This article was downloaded by:[University of Melbourne]
On: 15 January 2008
Access Details: [subscription number 789190216]
Publisher: Taylor & Francis
Informa Ltd Registered in England and Wales Registered Number: 1072954
Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK

Society & Natural Resources An International Journal

Publication details, including instructions for authors and subscription information:
<http://www.informaworld.com/smpp/title~content=t713667234>

The Ambiguities of "Environmental" Conflict: Insights from the Tolukuma Gold Mine, Papua New Guinea

Grant Walton^a; Jon Barnett^a

^a School of Social and Environmental Enquiry, The University of Melbourne, Melbourne, Victoria, Australia

Online Publication Date: 01 January 2008

To cite this Article: Walton, Grant and Barnett, Jon (2008) 'The Ambiguities of "Environmental" Conflict: Insights from the Tolukuma Gold Mine, Papua New Guinea', Society & Natural Resources, 21:1, 1 - 16

To link to this article: DOI: 10.1080/08941920701655635

URL: <http://dx.doi.org/10.1080/08941920701655635>

PLEASE SCROLL DOWN FOR ARTICLE

Full terms and conditions of use: <http://www.informaworld.com/terms-and-conditions-of-access.pdf>

This article maybe used for research, teaching and private study purposes. Any substantial or systematic reproduction, re-distribution, re-selling, loan or sub-licensing, systematic supply or distribution in any form to anyone is expressly forbidden.

The publisher does not give any warranty express or implied or make any representation that the contents will be complete or accurate or up to date. The accuracy of any instructions, formulae and drug doses should be independently verified with primary sources. The publisher shall not be liable for any loss, actions, claims, proceedings, demand or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.

Articles

The Ambiguities of “Environmental” Conflict: Insights from the Tolukuma Gold Mine, Papua New Guinea

GRANT WALTON AND JON BARNETT

School of Social and Environmental Enquiry, The University of Melbourne,
Melbourne, Victoria, Australia

In this article we propose that environmental conflicts in developing countries are caused not so much by environmental degradation—as suggested in much of the literature on environmental security—but by the unequal distribution of outcomes arising from environmental degradation and the processes that cause it. We then seek to inform this theoretical proposition through a review of research on conflicts surrounding mining in Papua New Guinea (PNG), and through a case study of socioenvironmental impacts of, and local responses to, the Tolukuma Gold Mine (TGM) in PNG. We show that the unequal distribution of environmental impacts and compensation payments caused by the mine has created conflicts between landowners and the mine, and among landowners. These conflicts are at present largely nonviolent. The case broadly supports the proposition that inequality is a critical factor in ostensibly “environmental” conflicts.

Keywords environmental degradation, environmental security, inequality, mining, Papua New Guinea, Tolukuma Gold Mine

Much of the research on environmental security has focused on the cause-effect relationships between environmental degradation and conflict. The focus has overwhelmingly been on instances where conflict has been overtly violent. The findings of this research have long been ambiguous (Deudney 1991; Gleditsch 1998; Hartmann 2001), leading to a range of explanations as to the linkages between environmental degradation and violent conflict. In the last few years, research from anthropologists, geographers, and sociologists (among others) on environmental conflicts has begun to influence (but not simplify) theories of environmental conflicts, and there are many cognate areas of study yet to be seriously considered. Among these, the

Received 3 August 2005; accepted 14 March 2007.

All figures produced by Fatima Basic of the School of Social and Environmental Enquiry, University of Melbourne. We are grateful to the Centre for Environmental Research and Development, particularly Matilda Koma, for supporting of the field work of the first author. We thank the people of Goilala district for their hospitality during this field work. We also thank the three anonymous reviewers for their valuable comments. Jon Barnett is an Australian Research Council Fellow.

Address correspondence to Jon Barnett, SSEE, The University of Melbourne, Melbourne 3010, Victoria, Australia. E-mail: jbarn@unimelb.edu.au

detailed research by anthropologists and geographers into violent and nonviolent mining-related conflicts in Papua New Guinea (PNG) has much to offer.

Informed by both theories of environmental conflicts, and the research on mining-related conflicts in PNG, this article examines the conflict surrounding the Tolukuma Gold Mine (TGM) in PNG. Through the case study we hope to contribute to a general theory of environmental conflicts. We also aim to link research on mining conflicts in PNG with theories on environmental conflicts. We also offer a modest proposal to avoid escalation of the conflict into large-scale violence.

We begin with an overview of the theories of environmental conflict that have emerged from that component of environmental security research that focuses on the connections between environmental degradation and violence. From this we propose a tentative general theory of environmental conflict, which we then seek to inform through a review of research on conflicts surrounding mining in PNG and through our case study of the socioenvironmental impacts of TGM. The article concludes with a discussion of the implications of the TGM case study for theories of, and research into, environmental conflicts.

Understanding Environmental Conflicts

There is now a considerable body of research seeking to explain the connections between environmental degradation and conflict. Of these, the early empirical studies directed by Thomas Homer-Dixon (e.g., 1999) are the most highly cited, and arguably the most influential on policymaking (as explained by Dabelko and Simmons 1997 and Griffiths 1997). These studies, as well as a project directed by Guenther Baechler (e.g., 1999), examined cases of violent conflict, and they then sought to determine the influence of environmental factors in the generation of these conflicts. Explanations emerging from both the Project on Environment, Population and Security at the University of Toronto and the Environment and Conflicts Project (ENCOP) include: that scarcity of renewable resources can at times lead to violent conflict and social instability; that unequal consumption of scarce resources is a critical factor in violent conflicts; that violent conflicts where environmental scarcity is a factor are more likely in low-income, resource-dependent societies; and that population pressure contributes to violent conflicts. These insights are somewhat limited because the studies that produced them did not consider instances where environmental degradation did not result in violent conflict (Barnett 2001; Matthew 2000), and because their search for the “environmental” component tended to downplay many other important causal factors (Gleditsch 1998).

In the wake of these early studies, two alternative approaches to understanding the connections between environmental degradation and conflict have emerged. The first approach situates environmental conflicts into the broader field of conflict studies. It entails quantitative analyses of aggregated data to test the relationships between various environmental and social variables, including resource scarcity, population growth, resource abundance, democracy, and poverty. Many of these studies suggest that “strong states” with a high trade/gross domestic product (GDP) ratio tend to be less prone to internal conflicts (Collier 2000; de Soysa 2000) and are more capable of managing environmental degradation and change (Hauge and Ellingsen 2001). States undergoing significant economic and political transitions seem to be relatively more prone to internal violent conflict (Esty et al. 1999). It is widely understood that relative and absolute poverty are important

variables, and some argue that vertical (class-based), horizontal (spatially based), or age-based inequalities can cause grievances that may lead to conflicts (Goodhand 2003; Keen 2000; Nafziger and Auvinen 2002; Stewart 2000). Finally, it has been argued that it is the abundance of natural resources as much their scarcity that drives conflict (Collier 2000; de Soysa 2000). However, none of these explanations are particularly conclusive, showing at best weak correlations among variables. They are significantly constrained by the quality of data that inform them (Conca 2002).

The second alternative approach to studying environmental conflicts is firmly grounded in long-standing environment–society studies conducted by geographers, anthropologists, and sociologists. This work offers more detailed insights into environmental problems and violence. A number of these studies suggest that when environmental changes alter the distribution of natural and economic capital among people and local groups it can stimulate grievances that may ultimately lead to violence. For example, inadequate distribution of the returns from resource extraction activities has been a factor in violence in West Kalimantan (Peluso and Harwell 2001) and the Niger Delta (Watts 2001). Bobrow-Strain (2001) shows that declining agricultural production due to economic and political forces (rather than environmental scarcity), and the unequal distribution of returns from production, was an important factor in land conflicts in a district of Chiapas, Mexico. Timura (2001) also shows that unequal access to economic and political resources was an important factor in the Zapatista rebellion, the "Guinea Fowl" war in Ghana, and conflict in Para, Brazil.

Many studies show that communities affected by externally-imposed resource extraction activities rarely comply with these developments without some exercise of resistance (Hirsch and Warren 1998; Peet and Watts 2000; Scott 1976; 1985). These studies suggest that the success or failure of nonviolent resistance strategies is critical to understanding the generation of violence (or peace). Despite this, the notion of resistance has been barely considered in research on environment and violent conflicts. Direct violence is only the most extreme form of resistance, but it may be that violence becomes more likely as successive resistance strategies fail to mitigate unequal power relations.

As a result of these most recent explorations, more nuanced theories of the connections between environmental degradation are emerging. "Environmental scarcity" itself can no longer be seen as a single causal factor in conflict, and explanations of environmental conflicts must look to a range of economic, political, and cultural processes that structure both material and institutional forms of power. On the basis of the discussion thus far, a tentative general theory of environmental conflicts seems possible. It is important to note that our concern here is for environmental conflicts within developing countries and for conflicts that may have explicitly violent outcomes. Yet we are by no means suggesting that responsibility for environmental change rests with local people in developing countries—we are well aware of the effects of global consumption on environmental change in developing countries (see Barnett 2001). Indeed, our study of conflict surrounding the TGM is a study of the local consequences of resource extraction to supply markets in developed countries. But we do consider that environmental conflicts are more likely to be violent in developing countries given that: people are generally more dependent on natural resources for livelihoods, so that changes in the relative abundance of these resources is often a matter of survival; and that states in developing countries do not have effective systems for mediating impending conflicts before they turn violent and

struggle to manage environmental degradation and change (Esty et al. 1999; Hauge and Ellingsen 2001).

Thus, we propose that environmental conflicts in developing countries are caused not so much by environmental degradation, but by the unequal distribution of outcomes arising from environmental degradation and the processes that cause it (in this case, mining). This is of course a general theory, and research that grounds the effects of environmental changes in the particular contexts in which agents sustain their lives and livelihoods is required (Matthew and Dabelko 2000). It also seems clear that much can be learned from researching processes *as they happen*, and regardless of whether or not violent conflict is an outcome. More research into the ways in which communities resist changes also seems important.

Our modest case study of the Tolukuma Gold Mine in PNG seeks to contribute to this general theory. It explains the impacts of, and people's responses and resistances to, the TGM. It is a study of a conflict as it unfolds, as the mine is still operating and its attending environmental and social impacts are still being felt. This, we argue, is true of many studies of environmental conflicts, since the beginnings and ends are not as clearly marked as scholarly studies imply (Pearce 1998). Inasmuch as our study is a "snapshot," decisive conclusions are impossible (a point not well recognized by many studies of this kind), although we draw some tentative conclusions.

The primary data for this study was collected during fieldwork in PNG in December 2003–January 2004 (see Walton 2004), and from earlier research in 2003 (Walton 2003). The principal data collection techniques were semistructured and unstructured interviews with groups and individuals affected by the mine (including people living outside of the immediate mining lease area). In total, 60 respondents were interviewed through individual and group interviews. The respondents included workers, male and female landowners, villagers, and representatives of people's associations and nongovernmental organizations. Care was taken to seek responses from women through group discussions or individual interviews. Interpreters assisted in translating questions from Tok Pisin (PNG pidgin) and the local Feuygue language into English. Our study also draws on a range of relevant secondary sources. However, before proceeding we offer a short review of other mining conflicts in PNG to set the national context in which the TGM case arises.

Mining Conflicts in Papua New Guinea

In his development of environmental conflict syndromes, Baechler (1999) identifies a category of "center–periphery" conflicts characterized by power struggles arising from modern developments implemented in rural and marginal locations. Such conflicts are frequently associated with mining operations, and in PNG, well-studied cases of (not necessarily violent) mining conflicts include the Panguna mine (Denoon 2000), the Ok Tedi mine (Hyndman 2001), the Porgera mine (Imbum 2000), and the Misima and Lihir mines (Macintyre and Foale 2004). These conflicts are relatively numerous in PNG because although mining accounts for up to 70% of the country's merchandise exports and 25% of its gross domestic product (GDP) (PNG Business and Tourism 2005), many mining projects have caused environmental destruction, disrupted traditional forms of land tenure, and increased social problems such as HIV/AIDS, gambling, and alcoholism (Ballard and Banks 2003; Banks 2002; Filer 1992; Macdonald and Ross 2003).

A pervasive source of conflict surrounding most mines is the distribution of compensation payments. Payments are highest among communities identified to have "ownership" over mining lease areas; these are areas in which mining can legally take place. Communities beyond the mining lease boundary receive fewer benefits from the mine, even though in some cases—such as the Ok Tedi mine—the environmental impacts of mining operations significantly undermine their livelihoods (Hyndman 2001). While communities outside the mining lease areas tend to see the concentration of payments to landowners within the lease areas as fair, they nevertheless expect in the longer term that the mine would benefit them as well (Macintyre and Foale 2004; Ballard and Banks 2003). When these benefits do not materialize, divisions between what were previously more amorphous community groups become polarized, largely according to geographic demarcations, while the claims of adjacent landowners against mines increase (Hirsch 2001). Thus, the boundary of the mining lease area becomes significant in providing enhanced social opportunities for landowners within its borders. The generation of a class of domestic mine employees coupled with the influx of expatriate workers into the mining lease area also adds to perceptions of economic inequalities (Howard 1991).

The serious violent conflict stimulated by the development of the Panguna mine on Bougainville Island can be read as broadly supporting the general theory of environmental conflict. Here, horizontal (across space), and vertical (e.g., class-based) inequalities were both important factors in the conflict. Horizontal inequalities appeared between landowners who received compensation and those that did not. Vertical inequalities became manifest between older people who received few benefits from the mine and who sought to maintain their power over custom in the face of its modernizing influence, and younger people, many of who were employed by the mine and were more open to its modernizing effects. Böge (1999) finds that while in some ways the mine was seen by people on the island as a positive development, the environmental and social impacts of the mine were a significant cause of violent opposition. Importantly, these losses—as well as some gains—from the mine were distributed unequally, exacerbating old and creating new social divisions that coalesced into warring parties (see also Denoon 2000).

The way in which mining operations affect individual and communal forms of resource control in and around mining areas is a core problem (Banks 2002). This includes actors claiming environmental damage as an "economic resource," and in turn arguing for compensatory payments (Macintyre and Foale 2004, 240). In this respect these are neither ostensibly "environmental" conflicts as Hyndman (2001) would suggest (by focusing upon "popular ecological resistance movements" and the clash of ecologies between the Ok Tedi Mine and the Yoggom), nor simply ways in which communities "menace the mining industry" for greater rents, as Filer (1997) suggests. For most people in PNG "the environment *is* economic, and it is also social and political life and cultural sustenance" (Banks 2002, 42). This view of nature as being indivisible from the social is not unique to PNG, and raises the possibility that in many places the identification of "environmental" elements in conflicts has little explanatory power, and that the category of "environmental conflicts" itself will have little meaning to those who experience them.

In response to the transformations wrought by mining operations in PNG, communities have developed various resistance strategies. These include increased demand for compensation payments and development programs, formation of local

nongovernmental organizations (NGOs) and alliances with international NGOs, legal claims against mining companies within PNG and in overseas courts, and formation of armed militias. These responses are often nonviolent, and are based on sophisticated strategies of alliance building, lobbying, and discourse making (Hyndman 2001; Macintyre and Foale 2004).

Research into the conflicts surrounding mining projects in PNG generally does not argue that the source of contention is purely, or even largely, the scarcity of resources affected by mines. Instead, the majority of studies explicitly or implicitly identify changes in the distribution of resources and opportunities affected by mining as the basis of contention that arises both between communities and the mine and among communities. In this respect, this research can be crudely said to support the theory of environmental conflicts we offered earlier: conflict is caused by a number of different factors, including environmental degradation and more importantly the unequal distribution of outcomes arising from environmental degradation and the processes that cause it.

The Tolukuma Gold Mine and Its Impacts

The TGM is located 100 km north of PNG's capital of Port Moresby in the Auga Valley of Goilala District, Central Province (Figure 1). The area had its first contact with Europeans around 1897, after which time missionaries set up outposts in the area and converted a number of people to Christianity. The area was successively opened to outside influences with the completion of the Woitape-Kosipe road in 1966, and an airstrip at Fane in 1972. There have been a number of short-lived and small-scale projects in the area (for example, the establishment of a small

Figure 1. Location of the Tolukuma Gold Mine.

agricultural station at Mondo village), but nothing comparable in scale to the TGM. As a result, Filer’s (1994) social impact assessment report for the mine suggested that it was a “very backward area” in 1993, with less than 10% of school age Yulai children attending school.

Exploration for minerals in the Goilala district began in 1983, and the TGM began operations in a defined mining lease area (MLA), referred to as ML 104, in 1995 (Macdonald and Ross 2003). There is also a larger exploration lease area (ELA), in which the company has a legal right to conduct exploration (see Figure 2). The Australian company Dome Resources oversaw the operation of the mine until 1999, after which time a South African mining company, Durban Roodepoort Deep Ltd (DRD) took over. Most recently, Australian company Emperor

Figure 2. The mining and exploration lease areas.

Mines Limited acquired the mine (in April 2006) (Emperor Mines Limited 2006a). The mine uses open pit and underground methods throughout the MLA (Figure 2).

A memorandum of agreement (MoA) negotiated between landowners within the MLA and the then owners of the TGM—Dome Resources—was not signed until 2 years after the mine began operating. The agreement was, and remains, controversial. A leader of the local NGO—the Centre for Environment and Development—considers that the lack sufficient public consultation on the MoA meant that most landowners did not understand its significance or its ramifications. The MoA outlines that royalty payments be divided among the three clans of the Yulai people (the Hameng, Yaulo, and Yangam) in the following manner: 60% to the three clans of Yulai, 30% to the Yulai Trust fund account established for the benefit of future generations, and 10% toward the Yulai Landowners Association (Gelu 1997). Thus, unlike older mines in PNG where the government received a large share of royalty payments, all royalty payments from the TGM are intended for landowning clans.

Approximately 93% of current production (by tonnage) is delivered from underground sources with the residual taken from open pit mining (Emperor Mines Limited 2006b). Both of these methods have affected the environment, with the physical scars of the open pit being the most visible signs of the mine's presence. However, it is the by-products of the mining operations that have caused the greatest environmental damage. Every year the mine pumps 160,000 tonnes of contaminated tailings into Iwu Creek, which runs into the Auga River, causing environmental damage in both the MLA and ELA (Macdonald 2004). Local landowners as well as local and international NGOs claim that this pollution has contributed to the loss of vegetation—including fruit trees—on the banks of the river; and to reductions in fish, prawn, and eel numbers; and, most disturbingly, it is blamed for unexplained illnesses and deaths in the area (Macdonald and Ross 2002; 2003; Walton 2003). These environmental impacts are set to increase, as output is expected to grow in coming years.

The absence of a road network into and around the mine has meant that helicopters are used to supply the TGM with fuels and cargo, increasing the threat of environmental damage. In March 2000 a HeviLift helicopter accidentally dropped 1000 kilograms of cyanide into the Yalonge River Valley 20 kilometers south of the mine (outside of the ELA) (Macdonald and Ross 2002; 2003). While the mine announced that cleanup operations were completed three days after the incident, these efforts were largely ineffectual (Microbal 2000; Burton 2002; Macdonald and Ross 2002; Macpherson 2002; Macdonald and Ross 2003). A team of international and local NGOs found that dangerously high levels of cyanide had resulted in downstream fish kills (Divecha et al. 2000). In addition, the crash was found to cause ongoing anxiety among affected populations. As a result, inhabitants of Inaina village were forced to leave their homes after the cyanide incident. The village is still largely deserted, and many villagers are living in poverty and insecurity elsewhere (Macpherson 2002). In addition to this, since 2000, two diesel fuel spills have occurred from the regular helicopter trips into the area. There was a spill of some 4000 liters in September 2000 (Macdonald and Ross 2003), and another late in 2003.

Despite landowners within and outside of the MLA experiencing the environmental impacts of the mine, although to varying degrees, it is the landowners within the MLA that have received compensation payments. This, accompanied by the historical links landowners in surrounding villages have to the ML 104 site, has led

many landowners outside of the ML104 area to feel that they should have been afforded the same sorts of benefits provided to identified "owners" of land within the ML 104 area. One of the landowners outside of the ML 104 area reported that "by birthright I should have compensation and royalties because my grandmother is from the area." The leader of another clan claimed that the ML104 area was the place of origin of a number of other tribes and given these genealogical links he felt that his tribe, and others, should also be afforded royalties. Thus, with the TGM, the imposition of boundaries has had a profound effect on landowners unaccustomed to such delineation.

As a result of the way the mining leases delineate the rights of groups to negotiate with the mine, some groups have increased their power over others. For example, representatives from one village that had direct negotiations with the company concerning the conversion of exploration licences to mining leases were quick to agree to the conversion as "we are number one [i.e., the best] in the valley, so we will be the number one to represent [the community] in mining company negotiations." Leaders in this village acted to appropriate control over negotiations despite the affects it might have on surrounding villages. Residents of a nearby village that would also be affected by the conversion were left out of the negotiations. For their part, representatives of this community saw that their limited literacy, compared with other groups' perceived superior literacy, created a power imbalance that left them little chance of having their concerns heard. As one informant complained: "because of our illiteracy the [first village] take court cases against us. We are scared . . . because of our ignorance we are helpless." Thus, intracommunity inequalities, which already exist outside of the mining lease area, are being exacerbated by the nature of negotiations for compensation and benefits from upcoming mining operations.

For members of another landowning group the frustration of being excluded from the benefits of mining, while experiencing its negative environmental effects, has left them with few options. Says the leader of one village located within the ELA, and therefore excluded from the compensation payments: "I haven't been considered a beneficiary and the company has poisoned my river. That's why I should take up arms against them [TGM]." He and other villagers crossed the polluted Auga River each day to access their gardens and complained of unexplained deaths and skin discoloration (many villagers had unusually bright yellow feet and hands). Complaints to the mining company were made by presenting company representatives with dead fish from the river and raising concerns with the Oxfam mining ombudsman, in an effort to seek compensation and to alert the mine of the detrimental effects of its operations. Various members of the community complained that such efforts failed to change the situation, leading to levels of frustration that perhaps explain the threat of violence. Of course, there is a difference between talking about, and actually engaging in, violent acts. Nevertheless, this example suggests that when people have no other avenues to influence centers of power, violent action becomes a more plausible strategy of resistance.

People from local landowning groups employed at the mine perceive that they receive poorer wages and other working conditions relative to expatriates and "outsiders" (those not native to the Goilalan district). One local (Goilalan) said that "most work is done by local guys around this area . . . these [people] are always paid low wages. Sometimes they get frustrated." Two workers independently complained that most of the "grunt work" was carried out by locals. These factors lead to a

workers' strike in October 2002 when miners protested over unfair conditions and wages for workers. One mine worker reported that "there were about 80% locals [Goilans] at the strike." There is also a sense of unequal pay between local workers at the TGM and workers at other mines in PNG. One mineworker said: "People complain about wages—they are very low. In other parts of the country wages are higher."

In addition to the mine's environmental impacts and its structuring of inequality, landowners express frustration that the company has not honoured the original MoA by not providing infrastructure development (Macdonald and Ross 2003); that with the introduction of mining activities, alcohol abuse and prostitution have increased (Walton 2003); that the company is exploring beyond exploration lease areas (Macdonald and Ross 2003); and that the mine has had negative impacts on people's customs and traditional values through alcohol and prostitution, and more broadly through the social stratification and divisions it has increasingly affected. Many people are also aware of the benefits that come from the mine, including transport of school materials, improved access to markets, increased vegetable production, and increased employment of locals (Walton 2003). However, the majority of respondents argued that the negative effects associated with the mine outweigh these benefits, in turn fueling a number of resistance strategies.

Resisting the Tolukuma Gold Mine

Landowning groups have been active in bringing their concerns to mine management, the PNG government, and to a wider audience. While most strategies have been directed at the company, some have been targeted at the state. For example, in 2000, in response to the first diesel spill, affected landowners generated a petition, which was delivered to both the mine and to the PNG Department for Environment and Conservation (DEC) (Macdonald and Ross 2003). As a result of this petition, TGM and DEC responded separately, both denying responsibility for the legacy of the spill.

A number of other groups of landowners inside and outside the ELA have formed themselves into groups in order to coordinate their dealings with the mine, and to provide a more publicly recognizable front in their dealings with the TGM. This has become increasingly necessary as the mine has sought to convert exploration lease agreements into mining lease agreements. One of these groups—the Kuni landowners group (within the ELA)—reportedly refused to allow the mine to carry out exploration work in its area in 2001. The chairman of the landowners group reported that their opposition came about because TGM did not hold an exploration licence for the area, and because the mine denied official Kuni representation in mining warden (a dispute resolution function of the department of mining) hearings—a process aimed at garnering multistakeholder discussion regarding the company's application to extend its exploration area (The National Online 2002). Many local people see these landowner groups as enhancing their ability to interact with the company and the state and as having "a good capacity to bring change through negotiation."

In addition to actions at the local level, community leaders have come to realize the importance of engaging the company at the international level and bringing their

concerns to the world stage. Therefore, an important strategy has been to form alliances within international NGOs. For instance, in January 2001 a group of landowners within the MLA and ELA created the Auga River Waterway Resource Association (ARWROA), which, in August of that year, enlisted the support of Oxfam Community Aid Abroad to assist it in negotiations with the TGM. Oxfam Community Aid Abroad and the Port Moresby-based NGO Environmental Watch Group (NEWG), which is now known as the Centre for Environmental Research and Development, [CERD]) have continued to support these and other landowners within the MLA and ELA in their disputes with the mine.

Given the greater number of fora available, and lessons learned from past experiences, landowner groups inside the ELA insist that they would negotiate a better deal with the mine if mining were to occur on their land. Faced with the prospect of new mining operations, they have deployed two subtly different strategies. The first is to immediately negotiate for a "better deal" with the company. The leader of one village who supported the prospect of new mining operations acknowledged the inequity that mines bring about, but argued that ultimately it brings "easy access to earn money for living. But we realize these are scraps. We want big dollars." The second strategy has been to offer staunch opposition, but with a view to increasing their bargaining position with the mine. In the words of one respondent: "We are doing this until we are strong enough to negotiate with the mine. Right now we are not." Landowners are not opposed to the mine per se; rather, they are opposed to its environmental impacts and the unequal distribution of inadequate compensation payments, and their actions seek to gain greater leverage in negotiations to redress these coupled environmental and social affects.

For their part, workers at the mine drawn from local villages (within the MLA and ELA) reported a variety of different ways in which they acted on their frustrations over salaries and working conditions. One of the key expressions of resistance was through the 2002 strike and the threat of further strikes. However, in the eyes of one worker, the effectiveness of strike action is declining:

We talk strong but we see we're at a disadvantage. They have dogs, guns, savvy [knowledge/understanding], money and power. We know we are [only] employees in there. So if we are to do anything more than talk we would be sacked.

A more serious manifestation of frustration with the mine by employees was the death of a security guard at the mine, an event described in this way:

One of the employees argued with security [and] they [the security guards] belted him. The employees that saw this got to the security guard and belted him up. Later on he died. The guy arguing with the security guard became paralyzed. The argument was about wearing overalls out of the camp. Security asked him not to take it [the overalls] out of the mine. But the guy said he would take the money out of his pay if he lost them . . . they [fellow workers] hit security with an "iron" . . . the employees involved went to court and ended up in prison.

These local miners also reported using other resistance strategies such as going slow, not showing up to work, not doing as they are supposed to at work, damaging company property, and theft of company property.

Women have devised resistance strategies to the TGM through avenues they see as accessible. This has mainly occurred through influencing patriarchal fora. Indeed, a number of women claimed that they resist the mine through men, and through predominately male-controlled landowner associations. In a violent manifestation of resistance, two women reported that they “got the men to bash up a geologist to stop him from exploring this area.” However, women have also taken a stand against the mine on their own terms. For instance, a number are active in monitoring TGM activity for local and international NGOs in their work in the area. Some inside the ELA have refused to participate in a women’s association set up by the TGM as this would legitimate the mine’s activities in the area.

Other acts of resistance reported by the community and workers include overt forms of resistance such as sabotaging company property (e.g., water pipes) to disrupt mine operations, which was said to be carried out by a handful of disgruntled locals. Less overt forms of resistance have included complaining about problems that come with the company in a variety of open and secluded forums, talking among themselves of taking up arms, and invoking *puri puri* (black magic) to bring the down the clouds and, as a result, inhibit company helicopters from landing at the mine site. These less formal forms of resistance are more commonplace than the formal strategies of legal action, strikes, and alliance with domestic and international NGOs, even if they are less visible to outsiders.

In the past few years there have been various meetings and exchanges of correspondence between the mining company and CERD and Oxfam Community Aid Abroad (Macdonald and Ross 2003). In response to this increased involvement of local and international NGOs, to Oxfam’s *Mining Ombudsman Annual Reports* released since 2001 (which outline the social, economic and environmental impacts of the mine on the community), and to a South African current affairs program’s highly critical investigative report into the mine, the TGM began to formally respond to landowner grievances through press releases, letters to shareholders (e.g., Wellesley-Wood 2003), and with a detailed social responsibility report (Lake 2004). Despite the many community grievances, the DRD Divisional Director Australasia, Richard Johnson, argues that while worker morale was low, local and downstream communities were disenfranchised, and local environmental and community stakeholders were off side in September 2002, by 2004 DRD had “turned that completely around” (in Lake 2004, 2). Yet, in reality, measures to resolve the tensions between the mine and landowners have been piecemeal, but are slowly moving forward. The recent acquisition of TGM by Emperor Mines Limited may offer a window of opportunity for further meaningful dialogue with the community, as some of the animosity towards the mine was aimed at the DRD management and administration of the mine. However, given the way in which compensation payments have been arranged according to whether landowners are inside or outside of the MLA, rather than on the basis of kinship, for the foreseeable future grievances between landowner groups and the mine, and between landowner groups, seem likely to continue.

Given the thus far largely limited response of the mine, the immanent possibilities for mitigating the potential for violence in the future lie in efforts by third parties—such as NGOs—to reconcile power differentials between landowning

groups, and between landowners and the mine. It may be appropriate to first work with those groups that have the least amount of power vis-à-vis the mine and vis-à-vis other groups (for example, those who are marginalized through not knowing the languages of power—English and Tok Pisin). Such an approach could help redress inequalities in entitlements to resources and lay the foundations for future generations to empower themselves.

Conclusions

Through the unequal distribution of environmental impacts and compensation payments, the TGM mine has caused environmental and social problems in the Auga Valley. The most important source of inequality between communities is the allocation of rights to compensation based on the boundaries of mining lease areas and exploration lease areas. In that most of the grievances between landowner groups and the mine and among landowner groups are various forms of created or exacerbated inequalities, this case lends support to the theory that environmental conflicts in developing countries are caused not so much by environmental degradation, but by the unequal distribution of outcomes arising from environmental degradation and the processes that cause it.

In response to the environmental and social problems affected by the mine, people in the Auga Valley deploy a range of largely nonviolent resistance strategies, often involving acting collectively as landholding groups, and including the use of mechanisms associated with the state, building alliances with local and international NGOs, and refusing to cooperate with the mine. Violence against persons has been rarely used to resist the mine. However, there is a risk of increasing violence in and around the mine site, given the slow development of dispute resolution processes. The specter of violence will continue to loom if the resistance strategies people use fail to deliver to them some sense of satisfaction, and if the mine and/or the state responds with the use of force. Violent outcomes can be averted through the continued involvement of third parties to reconcile power differentials between landowning groups, and between landowners and the mine. Importantly, the mine needs to increase its dialogue with landholders within the MLA, the ELA, and the larger Auga valley area. It must avoid the use of force in its dealings with people in the Auga valley, as this is likely to result in violent reprisals and an escalation in violence in and around the mine.

That the objectives of the resistance strategies local people use are neither ostensibly environmental nor economic, but a synthesis of both, reflects the cosmological indivisibility of "environment" from social life in the Auga valley. The TGM case, like other conflicts surrounding mining projects in PNG, suggests that the meaning of "environment" in environmental conflicts may be a chimera of Western science that is incommensurable with local meanings. If the TGM case is any indication, research into environmental conflicts would benefit from relaxing the categories it applies to understanding conflicts, and instead seek to understand conflicts from the perspective of those that experience them, and as they transpire. From this inside-out perspective may emerge new theories of "environmental" conflict, and better understanding of the solutions to them. Further research of this kind might profitably focus more on the disruptions in the social relations that are embedded in an environment, and that give it meaning, and less on disruptions in the environment per se.

References

- Ballard, C. and G. Banks. 2003. Resource wars: The anthropology of mining. *Annu. Rev. Anthropol.* 32(1):287–313.
- Baechler, G. 1999. *Violence through environmental discrimination: Causes, Rwanda arena and conflict model*. Dordrecht, the Netherlands: Kluwer.
- Banks, G. 2002. Mining and the environment in Melanesia. *Contemp. Pacific* 14(1):39–67.
- Barnett, J. 2001. *The meaning of environmental security*. London: Zed Books.
- Bobrow-Strain, A. 2001. Between a ranch and a hard place: Violence, scarcity, and meaning in Chiapas, Mexico. In *Violent environments*, eds. N. Peluso and M. Watts, 155–188. Ithaca, NY: Cornell University Press.
- Böge, V. 1999. Mining, environmental degradation and war: The Bougainville Case. In *Environment, politics and violent conflict*, ed. M. Suliman, 211–227. New York: Zed Books.
- Burton, B. 2002. Village abandoned after PNG cyanide spill. *Mining Monit.* 5(3):3.
- Collier, P. 2000. *Economic causes of civil conflict and their implications for policy*. Washington, DC: The World Bank.
- Conca, K. 2002. The case for environmental peacemaking. In *Environmental peacemaking*, eds. K. Conca and G. Dabelko, 1–22. Baltimore, MD: John Hopkins University Press.
- Dabelko, G. and P. Simmons. 1997. Environment and security: Core ideas and U.S. government initiatives. *SAIS Rev.* 17(1):127–146.
- Denoon, D. 2000. *Getting under the skin: The Bougainville Copper agreement and the creation of the Panguna Mine*. Carlton South, Victoria, Australia: Melbourne University Press.
- de Soysa, I. 2000. The resource curse: Are civil wars driven by rapacity or paucity? In *Greed and grievance: Economic agendas and civil wars*, eds. M. Berdal and D. Malone, 113–136. Boulder, CO: Lynne Rienner.
- Deudney, D. 1991. Environment and security: Muddled thinking. *Bull. Atom. Scientists* 47(3):23–28.
- Divecha, S., M. Oakwood, R. Taylor, and U. Rakova. 2000. *Cyanide crash: Report into the Tolukuma Gold Mine cyanide spill of March 2000 in PNG*. Sydney, Australia: Greenpeace and Environmental Law Centre.
- Emperor Mines Limited. 2006a. Emperor completes acquisition of interests in Porgera and Tolukuma from DRDgold limited: Emperor becomes one of the largest gold producing companies on the ASX. *ASX Media Release*, 6 April.
- Emperor Mines Limited. 2006b. *Tolukuma Gold Mine, PNG*. Retrieved 6 June 2006. <http://www.emperor.com.au/abouteml/TolukumaPNG.html>.
- Esty, D., J. Goldstone, T. Gurr, B. Harff, M. Levy, G. Dabelko, P. Surko, and A. Unger. 1999. State failure task force report: Phase II findings. *Environ. Change Security Proj. Rep.* 5:49–72.
- Filer, C. 1992. The escalation of the disintegration and the reinvention of authority. In *The Bougainville crisis: 1991 Update*, eds. M. Spriggs and D. Denoon, 112–140. Bathurst NSW, Australia: Research School of Pacific Studies in association with Crawford House Press.
- Filer, C. 1994. Socio-economic impact assessment of the Tolukuma Gold Mine, Central Province. *Res. Melanesia* 18:1–84.
- Filer, C. 1997. The Melanesian way of menacing the mining industry. In *Environment and development in the Pacific Islands*, eds. B. Burt and C. Clerk, 91–122. Canberra, Australia, and Port Moresby, Papua New Guinea: Research and School of Pacific and Asia Studies, Australian National University, and University of PNG Press.
- Gelu, Z. 1997. *Memorandum of agreement*. Port Moresby: Department of Attorney General.
- Gleditsch, N. 1998. Armed conflict and the environment: A critique of the literature. *J. Peace Res.* 35(3):381–400.

- Goodhand, J. 2003. Enduring disorder and persistent poverty: A review of linkages between war and chronic poverty. *World Dev.* 31(3):629–646.
- Griffiths, F. 1997. Environment in the U.S. security debate: The case of the missing Arctic waters. *Environ. Change Security Proj. Rep.* 3:15–28.
- Hartmann, B. 2001. Will the circle be unbroken? A critique of the project on environment, population, and security. In *Violent environments*, eds. N. Peluso and M. Watts, 39–62. Ithaca, NY: Cornell University Press.
- Hauge, W. and T. Ellingsen. 2001. Causal pathways to conflict. In *Environmental conflict*, eds. P. Diehl and N. Gleditsch, 36–57. Boulder, CO: Westview Press.
- Hirsch, E. 2001. New boundaries of influence in highland Papua: "Culture," mining and ritual conversions. *Oceania* 71(4):298–312.
- Hirsch, P. and C. Warren (Eds.). 1998. *The politics of environment in Southeast Asia: Resources and resistance*. London: Routledge.
- Homer-Dixon, T. 1999. *Environmental scarcity and violence*. Princeton, NJ: Princeton University Press.
- Howard, M. 1991. *Mining, politics and development in the South Pacific*. Boulder, CO: Westview Press.
- Hyndman, D. 2001. Academic responsibilities and representation of the Ok Tedi crisis in postcolonial PNG. *Contemp. Pacific*. 13(1):33–54.
- Imbum, B. 2000. Mining workers or "opportunists" tribesmen?: A tribal workforce in a PNG mine. *Oceania* 71(2):129–149.
- Keen, D. 2000. Incentives and disincentives for violence. In *Greed and grievance: Economic agendas in civil wars*, eds. M. Berdal and D. Malone, 19–42. Boulder, CO: Lynne Rienner.
- Lake, J. 2004. *Tolukuma Gold Mine social responsibility report 2004*. Port Moresby, Papua New Guinea: Durban Roodepoort Deep Ltd.
- Macdonald, I. 2004. *Mining ombudsman annual report 2004*. Fitzroy, Australia: Oxfam Community Aid Abroad.
- Macdonald, I. and B. Ross. 2002. *Mining ombudsman annual report 2001–02*. Fitzroy, Australia: Oxfam Community Aid Abroad.
- Macdonald, I. and B. Ross. 2003. *Mining ombudsman annual report 2003*. Fitzroy, Australia: Oxfam Community Aid Abroad.
- Macintyre, M. and S. Foale. 2004. Politicized ecology: Local responses to mining in PNG. *Oceania* 74(3):231–251.
- Macpherson, J. 2002. *Analysis of the social impact on the people of Inaina village of the Tolukuma Gold spill*. Prepared for the people of Inaina. Port Moresby, Papua New Guinea: NGO Environmental Watch Group. Unpublished.
- Matthew, R. 2000. Environment and security in an international context: Critiquing a pilot study from NATO's Committee on the Challenges of Modern Society. *Environ. Change Security Proj. Rep.* 6:95–98.
- Matthew, R. and G. Dabelko. 2000. Environment, population, and conflict: Suggesting a few steps forward. *Environ. Change Security Proj. Rep.* 6:99–103.
- Microbal. 2000. *Study of the social impact on Inaina village of the spill of cyanide by TGM and Hevilift in March*. Port Moresby, Papua: New Guinea Micobal Ltd. Unpublished report.
- Nafziger, E. and J. Auvinen. 2002. Economic development, inequality, war, and State violence. *World Dev.* 30(2):153–163.
- PNG Business and Tourism. 2005. *Economic overview of PNG*. Retrieved 2 June 2006. <http://www.pngbd.com/forum/showthread.php?t=12751>.
- Pearce, J. 1998. From civil war to civil society: Has the end of the Cold War bought peace to Central America? *Int. Affairs*. 74(3):587–615.
- Peet, R. and M. Watts (eds.). 2000. *Liberation ecologies: Environment, development, and social movements*. London: Routledge.

- Peluso, N. and E. Harwell. 2001. Territory, custom, and the cultural politics of ethnic war in West Kalimantan, Indonesia. In *Violent environments*, eds. N. Peluso and M. Watts, 83–116. Ithaca, NY: Cornell University Press.
- Scott, J. 1976. *The moral economy of the peasant: Rebellion and subsistence in South East Asia*. London: Yale University Press.
- Scott, J. 1985. *Weapons of the weak: Everyday forms of peasant resistance*. New Haven, CT: Yale University Press.
- Stewart, F. 2000. Crisis prevention: Tackling horizontal inequalities. *Oxford Dev. Stud.* 28(3):245–263.
- The National Online. 2002. *Landowners refuse Tolukuma access*. 19 June. Retrieved 19 December, 2002. www.thenational.com.pg/061.
- Timura, C. 2001. “Environmental conflict” and the social life of environmental security discourse. *Anthropol. Q.* 74(3):104–113.
- Walton, G. 2003. *Tolukuma Gold Mine case study: Should NGO Environmental Watch Group incorporate a development arm into its operations?* Port Moresby, Papua New Guinea: NGO Environmental Watch Group.
- Walton, G. 2004. *Resistance and the Tolukuma Gold Mine—Auga Valley, Central Province, PNG*. Master’s thesis, SAGES, Melbourne University. Melbourne, Australia: Unpublished.
- Watts, M. 2001. Petro-violence: Community, extraction, and political ecology of a mythic commodity. In *Violent environments*, eds. N. Peluso and M. Watts, 189–212. Ithaca, NY: Cornell University Press.
- Wellesley-Wood, M. 2003. Letter to shareholders from Chairman and CEO Mark Wellesley-Wood. DRD Gold Limited. 3 October. Retrieved 12 April 2005. http://www.drdgold.com/ir/letter_display.asp?id=11&yr=2003