

# Impact of the 1997 Drought in the Hewa Area of Southern Highlands Province

Nicole C. Haley\*

## *Abstract*

This paper gives an account of the 1997 drought and the way it impacted upon the Hewa-speaking peoples of the Lagaip and Upper Strickland river valleys, situated in the most northwesterly corner of Southern Highlands Province, PNG. It examines the strategies used by Hewa people during the drought and the losses they sustained. Central to this discussion is a consideration of how gardens and bush resources were affected by the drought and the extent to which they ultimately recovered. The paper evaluates the provision of food aid in the Hewa area. It also comments on the actual number of Hewa deaths that may be directly attributed to the drought, and the so-called 'witch killings' and violence that were a consequence of the deaths.

DURING 1997–98, Rebecca Robinson and I spent four months in the Hewa area undertaking a social and genealogical study for the Porgera Joint Venture (PJV) project. The first 11 weeks of the fieldwork were conducted during the drought between July and September 1997; the remaining six weeks were conducted after the drought, in the immediate post food-relief period from April to June 1998. In the course of the study, we spent three days to two weeks in each of the major Hewa settlements, mapping clan boundaries, recording histories and genealogies and conducting a household census. We also recorded deaths that had occurred in the period 1987–98, held daily health clinics, held community meetings, surveyed gardens and tried to identify plants and animals. These activities allowed us to monitor the 1997 drought and its impacts upon the lives of the Hewa people.

## **Food Security Issues and the Hewa**

### **Hewa subsistence and food security**

The Hewa are a remarkably mobile highlands fringe people, numbering approximately 3000. They inhabit the area north and south of the lower Lagaip River in the most northwesterly corner of Southern Highlands Province, extending from the junction of the Lagaip, Strickland and Ok Om rivers east into Enga Province to roughly the Lagaip–Porgera river junction (see Figure 1). The Hewa engage in pig husbandry and practise low-intensity swidden (slash and burn) agriculture based primarily on sweet potato cultivation. They also supplement their diets through hunting, gathering and sago production, which until quite recently were relied upon more than gardening.

Today, the Hewa live in communal houses with up to 40 occupants. These households maintain their own gardens, which tend to be planted only once before a long fallow. In addition to sweet potato, the Hewa cultivate a variety of local and introduced crops, including taro, banana, sago, pumpkin, cassava, breadfruit, corn, pawpaw and a number of leafy greens. Table 1 lists the Hewa crop varieties that we recorded

---

\* Department of Anthropology, Research School of Pacific and Asian Studies, The Australian National University, Canberra, ACT 0200, Australia.  
Email: nhaley@coombs.anu.edu.au



in 1997–98 and Table 2 provides a sample of the garden surveys conducted. These give an indication of the range of crops cultivated in individual Hewa gardens. Important food crops gathered by the Hewa on a regular seasonal basis include *marita* pandanus (*Pandanus conoideus*), breadfruit, *pangi* (*Pangium edule*) and sago. When in season, these foods contribute significantly to the diet, as does hunting. Hewa men regularly hunt wild pigs in the grasslands of the Strickland Gorge and in the lower altitude bushland alongside the Lagaip River. As well as hunting, the Hewa engage in spearfishing and collect prawns from the oxbows of the Lagaip River. This range of food sources generally affords the Hewa food security in times of environmental stress.

### Factors that threaten food security

Another paper in these proceedings ('An Overview of Food Security in PNG' by R. Michael Bourke) notes that food security in PNG has been enhanced by access to cash and the ability to migrate to better endowed urban and periurban areas when local food security is threatened. Whilst this is generally the situation, neither applies in the Hewa case. Apart from occasional and fleeting reminders that they are part of the PNG state, the Hewa have been all but left to their own devices during both the colonial and postindependence periods. They lack even the most basic services. Indeed, because their area is remote, sparsely populated<sup>1</sup> and not easily accessible except by air, the Hewa have received little attention from either missions or government, and have neither a regular school nor government-funded health facilities. Their main sources of external contact, to date, have been with mineral prospectors and developers or with law enforcement agents seeking to apprehend or punish those responsible for witchcraft-related killings (see Hatanaka and Bragge 1973; Pascoe 1975ab; Haley and Robinson 1998).

Part of the reason why the Hewa lack even the most basic services lies in confusion as to which local government authorities are responsible for administering

<sup>1</sup> Based on our census data collected in 1997–98 (Robinson and Haley 1998ab), Robinson (1999) has calculated that the Hewa population density varies between 0.5 and 3.5 people per square kilometre of arable land in the North Hewa and South Hewa areas, respectively.

them; despite being few in number, the Hewa extend into two provinces (Enga and Southern Highlands), four census divisions and four local council areas. Apart from the six easternmost settlements, all Hewa settlements are actually located within Southern Highlands Province, although Sandaun (West Sepik) Province is often reputed to be responsible for the Sisimin Hewa and the North Hewa groups as far east as Waialima (see Brutti 1998ab; Kanua and Liripu 1997).

Whatever the reasons for their neglect, it remains the case that few Hewa have had any formal schooling, lived in urban areas or ever engaged in paid employment. Hence they have little cash. At Tali, for example, in January 1998, the combined cash resources of the then 57 residents was only 156 PNG kina (PGK).<sup>2</sup> That the Hewa are poor, even by rural standards, is also evidenced by the small amounts of cash included in bride price and compensation payments. For example, when a 30-year-old North Hewa man recently drowned in the Lagaip River, his family was compensated with five live pigs, 160 PGK, and three bows (author's unpublished data). These examples show that, even if the Hewa had had access to store-bought foods during the drought, which they did not because there are no trade stores in the Hewa area, their capacity to purchase food would have been very limited.

### Hewa health

Another factor relevant to the way the Hewa managed during the drought was their general state of health. The Hewa face extreme hardship in terms of health. Government health workers have long since left, government health patrols have all but ceased, and aidposts have either been abandoned or lack basic supplies. Together, these factors have contributed to death rates that are higher than those generally expected for rural populations in PNG and population growth rates that are lower than those recorded elsewhere in Southern Highlands Province. In the decade from 1987, for example, South Hewa people died at an average rate of 15 per 1000 per year, and North Hewa people died at an average rate of 23 per 1000 per year. This compares with a crude death rate of 12 per 1000 per year in the Tari area of Southern Highlands Province (Lehmann et al. 1993).

<sup>2</sup> In 1998, 1 PGK = approx. US\$0.49 (A\$0.77).

**Table 1.** Hewa garden crop varieties.

Scientific Name	Common name	Local name	Variety	Description	Origins	Date if lost
<i>Abelmoschus manihot</i>	<i>Aibika</i>	<i>Taiyufiangua</i>	<i>Hanguli</i>	na	na	
			<i>Koknatai</i>	na	na	
			<i>Kuk</i>	na	na	
			<i>Mbetata</i>	Pale stem	na	
			<i>Namania</i>	na	na	
			<i>Noulap</i>	na	na	
			<i>Tailalap</i>	na	na	
			<i>Wannuni</i>	na	na	
<i>Acorus calamus</i>	Bog iris	<i>Wap</i>	na		Old variety	
<i>Albizia</i> sp.	na	<i>Sipai</i>	<i>Waimo</i>	Edible leaves	Old variety	
<i>Allium cepa</i>	Onion/shallot	<i>Aniani</i>	<i>Yunuwaima</i>		Old variety (Waialima)	
<i>Alocasia</i> sp.	Taro	<i>Panei/sau</i>	<i>Kenal</i>	Yellow and red tuber	Old variety	
	Giant taro	<i>Kenal</i>	na		Old variety	
<i>Amaranthus tricolor</i>	Amaranth spinach	<i>Lupalupa/paitala</i>	na	na	na	
<i>Arachis hypogaea</i>	Peanut	<i>Pinat/galipa</i>	<i>Moptima</i>	Red variety	PNG Government	
<i>Araucaria cunninghamii</i>	Hoop pine	<i>Yalu</i>	na	na	Old variety	
<i>Artocarpus camansi</i>	Breadfruit	<i>Anua</i>	na	na	na	
<i>Bambusa</i> sp.	Bamboo	<i>Wapeyai/kakain</i>	na	na	Old variety	
<i>Brassica chinensis</i>	Chinese cabbage	<i>Wat sich</i>	na	na	na	
<i>Capsicum frutescens</i>	Chilli	<i>Sili</i>	na	na	PNG Government	
<i>Carica papaya</i>	Pawpaw	<i>Moptaiyo/popo</i>	na	na	na	
<i>Castanopsis acuminatissima</i>	Chestnut	<i>Tiyal/piala</i>	na	na	Old variety	
<i>Casuarina oligodon</i>	She-oak	<i>Yowal</i>	na	na	Old variety	
<i>Citrus lanatus</i>	Watermelon	<i>Wataplen</i>	na	na	na	
<i>Citrus</i> sp.	Citrus	<i>Muli</i>	na	na	na	

*Continued on next page*

**Table 1** (cont'd). Hewa garden crop varieties.

Scientific Name	Common name	Local name	Variety	Description	Origins	Date if lost
<i>Colocasia esculenta</i>	Taro	<i>Panei/sau</i>	<i>Ainowa</i>	na	Old variety	
			<i>Eleleyan</i>	Yellow tuber	Old variety	
			<i>Elipali</i>	na	Old variety	
			<i>Inai</i>	na	Old variety	
			<i>Invetai</i>	na	Old variety	
			<i>Kanaiya</i>	na	Old variety	
			<i>Lan</i>	White tuber	Oksapmin pre-1934	
			<i>Makaperei</i>	na	Old variety	
			<i>Miyayn</i>	Red tuber	Old variety	
			<i>Mos</i>	na	Old variety	
			<i>Simbu</i>	Large tuber	Simbu Province	
			<i>Sinai</i>	White tuber	Paiella Hewa pre-1934	
			<i>Tapli</i>	na	Old variety	
			<i>Tsinali</i>	na	Old variety	
<i>Yiyai</i>	na	Old variety				
<i>Cordyline fruticosa</i>	Cordyline	<i>Yafuf</i>	na	na		
<i>Cucumis sativus</i>	Cucumber	<i>Pene</i>	na	Large, white skin	North Hewa	
<i>Cucurbita moschata</i>	Pumpkin	<i>Fimalu</i>	Small, green skin	Old variety		
		<i>Filipambo</i>	Long pumpkin	Papaki 1996		
		<i>Mbisel</i>	na	Kopiago 1970		
<i>Cyathea</i> sp.	Tree ferns	<i>Utam</i>	Really long pumpkin	Kopiago 1967		
<i>Cyclosorus</i> sp.	Bush ferns/greens	<i>Wutame</i>	Round, green skin	Kopiago pre-1965		
<i>Cyrtosperma chamissonis</i>	Wild/swamp taro	<i>Tal</i>	na	Old variety		
			na	Edible fronds	Old variety	
			na	na	Old variety	

*Continued on next page*

**Table 1** (cont'd). Hewa garden crop varieties.

Scientific Name	Common name	Local name	Variety	Description	Origins	Date if lost
<i>Dioscorea</i> sp.	Yam	<i>Akwei ta</i>	na	na	Old variety	
<i>Eugenia malaccensis</i>	Malay apple	<i>Uwai</i>	<i>Masei</i>	Wild yam	Old variety (Yena)	
<i>Ficus copiosa</i>	Kumu musong fig	<i>Likya/toptop</i>	na	na	Old variety	
<i>Finschia</i> sp.	Finschia	<i>Wuapsal</i>	na	Edible leaves	Old variety	
<i>Gnetum gnemon</i>	<i>Tulip</i>	<i>Itai/talu</i>	na	Edible kernels	Old variety	
<i>Ipomoea batatas</i>	Sweet potato	<i>Akoi</i>	<i>Aluni</i>	Edible leaves	na	
			<i>Andakap</i>	na	Aluni	
			<i>Aptam</i>	White skin, white tuber	Kopiago/Galaga 1992	
			<i>Bespele</i>	Red skin, yellow tuber	Hagen/Sisimin 1984	
			<i>Bone</i>	na	na	1997
			<i>Buntek</i>	na	na	1997
			<i>Kakali</i>	Red skin, white tuber	Old variety	1997
			<i>Kambim</i>	Yellow skin, yellow tuber	Kopiago/Papaki 1983	
			<i>Kapanau</i>	na	Old variety	1983
			<i>Kena kena</i>	White skin, red tuber	Kopiago	1997
			<i>Koman</i>	na	Kopiago	1997
			<i>Kuana</i>	na	Kopiago	1997
			<i>Madang</i>	White skin, yellow tuber	Sisimin 1991	
			<i>Mamim</i>	Red leaves, yellow tuber	na	
			<i>Mendi</i>	na	na	1983
			<i>Metene</i>	Red skin, white tuber	na	1997
			<i>Metipan</i>	Red skin, red tuber	Old variety (Waiki)	
			<i>Mindi</i>	na	Old variety	
			<i>Nalu</i>	Red skin, white tuber	Hagen/Sisimin 1984	1997
			<i>Omora</i>	na	Oksapmin	

*Continued on next page*

**Table 1** (cont'd). Hewa garden crop varieties.

Scientific Name	Common name	Local name	Variety	Description	Origins	Date if lost
			<i>Paiapua</i>	Red skin, white tuber	Old variety	
			<i>Patala</i>	na	Kopiago	
			<i>Pan</i>	Yellow skin, yellow tuber	Hagen/Sisimin c1984	
			<i>Pati</i>	na	Arini 1995	
			<i>Patu</i>	Yellow skin, yellow tuber	Paiella Hewa 1990	
			<i>Pisam</i>	White tuber, white skin	Goroka 1973	1997
			<i>Pokoli</i>	na	Kopiago	
			<i>Pom</i>	na	na	1983
			<i>Sakala</i>	na	Old variety	1983
			<i>Tataka</i>	na	Old variety	1983
			<i>Tatawi</i>	na	Old variety	1983
			<i>Tau</i>	na	Old variety	1983
			<i>Tei</i>	na	na	1997
			<i>Tuliten</i>	Red skin, white tuber	Waranene	
			<i>Tumon</i>	White skin, red tuber	Old variety	
			<i>Walitako</i>	na	North Hewa	
			<i>Walmin</i>	Red skin, cream tuber	Oksampmin 1967	1997
			<i>Wannun</i>	Purple skin, white tuber	Old variety	
			<i>Wiptak</i>	na	North Hewa	
			<i>Wiski</i>	Red skin, white tuber	Wiski	
			<i>Wome</i>	na	na	1997
<i>Lagenaria siceraria</i>	Bottle gourd	<i>Ataoi kouta/ataoipwoi</i>	na	na	Old variety	
<i>Lithocarpus rugi-villosus</i>	Oak	<i>Niki</i>	na	na	Old variety	
<i>Lycopersicon esculentum</i>	Tomato	<i>Tamato</i>	na	na	PNG Government	
			na	na	na	

*Continued on next page*

**Table 1** (cont'd). Hewa garden crop varieties.

Scientific Name	Common name	Local name	Variety	Description	Origins	Date if lost
<i>Manihot esculenta</i>	Cassava	<i>Paikawa/topapu</i>	<i>Epalu</i>	Brown skin, yellow tuber	Kopiago 1985	
			<i>Lobal</i>	White skin, yellow tuber	North Hewa 1960	
			<i>Toi</i>	White skin, white tuber	Old variety	
<i>Metroxylon sagu</i>	Sago	<i>Kahpi/angiaawe</i>	<i>Tokolapia</i>	Brown skin, white tuber	Sepik/Sisimin 1940	
			<i>Kap</i>	na	Old variety (Yena)	
			<i>Angiawe</i>	na	Old variety (Eyaka)	
			<i>Waip</i>	na	Old variety (Yena)	
			<i>Atuwao</i>	Sweet	Old variety	
			<i>Hogong</i>	Cooking, long	Old variety	
			<i>Kaiyo</i>	Cooking	Old variety	
			<i>Kotao</i>	Sweet, short	Kopiago 1972	
			<i>Lelekeno</i>	Sweet, long	Sepik	
			<i>Liyao</i>	Cooking, short	Old variety	
<i>Musa</i> sp.	Banana	<i>Kuan</i>	<i>Mam</i>	Sweet/cooking, short	Old variety	
			<i>Meku</i>	Cooking	Old variety	
			<i>Muwe</i>	Cooking, long	Old variety	
			<i>Nenekaino</i>	Sweet	Old variety	
			<i>Nenekoma</i>	Sweet, long	Old variety	
			<i>Oma</i>	Sweet/cooking, long	Old variety	
			<i>Pakai</i>	Cooking, long	Old variety	
			<i>Pei</i>	Cooking, long	Old variety	
			<i>Petei</i>	Sweet, short	Old variety	
			<i>Pis</i>	Cooking	Old variety	
			<i>Pisaka</i>	Sweet, short	Old variety	
			<i>Pisokal</i>	Sweet/cooking	Old variety	
			<i>Sakal</i>	Sweet	Old variety	

*Continued on next page*



**Table 1** (cont'd). Hewa garden crop varieties.

Scientific Name	Common name	Local name	Variety	Description	Origins	Date if lost
			<i>Sakan</i>	Sweet, short, pale leaves	Old variety	
			<i>Silao</i>	Cooking	Old variety	
			<i>Sugu</i>	Sweet/cooking	Wanakipa 1945	
			<i>Suksuk</i>	Cooking, long	Old variety	
			<i>Tali</i>	Cooking, long	Old variety	
			<i>Taru</i>	Cooking, fast growing	Old variety	
			<i>Telemap</i>	Cooking, long	Old variety	
			<i>Tiwei</i>	Cooking, short	Old variety	
			<i>Toku</i>	Sweet, red skin	Old variety	
			<i>Tsakal</i>	Cooking	Old variety	
			<i>Tiwa</i>	Sweet/cooking, red leaves	Old variety	
			<i>Ungolo</i>	Cooking	Paiella 1982	
			<i>Wakananem</i>	Sweet	Old variety	
			<i>Wampelei</i>	Cooking, long	Old variety	
			<i>Wanop</i>	Sweet/cooking	Old variety	
			<i>Wanuf</i>	Cooking	Wuoane 1967	
			<i>Wijal</i>	Cooking, long	Old variety	
			<i>Wifam</i>	Cooking	Old variety	
			<i>Wuaka</i>	Cooking	Old variety	
			<i>Wuakapa</i>	Cooking, short	Old variety	
			<i>Wueip</i>	Sweet/cooking	Old variety	
<i>Nasturtium officinale</i>	Watercress	<i>Hambo</i>	na	na	na	
<i>Nicotiana tabacum</i>	Tobacco	<i>Apai</i>	na	na	Old variety	
<i>Nothofagus</i> sp.	Beech	<i>Yau/mamo</i>	na	na	Old variety	
<i>Oenanthe javanica</i>	Water dropwort	<i>Husalu</i>	na	na	na	

*Continued on next page*

**Table 1** (cont'd). Hewa garden crop varieties.

Scientific Name	Common name	Local name	Variety	Description	Origins	Date if lost
<i>Pandanus conoideus</i>	Fruit pandanus	<i>Ogol</i>	<i>Atema</i>	Yellow fruit	Old variety	
<i>Pandanus julianettii</i>	Nut pandanus	<i>Akoi</i>	<i>Mapima</i>	Red fruit	Old variety	
<i>Pangium edule</i>	<i>Pangi</i>	<i>Kuka</i>	<i>Mapu</i>	Rare	Old variety	
<i>Persea americana</i>	Avocado	<i>Mbata</i>	<i>Opaa</i>	Red fruit	Old variety	
<i>Phaseolus vulgaris</i>	Common bean	<i>Kumi/matano</i>	na	na	Old variety	
<i>Psophocarpus tetragonolobus</i>	Winged bean	<i>Tomai/wuntua</i>	na	na	na	
<i>Rorippa</i> sp	Crucifer spinach	<i>Lita</i>	na	na	na	
<i>Rungia klossii</i>	Acanth spinach	<i>Ketepa/pandala</i>	na	na	na	
<i>Saccharum edule</i>	Lowland <i>pitpit</i>	<i>Nakh</i>	na	na	Old variety	
<i>Saccharum officinarum</i>	Sugarcane	<i>Mbisam/alia</i>	<i>Mapeima</i>	Thick, red skin	Old variety	
			<i>Pasim</i>	Thick, white/green skin	Old variety	
			<i>Pisam</i>	Thick, yellow/red skin	Old variety	
			<i>Yefei</i>	Very thick green skin	Old variety	
<i>Sechium edule</i>	Choko	<i>Sokop/saiko</i>	na	na	na	
<i>Setaria palmifolia</i>	Highlands <i>pitpit</i>	<i>Paina/isao</i>	<i>Isao</i>	Large, white	Old variety	
			<i>Kalu</i>	Red	Oksapmin pre-1934	
<i>Trichosanthes pulleana</i>	Climbing cucurbit	<i>Kusi</i>	na	Red melon-like fruit	na	
<i>Xanthosoma sagittifolium</i>	Singapore taro	<i>Panei/sau</i>	<i>Singapo</i>	na	Kopiago 1980	
			<i>Sakukun</i>	na	Kopiago 1980	
<i>Zea mays</i>	Corn	<i>Kona</i>	na	Yellow kernel	PNG Government.1970	
<i>Zea mays</i>	Corn	<i>Kona</i>	<i>Senia</i>	Red kernel	PNG Government 1970	
<i>Zingiber officinale</i>	Ginger	<i>Wais/palena</i>	na	na	Old variety	

*Continued on next page*

**Table 1** (cont'd). Hewa garden crop varieties.

Scientific Name	Common name	Local name	Variety	Description	Origins	Date if lost
na	Edible fungus	<i>Mikia/tele</i>	na	na	Many varieties	
na	Edible fruit	<i>Wuak</i>	na	na	Old variety	
na	Wild breadfruit	<i>Yetu</i>	na	na	na	

na = not available

**Table 2.** Garden surveys.

Rama Alolu's garden alongside the Wanika River, Wanakipa area, South Hewa, cleared from secondary forest after a five-year fallow, August 1997.

Scientific Name	Common name	Local name	Variety	Origin
<i>Amaranthus tricolor</i>	Amaranth spinach	<i>Lupalupa</i>	na	na
<i>Artocarpus camansi</i>	Breadfruit	<i>Anua</i>	na	Old variety
<i>Carica papaya</i>	Pawpaw	<i>Popo</i>	na	na
<i>Colocasia esculenta</i>	Taro	<i>Pane</i>	na	na
<i>Cucurbita moschata</i>	Pumpkin	<i>Pumpkin</i>	<i>Sepik</i>	Kopiage (pre-1965)
<i>Cyrtosperma chamissonis</i>	Swamp taro	<i>Tal</i>	na	Old variety
<i>Ipomoea batatas</i>	Sweet potato	<i>Akoi</i>	<i>Kakalia</i> <i>Pisam</i> <i>Walmin</i> <i>Wiski</i>	Old variety Goroka Old variety Wiski (1991)
<i>Manihot esculenta</i>	Cassava	<i>Paikuwa/togapu</i>	<i>Epalu</i> <i>Tokolapia</i>	Kopiage Old variety
<i>Musa</i> sp.	Banana	<i>Kan</i>	na	na
<i>Nicotiana tabacum</i>	Tobacco	<i>Ai</i>	na	Old variety
<i>Pandanus conoideus</i>	<i>Marita</i>	<i>Ogol</i>	na	Old variety
<i>Saccharum officinarum</i>	Sugarcane	<i>Mbisam/alia</i>	na	Old variety
<i>Zea mays</i>	Corn	<i>Kona</i>	na	PNG Government (1970)
na	Bean	<i>Kum/matano</i>	na	na

Isao Martin's dryland garden, Waiki area, South Hewa, cleared from secondary forest after a 25-year fallow, September 1997.

Scientific Name	Common name	Local name	Variety	Origin
<i>Allium cepa</i>	Spring onion	<i>Aniami</i>	na	Kopiage
<i>Amaranthus tricolor</i>	Amaranth spinach	<i>Lupalupa</i>	na	na
<i>Carica papaya</i>	Pawpaw	<i>Popo</i>	na	na
<i>Colocasia esculenta</i>	Taro	<i>Pane/sau</i>	<i>Sinai</i>	Old variety
<i>Cucurbita moschata</i>	Pumpkin	<i>Pumpkin</i>	<i>Mbisel</i>	Kopiage (1970)
<i>Ipomoea batatas</i>	Sweet potato	<i>Akoi</i>	<i>Andakap</i> <i>Apiam</i> <i>Madang</i> <i>Metipan</i> <i>Paiapua</i> <i>Tuomn</i> <i>Walumin</i> <i>Wiski</i>	Galaga (1992) Old variety Sisimin (1991) Old variety Old variety Old variety Old variety Wiski (1993)
<i>Laportea interrupta</i>	Bog iris	<i>Wap</i>	na	Old variety
<i>Manihot esculenta</i>	Cassava	<i>Paikuwa/togapu</i>	<i>Lobal</i> <i>Tokolapia</i>	North Hewa Old variety

*Continued on next page*

**Table 2** (cont'd). Garden surveys.

Scientific Name	Common name	Local name	Variety	Origin
<i>Musa</i> sp.	Banana	<i>Kan</i>	<i>Lelekeno</i> <i>Tsakal</i>	Sepik Old variety
<i>Nicotiana tabacum</i>	Tobacco	<i>Apai</i>	na	Old variety
<i>Saccharum officinarum</i>	Sugarcane	<i>Mbisam/alia</i>	<i>Mapiema</i>	Old variety

Isao Martin and Lupet Naliap's dryland garden, Waiki area, South Hewa, cleared from secondary regrowth after a 5-year fallow, September 1997.

Scientific Name	Common name	Local name	Variety	Origin
<i>Abelmoschus manihot</i>	<i>Aibika</i>	<i>Taiyu</i>	na	na
<i>Allium cepa</i>	Spring onion	<i>Aniami</i>	na	Kopiago
<i>Amaranthus tricolor</i>	Amaranth spinach	<i>Lupalupa</i>	na	na
<i>Arachis hypogaea</i>	Peanut	<i>Pinut/galipa</i>	<i>Mopiima</i>	PNG Government
<i>Carica papaya</i>	Pawpaw	<i>Popo</i>	na	na
<i>Citrullus lanatus</i>	Watermelon	<i>Wataplen</i>	na	na
<i>Colocasia esculenta</i>	Taro	<i>Pane/sau</i>	<i>Sinai</i>	Old variety
<i>Cucurbita moschata</i>	Pumpkin	<i>Pumpkin</i>	<i>Mbisel</i>	Kopiage (1970)
<i>Ipomoea batatas</i>	Sweet potato	<i>Akoi</i>	<i>Andakap</i> <i>Apiam</i> <i>Madang</i> <i>Metipan</i> <i>Paiapua</i> <i>Pati</i> <i>Tuomn</i> <i>Walumin</i> <i>Wiski</i>	Galaga (1992) Old variety Sisimin (1991) Old variety Old variety Arini (1995) Old variety Old variety Wiski (1993)
<i>Laportea interrupta</i>	Bog iris	<i>Wap</i>	na	Old variety
<i>Manihot esculenta</i>	Cassava	<i>Paikuwa/togapu</i>	<i>Tokolapia</i>	Old variety
<i>Musa</i> sp.	Banana	<i>Kan</i>	<i>Atuwano</i> <i>Lelekeno</i>	PNG Government Sepik
<i>Nicotiana tabacum</i>	Tobacco	<i>Apai</i>	na	Old variety
<i>Saccharum officinarum</i>	Sugarcane	<i>Mbisam/alia</i>	<i>Mapiema</i>	Old variety
<i>Zea mays</i>	Corn	<i>Kona</i>	na <i>Senia</i>	PNG Government PNG Government

*Continued on next page*

**Table 2** (cont'd). Garden surveys.

Phillip and Mattius Tipiyao's dryland garden, Wusai Area, East Hewa, cleared from secondary forest after a 15-year fallow, September 1997.

Scientific Name	Common name	Local name	Variety	Origin
<i>Alocasia</i> sp.	Taro	<i>Pane</i>	<i>Kenal</i>	Old variety
<i>Colocasia esculenta</i>	Taro	<i>Pane</i>	<i>Eleleyan</i> <i>Lan</i> <i>Miyan</i> <i>Sinai</i> <i>Singapo</i>	Old variety Oksapmin (pre-1934) Old variety Paiella Hewa (pre-1934) Kopiago (1980)
<i>Cucumis sativus</i>	Cucumber	<i>Pene</i>	<i>Fimalu</i> na	Old variety North Hewa
<i>Cucurbita moschata</i>	Pumpkin	<i>Pumpkin</i>	<i>Flipambo</i> <i>Mis</i> <i>Sepik</i>	Papaki (1996) Kopiago (1967) Kopiago (pre-1965)
<i>Ipomoea batatas</i>	Sweet potato	<i>Akoi</i>	<i>Apiam</i> <i>Kambin</i> <i>Nalu</i> <i>Pan</i> <i>Patu</i> <i>Walumin</i> <i>Wiski</i>	Hagen (1984) Kopiago (1983) Hagen (1984) Hagen (1984) Paiella Hewa (1990) Oksapmin (1967) Wiski (1984)
<i>Lycopersion esculentum</i>	Tomato	<i>Tamato</i>	na	PNG Government
<i>Manihot esculenta</i>	Cassava	<i>Oaikuwa/togapu</i>	<i>Lobal</i> <i>Tokolapia</i>	North Hewa Old variety
<i>Musa</i> sp.	Banana	<i>Kan</i>	<i>Kota</i> <i>Liyao</i> <i>Mam</i> <i>Pakai</i> <i>Pisokol</i> <i>Silao</i> <i>Sugu</i> <i>Telemap</i> <i>Ungolo</i> <i>Wanuf</i> <i>Wifam</i> <i>Wuakapa</i>	Kopiago (1972) Old variety Old variety Old variety Old variety Old variety Wanakipa (1945) Old variety Paiella (1982) Wuoane (1967) Old variety Old variety
<i>Nicotiana tabacum</i>	Tobacco	<i>Apai</i>	na	Old variety
<i>Saccharum officinarum</i>	Sugarcane	<i>Mbisam/alia</i>	<i>Mapiema</i> <i>Pasim</i> <i>Yefei</i>	Old variety Old variety Old variety
<i>Setaria palmifolia</i>	Highlands pitpit	<i>Paina</i>	<i>Isao</i> <i>Kalu</i>	Old variety Oksapmin (pre-1934)
<i>Zea mays</i>	Corn	<i>Kona</i>	na	PNG Government (1970)

*Continued on next page*

**Table 2** (cont'd). Garden surveys.

Mark and Joseph Tipiyao's garden alongside the Urei River, Wusai area, East Hewa, cleared from primary forest, September 1997.

Scientific Name	Common name	Local name	Variety	Origin
<i>Allium cepa</i>	Spring onion	<i>Aniami</i>	na	Kopiago
<i>Amaranthus tricolor</i>	Amaranth spinach	<i>Lupalupa</i>	na	na
<i>Carica papaya</i>	Pawpaw	<i>Popo</i>	na	na
<i>Colocasia esculenta</i>	Taro	<i>Pane/sau</i>	<i>Sinai</i>	Old variety
<i>Cucurbita moschata</i>	Pumpkin	<i>Pumpkin</i>	<i>Mbisel</i>	Kopiago (1970)
<i>Ipomoea batatas</i>	Sweet potato	<i>Akoi</i>	<i>Andakap</i> <i>Apiam</i> <i>Madang</i> <i>Metipan</i> <i>Paiapua</i> <i>Tuomn</i> <i>Walumin</i> <i>Wiski</i>	Galaga (1992) Old variety Sisimin (1991) Old variety Old variety Old variety Old variety Wiski (1993)
<i>Laportea interrupta</i>	Bog iris	<i>Wap</i>	na	Old variety
<i>Manihot esculenta</i>	Cassava	<i>Paikuwa/togapu</i>	<i>Lobal</i> <i>Tokolapia</i>	North Hewa Old variety
<i>Musa</i> sp.	Banana	<i>Kan</i>	<i>Lelekeno</i> <i>Tsakal</i>	Sepik Old variety
<i>Nicotiana tabacum</i>	Tobacco	<i>Apai</i>	na	Old variety
<i>Saccharum officinarum</i>	Sugarcane	<i>Mbisam/alia</i>	<i>Mapiema</i>	Old variety

Isao Martin and Lupet Naliap's dryland garden, Waiki area, South Hewa, cleared from secondary regrowth after a 5-year fallow, September 1997.

Scientific Name	Common name	Local name	Variety	Origin
<i>Allium cepa</i>	Spring onion	<i>Aniami</i>	na	Kopiago
<i>Amaranthus tricolor</i>	Amaranth spinach	<i>Lupalupa</i>	na	na
<i>Arachis hypogea</i>	Peanut	<i>Pinut/galipa</i>	<i>Mopiima</i>	PNG Government
<i>Carica papaya</i>	Pawpaw	<i>Popo</i>	na	na
<i>Citrullus lanatus</i>	Watermelon	<i>Wataplen</i>	na	na
<i>Colocasia esculenta</i>	Taro	<i>Pane/sau</i>	<i>Sinai</i>	Old variety
<i>Cucurbita moschata</i>	Pumpkin	<i>Pumpkin</i>	<i>Mbisel</i>	Kopiago (1970)
<i>Abelmoschus manihot</i>	<i>Aibika</i>	<i>Taiyu</i>	na	na

*Continued on next page*

**Table 2** (cont'd). Garden surveys.

Scientific Name	Common name	Local name	Variety	Origin
<i>Ipomoea batatas</i>	Sweet potato	<i>Akoi</i>	<i>Andakap</i>	Galaga (1992)
			<i>Apiam</i>	Old variety
			<i>Madang</i>	Sisimin (1991)
			<i>Metipan</i>	Old variety
			<i>Paiapua</i>	Old variety
			<i>Pati</i>	Arini (1995)
			<i>Tuomn</i>	Old variety
			<i>Walumin</i>	Old variety
			<i>Wiski</i>	Wiski (1993)
<i>Laportea interrupta</i>	Bog iris	<i>Wap</i>	na	Old variety
<i>Manihot esculenta</i>	Cassava	<i>Paikuwa/togapu</i>	<i>Tokolapia</i>	Old variety
<i>Musa</i> sp.	Banana	<i>Kan</i>	<i>Atuwano</i>	PNG Government
			<i>Lelekeno</i>	Sepik
<i>Nicotiana tabacum</i>	Tobacco	<i>Apai</i>	na	Old variety
<i>Saccharum officinarum</i>	Sugarcane	<i>Mbisam/alia</i>	<i>Mapiema</i>	Old variety
<i>Zea mays</i>	Corn	<i>Kona</i>	na	PNG Government
			Senia	PNG Government

Phillip and Mattius Tipiyao's dryland garden, Wusai Area, East Hewa, cleared from secondary forest after a 15-year fallow, September 1997.

Scientific Name	Common name	Local name	Variety	Origin
<i>Abelmoschus manihot</i>	<i>Aibika</i>	<i>Taiyu</i>	na	na
<i>Alocasia</i> sp.	Taro	<i>Pane</i>	<i>Kenal</i>	Old variety
<i>Amaranthus tricolor</i>	Amaranth spinach	<i>Lupalupa</i>	na	na
<i>Colocasia esculenta</i>	Taro	<i>Pane</i>	<i>Lan</i>	Oksapmin (pre-1934)
			<i>Miyan</i>	Old variety
			<i>Sinai</i>	Paiella Hewa (pre-1934)
<i>Cucumis sativus</i>	Cucumber	<i>Pene</i>	<i>Fimalu</i>	Old variety
<i>Cucurbita moschata</i>	Pumpkin	<i>Pumpkin</i>	<i>Sepik</i>	Kopiago (pre-1965)
<i>Ipomoea batatas</i>	Sweet potato	<i>Akoi</i>	<i>Apiam</i>	Hagen (1984)
			<i>Kambin</i>	Kopiago (1983)
			<i>Nalu</i>	Hagen (1984)
			<i>Pan</i>	Hagen (1984)
			<i>Walumin</i>	Oksampmin (1967)
<i>Wiski</i>	Wiski (1984)			
<i>Lycopersion esculentum</i>	Tomato	<i>Tamato</i>	na	PNG Government
<i>Manihot esculenta</i>	Cassava	<i>Oaikuwa/togapu</i>	<i>Epalu</i>	Kopiago (pre-1934)
			<i>Toi</i>	Old variety

*Continued on next page*



**Table 2** (cont'd). Garden surveys.

Scientific Name	Common name	Local name	Variety	Origin
<i>Musa</i> sp.	Banana	<i>Kan</i>	<i>Mam</i>	Old variety
			<i>Pisokol</i>	Old variety
			<i>Silao</i>	Old variety
			<i>Telemap</i>	Old variety
			<i>Ungolo</i>	Paiella (1982)
			<i>Wanuf</i>	Wuoane (1967)
			<i>Wifam</i>	Old variety
			<i>Wuakapa</i>	PNG Government (1970)
<i>Nasturtium officinale</i>	Watercress	<i>Hambo</i>	na	na
<i>Nicotiana tabacum</i>	Tobacco	<i>Apai</i>	na	Old variety
<i>Rungia klossii</i>	Acanth spinach	<i>Korepa</i>	na	na
<i>Rorippa</i> sp.	Crucifer spinach	<i>Lita</i>	na	na
<i>Saccharum officinarum</i>	Sugarcane	<i>Mbisam/alia</i>	<i>Mapiema</i>	Old variety
			<i>Pasim</i>	Old variety
			<i>Pisam</i>	Old variety
			<i>Yefei</i>	Old variety
<i>Sechium edule</i>	Choko	<i>Sokop</i>	na	na
<i>Setaria palmifolia</i>	Highlands <i>pitpit</i>	<i>Paina</i>	<i>Isao</i>	Old variety
			<i>Kalu</i>	Oksapmin (pre-1934)
<i>Zea mays</i>	Corn	<i>Kona</i>	na	PNG Government (1970)

na = not available

In 1991, a health study conducted amongst the Hewa revealed that 45% of children were suffering some degree of malnutrition and 17% were severely malnourished, malaria was endemic and 90% of children under the age of 10 years demonstrated some degree of splenic enlargement (Dyke et al. 1991). The situation of 1997–98 suggested little improvement. In every Hewa settlement visited, we treated a range of complaints and found malaria, chronic ulcers, fire burns, malnutrition and tinea imbricata to be prevalent. We also saw evidence of filariasis and thyroid complaints and treated numerous people suffering from ‘flesh-eating’ complaints such as yaws.

Another problem specific to Hewa women is persistent or unusual bleeding resulting from pregnancy and miscarriage. Genealogies collected revealed that many Hewa women, especially young girls, die in childbirth and this no doubt contributes to the unusual disparity in the ratio of men to women. In South Hewa we recorded a male to female ratio of 1.2:1, and in North Hewa an even more significant gender imbalance, where men outnumbered women by 1.34:1 (Haley and Robinson 1998). This ratio rises to an alarming 2:1 if prepubescent girls and postmenopausal women are excluded. Another factor contributing to

this disparity is the practice of so-called ‘witch killing’. The Hewa have a strong belief in witches and a long history of killing people, usually women, thought to be witches. Steadman (1971) calculated the rate of witch killing amongst the Hewa during the late 1960s to be 8 per 1000 per year. This rate is thought to be lower today, but we have recorded numerous instances during the last decade where women held to be witches have been killed. In one instance the victim was only 10 years old.

Together these factors have contributed to a situation where there is a shortage of child-bearing women and this has encouraged the retention of marriage practices where older, well-established men marry very young girls. This increases the likelihood that young Hewa women will continue to die prematurely. The existing gender imbalance means that there are fewer able-bodied women to make gardens and hence provide for their respective households. It is possible that Hewa women are required to work harder than their counterparts elsewhere in PNG, in order to maintain food security, and this may contribute adversely to their overall state of health and the ability to cope in times of environmental hardship.

## The Hewa Response to the 1997 Drought

When crops fail, for whatever reason, hunting and gathering activities acquire greater significance than usual. Household fission is a strategy Hewa typically employ during times of drought. They temporarily abandon their homes and frequent forest areas alongside riverbanks, where they can hunt, gather vegetable foods, harvest breadfruit and process sago and *pangi* (if it is in season). During the initial part of the 1997 drought these crops were utilised extensively; later they were replaced with a variety of famine foods.

When we started fieldwork in the Hewa area in mid-July 1997, the drought conditions were already well established. The previous six months had seen unusually lengthy periods without rain and this had already contributed to the failure of gardens in some areas. In late June, Hewa families from Ambi gathered at Galaga, a small Duna settlement, to process *pangi* fruit. There was very little sweet potato about and, apart from *pangi*, cassava was the predominant food crop being consumed at that time. After spending three weeks at Galaga, the visitors left, taking with them large quantities of the processed pulp. Galaga also had extensive sago groves, but water shortages meant that the sago could not be processed. These groves were later destroyed by fire.

The Hewa survived the drought by subsisting on the famine foods available to them. In all areas visited, pumpkins and *tulip* (*Gnetum gnemon*) leaves proved to be drought staples. When we visited Wiski and Arini in September 1997, people were spending the majority of their time foraging and hunting in the bush in small family groups. They no longer had any sweet potato in their gardens, their banana trees were sun- and fire-damaged and they had recently killed or released their remaining pigs. Leaving their homes, they had sought refuge alongside the Pori River, where they were able to hunt, find self-sown tubers of *Pueraria lobata*, harvest a kind of wild breadfruit known locally as *yetu* and gather bush greens such as *tulip* leaves and treefern fronds.

Had it not been for the huge fires that blazed between August and October 1997, the Hewa may well have survived in the bush quite adequately for many months, without the need for food aid. But the fires were so extensive and destroyed the forest so completely that the Hewa were forced to return to their settlements where they camped in the open. Before the fires they had been relying exclusively on bush and famine foods for many weeks.

When we arrived at Usai in September 1997, the people were camped in the open near their homes. During the next week, they ate little—only bush greens and *marita* fruit, which had been salvaged by soaking. These were cooked and consumed communally. It was said that this was to keep the local witches happy, because to hoard or consume food privately during such hardship would surely incite their wrath. Before our visit, many of the Usai residents had camped in a bush garden by the Urei River but had been forced back to their homes after a fire destroyed the area. At the river, they had watered a garden established for the express purpose of maintaining planting stock. Having been forced to return to the main settlement, the adults were foraging for food by day and hunting at night. Elsewhere in the Hewa area, at Tali for instance, similar attempts were made to keep planting stock alive through watering but, as in Usai, their efforts were thwarted by fires.

## Losses Resulting from the 1997 Drought

Some Hewa died as a result of the 1997 drought. By September 1997, only nine months into the year, and with the drought still worsening, the South Hewa death rate was already at 2.5%, or 25 deaths per 1000, which was higher than at any point in the previous 10 years. In the decade preceding the drought, South Hewa had died at an average rate of 15 per 1000 per year. Although we did not revisit all the South Hewa settlements in 1998, our inquiries at the settlements we did visit suggested that the death rate for 1998 was as high as, if not higher than, the rate in 1997. For example, at Waiki (which had a resident population of 114 in September 1997) three people (two babies and an adult woman) died within weeks of the food aid being distributed; that alone represents a local death rate of 2.6% per year. At Usai, Maliaeli and Arini, there were also a significant number of deaths in the postdrought recovery period. The few months either side of the food aid distribution were especially hard on young babies. Seven of the nine babies born at those settlements between January and May 1998 died within months of birth. Even in an area where infant mortality is high, this seems to be an exceptionally high death rate.

There were also instances where previously healthy adult men died during the drought. At Maliaeli, for example, a 20-year-old died as a result of a fall whilst searching for *marita* pandanus in the burnt out bush.

At Tali two adult men died. The first, aged approximately 65 years, drank water from the Lagaip river and suffered from vomiting and diarrhoea. He had been watering sweet potato runners planted in a river-side garden. Another man, aged 35 years, died after his legs swelled up. He had been in the bush searching for famine food. At around the same time, there were another two deaths at Iyali, a small North Hewa settlement a day's walk from Tali. The Iyali deaths were attributed not to the drought, but to witchcraft, which in turn resulted in further deaths in retaliation.

The 1997 drought also resulted in substantial losses of other kinds. The drought and fires destroyed gardens throughout the region. As soon as the rains came, people busily replanted new gardens. In most cases, greens and pumpkins recovered well but at many Hewa sites planting stock of the usual staples did not survive the drought. In almost every settlement numerous sweet potato and taro varieties were lost. Take Tali as an example: postdrought, in April 1998, there was not a single variety of taro and only the *tulien* variety of sweet potato. That single variety provided the only source of planting material when gardens were replanted in December 1997. Before the drought, the Tali people, like Hewa elsewhere, had cultivated numerous varieties of sweet potato. During the drought, they lost eight sweet potato varieties (*bespele*, *bone*, *bumtek*, *metene*, *pisam*, *tei*, *wanmun*, and *wome*). Other Hewa areas suffered similar losses.

The people of Usai went to great lengths to preserve planting material during the 1997 drought. They had suffered badly during both the 1972 and 1982 droughts, and had hoped to fare better this time. In 1972 they had lost seven varieties of sweet potato—*sakala*, *pom*, *mendi*, *tau*, *tataka*, *kapanau* and *tatawi* and retained only one (*walmin*). Gardens were replanted with *walmin* and runners were brought in from Papaki, Oksapmin and Sisimin. Ten years later, *walmin* was the only variety to survive the 1982 drought. Following that drought, the Usai people again went in search of planting material. On that occasion they obtained planting material from the North Hewa, Paiela Hewa, Sisimin and Papaki areas. In both the 1972 and 1982 droughts, the Usai people had relied significantly upon swamp taro (*Cyrtosperma chamissonis*) and treeferns (*Cyathea* sp.), but in the latter part of the 1997 drought these were not available. The severity of the 1997 drought rendered useless the Hewa survival strategies that they had employed in the past.

Our garden surveys revealed that predrought there were at least 31 varieties of sweet potato cultivated in the Hewa region, and that people at each of the major settlements used, on average, nine different sweet potato varieties.

It was not only gardens that were destroyed by the fires, but also houses, cane bridges and the bush resources needed to rebuild houses and bridges. Kanua and Liripu (1997) reported that when they visited Sisimin in December 1997 only six houses were left standing. Fires were equally destructive at Waiki, where 13 of the 19 houses were destroyed, along with the Lutheran church and the aidpost. These same fires severely depleted the local bush resources, as did fires elsewhere. At Waiki people lost numerous mature *pangi*, *marita*, sago, *tulip*, fig, chestnut and oak trees, and their hunting grounds sustained severe damage. They also reported that their domesticated pigs either died or were killed as the drought progressed and that wild pigs had all but disappeared. Because the Hewa rely on their sows mating with wild boars, it may well take them a very long time to replenish their domestic pig herds.

## Drought Aftermath

In the immediate postdrought period there was little intersettlement travel. When replanting their gardens, the Hewa did not seek out additional planting stock from neighbouring areas, as they had done in the past, nor had they done so by April/May 1998 when they began harvesting their first postdrought crop. This was somewhat surprising given the accounts of past drought events, where they had searched far and wide for planting material. Destruction of cane bridges was not the only factor constraining travel; another was the threat of witchcraft or being accused of witchcraft.

The 1997 drought resulted in higher than usual mortality rates. Weakened by a reduced food intake and being of poor health in any event, the Hewa succumbed to illnesses they might otherwise have survived. By leaving their homes, and taking refuge in small groups in the lower altitude forest areas alongside the major rivers, the Hewa exposed themselves not only to illness but to accusations of witchcraft. Steadman (1971) observed that Hewa men and women accused of witchcraft are most often those who lack the protection and support of strong and influential men. During the drought, when people were 'alone' in the bush, so to speak, they lacked such

support. Hence it was not surprising that witchcraft accusations and concerns became more prevalent as the drought worsened.

The previously mentioned deaths of two men at Iyali during the drought led directly to the murder of a young couple at Tali in January 1998. The Iyali people determined that the two men had been killed by witches, and murdered the suspects in a retaliatory raid. The young girl killed in retaliation was 15 years old and had only recently married into the area. Hearing of the murder, her kin, led by two local councillors, reported the matter to village police at Lake Kopiago, the subdistrict headquarters. Subsequently, seven reserve police were sent to Tali to 'investigate' the matter. On the way, they gathered another 30 or so men from Wiski, Arini, Maliaeli, Usai and Tapinam.

Only some of the 30 or so Hewa men who accompanied the Kopiago reserve police were related to the young murder victim. The others were Talikai clan men who took the opportunity to revive an unresolved feud dating back to 1975. The first patrols into the North Hewa area had been to investigate and apprehend the men responsible for a series of raids (witch killings and murders) associated with this fight (see Pascoe 1975ab). Seven men were eventually arrested, and served time for the murders, but because of this administrative intervention the matter was never properly resolved.

The 1998 murder 'investigation' took the form of a violent raid. Elderly men and women were assaulted and two young men forced at gunpoint to make confessions. The group robbed the Tali people of their possessions and razed all six houses in the village. As they left they kidnapped a recently married 13-year-old girl, who was then taken to Yagatone where she was held for some six weeks. During that time she was repeatedly raped. Three elderly men pursued the group and tried to rescue the girl, but all three received serious knife wounds.

These events were not the only ones of their kind. Witchcraft accusations also resulted in a particularly violent display at Wanakipa, where a woman suspected of witchcraft and sexual impropriety was violently raped at the behest of the reserve police. What these examples illustrate is that the stresses caused by the drought resulted in witchcraft accusations, witch killings, violent retaliatory acts and the revival of old enmities in the Hewa case (see also Stewart and Strathern 1998 for a Duna case). It is not surprising then that the Hewa chose to stay put, even after the rains came, for fear of becoming unwittingly embroiled in the attribution of blame for deaths elsewhere.

## Food Aid

Apart from the people at Wanakipa, who received some assistance from the Lutheran Church, the Hewa did not receive food aid until late March 1998. However, they had been identified as needing food aid in the initial Australian Agency for International Development (AusAID) report of October 1997 (Allen and Bourke 1997a). Even after it was decided that they would receive aid, there were long delays. Indeed, despite being assessed as category 5 (i.e. the most severely affected by drought), and accessible only by air (Allen and Bourke 1997b), the Hewa were not included in the food delivery operation conducted by AusAID and the Australian Defence Force. For some inexplicable reason, AusAID officials held firm to the view that the Hewa were accessible by road, even after Rebecca Robinson and I furnished them with maps, geographical positioning systems coordinates, up-to-date census figures and notes on how best to access the Hewa area. This same information was supplied to Paul Abbott of World Vision, who subsequently managed the PJV-funded Hewa distribution.

When the food aid was finally distributed, it was delivered to only six of the 22 major settlement locations. That people could not or would not move about was ignored. It was assumed that people from more remote settlements would collect their food aid but this was not the case. With the bridges impassable and concerns about witchcraft rife, the North Hewa could not collect the food supplies. Had the bridges been serviceable, they would still have needed to walk for up to three or four days to reach the nearest delivery point.

The only North Hewa location to receive rice was Waialima, but because of confusion regarding provincial boundaries it in fact received two deliveries, one from the Enga Province and one from the World Vision—Southern Highlands Province distribution. At every North Hewa and East Hewa settlement that we visited between May and July 1998, we were asked if we could collect their share of the rice from Waialima. No one from these villages received food aid. The people from Waialima were left with an equally pressing problem: what to do with all the rice. Having been told that it was to be shared, they were reluctant to use any of it. In May 1998, we were shown through the local aidpost, which was serving as a rice, flour and oil storehouse, as were other nearby houses.

Had the aid effort been managed by people with local knowledge, and the time and/or ability to talk to people and assess the social stresses flowing on from the environmental ones, they might well have noted

the increased concerns about witchcraft and the revival of old enmities. They might also have ensured that the aid was distributed in a more appropriate manner so that it reached its intended targets.

## Conclusion

Like people elsewhere in PNG, the Hewa employed traditional coping mechanisms to alleviate the worst effects of the drought, and by and large these were sufficient to maintain them for the many months when they had no food in their gardens. Their often very large households (up to 42 people) split into smaller groups, which temporarily migrated into the more forested areas where bush and famine foods are generally abundant. In the last 30 years, gardening has increased in importance at the expense of hunting and foraging. This may have meant that the Hewa experienced the effects of this drought somewhat sooner than they may have in the past. Even so, the effects of the drought should, in the initial stages at least, have been ameliorated by the use of drought-hardy crops such as cassava and pumpkin, which have been included in gardens in recent times. Drawing on past experience, the Hewa in some areas sought to keep planting stock alive through watering gardens but had very limited success due to fires. These same fires destroyed huge tracts of forest, depleting substantially the bush and famine foods available. The devastation caused by these fires was not foreseen because they were far more extensive than any fires in living memory.

In many ways, this drought extended people beyond their normal capacity for coping with environmental disasters. Deaths in both 1997 and 1998 were significantly higher than in the previous 10 years and this led to exacerbated and unprecedented (at least in recent times) concerns about witchcraft. Fear of witches and fear of being involved in troubles elsewhere meant that people were less inclined to move about after the drought. This meant that their gardens recovered less effectively than they otherwise might have. Because of the distribution delays, the Hewa received food aid not when it was needed most but when their gardens were once again starting to meet their needs. This should not be read as proof that food aid was not needed but that, had the Hewa received aid in a more timely manner, they would have coped far better.

The full extent to which the Hewa have been compromised by the drought remains to be seen. That concerns about witchcraft have been inflamed and

increase the likelihood that witch killing rates will again rise. However, the Hewa population today is not as it was 30 years ago. There is an increasing disparity in the ratio of men to women. Any further reduction in the number of child-bearing women would place some, if not all, of the Hewa communities at real risk. The long-term impact of the 1997 drought may be the disappearance of some Hewa groups.

## References

- Allen, B.J. and Bourke, R.M. 1997a. Report of an Assessment of the Impacts of Frost and Drought in Papua New Guinea. Australian Agency for International Development, Port Moresby.
- Allen, B. and Bourke, R.M., with J. Burton, S. Flew, B. Gaupu, S. Heai, P. Igua, S. Ivahupa, M. Kanua, P. Kokoa, S. Lillicrap, G. Ling, M. Lowe, R. Lutulele, A. Nongkas, M. Poienou, J. Risimeri, R. Shelton, J. Sowe, K. Ukegawa, N. Willson, D. Wissink and M. Woruba. 1997b. Report of an Assessment of the Impacts of Frosts and Drought in Papua New Guinea—Phase 2. Department of Provincial and Local Government Affairs, Port Moresby.
- Brutti, L. 1998a. Exploiting natives. *The Independent*, 13 February, 14–15.
- Brutti, L. 1998b. Who's lost? An anthropologist says the author owes one Papua New Guinea village a profound apology. *Worldview*, Spring 1998, 69–72.
- Dyke, T., Ballard, C., Flew, S., Mai, M., Crocker, J. and Lutz, S. 1991. *The Health of the Hewa. A collaborative report prepared by PNG Health Services, the Tari Research Unit and the PNG Institute of Medical Research.*
- Haley, N.C. and Robinson, R.P. 1998. *Lagaip River Land and Genealogical Study. Report prepared for the Porgera Joint Venture.*
- Hatanaka, S. and Bragge, L.W. 1973. Habitat, isolation and subsistence economy in the Central Range of New Guinea. *Oceania*, 44(1), 38–57.
- Kanua, M.B. and Liripu, G.K. 1997. *The Impact of Drought and Frost in the Southern Highlands Province: Phase II. Assessment, 1–8 December 1997. Unpublished report.*
- Lehmann, D., Vail, J., Riley, I.D. and Crocker, D.R. 1993. Demographic trends in Tari, Southern Highlands Province, Papua New Guinea. In: Taufa, T. and Bass, C., eds, *Population, Family Health and Development*. Port Moresby, University of Papua New Guinea Press, 94–103.
- Pascoe, N. 1975a. Justice? Death by axe or arrow. *Post-Courier*, 12 February, p. 5.
- Pascoe, N. 1975b. These people are totally honest. *Post-Courier*, 13 February, p. 5.

- Robinson, R.P. 1999. Big wet, big dry: the role of extreme periodic environmental stress in the development of the Kopiago agricultural system, Southern Highlands Province, Papua New Guinea. Unpublished MA thesis. Canberra, The Australian National University.
- Robinson, R.P. and Haley, N.C. 1998a. Hewa Census: Ambi to Papaki. Report for the Progera Joint Venture.
- Robinson, R.P. and Haley, N.C. 1998b. Hewa Census: Iyali to Eyaka. Report for the Progera Joint Venture.
- Steadman, L.B. 1971. Neighbours and killers: residence and dominance among the Hewa of New Guinea. Unpublished PhD thesis. Canberra, Australian National University.
- Stewart, P.J. and Strathern, A. 1998. Witchcraft, Murder, and Ecological Stress: A Duna (Papua New Guinea) case study. Centre for Pacific Studies, James Cook University, Australia.