirth was the exception rather than the rule in Papua New Guinea (Townsend 1986);
- in the specific case of parts of the Bulolo District, including the Watut area, economic circumstances and family relationships do not yet favour the promotion of clinic births at a distance from the village.

In the Watut, three VBA courses have been run since 1997: at Mainyanda in August 1997 (Figure 25); at Minava in August 1999; at Minava again in August 2000. The trainers were Srs. Rose Bosimbi and Nama Orebut. Sister Bosimbi has recently written a short evaluation of the programme (Rose Bosimbi 1 September 2000).

Of 41 women trained in 1999, 23 were available for evaluation, and of these 17 had actually assisted at births during the year. One woman was particularly active and assisted with 21 deliveries and referred many others to Bulolo. The remainder had assisted with 31 deliveries, or about two each. Given that each village had between four and five VBAs it does seem likely that most village births are now being attended. For example, Nauti has four VBAs who delivered 13 babies between August 1999 and August 2000. My records show that nine babies were born to Nauti women up to July 2000.

In 1997, the course was not without its problems—of the 36 women nominated, some were delayed from attending for several days for domestic reasons. It is still unclear whether there are trained VBAs in Akikanda, Minava or Nauti. These villages nominated women for training but it is not certain whether the women (i) have attended a full course, and (ii) are actually practising in the village.

It also remains to be seen whether the outlook for mothers and babies when VBAs attend in Watut villages can be shown to be better than when they do not attend.

By contrast, the VBA concept is a much easier one for Biangai women to adapt to, because of a long history of women working together in groups like church groups, the 'Food Centre' programme of some years ago and so on. (Matters are not perfect, however, Bonnell finding that women's groups replicate the generic defect of all Biangai organisations: that is to say, many *barets* exist between different groups.)

A refresher course was held for Biangai VBAs at Kaisenik village in 1999. The trainers were Sr. Rose Bosimbi and Sr. Kokoya Kebaby.

#### *New government initiative: HIV-AIDS awareness*

If the health woes of rural PNG were not already sufficient, a new and grave threat is now posed by the arrival of the HIV-AIDS epidemic. HIV deaths have now occurred at Wau. It is likely that most HIV cases here will succumb to TB or pneumonia. In the absence of the multi-drug treatment used in Australia and elsewhere, and with the compounding effects of multiple other infections, progress from first detection of symptoms to death is as short as three months.

The Department of Health was unresponsive to HIV-AIDS as recently as 1997, but now has awareness and trainer training programmes in place. The National Aids Council is the peak policy body in the country; support groups include the Friends Foundation; the major implementation project is the PNG National HIV/AIDS Support Project funded jointly by AusAID and the Department of Health. The latter project is in the process of recruiting Provincial HIV Response Co-ordinators. In Morobe's case, this person will head the Morobe AIDS Committee. At a lower level, the Bulolo District AIDS Committee is the closest body to the project.<sup>26</sup>

#### *Future work*

In 2000 the company appointed two Community Development Officers, Boina Yaya and Jennifer Krimbu, to work with Susy Bonnell on the practical aspects of social development. Their activities in 2000 in the area of health included:

- HIV-AIDS / STD / TB workshops;
- Adult literacy;
- Law and Order awareness;
- Substance abuse awareness;
- Starting village birth and death registers with VBAs;
- Planning for nutrition/food garden survey.

All of these activities can be seen as fundamental groundwork for improving health standards in the hinterland of the project. During mine operations the scope of their work will need to be enlarged; the involvement of donor agencies, NGO groups, and research

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<sup>26</sup> Note: ABC's *Foreign Correspondent* programme on 31 October 2000 broadcast a segment on prostitution and AIDS awareness in Lae.

institutions should be sought out as a means of improving the effectiveness of their programmes (→ *Recommendation 51*).

## CHAPTER 5

### VILLAGE EDUCATION: GENERAL BACKGROUND

(Recommendations in respect of education are given in Volume I. This section adds background to the situation around the landowner villages.)

#### History

Historically, the Wau is one of the earliest places in inland Papua New Guinea where education was promoted immediately after WWII. The uptake among the Biangai was extremely good with the generation of what are now elderly men attending mission school at Wandumi where the Lutherans were teaching in the Yabem language. In April 1951, a patrol officer commented on this:

WUNDUMI while being the centre for education in the area, also has the church of the mission and the congregation comes from all of the BIANGAI villages with the exception of WURA WURA who will have nothing at all to do with the Mission (Gordon Smith, Wau PR 5 of 1950/51).

The Katherine Lehmann School was founded in the same year, catering at that time for the children of missionaries and fee-paying expatriates.

The year 1952 saw the opening of a 'Higher Village School' at Kaisenik:

Higher Village School at Kaisenik has 40 students of whom 25 are Biangai, others from Biaru and Wau (Gordon Smith, Wau PR 9 of 1951/52)

Many notable Papua New Guineans passed through what was later called 'Kaisenik Primary T School' in the 1950s and 1960s, including a current national minister, Andrew Baing. The Biangai as a group were extremely keen to put their children in school, and in 1952 subscribed £160 to buy roofing iron for the mission school at Wandumi.

By contrast, no schools were about to open in the Watut area any time soon:

... only four young native males receiving education from the mission, but they are outside the area (R.H. Bamford Bulolo PR 1 of 1950/51)<sup>27</sup>

The Lutheran Mission, which has its headquarters at Mumeng, in the charge of Rev. Horrolt, has sent out native missionaries to YOKUA, KAUMANGA, DIDINGGUAVA,<sup>28</sup> PARAROA and NAUTI, but their attempts to lead people to church have been abortive. The reason is that before the war, native missionaries had been sent into the area from the coast and had caused trouble among women ...

... due to the lack of interest in the missions there is little educational activity in the area (R.H. Bamford, Bulolo PR 6 of 1951/52)

Thus started a educational divide between the Biangai and the Watuts that has only widened in the intervening half-century.

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<sup>27</sup> The students were all from Manki.

<sup>28</sup> Refers to Titingohawa, a settlement then occupied near Andarora.

In 1968, a Biangai girl, Simani Kaurua of Wandumi, became the first of a number of Biangai students to win four year scholarships to Australian high schools; she went to Toowoomba. In 1972, three were away: Simani and her younger sister, Nalu, and a boy, Ngebilak Sovi, of Werewere, who were both at Sydney (C.H. Long Wau PR 2 of 1971/72).<sup>29</sup>

In 1969, the enrollment figures for Kaisenik Primary T were as in Table 31. The figures show the Biangai were having mixed success in keeping their children at school long enough to pass Grade 6.

From Prep to Grade 3, the enrollment averages 30.2 children; from Grade 4 to Grade 6 it is only half this, 16.7 children. There is also a gender imbalance. From Prep to Grade 3, 42.1% of students were girls; from Grade 4 to Grade 6 only 18.0% were, or less than one girl to five boys. Both these indicators link poor educational attainment to factors of social underdevelopment.

Grade	Boys	Girls	Total
Prep	16	13	29
1	18	17	35
2	23	14	37
3	13	7	20
4	12	1	13
5	19	4	23
6	10	4	14
<b>Total</b>	<b>111</b>	<b>60</b>	<b>171</b>

**Table 31 Kaisenik enrollment on 30 April 1969**  
**Prep-Grade 3: mean of 30.2 students, 42.1% girls**  
**Grades 4-6: mean of 16.7 students, 18.0% girls**

Mainyanda Primary T opened in 1964 or thereabouts, and took Watut children, the children of mission station workers and gold miners along Elowa Creek; in 1972 it had 115 students (R.D.W. Draffen, Wau PR 1 of 71/72). In this year, a Primary T school was established at Pararoa—the first to cater exclusively for children in Watut villages. Initially it had an enrollment of 41 students.

Further schools have opened more recently; for example, Yokua Community School in 1992 which serves Yokua, Waikanda, Kaumanga, Tontomea and Nauti 2, Samuna Community School in June 1995, which serves Elauru, Werewere and Winima, and Bitoi, in 2000, which serves the children of alluvial miners in the Black Cat pass.

Even so, many children in inaccessible parts of the Watut and Wau Rural Councils still do not live within reasonable walking distance of a community school and some, as I shall show below, have virtually no chance of schooling at all.

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<sup>29</sup> Nalu matriculated, attended the University of Papua New Guinea for a period, and is now married and lives in Port Moresby. Simani married at Wandumi but died in 1998, aged 42. Ngebilak is also dead.

## Participation in education today

### *The institutions*

There are today some 27 schools and vocational centres in the Wau and Bulolo towns, and in the Wau Rural and Watut LLGs (Table 32). Further details on selected schools is given in Appendix E

Area	Agency
<b>Wau Rural LLG</b> Kaisenik Primary School Samuna Community School Regina Community School Biaru Community School Tekadu Community School Wau Adventist Primary School	Dept. Education Dept. Education Dept. Education Lutheran Dept. Education Seventh Day Adventists
<b>Wau Town</b> Wau Primary School Grace Memorial High School Wau Vocational Centre Marianhill Elementary School Marianhill Primary School Katherine Lehmann School Wau Christian School	Dept. Education Dept. Education Dept. Education Catholic Catholic Lutheran Baptist
<b>Bulolo Town</b> Karanas Elementary St. Peters Elementary School St. Peters Primary School Hompiri Primary School St. Stevens Community School Bulolo International Primary School Bulolo Vocational Centre	Dept. Education Catholic Catholic  Lutheran PNG Forestry Products
<b>Watut LLG</b> Menhi Elementary School Pararoa Community School Mainyanda Community School Yokua Community School Kebi Community School Baini Community School Malangta Community School	Dept. Education Dept. Education Lutheran Dept. Education Lutheran Lutheran Lutheran

**Table 32 List of schools in the Wau-Bulolo area.**

Countrywide, much of the primary level of education and about half of the secondary level is run by Church and other agencies, who receive operating grants from the provincial Division of Education; only part of the system is run directly by the government. The system has been undergoing a reorganisation in the period 1997-2000 with the former single designation 'community school' in principle being split into several parts and the primary years extended both earlier to two 'prep' years, taught in the local language, and later to accommodate Grades 7 and 8.

Old	What	New	What
-	-	Elementary School	Prep 1
Community School	Grade 1	Community <i>or</i> Elementary School	Prep 2
Community School	Grade 2	Community <i>or</i> Primary School	Grade 2
Community School	Grade 3	Community <i>or</i> Primary School	Grade 3
Community School	Grade 4	Community <i>or</i> Primary School	Grade 4
Community School	Grade 5	Community <i>or</i> Primary School	Grade 5
Community School	Grade 6	Community <i>or</i> Primary School	Grade 6
Provincial High	Grade 7	Primary School	Grade 7
Provincial High	Grade 8	Primary School	Grade 8
Provincial High	Grade 9	High School	Grade 9
Provincial High	Grade 10	High School	Grade 10
National High	Grade 11	High <i>or</i> National High School	Grade 11
National High	Grade 12	High <i>or</i> National High School	Grade 12

**Table 33 The old and new school systems in Papua New Guinea.**

In reality, the timing and resourcing of the overhaul mirrors the situation seen in the reforms to the system of local level government. The uptake of elementary schools—what have been known for many years as ‘Tok ples pre-schools’—has been slow and hampered by inadequate funding and a lack of materials in local languages, and teachers trained in their use.

For example, the Watut language materials are available through the New Tribes mission and an Elementary double classroom had been built at Menhi—in time for the 2000 school year—but funding meant that it did not open.

Similarly, the extension of the primary years to Grades 7 and 8 has not been matched by an extension of funding. Most notable is a lack of science and technology resources, and appropriate school library materials. This means that there is a limited preparation for technical skilling prior to Vocational School or post-secondary colleges.

A political objective of the new ‘top-up’ classes was to soak up the pool of unemployed youth sometimes called ‘Grade 6 dropouts’. Unfortunately, simply keeping students on at their old schools is qualitatively different than making more high school places available. In Grades 1-6, student discipline is not seen as a serious problem. But children in Grades 7 and 8 are young adolescents requiring a much greater degree of parental control. Also, the top-up classes mix academically poorer students with the students who would have formerly qualified for high school and what was once a minor problem—maintaining basic law and order within the school boundary—can now see teachers walking off the job in protest. Kaisenik (see Appendix E) is an example of this.

#### *School attendance and spending on school fees*

King’s household survey in July 2000 recorded highest school grade completed and current spending by household on school fees; data on school fee expenditure is also available for 1993.

School attendance and spending on school fees among landowner households rose sharply between 1993 and 2000. This is directly linked to the introduction of a policy by CRA of paying 50% of the school fees for students in Grade 7 and above. Spending in the Biangai households in 2000 also reflects the cost of keeping 22 Kwembu and 32 Winima children at high school or above.

Item	Winima	Kwembu	Nauti	Minava	Akikanda	Yokua
Spending on school fees 2000	K171	K289	K24	K38	K10*	K44
Spending on school fees 1993	K16	K77	K12	K7	K6	K4
School fees 1993, CPI adjusted	K33	K161	K25	K15	K13	K8
<b>Total no. of households</b>	<b>51</b>	<b>44</b>	<b>60</b>	<b>27</b>	<b>38</b>	<b>46</b>

**Table 34 Household spending on school fees, November 1993 and July 2000.**

Source: King 2001:Tables 10.1-10.6. Notes: CPI index multiplication factor 1993-2000 of 2.09 (Bank of Papua New Guinea 2000: Table: 10.3). \* This figure removes expenditure by villagers living in town from King's original value.

(However, for some reason the actual amounts reported to King's interviewers far exceed what the company records show were its matching payments. Kwembu villagers reported spending K12,727, when the company's 50% was K2,660. Winima villagers spending K8,709, when the company's 50% was K4,865.<sup>30</sup>)

By contrast, spending in the Watut villages by both parents and the company scheme is not adequate to enable them to raise their level of education to comparability with the Biangai (Table 35). Company records show that K9,402 was paid on behalf of 'Nauti' families in 2000 for school fees. But unlike at Kwembu and Winima, the bulk is not being spent on the education of village children—who are concentrated in Grades 1-6—but on the children of town-based 'supporters' who are in high school (see further in Chapter 5).

School attendance	Winima	Kwembu	Nauti	Minava	Akikanda	Yokua
Aged 5-9	21.3%	33.3%	5.9%	-	3.2%	3.1%
Aged 10-14	88.4%	95.3%	24.0%	40.0%	16.0%	31.8%
Aged 15-19	65.7%	76.7%	17.2%	9.1%	19.0%	35.0%

**Table 35 School attendance by village and age groups, July 2000.**

Source: King 2001:Tables 29.1-29.6

Still, it is not true to say there has been no progress in education in the Watut villages. The school at Yokua does not always remain open but it does serve Minava, Yokua and Kaumanga; the bigger school at Pararoa serves Akikanda; and other children, for example from Nauti where there is no school nearby, have gone to stay with relatives in Wau and Bulolo where they have managed to do at least some years of basic primary schooling.

In all areas, the numbers of students who have completed at least Grade 6 and the numbers than have gone to Grade 10 or beyond has shown considerable improvement since 1993 (Table 36). It is fair to say that the Watut villages now have about the same proportion of Grade 6 leavers as Kwembu and Winima had seven years ago, but their rate of progress to Grade 10 has not been as good. Kwembu and Winima, for their part, have leapt ahead in the numbers of high school graduates—and their students will predictably not stop there, but will go on to university and technical college.

<sup>30</sup> This does not reflect an underspend by the company because parents would have complained. Rather the interviewees may have added the cost of a course over several years; the interviewers did not check.

Highest school grade completed	Winima	Kwembu	Nauti	Minava	Akikanda	Yokua
Grade 6	63 (21)	76 (21)	21 (4)	18 (7)	28 (6)	35 (5)
Grade 10	18 (5)	29 (8)	6 (1)	2 (0)	5 (0)	4 (1)

**Table 36 Highest school grade completed, July 2000 (1993 figures in brackets).**

Source: King 2001:Tables 30.1-30.6

### *Educational disadvantage in the Watut area*

As already seen, Watut educational disadvantage began in the 1950s and has a range of causes; poor access to schools and a low valuation of education (at some villages) are the two main problems at the present time.

Distance is the key issue at Nauti. The village is 12 km walking distance from the nearest school which is at Yokua village. Such children as do attend school must live outside the village with relatives, either in one of the towns or near the schools at Yokua or Mainyanda. Data for 'highest school grade' was obtained by King in his December 1993 survey and again in July 2000, and by me in various surveys.

Combining information from King's survey and the broader base of the Community Express database, it appears that among 80 adult men at Nauti, eight have gone beyond Grade 6. They are Jason Kula, a church elder of about 42 who studied through the Hamtai Bible Church to the equivalent of Grade 9; two brothers from Kepas Hangitau family, three brothers from the Salis Nautamauyo family, an adopted son in the Tom Taipo family, and a bachelor who has only recently moved to Nauti.

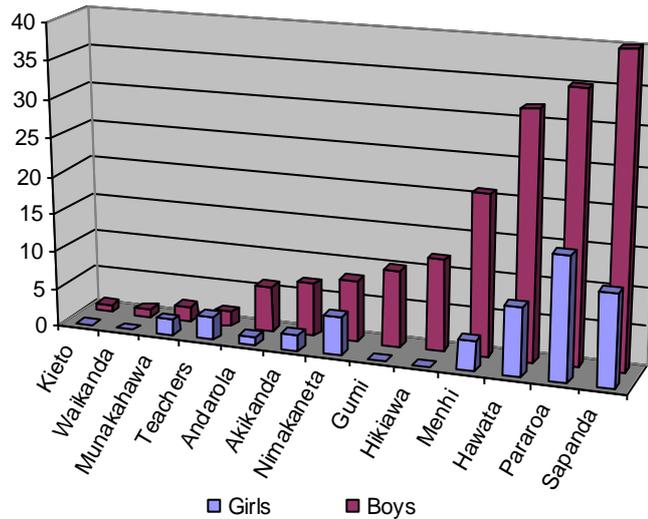
The situation among women is worse. Among 67 adult women at Nauti, none has gone beyond Grade 6; the eight women to have between Grades 4 and 6 are made up of four Nauti daughters aged between 20 and 24 years and four women from other places married to Nauti men.

The vast majority of adults at Nauti (109 of 147 or 74%) have either no education at all, one or two years of Tok Ples schooling when the New Tribes Mission ran this, or less than Grade 3 in the government system. This means that hardly any anyone from Nauti, other than those mentioned, is readily employable in jobs requiring entry qualifications if a mining operation starts at Hidden Valley.

### *Current enrolments at Pararoa*

Pararoa is the biggest school serving rural Watut villages, with ten teachers. Figure 26 shows the enrollment by village in 2000.

The figure shows that only three nearby villages are able to get a good proportion of their children into school: Pararoa, Hawata and Sapanda. And by 'nearby', a reminder is needed that Hawata and Sapanda are so far from Pararoa that children from these places are likely to spend two hours walking to school in the morning, and two hours back in the afternoon.



**Figure 26 Enrollments at Pararoa Community School in 2000, by village**

Girls suffer the most whenever there is a question of long distances to be walked to schools: the parents are simply unwilling to allow them to enrol. In the diagram, 31% of students from Pararoa are girls, but only 22% and 23% at Hawata and Sapanda respectively (the overall average is 23% girls).

*Efforts to improve to Watut education since 1990*

As discussed in Volume I, CRA offered school fee assistance to landowner children from 1990, a programme that has continued to the present day. The total amount of assistance, K27,071, has given a lot of benefit to school—and recently university—students and the scheme is expected to go on being very useful to parents in the future. But taking into account the different places that landowners and supporters live, few benefits of the school fee scheme helped the most disadvantaged *primary* landowner groups. Table 37 shows that only K178 or 0.66% of the total has gone to children of the principal landowners, the Yatavo, living at Nauti village.<sup>31</sup> (Among the Yatavo as a whole they have only received 3.4%).

The full picture is that two-thirds of the assistance has gone to the children of families living in town, largely because of the access to schools that town dwellers have. Most village-dwelling children live far from community schools and, when they live close by, their parent may not value education highly, because of *their* own poor education. Obviously, assistance in the future must ensure that Nauti-resident children can participate (see recommendations in Volume I).

<sup>31</sup> The K178 is made up of four fee payments in 2000 for children in prep, Grade 1 and Grade 2 to St Peters (Bulolo), Mainyanda and Kaisenik, and one fee payment for a girl in Grade 5 at Regina. The latter withdrew a week before King’s survey, aged 15, to marry a boy at Nauti.

<b>Ancestor</b>	<b>Village residents in male line</b>	<b>Per cent</b>	<b>Others in village and town</b>	<b>Per cent</b>	<b>Total</b>
Yatavo	K178.00	3.4%	K4,998.25	96.6%	K5,176.25
Yandimango	K1,448.75	11.2%	K11,536.50	88.8%	K12,985.25
Qavaingo	K2,327.50	26.1%	K6,582.00	73.9%	K8,909.50
<b>Grand total</b>	<b>K3,954.25</b>	<b>14.6%</b>	<b>K23,116.75</b>	<b>85.4%</b>	<b>K27,071.00</b>

**Table 37 Education assistance to members of principal groups living in the village as a proportion of the total assistance, 1989-2000**

But distance is not always the problem. In the enrollment data for Pararoa School (Figure 26), only 7 boys and 2 girls from Akikanda village, which is quite close to the school, were attending in 2000.

From data in King's original worksheets, only eight Akikanda families reported paying school fees in 2000, spending a total of only K394 in their children education. This time the problem can be identified as being of cultural attitude and the low value placed on education by some parents, harking back to comments of the 1950s in this area.

## CHAPTER 6

### LAW AND ORDER

#### Introduction

Law and order problems have a high profile in contemporary Papua New Guinea and there is no doubt that this adds both to operational costs and to the level of commercial risk of doing business in the country, including in Morobe Province

In closer connection to the resources industry, the leading oil and gas province of Southern Highlands has been racked by tribal fighting during 1999 and 2000. No-one can overlook this. Could something similar disrupt operations at Wau?

Any answer should be divided into parts: while Lae matches Port Moresby in the level of street gang violence, home invasions and brutal killings, once away from the vicinity of Lae, the situation is quite different. The traditional village communities of rural Morobe show a considerable range from the invariably peaceful to those with alarming rates of internal killings, but it is a rule of thumb that few are the cause of law and order problems involving people outside the village.

#### *Settlements*

In discussions of law and order, the accusatory finger is often pointed at settlers, that is to migrants living outside their areas of ethnic origin: there are considerable numbers of these around Wau and Bulolo. But their settlements can be very law-abiding if the residents are all from the same home area and that area is itself inherently peaceful. Examples of such places around Wau are Kapin, Nemnem and Kobiak; the inhabitants originated in the same place (Kapin – Middle Watut; Nemnem and Kobiak – Kumalu), the settlements are well-organised internally with church activities and leaders in control of the youths. A significant factor is that these communities were established from about 1957 onwards on agricultural lease blocks set aside for this purpose by the colonial administration: they are to all intents and purposes private property owners.

On the other hand, settlements with a bad reputation are almost invariably of mixed ethnic composition (= leaders cannot control youths) and closer to the two towns. Examples are Maus Paip, Black Camp, Maus Koranga, Seven Block and Nine Block at Wau, and the many settlements at Bulolo. Added factors in the degree of peacefulness are the inherent propensity to resort to violence in the home area, with the consensus of opinion placing Goilalas at the unruly end of the spectrum and Buangs at the peaceful end.

Lawlessness in settlements like this does affect outsiders. Typically, armed men hold up passing vehicles and steal all their possessions. A factor suspected in all hold-ups is that the perpetrators lie in wait and pick targets whose owners are expected to cause the least amount of retaliation in the days after the attack. This is why PMV trucks<sup>32</sup>, a favourite target, are often struck even though the passengers are not very likely to be carrying valuables or cash in large amounts. If MCG company vehicles have rarely been affected,

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<sup>32</sup> Three tonne flat back trucks with seating fitted: 'passenger motor vehicles'.

it may be because it is understood that a hue and cry by police, other aggrieved citizens and possibly landowners will persist for days or weeks afterwards, co-ordinated by the radios that all company cars carry. (Nevertheless a shot was fired at a company driver in 2000 near Maus Koranga, hitting his vehicle on the front wing.)

#### *'Community retaliation'*

The positive side of the long history of migration to Wau and Bulolo is that no one ethnic group now has the upper hand either politically or in terms of overall numbers. This means that while many groups may be involved in crime to some degree, there is a level of tolerance that once exceeded will cause the majority to temporarily set aside their differences and take joint action to suppress the one that has overstepped the mark.

A practical example concerns the behaviour of Chimbu settlers at Wau, believed to have numbered around one thousand in the early 1990s. The Chimbis may or may not have been inherently more unruly than any other group but, almost certainly, any attacks on one of their number would have been met with retaliation: their culture emphasizes duty towards 'brothers'. Over a period of time, this undoubtedly led to an asymmetry in their success rate at punishing others as against the success rate of other Wau groups in punishing them. When, on 23 August 1994, a Watut man was killed by Chimbu settlers the ledger was too far out of balance. At this point a compounding factor was that Watut culture emphasises retaliation at the expense of making demands for homicide compensation (archetypically a highlands custom). At any rate, Watuts and others living in Wau banded together, burnt about 20 Chimbu houses and killed an old Chimbu man (Kim Denwer 'Wau situation report' 23 August 1994). The result, after several more days of unrest, was that all of Wau's Chimbu settlers were forced to pack up and leave.

This obviously is an instance of inter-ethnic fighting, but those who were present say it followed at least fifteen years of provocation. The result did not make the situation untenable for a business to run its affairs; in fact many Wau people say it has been a positive outcome. Similar sporadic acts of 'community retaliation' have occurred from time to time between 1994 and the present. (And are quite different in nature to the endemic inter-ethnic lawlessness in Southern Highlands which filled the media during 1999-2000, where trucks and cars could not drive freely on the roads.)

#### *Local inter-ethnic conflict*

An instance of local inter-ethnic conflict occurred in early April 2000 that reflects the ancient history of relationships between the Manki and Watut people. The Manki—in reality Narakia, Ingyeta and others clans—fled the Langimar Valley in the Middle Watut perhaps a hundred and fifty years ago and settled in the Upper Watut and the Bulolo Valley.

As Watuts migrated into the Upper Watut in the 1880s and 1890s they chased the Manki eastwards until only a handful was left. Accounts of what happened next are varied (see Working Paper No. 7), but a typical example is that an orphan boy surrenders to a Watut leader's wife as she works in her garden. She persuades her husband to spare him, and he is given gardens and eventually found a wife, whence a line of Manki people is re-established.

Today the Manki live in two villages, the main Manki village near Society and Firetower (or ‘Manki Tower’ or ‘Tower’<sup>33</sup>). Some now-distant relatives from Langimar, a much less developed area, may have joined them recently and have helped built their numbers up again.

In early 2000, though, Manki youths had been causing trouble raiding PMVs on the Aseki road and carrying out crimes like break-and-enter around Society. Their patience at an end, Watuts mobilised against the Manki and burnt a store and several houses on 9 April 2000. A few days later many hundreds assembled, armed and in full traditional dress, at Yamaini and Pararoa ready to swoop on Manki and completely destroy it. The Wau and Mumeng police responded and were able to prevent a further attack.

In response to this crisis, community leaders organised a rally on 19 April 2000 on the football field at the former New Tribes Mission at Mainyanda, inviting the Governor, Luther Wenge, the Member for Bulolo, Samson Napo, and other officials to attend. A dais was prepared on the back of a truck for the dignitaries to listen to their grievances.

Hundreds of Watuts attended in traditional dress and smeared with red clay. The Manki, threatened with attack from all sides and unable to leave their village on foot, were fetched to Mainyanda by PMV truck and placed in a small group at the front. Armed Watuts now entered the field, dancing and twanging their bowstrings towards the dais, to present a petition to the Governor, demanding that the Manki have seven days to leave the Watut and go somewhere else.

On a prearranged signal, other groups of armed Watuts now sprang out from places of concealment in the pines trees at the back of the field and surged forward to attack the Manki. The total number of Watuts may now have been (N. Mitio and L. Giam pers. comm.) over a thousand. The Governor responded and attempted to calm the crowd but angry Watuts surged forward swinging axes. The dais was overrun and the dignitaries were forced to flee.

This drama very nearly did lead to the eviction of the Manki from the Upper Watut, but somehow feelings were cooled and talk continues today. It was nothing new—from the foundation of the Otibanda patrol post in 1932 the Manki were guarded from attack by Watuts; patrol reports show that the Manki were again under police guard in the early 1950s.

There are no implications<sup>34</sup> for company operations and the nature of the incident shows that a lengthy period of lawlessness or ‘tribal fighting’ did not ensue in which, for example, road traffic might have been blocked or opportunists turned to looting vehicles. Instead it serves as a reminder how seemingly ancient historical issues inflame passions quickly and that people can mobilise quickly, and in numbers, in the ‘community retaliation’ mode I have just discussed.

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<sup>33</sup> The name ‘Tower’ comes from the forestry fire tower near the village. However, during the mapping exercise for the 2000 census, the village was incorrectly recorded as ‘Tawa’. There really is a Watut place called ‘Tawa’, but it is in Aseki—and therefore culturally inappropriate to use for the name of a Manki settlement.

<sup>34</sup> Unless infrastructure required for the project needed access to Manki land. This was a possibility under AGF’s plans for the access road.

## Crime reports

### *Wau police statistics*

Crime reports were obtained from the Wau police station for the period January 1999 to July 2000 (Table 38). As everywhere in Papua New Guinea, crime is underreported and official statistics are plagued with inconsistency across reporting periods, geographical areas and reportable categories.

	1999*	2000†
Murder	3	1
Attempted murder	1	0
Infanticide	1	0
Pack rape	1	1
Rape	6	3
Attempted rape & sexual assault	1	2
Armed robbery	7	14
Looting	0	1
Robbery	3	2
Attempted robbery	2	0
Break, enter and steal	27	17
Grievous bodily harm	4	5
Wounding	2	1
Arson	3	1
Incest	1	0
Carnal knowledge	1	0
Death in custody§	0	1

**Table 38 Wau police station crime statistics: criminal offences**

\* no data returned in October and December; † January-July only.

§ See discussion in the text. I thank Susy Bonnell for interviewing the Wau station commander and chasing up these figures.

It is not clear what area the data in Table 38 represents. In the accompanying Crime Report Register, the vast majority of incidents logged were committed in Wau town, but some were supposedly committed as far afield as Pararua in the Upper Watut, Biarua and Memyamya.<sup>35</sup> In the catchment of the Wau police station, only socially dramatic incidents tended to be reported from villages. For example, one rape and one assault were reported at Winima and one rape at Kwembu. In reality, offences of all kinds are committed in villages and settlements, of which some are dealt with by customary means and others remain unresolved. The incidents reported from Biarua and Memyamya, both a day's drive from Wau, fall into the 'socially dramatic' category and were grievous bodily harm and wilful murder. Rape is obviously a 'socially dramatic' crime, and though it can be reported with a great outcry, the fear of shame means that we do not actually know the true number of cases each year. It is widely suspected that there are far more cases than are reported.

<sup>35</sup> There is a 'Where committed' crime report column, but it cannot be ruled out that the place of origin of the complainant has been entered in some cases.

Only one crime appears to have been committed against expatriates in the 18 months of data collected by Susy Bonnell for the table.<sup>36</sup>

*News media content search, 1999-2001, for Lae, Wau, Bulolo*

Crime is under-reported in Morobe Province compared to the National Capital District, both in official statistics and because of the lack of locally-based media. Nevertheless, the following news items dating to the start of PNG newspaper archives on the internet are indicative of the situation.<sup>37</sup>

- *Independent* 5 Aug 1999. ‘Twenty detainees broke out of Lae police cells on Monday after they cut the iron bars from the cells. Lae Police Chief Tony Wagambie said that the 20 detainees were charged for various crimes ranging from armed hold ups to break and enter and attempted murder. Mr Wagambie warned Lae residents to be extra careful when moving about after hours and to report any suspicious people in their area.’
- *Post-Courier* 6 Aug 1999. 41 Chinese boat people who had landed at Gasmata, West New Britain, disappeared from Lae.
- *Post-Courier* 3 Sep 1999. Police chief replaced following ‘an apparent upsurge in crime in Lae City’.
- *Post-Courier* 19 Aug 1999. ‘Morobe Governor Luther Wenge said yesterday an inquiry was needed to save the country millions of kina in “special land deals”. Mr Wenge said the Morobe Tutumang (assembly) would this week debate the issue of alienated land in Lae and other districts in the province that had been “given away” by the land board or previous lands ministers to private developers and individuals without proper tendering procedures being followed. He said the Tutumang would agree on a move to petition Parliament, through the national Members from the province, to set up the special inquiry. Mr Wenge claimed he had evidence to show that some State land in Lae and in Wau and Bulolo had been given to private developers illegally.’
- *Post-Courier* 4 Jul 2000. ‘Four hijackers in Lae get jail terms’—they robbed a plane at gunpoint in Sialum, Morobe Province, in January 1998.
- *AAP (on Wantok’s Forum* 7 Nov 2000). ‘An Australian woman has been shot and then stabbed to death by robbers in the Papua New Guinea city Lae. Helen Suzanne Nish, formerly of Macedon in Victoria, was carrying company cash and cheques totalling kina 4,618 (about \$A4,000) when she was confronted on Monday outside major electrical goods chain store Brian Bell, where she was the administration manager. Lae Metropolitan police commander, Chief Superintendent Awan Sete, told AAP today that a gang of men on foot approached her car as it arrived at the store. “One of the men yelled at her to get out of the car and another fired a shot from a pistol into the passenger window,” he said. “The bullet hit her in the left side, but it was not fatal.

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<sup>36</sup> On 27 February 2000, Susy Bonnell and I were robbed at knifepoint on Dover Road in Wau! Our incident is one of the fourteen armed robberies logged in the Crime Report Register for the first half of 2000 (and was typical of the others).

<sup>37</sup> Google search of [www.zipworld.com.au](http://www.zipworld.com.au) (*National* newspaper) and [www.postcourier.com.pg](http://www.postcourier.com.pg) (*Post-Courier* newspaper) domains for ‘police’, ‘Lae’ etc. (The actual newspapers did not arrive in Wau every day during 2000.)

“When she got out of the car another member of the gang stabbed her in the back and her heart was pierced. She died at the scene.” The robbers grabbed her bag and escaped with kina 1,013 in cash and kina 3,605 in cheques which she had earlier collected from a subsidiary Brian Bell store.’

- *National* 14 Nov 2000. ‘The voluntary stop work rally yesterday in Port Moresby and Lae to protest against the Government’s privatisation drive met with mixed results. In Port Moresby, it was business as usual throughout much of the city and Prime Minister Sir Mekere Morauta refused to meet union executives to accept a petition. In Lae, hooligans took advantage of the planned march to break into and loot a supermarket before police restored order although most businesses remained close in the morning.’
- *National* 15 Nov 2000. ‘The Morobe Provincial Law and Order Committee yesterday urged police to arrest the organisers of the aborted anti-privatisation rally in Lae on Monday, which forced the closure of businesses after the crowd went on a rampage ... Businesses and government activities in Lae came to a standstill when the meeting on anti-privatisation got out of control, leading to the destruction of some shops ... The committee also noted that the cost of damages to properties and loss of business ran into tens of thousands of kina.’
- *National* 21 Nov 2000. ‘Meanwhile, the sister of a man, Michael Pokana shot dead in Bulolo last Monday has denied media reports that the men who shot her brother had demanded money before the shooting. “My brother was shot by the criminals for reasons known only to them. They did not demand any money from him,” said Ms Judy Pokana. She also said that her brother was 30 years old and not 34 as reported last week. Police in Bulolo have arrested two suspects and are still investigating the shooting of Mr Pokana.’
- *National* 1 Dec 2000. ‘A senior lands official in Lae, Morobe province was yesterday charged by the Department of Morobe with misappropriating public funds. More officers are expected to face similar charges once investigations into the alleged theft of cheques are complete ... According to documents obtained by The National, the senior lands official was alleged to have been part of a group that collected cheques meant for provincial lands board members and cashed them. The cheques to the amount of almost K3,000 were the sitting allowance for provincial lands board members.’
- *National* 12 Dec 2000. ‘Morobe police arrest plane hijack suspect.’ The light Cessna 402 owned by North Coast Aviation was enroute to Port Moresby from Lae when it was forced to land at Garaina airstrip in rural Morobe. The hijackers escaped with 20 kilograms of gold valued at K500,000. Bulolo police said they arrested the suspect at a road block at Gabensis village on Tuesday morning’.
- *National* 12 Dec 2000. ‘Wau police are also investigating the death of a high school teacher after a drinking brawl at the weekend. Morobe provincial police commander superintendent Peter Nessat confirmed the incident and said he was awaiting a full report from the police station commander in Wau. A police spokesman said yesterday that teachers from Grace Memorial High School in Wau were having their Christmas party at the school grounds and sent the school driver over to look for more beer at a drinking club in town. “When the driver arrived at the club to buy some beer he was confronted by some youths and a commotion took place which resulted in the smashing of the school bus windscreen,” said the spokesman. The spokesman said the driver returned to the school and reported the incident to the teachers who then got into the

bus and went over to investigate the incident. “When the teachers arrived at the club to investigate the incident, the suspects picked on them and another fight broke out resulting in the headmaster and one of the teachers sustaining serious injuries.” He said the seriously injured teacher was rushed to Angau Memorial Hospital on Saturday morning where his condition deteriorated and he died on Sunday morning.

- *National* 13 Dec 2000. ‘Wau police are investigating the case of a man who was hacked to death in a payback attack for the earlier killing of another man from Kaisenik village in Wau, Morobe province on Sunday. A reliable source told The National yesterday the Kaisenik man was killed and his body dumped at the Kauri river last Thursday. When his kinsmen found his body on Saturday, they went to the alleged killer's house, caught him and hacked him to death. A police spokesman from Wau said on Monday that police are still interviewing a number of people from the village and no arrests have been made.
- *National* 18 Dec 2000. ‘Culture and Tourism Minister Samson Napo has condemned the brutal killing of two men in his Bulolo electorate over the weekend. Mr Napo said both killings took place in Kaisenik village in Wau, and were carried out in a barbaric manner by people who have no regards for human lives.’
- *National* 20 Dec 2000. ‘Four arrested over killing of teacher’.
- *National* 20 Dec 2000. ‘Wau police are coming close to making arrests in relation to the payback killing of a man from Kaisenik village two weeks ago’.
- *National* 20 Dec 2000. ‘Criminals held up a government vehicle travelling down from Wau last week and harrassed and threatened a government worker. The alleged victim told The National that security must now be tightened in the flood hit areas at night as many people who are stranded on both sides of the Kumalu river were attacked and robbed by criminals.’

### *Homicides*

There were seven homicides that I know of in the Wau-Bulolo area in 2000. Only two were killings of the kind usually associated with ‘law and order’ problems—that is, where the killer is unknown to the victim and commits the crime during a robbery or following a pattern of gang violence.

In November, a coffee-buyer, Michael Pokana, was shot at near the junction of the road to Aseki at Bulolo during an armed hold-up. In December, in the incident involving the Christmas party at Grace Memorial High School, Mr Werimap, a teacher from the Ono River area, was beaten and died of head and internal injuries.

Four murders occurred in villages among people who knew each other. In February, the mother and niece of the Qavaingo spokesman, Contreas Kipamono, were murdered in their house at Akikanda in the Upper Watut. Although the motives remain unclear and even the relatives of the victims do not appear to know for sure who was responsible—they were jailed for burning down the houses of those they suspected of being implicated—it is obvious this was not the random act of strangers. It is worth noting that nothing was reported in the newspapers. In many parts of the country killings like this would have triggered the mobilisation of large tribal groups, demands for huge amounts of compensation from the clans of the suspects, intervention by the police mobile squad, and even coverage on television. This is because, notably in the highlands, killings shift from being merely ‘socially dramatic’ to being the ‘politically dramatic’ events that

engender wide media coverage. This does not normally happen in the Upper Watut or among the Biangai.

On the same weekend as the Grace Christmas party, two killings occurred at Kaisenik village in circumstances which are not fully understood. Two youths, one from a Biangai family and the other a Wantoat adopted into the village had grown up together. The Biangai youth and some witnesses from another area were sleeping in the house they all shared, when the other returned late at night. An argument ensued resulting in the second youth killing the first (or, in another version, the victim was killed in his sleep). The perpetrator, probably assisted by the witnesses (who have fled the area), dragged the body to the Bulolo River and dumped it there. When the crime was discovered a hue and cry ensued resulting in the perpetrator being brought to the church at Kaisenik, where he was beaten publicly to extract a confession. He confessed but died of his injuries. Many blamed the police for being late to respond to the situation. It is not known if arrests have since been made.

If this was a case of villagers taking the law into their own hands, the first violent death early in the year is noted in the Crime Register as a 'death in custody'. The son of a Wau PMV owner was suspected of involvement in a theft at Lae and was apprehended at Bulolo by police and other local officials one afternoon. He was, by all accounts, driven to Wau by a back road while being beaten by them, suffering what would prove to be fatal injuries. He was then attended to but died in the night, his body being placed in a cell *after his death had already taken place*.<sup>38</sup>

#### *Comparison with other jurisdictions*

Thus, as in Western countries, those who kill are most likely to be well known to their victims. Having said this, is Wau more or less violent than other places?

If it is assumed that the seven homicides represent the true number that occurred within the Watut Council, Wau Rural Council and Wau-Bulolo Urban Council areas in 2000, an estimate of the underlying rate can be made, along with some comparisons (Table 39). The homicide rates of Western countries vary enormously: the US is violent and its rates are generally the highest; Australia is somewhere in the middle; Japan has about half the Australian rate.

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<sup>38</sup> Puzzled as to why a 'death in custody' was in the Crime Register—this would normally understood to be a suicide, death from an undiagnosed medical condition or severe intoxication—was counted among crimes, I initially failed to include it in the table. But the full explanation shows that it was known to the officer filling in the Crime Register to be a homicide.

	Homicides	Population	Rate/100,000
Wau 2000 *	7	approx. 40,000	17.5
Northern Territory 1990-1991 ‡	approx. 29	approx. 180,000	16.0
Wau 1999 †	4	approx. 40,000	10.0
United States 1995 §	21,606	263,488,000	8.2
Northern Territory 1999-2000 ‡	6	194,000	3.1
All Australia 1999-2000 ‡	337	18,722,000	1.8

**Table 39** Approximate homicide rate in the Wau-Bulolo area with comparisons.

Notes: \* rate subject to revision when population figures from the 2000 national census are released; † nominal number only and mixes areas; § data from FBI Uniform Crime Reports (on the internet); ‡ data from Mouzos 2001.

In comparison to them, and even granting that the present data are poor, Wau fits in as a violent place. An interesting comparison is with the Northern Territory, the most violent place in Australia, where the homicide rate peaked in 1990-91 at a rate apparently similar to that being experienced around Wau. (The Northern Territory rate has declined each year since then for reasons that are not quite clear.) At the ‘all Australian’ rate, one homicide may be expected among 40,000 people every two years—at Wau we actually see at least eleven.

Further cautions are as follows. All crime rates are sensitive to the relative proportions of different age groups in the population. For example, younger age groups offend at up to four times the rate of the general population; if the Australian population was corrected to the same youthful, demographic structure as the population of Wau and Bulolo, its homicide rate might be twice as high. But the Wau figures may undercount, or omit entirely, deaths that more rigorous investigations or legal interpretations would have classed as homicide, understating its true rate. These include: infanticide (one case reported in Wau in 1999), deaths of women accelerated by domestic violence, deaths from ruptured spleens in fights (one case at Nauti village in 1998), deaths where victims were extremely drunk and the cause of death was not ascertained and, as already discussed, deaths in dubious circumstances where there is no immediate complainant.

### Other kinds of serious crime

The media reports mention most of the other kinds of law and order problems that the area is susceptible to. These are:

- armed hold-ups on the roads (see *National* 20 Dec 2000);
- armed robberies at banks and other local businesses;
- aircraft hijackings (see *Post-Courier* 4 Jul 2000, *National* 12 Dec 2000);
- murders and other violence during robberies and home invasions in Lae (see *AAP / Wantok's Forum* 7 Nov 2000);
- riots and looting (see *National* 15 Nov 2000);
- white collar crime: ‘special land deals’ (see *Post-Courier* 19 Aug 1999);
- white collar crime: ‘inside jobs’, misappropriation of funds, etc.

These categories warrant individual discussion:

### *Armed hold-ups on the roads*

The armed hold-up is arguably the commonest form of premeditated serious crime and is the classic *modus operandi* of the PNG *raskol* in this area. It may not be correct to describe the groups of men who carry hold-ups as ‘gangs’—for some writers, a ‘gang’ ought to have more permanence than do most PNG gangs—but those who do hold-ups do so in groups of four to six men. Such groups procure weapons in advance through black market connections. Usually at least one factory made gun is used; one or more home-made guns may be in evidence. A getaway car is stolen if the gang is from the direction of Lae (fitting into one vehicle is one reason why gangs are not larger), but this is of limited usefulness if the gang is from a local settlement. Otherwise an ambush spot is chosen near to bush tracks leading back to a settlement where gang members have relatives who will hide them, even if they do not live there permanently.

Favoured spots for vehicle holds-up are

- near Pine Tops Bridge and Cliffside in the Bulolo Gorge;
- between Aitape Compound and Pine Tops Bridge at Bulolo;
- on the Aseki Road just outside Bulolo;
- between Bayliss and No.8 just north of Bulolo;
- at various isolated places, often bends or steep inclines, between Bulolo and Lae.

PMV passengers are frequent targets and most people who travel regularly by PMV to Lae have been held up at some time or another in the past or have had narrow escapes.

A bad section of road at one time was around Gurakor, but this has been quiet since 1996 or 1997 when the Wau community retaliated: three or four ‘BM’ buses (owned by Mr Bimalo Mamit of Wau) set out and attacked the village in force, burning houses and even using chainsaws to cut down betelnut palms. Rev. Ulrich Bergmann and his Lutheran co-workers at Bundun, adjacent to Gurakor, may also have village youth extension programmes which have had a positive effect.

During 2000, company vehicles only had trouble on four occasions, according to the drivers. The first, in February, followed a minor accident in which a company vehicle and a village PMV side-swiped one another on a bend. The PMV owners, from Timini village, held-up the next vehicle to pass through their village and demanded immediate compensation. This was not a serious incident and was resolved through mediation with the traffic police stationed at Mumeng.

In the second incident, a company driver was fired upon near Maus Koranga, Wau, the shot hitting the front side of the vehicle. He passed through and called back to Wau by radio. Another company vehicle was able to respond within a few minutes and pick up police from Wau to make a search, but the offenders were not found.

The other two incidents occurred at Three Mile in Lae; I was present on both occasions.<sup>39</sup> In March, a gang was just moving a log into the road as the company vehicle passed; armed with an M16 and an unknown number of shotguns, it ransacked vehicles coming up behind. In December, a rock was thrown at a vehicle coming into Lae through Three Mile, smashing the windshield but not causing injury.

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<sup>39</sup> I drove between Wau and Lae approximately 30 times between February and November 2000; all company vehicles may have made 200 trips or so during the year.

*Can the company use the road between Lae and Wau in safety?*

The key question is: how safe is the road between Lae and Wau?

Valid comparisons can be made with three major road links to resource projects elsewhere in the country: the Kiunga Highway linking the port town of Kiunga with Tabubil in Western Province, the Enga Highway linking Mt Hagen with Porgera, and the road from Mt Hagen to the Kutubu oil field and the Hides gas field in Southern Highlands Province.

The Kiunga Highway (opened 1983; length 135 km) has always been trouble-free. With the noted exception of a bank robbery and shoot-out in the late 1990s, the North Fly has a very little crime. Road blocks were common during construction, but were all caused by disputes over land access and compensation. On the rare occasions they were seen in the first ten years of operations (e.g. August 1992), the cause was also disputes between villagers and the company (cf. Burton 1997).

By contrast, the Enga Highway (upgraded to take mine traffic 1986-90; length about 150 km) posed a very considerable problem for the Porgera Joint Venture during construction and the early phase of operations. Largely as a result of the road, and the realisation that its law and order problems would not be dealt with by State agencies, the number of Community Relations staff employed by the company rose from about one dozen based at the mine site to about 85 people across the whole province—a far greater number than ever used at any other mining or petroleum project in Papua New Guinea (cf. Bonnell 1994:112; Burton 1999).

Problems reported by staff at Hides make Porgera's difficulties pale into insignificance; at a meeting between hauliers and police that I attended in Hagen (in connection with drought relief) in 1997, it was clear that a state of open warfare existed among local groups in the area and between them and the police. The Southern Highlands police commander, for his part, reported that his men had nearly forty outstanding claims for compensation in connection with shoot-outs between highway gangs and police. *All* trucks breaking down en route were looted; gangs were climbing onto the back of semitrailers on steep ascents and opening containers through the roof and emptying the contents.

In these two last cases, lawlessness on the highway beyond Mt Hagen has exacted a heavy financial burden on the resource operators running into millions of kina each year—not to mention the effect on the well-being of drivers and mechanics, and not counting the *additional* cost of delays and vehicle breakdowns caused by the decayed state of the Okuk Highway from the Markham through to Hagen.

Happily, the Lae-Wau road resembles the Kiunga Highway far more than it does the Enga or Southern Highlands Highways. Moreover, it is understood that the initiatives from Bundun in village-level development, with modest resources, have borne good results in terms of the attitudes of youths in the roadside villages.

This said, the road should not be taken for granted as the near misses in 2000 should make clear. A particular concern is that company vehicles may be held up and stolen for use in robberies, as it is well known that they are in good running order and have full fuel tanks. If this does happen, the robbers will also find themselves able to hear the radio traffic that the police and other searchers are using. The company would be well advised to have emergency radio procedures for reporting vehicle locations, directions of movement, number of passengers and so on in such situations (→ *Recommendation 52*);

a much clearer policy is also needed in situations that require police assistance (→ *Recommendation 54*).

#### *Armed robberies at banks and other local businesses*

Wau has its own criminals, but major heists are often planned and executed from Lae, whether or not they involve local identities. The Papua New Guinea Banking Corporation agency at Wau was robbed twice in 1997 (after which it was closed). On the first occasion, the gang arrived in Wau with a car stolen in Lae, saw that its preferred target among the stores had too much security, then robbed the PNGBC. The gang escaped with about K30,000 towards Wau Ecology and, dumping the vehicle, made off on foot. None was caught. On the second occasion five men arrived on foot with guns hidden in khaki bags, stole over K50,000 and made off in an employee's car through the Wau Valley, abandoning it in the Wandumi forestry area. A hue and cry ensued and two of the perpetrators were apprehended and beaten by the town mob, and later imprisoned. (Information from former PNGBC employee T. Osikore and others.)

In late 1998, a different gang came up from Lae with automatic weapons, stole a police car at the Wau market and robbed most of the stores in the main street. Once again, the gang abandoned the police car in the Wau Ecology area and ran off on foot into the bush.

Typically, then, a gang does not try to escape from Wau or Bulolo by the main road at the time of the robbery. Instead, the robbers attempt to melt away into the settlements for a few days where they can be harboured by peripheral gang members or trustworthy wantoks. The main aspect of their planning is thus to outwit the general Wau community by not being recognised during a robbery and then to lie low without attracting attention.

The obvious means of catching such suspects is for the police, with the help of their reserve constables, to saturate an area suspected of harbouring the suspects in the days immediately following a robbery—but the resources needed to do this are not available at the present time.

#### *Aircraft hijackings*

The unusual crime of aircraft hijacking has occurred several times in Morobe; the province has many rural strips to and from which cash and gold are carried by light plane. The modus operandi is for the highjackers to board as passengers, then to produce weapons and make off with the valuables at the next strip, from which they have planned a getaway in advance.

As indicated in the newspaper report (*National* 12 Dec 2000), the most recent occurrence involved (a claimed amount of) 20 kg of gold en route from Wau to a refinery in Port Moresby. Given the circumstances, the inescapable conclusion is that the highjackers had inside knowledge of the timing of the shipment and the method of transportation.

An intriguing speculation is how the robbers may have disposed of their haul, which was in the form of 'gold dust' and 'piece gold' exactly as bought from alluvial miners. Since it could be dangerous to try and sell large amounts in other centres, the most logical place for robbers to bring the gold is back to Wau—where they could sell it back in small amounts to the buyer it was stolen from in the first place. (And if so, someone is likely to find them out.) I mention this because while the theft was obviously a major setback for one Wau business, it may be that the proceeds of the crime will in time return to the economy of Morobe.

(On the other hand: not if they stole to order or had a pre-arranged contact in Port Moresby.)

In respect of the present project, more secure arrangements are obviously essential. The above case involved a scheduled passenger flight, but charter operations are also vulnerable. This is notably the case at the Port Moresby end, and several armed robberies have taken place at Jackson's Airport in recent years.

### *Crime in Lae*

Lae is a more hostile place to live in than Wau, because it is a city and consequently neighbourhood groups are too small to be able to influence law and order by example or community action. The identities I called *raskols* in relation to the Wau crime seen are rather superseded by a permanent class of 'street boys' who either 'look after' an area and its residents, making a living as they can but generally keeping out violent criminals and only raiding the areas of other street boys if provoked. Whereas *raskols* might be thought of as living in settlements and coming out at night to commit crimes in residential areas, street boys live in residential areas all the time.

All Wau visitors take precautions on day visits to Lae—not walking alone unnecessarily, holding onto their string bags and always guarding vehicles—and expatriate staff are wise to copy local practice.

Two expatriates were murdered in Lae in the twelve months from February 2000. Up to date assessments of security issues can be obtained by contacting consular officials at the Australian High Commission.

If the company needs to base staff at Lae, the security and location of office facilities will be a major issue, not to mention the security and cost of housing for staff, whether national or expatriate.<sup>40</sup> There are other social problems. Some national staff may be reluctant to live in Lae if there is road access to their home areas: Wau can be preferred because of the privacy it brings. Expatriates with families can find the scarcity of recreational facilities difficult to cope with; on the other hand the International School of Lae is a very good institution with arguably better standards than a typical government school in Australia.

### *Riots and looting*

The media reports concerning disturbances in Lae (*National* 14-15 Nov 2000), understate the full extent of what occurred.

Essentially the Trades Union Congress called a day of action against the national government's policy of privatising its utilities and nationally owned business organisations (e.g. Air Niugini, the Papua New Guinea Banking Corporation). This might seem a matter of holding a political rally to send a message to Waigani, but the crowd became inflamed and a riot developed. The stores that did not lock up immediately were looted and the police are said to have shot and killed two people, one a PMV driver from either the Watut or Menyamya.

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<sup>40</sup> Rentals are extremely high for an indifferent quality of house, as I found out in Eriku during 2000, and the location in a relatively 'good' area did not prevent the discovery of between three and six bodies (depends on the version) within a 500m radius of the house.

It should be noted that the ‘foreign experts’ are popularly blamed for Papua New Guinea financial woes—even though the plain evidence in the daily newspapers is that the plundering of national institutions is a home grown affair—and anti-World Bank sentiment is high.

These feelings quickly turn to anger at what are perceived as ‘greedy’ businesses when a riot is on. Wau is not immune to this phenomenon (see ‘community retaliation’, p. 76), but there are limited circumstances in which company property could be threatened during a local disturbance:

- a dispute over allegations of favouritism in the hiring and dismissal of employees, or the letting of small business contracts by the company, were this to occur;
- a dispute over allegations of unfair dealings with ‘outsiders’ by the company at the expense of local interests, were this to occur;
- a perception of some kind of lack of respect by the company for local sensitivities, e.g. if the police used heavy-handed tactics to quell a mob (and, as in November 2000 at Lae, shot someone) and the company was felt to be in collusion;

These are entirely preventable scenarios, so long as management pays attention to maintaining the long-standing balance in its social and commercial relationships with the community and acts with appropriate transparency (→ *Recommendation 53*).

#### *White collar crime*

I have dealt with what I called ‘corruption of process’ cases involving land in Volume I, a major category of white collar crime that this area is susceptible to. But the biggest crime perpetrated against Wau residents during 2000 was not even committed inside the province: it was the National Provident Fund financial scandal in Port Moresby. The NPF is a compulsory superannuation fund to which all private sector employees must contribute (with the notable exception in mining of Ok Tedi Mining Limited employees, who have a private fund set up under special legislation).

The final writedown of employee contributions may be less than the original 50% announced in 2000, but it is likely to have cost Wau residents alone some millions of kina when the rescue package is complete. While it remains to be seen whether any NPF staff or directors will be prosecuted, NPF contributors at Wau certainly class the actions of those in charge as white collar crime.

The reason for pointing this out is that many see strong linkages between unpunished white collar crime and more conventional law and order problems in Papua New Guinea. The grassroots criminal is often a figure of sympathy, a Robin Hood who acts to redress the imbalance between rich and poor. There is something in this, and low level crime may well be worse because of perceptions of misbehaviour among the elite. But at the same time, there is a positive lesson for business; if ordinary people react to bad behaviour, the corollary is that they will also respond well to the manner in which good corporate citizens conduct business.

This should therefore reinforce the company’s will to act with probity and fairness to its employees and to the people its encounters daily in its business environment. In 1998, this reputation for fair dealings came close to breaking down when MCG was under administration, but it is happily true to say that a fund of trust has been re-established since then.

## **The needs of the police**

At Wau and Bulolo the police face problems endemic to the country as a whole: ancient infrastructure, no maintenance, poor in-service training, the starvation of essential operational resources like fuel for vehicles.

I will single out two problems in particular. First, the police are able to get out in force given advance warning of trouble but have limited capabilities to maintain a constant presence at a trouble spot for any length of time, and they cannot go far off the main roads. If there is a sudden emergency, it is unpredictable whether police will be able to attend promptly or not. For example, police were roundly criticised over the Kaisenik incident in December 2000 for taking some hours to respond when the suspect in the first killing was found. In the shooting incident at Maus Koranga, the company driver alerted Wau Base immediately, but all police vehicles were off the road. Another company car was sent out, collected police from Wau police station and took them to the scene. During the Watut-Manki clashes in April 2000, police from Mumeng attended, but the Wau police had to request company assistance in transporting their men.

The second problem is that police have a poor record of obtaining convictions because their low standard of case investigation means that they do not consistently attend court with properly prepared evidence. This can be simply due to poor police work or it can reflect managerial inadequacies, such as when officers are transferred between police stations and all the cases they are working on collapse for lack of documentation. There are problems in the court system: cases are often deferred for long periods, and remand prisoners often escape before their trials. All in all, frustration at the low conviction rate is widely acknowledged to fuel a cycle of police and community violence against suspected offenders.

The company will find this as trying as all other members of the community do, but care should be taken not to get into a position where the company is perceived as garrisoning police for its private use. All citizens would like the police to patrol their neighbourhoods; the company should be watchful of perceptions of favouritism<sup>41</sup> (→ *Recommendation 54*).

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<sup>41</sup> In 1997, the Wau police seconded two police to stay at the Hamata exploration camp, where they were fed and housed by the company. This should only ever happen again in very extreme circumstances, and after proper consultation with other local stakeholders.

## CHAPTER 7

### RECOMMENDATIONS FROM VOLUME II

(Volume I contains 42 recommendations.)

#### **Protecting the environment**

*Recommendation 43.* The company should negotiate with Nauti leaders to ensure that (a) their nominees for employment are discouraged from moving their families onto Nauti land and (b) any internal disputes they may have do not impact on the vicinity of the project in terms of a settler influx (p. 34).

*Recommendation 44.* When (as has been the case at certain stages of exploration) the company hires significant numbers of employees from Nauti, it should monitor its practices in relation to pick-up and drop-off points so as to minimise foot traffic in the direction of Hidden Valley (p. 34).

*Recommendation 45.* The company should negotiate with Biangai elders and the Wau Local Government Council to establish a clear policy on settlers. At Kwembu and Winima, outcomes should ensure that any internal disputes they may have do not impact on the vicinity of the project in terms of a settler influx (p. 39).

*Recommendation 46.* A agricultural consultant should be used and/or the advice of NARI sought in due course to advise on subsistence improvement and environmental conservation measures that may be taken in Watut villages and by settlers on Kwembu and Winima customary land (p. 40).

*Recommendation 47.* A 'whole of environment' view should be adopted by the company when assessing its own environmental performance. The project's Environmental Management and Monitoring Committee (or equivalent) should keep up discussion with the Wau and Watut Councils and with customary owners in relation to land management issues between the lease boundaries and population centres (p. 40).

#### **Community development: village projects**

*Recommendation 48.* Resources that the company, or any other party, may undertake to commit to Community Development at the Mining Forum or in any other negotiations should be matched by sufficient additional resources to properly plan and oversee projects in villages, or they will fail (p. 45).

#### **Health services**

*Recommendation 49.* In respect of all involvement with health, a heavy emphasis must be placed on regular face-to-face contact, the follow-up of sick patients, and health education. (p. 56, 63).

*Recommendation 50.* Success in health delivery should be evaluated by outcomes, not procedures, training effort, working relationships and the like. The primary indicator should be a reduction in the excessive rates of mortality in some villages and age groups (p. 57).

*Recommendation 51.* The involvement of appropriate donor agencies, NGO groups, and research institutions should be sought out as a means of improving the effectiveness of health programmes. In some areas (e.g. HIV-AIDS) there are large existing aid programmes; working relationships should be established with them as soon as possible once the project goes ahead (p. 65).

## **Security**

*Recommendation 52.* The company requires emergency radio procedures for reporting vehicle locations, directions of movement, number of passengers and so on to use in the event of a vehicle being stolen on the Lae-Wau road (p. 85).

*Recommendation 53.* A short internal document is required explaining the rationale of the company's local contractual dealings and its employment policy, for the purposes of informing all staff in the goals of maintaining good balance in dealings with local stakeholders. At the same time, local contracts need to be put on a sound contractual footing so that the company's commercial relations in the local area are more transparent (p. 88).

*Recommendation 54.* A properly stated policy for police-company co-operation is required. Care should be taken when requesting assistance from the police, or when the police request assistance (e.g. logistical help) from the company, that there are no community perceptions of favouritism or unfair collusion between the company and the police in actions against particular groups. If there is a likelihood of doubt, consultation with other project stakeholders should take place before assistance is either given or requested (p. 86, 89).

## APPENDIX A

### ADDITIONAL HEALTH TABLES

<b>Diagnosis</b>	<b>Yokua</b>	<b>Kaumanga</b>	<b>Sapanda</b>
Sores	44	63	89
U.R.T.I.	39	24	84
Malaria	12	23	56
Tropical ulcer	11	14	15
Pneumonia	7	4	12
Diarrhoea	4	4	13
Dysentery	1	1	2
Otitis media	2	4	3
Conjunctivitis	4	2	6
Abscess	1	3	4
Arthritis	4	7	12
Scabies	10	8	9
Other	3	5	7
<b>Total</b>	<b>142</b>	<b>162</b>	<b>312</b>

**Table A1 Watut patrol from Bulolo Health Centre, 5-8 April 1993.  
Complaints attended to (Yamansang 1993).**

<b>Diagnosis</b>	<b>Yokua/ Kaumanga</b>	<b>Sapanda</b>	<b>Akikanda</b>
Sores	47	47	10
U.R.T.I.	8	3	5
Malaria	20	25	17
TU	10	0	4
Pneumonia	8	10	7
U.T.I.	15	6	0
Tropical ulcer	10	0	4
Arthritis	10	5	0
Scabies	0	15	0
Asthma	0	0	3
Other	15	30	2
Immunisations	36	53	18
<b>Total</b>	<b>179</b>	<b>194</b>	<b>70</b>

**Table A2 Watut patrol from Bulolo Health Centre, 2-6 August 1993.  
Complaints attended to (Wau 1993).**

## APPENDIX B

### ADULT MORTALITY IN WATUT VILLAGES

Good demographic baseline data now exists for the villages of Nauti, Minava, Akikanda, Yokua, Kaumanga. An initial round of field census was done in 1995 and an update round in 1997; village spokesmen have provided additional data when working on their genealogies between 1995 and the present. D. King's household survey shows which people were actually present in July 2000.

One assumption about poor health in villages is that the primary target should be reducing maternal and infant deaths and that better immunisation—a technical, 'Western' innovation—is all that is required to make dramatic improvements in life expectancy. Watuts do die in childhood, and at an unacceptable rate (pp. 52, 56). But the analysis of our data show that is an extraordinary level of mortality among young adults, and most notably among women, in these villages (Table 3).

Group	Residents mid-period	Deaths	Mortality rate (deaths per 1000 per 25 years)
20 - 44 males	161	8	49.7
20 - 44 females	134	19	134.3

**Table 3** Aggregated death rates for adults 20-44 years of age.

Table 4 lists the circumstances, insofar as they are known, for 19 deaths of married women that have occurred in the five year reporting period.

In eight of the 19 cases, one or other of the husband and wife had already been a widow, or the husband has since died. There is one instance of suicide.

The average age at death of these women was just under 30 years and they had an average number 3.7 children, of whom an average of 0.63 are now dead.

<b>Name</b>	<b>Date of death</b>	<b>Age at death</b>	<b>No. of births</b>	<b>Comments</b>
Isia KONTREAS origin: Akikanda died: Akikanda	1995	43 yrs	12 (3 d.)	Died after birth of 12 <sup>th</sup> child, who also died. Husband had previously married a brother's widow and remains with her.
Koni BALAPAS origin: Nauti died: Menyamya	1995	23 yrs	0	She was newly married at Nangama, Menyamya, when her family found out that she had died. She is not believed to have had any children and it is unknown whether she was pregnant or not.
Lonia LEMEK origin: Nauti died: Akikanda	1995	20 yrs	1 (0 d.)	Died when 1 <sup>st</sup> child was less than a year old. Husband has remarried a girl from Koke, Aseki.
Janeth FRIEDSEN origin: Gumi died: Nauti	29/10/95	23 yrs	1 (0 d.)	She died of a gynaecological complaint at Bulolo Hospital. Husband said 'she didn't look after her family planning pills properly'. Husband has not remarried yet.
Akakngopi NALUS origin: Akikanda died: Akikanda	1996	19 yrs	1 (0 d.)	Died when only child about two years. Husband's 1 <sup>st</sup> wife also died, after 5 children. Husband not known to have remarried yet.
Indipela ANDREW origin: Nauti 2 died: Minava	1996	32 yrs	4 (2 d.)	Died when 4 <sup>th</sup> child was about 2 years. Two other children are dead. Husband remains with 2 <sup>nd</sup> wife whom he had married prior to her death.
Yakusa PAROMIAS origin: Nauti died: Nauti	Oct 96	36 yrs	5 (0 d.)	Died when 5 <sup>th</sup> child aged about 10 years. Husband Paromias died a year before she did. Younger children are adopted to related families.
Ebether MARAKA origin: Kieto died: Nauti	2/10/96	18 yrs	0	Died when newly married.

**Table 4 Family circumstances of 19 married women born 1950-1985 in five village sample who are now dead (continued on next page).**

Esther TEN origin: Yokua died: Yokua	1997	37 yrs	6 (2 d.)	Died when 6 <sup>th</sup> child was about 2 years. Current status of husband, an Aseki man, unknown.
Jeneta JEFFREY origin: Tontomea died: Akikanda	1997	32 yrs	4 (0 d.)	Died with 4 <sup>th</sup> child was about 6 years. Husband has married new wife from same village. (New wife had one baby that died with another man, identity not known.)
Tema YATEME origin: Yokua died: Nauti	5/8/1997	44 yrs	6 (0 d.)	Was already a widow when she became Yateme's 2 <sup>nd</sup> wife. Died when last child was about 14. Husband's 1 <sup>st</sup> wife died in 1993 and his new 3 <sup>rd</sup> wife is the widow of a brother.
Lia JOE origin: Tontomea died: Yokua	1998	20 yrs	1 (0 d.)	Died when 1 <sup>st</sup> child about 2 years. Husband's 1 <sup>st</sup> wife also died, aged 26 years. Husband divorced 2 <sup>nd</sup> wife. Husband now with 4 <sup>rd</sup> wife.
Elizabeth GOSA origin: Minava died: Minava	22/12/1998	38.4 yrs	1 (0 d.)	Had only 1 child who was 17 when she died. Current status of husband, a Kapau man, unknown.
Julie YANGEN origin: Yokua died: Yokua	11/2/1999	23 yrs	2 (1 d.)	Died when 1 <sup>st</sup> child was less than a year old. Husband died shortly afterwards, aged 27 yrs.
Erica JAMES origin: Yawaipo died: Nauti	18/3/1999	24 yrs	2 (1 d.)	Died in childbirth with second child. Husband's previous wife had also died in childbirth, aged 21 years. Husband now with 3 <sup>rd</sup> wife.
Delia INAS origin: Nauti died: Nauti	6/5/1999	31 yrs	5 (1 d.)	Died when 5 <sup>th</sup> child was about 5 years. Current status of husband, an Okanaiwa man, unknown.
Yamuo VIONE origin: Menyi died: Nauti	6/7/1999	44 yrs	9 (2 d.)	Died when 9 <sup>th</sup> child aged about 1 year. She became Vione's 2 <sup>nd</sup> wife after both she and he were widowed. Husband is not currently married.
Delusamo FENIS origin: Yowanga, Kapau died: Nauti	17/11/1999	29 yrs	5 (0 d.)	She hanged herself. She was from Yowanga, Kapau, and had no relatives in her husband's village. Husband has not remarried yet.
Venita OVEN origin: Nauti died: Minava	21/7/2000	32 yrs	5 (0 d.)	Died when 5 <sup>th</sup> child five years old from complications arising from pelvic inflammatory disease. Treated at Bulolo and referred to Angau Hospital, but had no means to go there.

(Table 4 continued.)

## APPENDIX C

### SELECTED LIFE TABLES

The 'life table' is an actuarial schedule of mortality and is a useful overall way of capturing the health status of a population.

The first column in the life table, X in Table 5, is the age in years at the start of the interval. Many demographic textbooks discuss the remaining columns (e.g. Palmore and Gardner 1978).

The statistic most frequently quoted from a life table is 'life expectancy at birth' ( $E_0$ ). In Table 5, this is 40.9 years and is the first figure in the righthand column.

X	qx	lx	dx	Lx	Mx	Tx	ex
0	0.2000	1000.0	200.0	820.0	0.2439	40859.2	40.9
1	0.0188	800.0	15.0	3169.9	0.0047	40039.2	50.0
5	0.0112	785.0	8.8	3902.9	0.0022	36869.2	47.0
10	0.0138	776.2	10.7	3854.3	0.0028	32966.3	42.5
15	0.0067	765.5	5.1	3814.6	0.0013	29112.1	38.0
20	0.0338	760.4	25.7	3737.6	0.0069	25297.4	33.3
25	0.0625	734.7	45.9	3558.6	0.0129	21559.9	29.3
30	0.0929	688.8	64.0	3283.7	0.0195	18001.3	26.1
35	0.1229	624.7	76.8	2931.7	0.0262	14717.6	23.6
40	0.1476	548.0	80.9	2537.6	0.0319	11785.9	21.5
45	0.1621	467.1	75.7	2146.1	0.0353	9248.3	19.8
50	0.1661	391.4	65.0	1794.3	0.0362	7102.2	18.1
55	0.1687	326.4	55.0	1494.2	0.0368	5307.9	16.3
60	0.1847	271.3	50.1	1231.3	0.0407	3813.7	14.1
65	0.2241	221.2	49.6	982.1	0.0505	2582.4	11.7
70	0.2876	171.6	49.4	734.8	0.0672	1600.3	9.3
75	0.3771	122.3	46.1	496.1	0.0929	865.5	7.1
80	0.5299	76.2	40.4	279.9	0.1442	369.4	4.9
85+	1.0000	35.8	35.8	89.5	0.4000	89.5	2.5
N =				40859.2			

**Table 5 Life for Nauti village, both sexes. Number of persons ever born = 526. Number of survivors = 329. Cut-off date = 30 August 2000.**

Notes: The method of calculation used here differs from the conventional one in that mortality rates are based on the survivorship of actual cohorts from birth to the present, not across an intercensal period. Elevated risks of death in the past will worsen life expectancy rates across the table but will not affect the 'probability of dying in the interval' values for the younger age groups. In the present case, approximately 65% of the 'years ever lived' in the table have been lived since 1965, when health conditions may be assumed to have been reasonably similar to what they are today, indeed possibly better at some points in time.

Caution: the small population size means that the technique used here is experimental.

X	qx	lx	dx	Lx	Mx	Tx	Ex
0	0.0000	1000.0	0.0	1000.0	0.0000	37316.4	37.3

1	0.1757	1000.0	175.7	3648.7	0.0481	36316.4	36.3
5	0.0732	824.3	60.3	3970.9	0.0152	32667.8	39.6
10	0.0411	764.0	31.4	3741.6	0.0084	28696.9	37.6
15	0.0161	732.6	11.8	3633.7	0.0032	24955.3	34.1
20	0.0563	720.8	40.6	3502.8	0.0116	21321.7	29.6
25	0.0931	680.3	63.3	3243.1	0.0195	17818.9	26.2
30	0.1253	617.0	77.3	2891.5	0.0267	14575.7	23.6
35	0.1524	539.6	82.2	2492.5	0.0330	11684.3	21.7
40	0.1724	457.4	78.9	2089.8	0.0377	9191.7	20.1
45	0.1819	378.5	68.8	1720.6	0.0400	7101.9	18.8
50	0.1803	309.7	55.8	1408.9	0.0396	5381.3	17.4
55	0.1780	253.8	45.2	1156.3	0.0391	3972.4	15.6
60	0.1938	208.7	40.4	942.3	0.0429	2816.1	13.5
65	0.2400	168.2	40.4	740.3	0.0546	1873.8	11.1
70	0.3137	127.9	40.1	539.0	0.0744	1133.6	8.9
75	0.4089	87.8	35.9	349.1	0.1028	594.6	6.8
80	0.5535	51.9	28.7	187.6	0.1531	245.5	4.7
85+	1.0000	23.2	23.2	57.9	0.4000	57.9	2.5
N =				37316.4			

**Table 6 Life for Nauti village, females only. Number of persons ever born = 256. Number of survivors = 163. Cut-off date = 30 August 2000.**

Cohort	qx	lx	dx	Lx	Mx	Tx	Ex
0	0.0000	1000.0	0.0	1000.0	0.0000	46294.0	46.3
1	0.1219	1000.0	121.9	3756.2	0.0324	45294.0	45.3
5	0.0431	878.1	37.8	4296.1	0.0088	41537.8	47.3
10	0.0176	840.3	14.8	4164.5	0.0036	37241.7	44.3
15	0.0056	825.5	4.6	4116.0	0.0011	33077.2	40.1
20	0.0216	820.9	17.8	4059.9	0.0044	28961.2	35.3
25	0.0452	803.1	36.3	3924.8	0.0092	24901.3	31.0
30	0.0765	766.8	58.7	3687.4	0.0159	20976.5	27.4
35	0.1104	708.1	78.1	3345.4	0.0234	17289.0	24.4
40	0.1385	630.0	87.3	2931.8	0.0298	13943.7	22.1
45	0.1544	542.7	83.8	2504.1	0.0335	11011.9	20.3
50	0.1586	458.9	72.8	2112.6	0.0345	8507.7	18.5
55	0.1617	386.1	62.4	1774.5	0.0352	6395.1	16.6
60	0.1787	323.7	57.8	1473.8	0.0392	4620.6	14.3
65	0.2182	265.8	58.0	1184.2	0.0490	3146.8	11.8
70	0.2806	207.8	58.3	893.4	0.0653	1962.6	9.4
75	0.3694	149.5	55.2	609.5	0.0906	1069.3	7.2
80	0.5246	94.3	49.5	347.7	0.1422	459.8	4.9
85+	1.0000	44.8	44.8	112.1	0.4000	112.1	2.5
N =				46294.0			

**Table 7 Life for Nauti village, males only. Number of persons ever born = 254. Number of survivors = 166. Cut-off date = 30 August 2000.**

Caution: the small population size means that the technique used here is experimental.

X	qx	lx	dx	Lx	Mx	Tx	Ex
0	0.0000	1000.0	0.0	1000.0	0.0000	58603.7	58.6
1	0.0391	1000.0	39.1	3921.7	0.0100	57603.7	57.6
5	0.0137	960.9	13.1	4771.4	0.0028	53681.9	55.9
10	0.0067	947.7	6.3	4722.7	0.0013	48910.5	51.6
15	0.0024	941.4	2.3	4701.2	0.0005	44187.8	46.9
20	0.0086	939.1	8.1	4675.3	0.0017	39486.7	42.0
25	0.0166	931.0	15.5	4616.5	0.0033	34811.4	37.4
30	0.0285	915.6	26.1	4512.5	0.0058	30194.9	33.0
35	0.0456	889.5	40.6	4345.8	0.0093	25682.4	28.9
40	0.0679	848.9	57.6	4100.3	0.0141	21336.6	25.1
45	0.0944	791.2	74.7	3769.5	0.0198	17236.3	21.8
50	0.1243	716.6	89.1	3360.2	0.0265	13466.8	18.8
55	0.1577	627.5	98.9	2890.2	0.0342	10106.7	16.1
60	0.1960	528.6	103.6	2383.8	0.0435	7216.5	13.7
65	0.2419	425.0	102.8	1867.8	0.0550	4832.7	11.4
70	0.2993	322.2	96.4	1369.8	0.0704	2964.9	9.2
75	0.3796	225.7	85.7	914.4	0.0937	1595.1	7.1
80	0.5279	140.0	73.9	515.4	0.1434	680.7	4.9
85+	1.0000	66.1	66.1	165.3	0.4000	165.3	2.5
N =				58603.7			

**Table 8 Life for Kwembu village, both sexes. Number of persons ever born = 382.  
Number of survivors = 297. Cut-off date = 30 August 2000.**

Cohort	qx	lx	dx	Lx	Mx	Tx	Ex
0	0.0000	1000.0	0.0	1000.0	0.0000	56306.9	56.3
1	0.0477	1000.0	47.7	3904.6	0.0122	55306.9	55.3
5	0.0172	952.3	16.4	4720.6	0.0035	51402.2	54.0
10	0.0096	935.9	9.0	4657.0	0.0019	46681.7	49.9
15	0.0037	926.9	3.5	4625.9	0.0007	42024.6	45.3
20	0.0153	923.5	14.1	4582.0	0.0031	37398.7	40.5
25	0.0281	909.3	25.5	4482.8	0.0057	32816.8	36.1
30	0.0428	883.8	37.8	4324.4	0.0087	28334.0	32.1
35	0.0598	846.0	50.6	4103.4	0.0123	24009.6	28.4
40	0.0793	795.4	63.1	3819.3	0.0165	19906.2	25.0
45	0.1015	732.3	74.3	3475.8	0.0214	16086.9	22.0
50	0.1266	658.0	83.3	3081.8	0.0270	12611.1	19.2
55	0.1549	574.7	89.1	2651.0	0.0336	9529.3	16.6
60	0.1874	485.7	91.0	2200.8	0.0414	6878.3	14.2
65	0.2262	394.6	89.3	1750.1	0.0510	4677.5	11.9
70	0.2768	305.4	84.5	1315.6	0.0643	2927.5	9.6
75	0.3552	220.8	78.4	908.1	0.0864	1611.9	7.3
80	0.5116	142.4	72.9	529.9	0.1375	703.8	4.9
85+	1.0000	69.6	69.6	173.9	0.4000	173.9	2.5
N =				56306.9			

**Table 9 Life for Kwembu & Winima combined, both sexes. Number of persons ever born = 774. Number of survivors = 617. Cut-off date = 30 August 2000.**

Notes: Table cannot be calculated for Winima alone as data creates negative values.

Caution: the small population size means that the technique used here is experimental.

**APPENDIX D**  
**AGE-SEX STRUCTURES OF VILLAGE POPULATIONS**

(following pages)

1. Kwembu (cut-off: 30 August 2000)
2. Winima (cut-off: 30 June 1998)
3. Nauti (cut-off: 30 July 2000)
4. Akikanda (cut-off: 30 June 1998)
5. Minava (cut-off: 30 July 2000)
6. Yokua (cut-off: 30 July 2000)

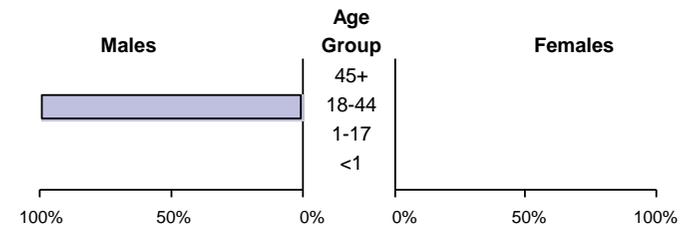
Note: village totals may vary slightly from tables in the text.  
Crude birth and death rates are nominal only.

## Kwembu: Basic Demographics for 12 months to 30 August 2000

**Project**                   BIANGAI  
**District**                 MOR21 Biangai  
**Village**                  CU004 Kwembu

Changes during the reporting period

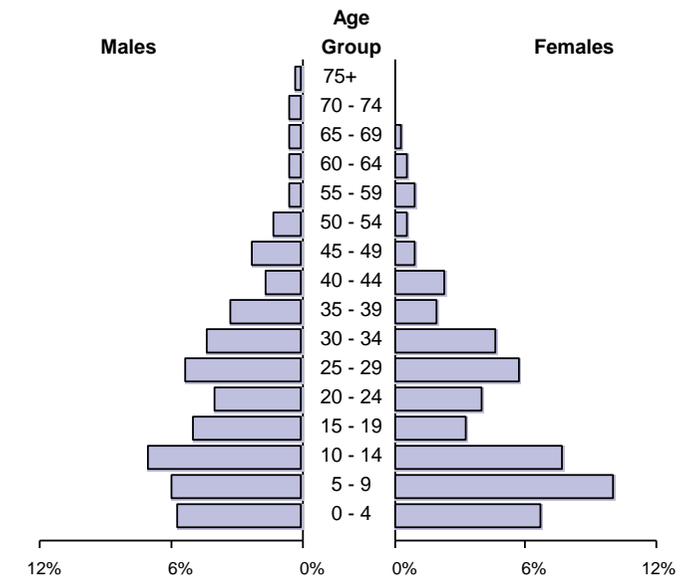
	Births	M/I	M/O	Age Group	Reported deaths	
					Males	Females
Male	5	n/a	n/a	45+	0	0
Female	1	n/a	n/a	18-44	1	0
<b>Totals</b>	6	n/a	n/a	1-17	0	0
<b>Crude birth rate</b>	20.27 per thousand			<1	0	0
<b>Crude death rate</b>	3.38 per thousand			<b>Totals</b>	1	0
<b>Net population change</b>	5			<b>All</b>	1	
<b>Population growth</b>	1.69% p.a.					



**Deaths by aggregated age and sex groups**

Countable population at the end of the reporting period

Age Group	Residents		Absentees		Countable total	
	Males	Females	Males	Females	Males	Females
75+	1	0	0	0	1	0
70 - 74	2	0	0	0	2	0
65 - 69	2	1	0	0	2	1
60 - 64	2	2	0	0	2	2
55 - 59	2	3	0	0	2	3
50 - 54	4	2	0	0	4	2
45 - 49	7	3	0	0	7	3
40 - 44	5	7	0	0	5	7
35 - 39	10	6	0	0	10	6
30 - 34	13	14	0	0	13	14
25 - 29	16	16	0	1	16	17
20 - 24	12	12	0	0	12	12
15 - 19	15	10	0	0	15	10
10 - 14	21	23	0	0	21	23
5 - 9	18	30	0	0	18	30
0 - 4	17	20	0	0	17	20
<b>Totals</b>	<b>147</b>	<b>149</b>	<b>0</b>	<b>1</b>	<b>147</b>	<b>150</b>
<b>Grand total</b>	<b>296</b>		<b>1</b>		<b>297</b>	



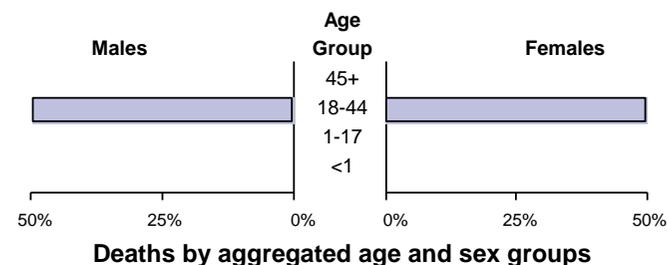
**Age-sex structure by five yearly interval (residents)**

## Winima: Basic Demographics for 12 months to 30 June 1998

**Project** BIANGAI  
**District** MOR21 Biangai  
**Village** CU007 Winima

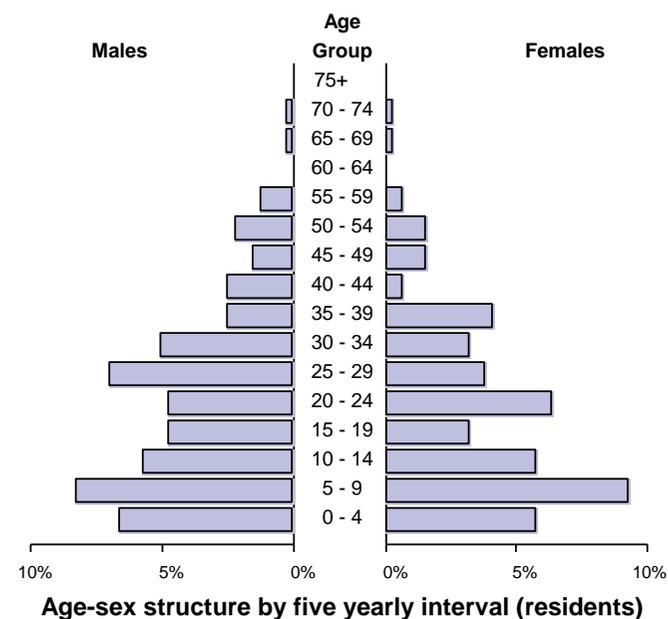
Changes during the reporting period

	Births	M/I	M/O	Age Group	Reported deaths	
					Males	Females
Male	0	n/a	n/a	45+	0	0
Female	1	n/a	n/a	18-44	1	1
Totals	1	n/a	n/a	1-17	0	0
Crude birth rate	3.21 per thousand			<1	0	0
Crude death rate	6.41 per thousand			Totals	1	1
Net population change	n/a			All	2	
Population growth	-0.32% p.a.					



Countable population at the end of the reporting period

Age Group	Residents		Absentees		Countable total	
	Males	Females	Males	Females	Males	Females
75+	0	0	0	0	0	0
70 - 74	1	1	0	0	1	1
65 - 69	1	1	0	0	1	1
60 - 64	0	0	0	0	0	0
55 - 59	4	2	0	0	4	2
50 - 54	7	5	0	0	7	5
45 - 49	5	5	0	0	5	5
40 - 44	8	2	0	0	8	2
35 - 39	7	13	1	0	8	13
30 - 34	16	10	0	0	16	10
25 - 29	22	12	0	0	22	12
20 - 24	15	20	0	0	15	20
15 - 19	15	10	0	0	15	10
10 - 14	18	18	0	0	18	18
5 - 9	26	29	0	0	26	29
0 - 4	21	18	0	0	21	18
<b>Totals</b>	<b>166</b>	<b>146</b>	<b>1</b>	<b>0</b>	<b>167</b>	<b>146</b>
<b>Grand total</b>	<b>312</b>		<b>1</b>		<b>313</b>	

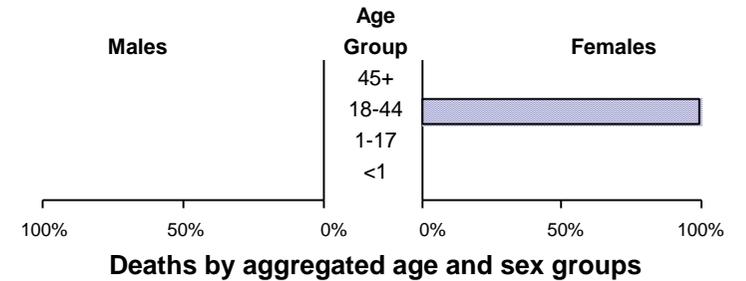


## Nauti: Basic Demographics for 12 months to 30 July 2000

**Project** YAKAYA  
**District** MOR20 Watut  
**Village** CU015 Nauti

Changes during the reporting period

	Births	M/I	M/O	Age Group	Reported deaths	
					Males	Females
Male	1	n/a	n/a	45+	0	0
Female	3	n/a	n/a	18-44	0	2
Totals	4	n/a	n/a	1-17	0	0
Crude birth rate	12.16 per thousand			<1	0	0
Crude death rate	6.08 per thousand			Totals	0	2
Net population change	2			All	2	
Population growth	0.61% p.a.					



Countable population at the end of the reporting period

Age Group	Residents		Absentees		Countable total	
	Males	Females	Males	Females	Males	Females
75+	0	0	0	0	0	0
70 - 74	2	0	0	0	2	0
65 - 69	2	2	0	0	2	2
60 - 64	1	3	0	0	1	3
55 - 59	1	2	0	0	1	2
50 - 54	2	0	0	0	2	0
45 - 49	3	2	0	0	3	2
40 - 44	5	3	0	0	5	3
35 - 39	13	11	0	0	13	11
30 - 34	13	4	0	0	13	4
25 - 29	17	18	0	0	17	18
20 - 24	21	21	0	0	21	21
15 - 19	16	22	0	0	16	22
10 - 14	16	27	0	0	16	27
5 - 9	30	23	0	0	30	23
0 - 4	24	25	0	0	24	25
<b>Totals</b>	<b>166</b>	<b>163</b>	<b>0</b>	<b>0</b>	<b>166</b>	<b>163</b>
<b>Grand total</b>	<b>329</b>		<b>0</b>		<b>329</b>	

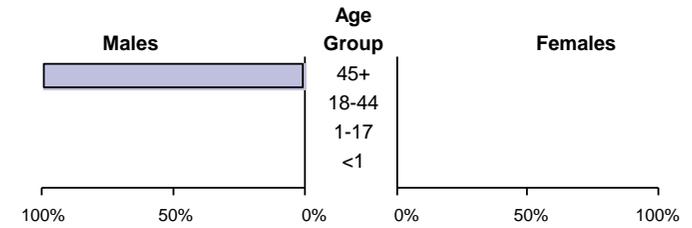


## Akikanda: Basic Demographics for 12 months to 30 June 1998

**Project** YAKAYA  
**District** MOR20 Watut  
**Village** CU001 Akikanda

Changes during the reporting period

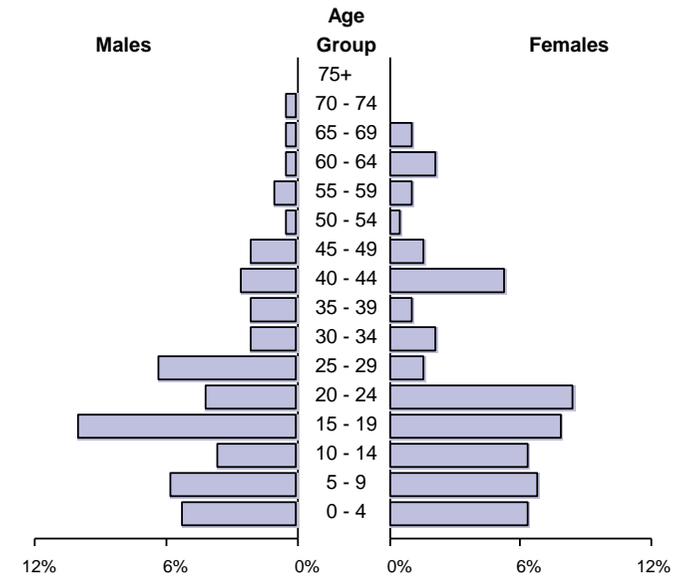
	Births	M/I	M/O	Age Group	Reported deaths	
					Males	Females
Male	1	n/a	n/a	45+	1	0
Female	1	n/a	n/a	18-44	0	0
Totals	2	n/a	n/a	1-17	0	0
Crude birth rate	10.58 per thousand			<1	0	0
Crude death rate	5.29 per thousand			Totals	1	0
Net population change	1			All	1	
Population growth	0.53% p.a.					



**Deaths by aggregated age and sex groups**

Countable population at the end of the reporting period

Age Group	Residents		Absentees		Countable total	
	Males	Females	Males	Females	Males	Females
75+	0	0	0	0	0	0
70 - 74	1	0	0	0	1	0
65 - 69	1	2	0	0	1	2
60 - 64	1	4	0	0	1	4
55 - 59	2	2	0	0	2	2
50 - 54	1	1	0	0	1	1
45 - 49	4	3	0	0	4	3
40 - 44	5	10	0	0	5	10
35 - 39	4	2	0	0	4	2
30 - 34	4	4	0	0	4	4
25 - 29	12	3	0	0	12	3
20 - 24	8	16	0	0	8	16
15 - 19	19	15	0	0	19	15
10 - 14	7	12	0	0	7	12
5 - 9	11	13	0	0	11	13
0 - 4	10	12	0	0	10	12
<b>Totals</b>	<b>90</b>	<b>99</b>	<b>0</b>	<b>0</b>	<b>90</b>	<b>99</b>
<b>Grand total</b>	<b>189</b>		<b>0</b>		<b>189</b>	



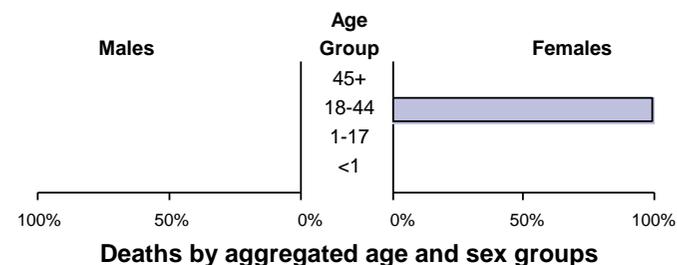
**Age-sex structure by five yearly interval (residents)**

## Minava: Basic Demographics for 12 months to 30 July 2000

**Project** YAKAYA  
**District** MOR20 Watut  
**Village** CU021 Minava

Changes during the reporting period

	Births	M/I	M/O	Age Group	Reported deaths	
					Males	Females
Male	5	n/a	n/a	45+	0	0
Female	3	n/a	n/a	18-44	0	1
Totals	8	n/a	n/a	1-17	0	0
Crude birth rate	49.38 per thousand			<1	0	0
Crude death rate	6.17 per thousand			Totals	0	1
Net population change	7			All	1	
Population growth	4.32% p.a.					



Countable population at the end of the reporting period

Age Group	Residents		Absentees		Countable total	
	Males	Females	Males	Females	Males	Females
75+	0	0	0	0	0	0
70 - 74	1	0	0	0	1	0
65 - 69	0	1	0	0	0	1
60 - 64	0	0	0	0	0	0
55 - 59	0	1	0	0	0	1
50 - 54	3	1	0	0	3	1
45 - 49	3	2	0	0	3	2
40 - 44	2	2	0	0	2	2
35 - 39	9	2	0	0	9	2
30 - 34	7	3	0	0	7	3
25 - 29	10	12	0	0	10	12
20 - 24	12	11	0	0	12	11
15 - 19	7	8	0	0	7	8
10 - 14	7	13	0	0	7	13
5 - 9	11	12	0	0	11	12
0 - 4	14	8	0	0	14	8
<b>Totals</b>	<b>86</b>	<b>76</b>	<b>0</b>	<b>0</b>	<b>86</b>	<b>76</b>
<b>Grand total</b>	<b>162</b>		<b>0</b>		<b>162</b>	

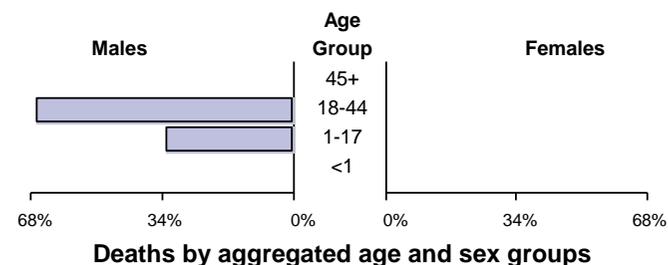


## Yokua: Basic Demographics for 12 months to 30 July 2000

**Project** YAKAYA  
**District** MOR20 Watut  
**Village** CU024 Yokua

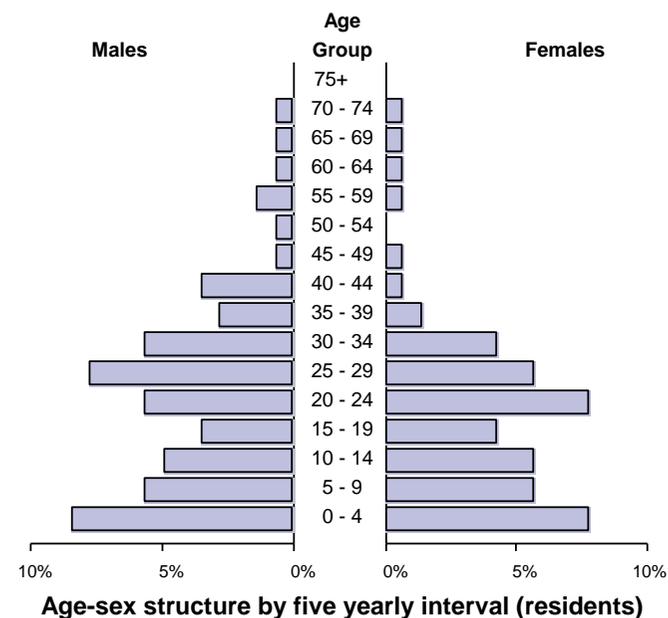
Changes during the reporting period

	Births	M/I	M/O	Age Group	Reported deaths	
					Males	Females
Male	1	n/a	n/a	45+	0	0
Female	2	n/a	n/a	18-44	2	0
Totals	3	n/a	n/a	1-17	1	0
Crude birth rate	21.28 per thousand			<1	0	0
Crude death rate	21.28 per thousand			Totals	3	0
Net population change	0			All	3	
Population growth	0.00% p.a.					



Countable population at the end of the reporting period

Age Group	Residents		Absentees		Countable total	
	Males	Females	Males	Females	Males	Females
75+	0	0	0	0	0	0
70 - 74	1	1	0	0	1	1
65 - 69	1	1	0	0	1	1
60 - 64	1	1	0	0	1	1
55 - 59	2	1	0	0	2	1
50 - 54	1	0	0	0	1	0
45 - 49	1	1	0	0	1	1
40 - 44	5	1	0	0	5	1
35 - 39	4	2	0	0	4	2
30 - 34	8	6	0	0	8	6
25 - 29	11	8	0	0	11	8
20 - 24	8	11	0	0	8	11
15 - 19	5	6	0	0	5	6
10 - 14	7	8	0	0	7	8
5 - 9	8	8	0	0	8	8
0 - 4	12	11	0	0	12	11
<b>Totals</b>	<b>75</b>	<b>66</b>	<b>0</b>	<b>0</b>	<b>75</b>	<b>66</b>
<b>Grand total</b>	<b>141</b>		<b>0</b>		<b>141</b>	



## APPENDIX E

### SURVEY OF SELECTED WAU AND BULOLO SCHOOLS

This survey was carried out at various times in 2000 by Susy Bonnell, Jennifer Krimbu and Boina Yaya. Additional data added by John Burton. (Note: no current data for Yokua School.)

#### 1. Kaisenik Primary School

Established: 1952  
Agency: Government  
Level: 4  
Boarders: nil  
Principal: 1999: Mr Yoman Kumbu  
Teachers: 10  
Teachers short: ?  
Student catchment: Winima, Biawen, Kaisenik, Kwembu, Wau Town, Mairu Block

Grade	Boys	Girls	Total
2 x 1	37	31	68
2	27	18	45
3	16	15	31
4	17	13	30
5	13	12	25
6	13	14	27
7	9	17	26
8	To start in 2000		
<b>Total</b>	<b>132</b>	<b>120</b>	<b>252</b>

Table E1 Kaisenik enrollment 1999

Problems: Low staff morale, inadequate housing, lack of cooperation with community, discipline problems especially with Grade 7 boys.

#### Problems

The immediate problems of this school centre on relations with the community. The school board is made up of parents who themselves have in many cases been teachers, and it is active and vocal. But continuous petty theft and several violent incidents has seen a walkout by teachers.

The problems centre on the Grade 7 students whose parents have so far been unsuccessful in controlling them.

## 2. Samuna Community School

Established:	Opening ceremony, 7 June 1995
Agency:	Government
Level	4
Boarders:	Nil
Date of visit:	16 August 2000
Principal:	Mr Maibu Sari
Teachers:	6
Teachers short:	none
Student catchment:	Werewere, Elauru, Winima and Biawen (teacher's children)

Grade	Boys	Girls	Total
1	16	18	34
2	17	18	35
3	17	9	26
4	21	10	31
5	13	11	24
6	15	11	26
<b>Total</b>	<b>99</b>	<b>77</b>	<b>176</b>

Table E2 Samuna enrollment, August 2000

### Problems

- Shortage of curriculum materials and supplies.
- Need 36 more desks: 12 each for Grades 1 & 2; 4 for Grade 3, and 9 each for Grades 5 & 6.
- Teachers' housing not complete due to lack of support from community & council.
- Absenteeism of both teachers and students.
- Water supply inadequate & rivers and creeks are far away.
- Teachers have problems obtaining firewood for cooking
- Classroom promised by council not yet built.

### Comments

The intention is that from Grade 6, students will move to Kaisenik for Grades 7 and 8.

### 3. Regina Community School

Established: 1984  
Agency: Government  
Level: Four  
Boarders: Nil  
Date of visit: 31 Oct 2000  
Principal: Mr Yoman Kumbu  
Teachers: Six  
Teachers short: -  
Student catchment: Mrs Booth, Pine Top, Maus Bokis, Kobiak, As Karuka, Kilolo Buang, Kilolo Finsch, Maus Koranga, Klin Wara.

<b>Grade</b>	<b>Boys</b>	<b>Girls</b>	<b>Total</b>
1	42	26	68
2	24	23	47
3	17	22	39
4	17	12	29
5	19	11	30
6	16	3	19
<b>Total</b>	<b>135</b>	<b>97</b>	<b>232</b>

**Table E3 Regina enrollment, 2000.**

#### **Problems**

- The school needs a new classroom.
- The school has a shortage of desks.
- The schools needs a new staff house.
- The existing classrooms all need maintenance.

#### **Comments**

The school is in the education plan to have a Grade 7 class from 2002, but at the moment the facilities are physically inadequate for the existing number of students.

#### 4. Wau Adventist Primary School

Established: 1984  
Agency: Seventh Day Adventist Church  
Level: Private?  
Boarders: None  
Date of visit: 16 August 2000  
Principal: Mr Jack Anis  
Teachers: 1  
Teachers short: none  
Student catchment: Mostly children of church workers. from Mairu, Wara Muli, Kapiro Block.

Grade	Boys	Girls	Total
1	6	2	8
2	-	-	0
3	1	4	5
4	0	3	3
5	0	4	4
6	0	0	0
<b>Total</b>	<b>7</b>	<b>13</b>	<b>20</b>

**Table E4 Wau Adventist enrollment, August 2000**

**Note: all students in Grade 2 left at the end of Term 2.**

#### Problems

- Low student numbers.
- Only one teacher.
- Lack of proper classrooms.

#### Comments

Not all the students are Seventh Day Adventists; enrollment is low because the fees are high compared to the government system: K226 for Grades 1 and 2; K299 for Grades 3 and 4; K320 for Grades 5 and 6.

.After Grade 6, students continuing in the SDA system can do Grades 7 and 8 at Gabensis near Lae. After Grade 8 they can continue at Kabiufa (Eastern Highlands), Kambubu or Mt Diamond (NCD) SDA schools. They can also go into the government system.

## 5. Wau Primary School

Established:	Late 1950s
Agency:	Government
Level	7
Boarders:	
Date of visit:	
Principal:	Mr S Nalau
Teachers:	25
Teachers short:	2
Student catchment:	Wau town, Nem Nem, Wandumi, Forestry, Kaindi, Nami, Kiloru. Some students from Menyamya, Aseki, Garaina boarding with wantoks.

Grade	Boys	Girls	Total
3 x 1	66	48	114
3 x 2	69	57	126
3 x 3	51	58	109
3 x 4	56	48	104
3 x 5	59	42	101
3 x 6	35	44	79
3 x 7	38	34	72
2 x 8	44	28	72
<b>Total</b>	<b>418</b>	<b>359</b>	<b>777</b>

Table E5 Wau Primary enrollment, April 2000

### Problems

- Vandalism.
- Water supply
- Discipline and drug abuse
- Teachers housing
- Lack of classrooms
- Fencing
- Concern over possible proliferation of elementary schools feeding into community/primary schools.
- P & C not supportive with work parades but good at fund raising.

### Comments

Classes were suspended for 2 days in May 2000 due to water shortage for toilets. Prep classes are proposed for 2001.

## 6. Grace Memorial High School

Established:	First Grade 10 graduates in 1983.
Agency:	Government
Level	7
Boarders:	599 (day students: 167)
Date of visit:	11 May and 21 Aug 2000
Principal:	Mr Emmuel Abore
Deputy	Mr Dusty Imita
Teachers:	24
Teachers short:	none
Student catchment:	Students selected by Provincial Education Board from all over Morobe: mostly from Wau, Watut, Mumeng, Garaina, Boana and Wantoat.

Grade	Boarders		Day students		Total
	Boys	Girls	Boys	Girls	
3 x 7	92	44	1	3	140
3 x 8	91	41	11	1	144
5 x 9	118	63	50	34	265
5 x 10	91	59	43	24	217
<b>Total</b>	<b>392</b>	<b>207</b>	<b>105</b>	<b>62</b>	<b>766</b>

Table E6 Grace Memorial High enrollment, May 2000

### Problems

- Lack of accommodation for teachers.
- No fence compromises student security and is allowing absenteeism
- Inadequate dormitory space, ablution blocks
- No manual arts class
- Shortage of curriculum materials and text books
- Kitchen lacks pots
- Lack of uniforms

### Comments

The school closed early at the end of Term 2 because its budget allocation was not paid by the Provincial Administration. It simply ran out of money to buy food for the boarding students.

This is a large school but along with everything else is suffering from the chronic funding shortages brought on by the national government's inability to remit budgetted funds to the provinces due them. The school lacks proper accommodation for staff, leading to security problems all round. At least five staff houses should be located on the campus. The same applies to the lack of proper fencing, dormitories, kitchen equipment, curriculum materials and so on.

## **7. Wau Vocational Centre**

Established:	1978 (as a Skul Anka)
Agency:	Government
Level	n/a
Boarders:	73 (all male)
Date of visit:	
Manager:	Mr Yehimen
Teachers:	
Teachers short:	
Student catchment:	
Enrollment:	197 (166 boys, 31 girls)

### **Two year courses offered in:**

- Welding
- Carpentry
- Mechanics
- Plumbing
- Secretarial
- Home Economics

### **Problems**

- Subsidies do not arrive on time

### **Comments**

For the same reasons as Grace Memorial High, the vocational school closed two weeks before the end of Term 2 and opened one week late for the start of Term 3.

The Vocational School would like to start courses in agriculture, but none are offered at present. CODE is not offered.

## 8. Marianhill Elementary School

Established: 1997  
Agency: Roman Catholic  
Level: 3  
Boarders: none  
Date of visit: May 2000  
Principal: Mr James Rabin (ph. 474 6217)  
Teachers: 6  
Teachers short: none  
Student catchment: Wau Town and nearby settlements.

<b>Grade</b>	<b>Boys</b>	<b>Girls</b>	<b>Total</b>
2 x Prep	44	69	113
2 x 1	48	38	86
2 x 2	56	43	99
<b>Total</b>	<b>148</b>	<b>150</b>	<b>298</b>

**Table E7 Marianhill Elementary enrollment, August 2000**

### Problems

- 1. Overcrowding. Teacher/Pupil ratio exceeds 1:40
- 2. Lack of classrooms
- 3. No office (using temporary church facilities)

### Comments

This is a new school, but its facilities are inadequate

## 9. Marianhill Primary School

Established: 1987  
Agency: Roman Catholic  
Level: 5  
Boarders: none  
Date of visit: May 2000  
Principal: Mr Tobem (ph. 474 6217)  
Teachers: 10  
Teachers short: none  
Student catchment: Wau Town, nearby settlements, Wandumi Village.

<b>Grade</b>	<b>Boys</b>	<b>Girls</b>	<b>Total</b>
3A	29	18	47
3B	29	14	43
4	21	23	44
5	29	10	39
6A	18	8	26
6B	16	7	23
7	21	20	41
8	9	11	20
<b>Total</b>	<b>172</b>	<b>111</b>	<b>283</b>

Table E8 Marianhill enrollment, May 2000

### Problems

- Discipline especially with Grades 7 and 8.

### Comments

This school is well-regarded in Wau and has to a large extent taken over the mantle of being the premier private primary school in the town from the much older Katherine Lehmann School. Catholic students are in a minority but they do receive preference in enrollments.

Marianhill enjoys good Community support.

## 10. Katherine Lehmann School

Established:	1951
Agency:	Lutheran
Level:	International Education Agency
Boarders:	22
Date of visit:	16 May 2000
Principal:	Mr Rex Kiage
Teachers:	3 plus 1 Teachers Aid, and a secretary
Teachers short:	-
Student catchment:	Wau area plus boarders from other Lutheran Missions in PNG.

Grade	Boys	Girls	Total
1	7	4	11
2	3	3	6
3	3	0	3
4	2	2	4
5	3	0	3
6	5	0	5
7	1	2	3
8	4	0	4
<b>Total</b>	3	3	6
	<b>31</b>	<b>14</b>	<b>45</b>

Table E9 Katherine Lehmann enrollment, May 2000

### Problems

- Poor enrollment
- Now falling below IEA standards

### Comments

This is one of the oldest IEA schools in the country. Unfortunately, the present low enrollment and scant resources means that it is failing to meet the current expectations of an IEA school. Its last Australian teacher left in 1996.

On the other hand, Katherine Lehmann still has assets in the form of housing and classrooms that other schools in Wau have a shortage of, and it has its own bus. It appears to survive financially by letting some of its property to the public.

The school is capable of re-equipping and, with the support of its board, is a suitable institution to take expatriate children at primary level if the Morobe Gold Project goes ahead. Indeed, the existence and revitalisation of the Katherine Lehmann School should be seen as an attractive feature of Wau in relation to the recruitment of expatriate staff.

## 11. Wau Christian School

Established: August 1997  
Agency: Baptist Church  
Level (Pre-school to High School)  
Boarders: none  
Date of visit: 8 June 2000  
Principal: Mrs Martha Smith (Administrator: Pastor Tania Tia)  
Teachers: 5  
Teachers short: 1  
Student catchment: Wau town

<b>Grade</b>	<b>Boys</b>	<b>Girls</b>	<b>Total</b>
1	3	3	6
2	1	1	2
3	0	2	2
4	0	2	2
5	1	0	1
6	3	0	3
7	0	1	1
8	1	1	2
9	5	0	5
12	1	1	2
<b>Total</b>	<b>15</b>	<b>11</b>	<b>26</b>

Table E10 Wau Christian School enrollment, June 2000

### Problems

- Finance for major equipment such as photocopier, computers, etc.

### Comments

## 12. Pararoa Community School

Established:	July 1972
Agency:	Government
Level	4
Boarders:	none
Date of visit:	25 May 2000
Principal:	Mr Paul Kou
Teachers:	10
Teachers short:	2
Student catchment:	Pararoa, Kieto, Menhi, Nemakenata, Hikiawa, Hawata, Gumi, Akikanda, Sapanda and Andarola.

Grade	Boys	Girls	Total
2 x 1	77	29	106
2 x 2	51	26	77
3	30	15	45
2 x 4	32	20	52
5	14	8	22
6	26	8	34
7	(to start in 2001)		
<b>Total</b>	<b>230</b>	<b>106</b>	<b>336</b>

Table E11 Pararoa enrollment, May 2000

### Problems

- Late payment of subsidies.
- Plan to strike over pay, teacher morale low.
- Need more desks, gestettner, electricity, typewriter
- Toilets and water supply are problems.
- HVG built a library but more books are needed.

### Comments

As in Wau schools, the late payment of budgetted grants means that school supplies had almost run out at the time of the visit. This included exercise books, chalk, pencils and other consumables.

Even so the school is scheduled to change to a Primary School in 2001 and it may be expected to take boarders.

After Grade 6, students have been sent to Menyamy High School in the past but the headmaster is trying to get his graduates places at Grace Memorial High School because this is much closer to their homes.

### 13. Mainyanda Community School

Established: About 1964  
Agency: Lutheran Church  
Level  
Boarders: none  
Date of visit: August 2000  
Principal: Mr Eliaking Oku  
Teachers: 3  
Teachers short: 3 left in April following disturbances  
Student catchment:

Grade	Boys	Girls	Total
1	36 (-)	24 (-)	60 (-)
2	26 (-)	15 (-)	41 (-)
3	20 (11)	15 (8)	35 (19)
4	16 (9)	9 (7)	25 (16)
5	17 (8)	7 (5)	24 (13)
6	12 (9)	12 (9)	24 (18)
<b>Total</b>	<b>127 (37)</b>	<b>82 (29)</b>	<b>209 (66)</b>

**Table E12 Mainyanda enrollment, January 2000 with numbers still enrolled in August 2000 in brackets.**

#### Problems

- Slate Creek and the Watut River are frequently in flood
- Hold-up of headmaster, April 2000
- Frequent teacher absenteeism

#### Comments

At one time the school was well situated with a Lutheran and New Tribes Missions at the adjoining stations of Mainyanda and Yeiwahawa, but it is now very isolated. New Tribes has closed and the establishment at Mainyanda has dwindled to a few families. The opening of the new Watut Government Station at Yeiwahawa is a positive step to getting this area back to where it was in the 1960s and it should assist with security and stability at the school.

On the matter of security, children from Manki are probably now absent following rioting between Watuts and Manki villagers. The school itself was closed from 13 April to 15 May after the hold-up of the headmaster. Three of the six teachers who started the year did not return to work.

As the school is situated in the fork of two major rivers, students have a problem when they are in flood. A footbridge over the Watut used to exist but is now non-functional.

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