# REFUGEES ON THEIR OWN LAND:

# IDENTITY, INDEPENDENCE, ENVIRONMENTAL DAMAGE AND RISK AMONG THE MUYU BORDER 'REFUGEES' OF THE MIDDLE FLY, WESTERN PROVINCE, PAPUA NEW GUINEA

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# THESIS DECLARATION

*STUDENT*

I hereby declare that this thesis comprises my own original work and does not exceed 15,000 words (+/- 10%) exclusive of footnotes, bibliography and appendices.

(Student's signature)

*SUPERVISOR*

I hereby declare that I have approved this thesis for submission.

(Supervisor's signature)

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## ABSTRACT

In 1984, following a period of armed resistance against the Indonesian military, approximately 11,000 West Papuans were forced to flee into the Western Province of Papua New Guinea (PNG) establishing themselves in 17 separate camps along the border. Around 9,500 of these refugees were from the Muyu tribe whose traditional land extends either side of the Fly River and the colonially-derived international border between the Indonesian province of West Papua and PNG. That same year the Ok Tedi mine began operations with the method of riverine tailings disposal that has resulted in massive ecological and social impact on a vast scale to all communities along the Ok Tedi and Fly River systems. The response of the PNG government and the UNHCR was to establish a refugee camp located away from the border region and to offer refugees who relocate to the official camp assistance in the form of education, health services and various development projects. However, some 4,600 Muyu refugees have thus far refused to relocate and remain at their border camps along the Fly River. This thesis examines the motivations, ambitions, and political and cultural identity of Muyu border refugees through a framework of risk perception. The various risks faced by the refugees are conceptualised in terms of different risk regimes along the lines of Arturo Escobar's (1999) regimes of nature; that is organic risk, technorisk and capitalist risk, with the addition of political risk and cultural risk. By positing these different risk regimes by way of their diverse ontological foundations the relationality between these risks is described in terms of the Actor Network Theory of Latour (2005) so that the overall risk environment can be understood as a multi-ontological, interrelated network that produces the logical outcome that is the decision of the refugees to remain at the border.

## 1. INTRODUCTION

Between April 1984 and September 1985 approximately 9,500 West Papuans of the Muyu tribe crossed the border into Papua New Guinea (PNG) at several places along the Fly River (Glazebrook 2008, p. 6). On 15th May 1984 operations at the Ok Tedi mine began with the method of discharging mine tailings directly into the Ok Tedi river, which is a tributary of the Fly River, thus heralding a new era of massive environmental change to the Fly River system (Kay 1995). The accumulated impact of tailings discharge to the Fly River caused profound disruption to the lives of people indigenous to the river system who depended on the river for their livelihood. This disruption eventually led the Yonggom[1] people living on the PNG side of the border to take legal action against BHP, the majority shareholder and parent company of the mine's operator Ok Tedi Mining Limited (OTML), in the Supreme Court of Victoria (Kirsch 2006b, p. 20). The successful action by the Yonggom against BHP resulted in widespread and on-going changes to their lives. Yonggom people, along with several other groups in the region, became recipients of very large cash compensation payments as well as numerous development projects paid for by the mine. The Muyu people however, also living along the Fly, because of their political status as refugees have never been officially[2] recognised by the mine nor party to any compensation agreement. The Muyu and the Yonggom, split geographically, politically and in nomenclature by a colonial border, have experienced the impacts of the Ok Tedi mine in vastly different ways.

[1] Both Yonggom and Muyu describe the same tribal group living either side of the PNG-West Papuan border. The naming distinction is colonial in origin with *Yonggom* being a local name for a language from the Ok Tedi river and *Muyu* being the name of a river in West Papua. I have used the term Muyu to refer to these people generally and to the border refugees living in PNG. I have used the term Yonggom to refer specifically to those who originate from the PNG side of the border.

[2] I have qualified this statement with the word 'officially' to acknowledge the substance of unofficial and indirect assistance that has been provided by OTML.

*Research Question*

For the past 30 years the PNG government has tried unsuccessfully to relocate the Muyu border refugees to a purpose-built refugee camp at East Awin, located approximately 120 kilometres east of the Indonesian border. Because of their refusal to leave, the Muyu border refugees have been denied assistance from both the PNG government and the UNHCR and have remained as stateless non-citizens in occupation of their own ancestral land. This thesis examines the motivations, ambitions, and political and cultural identity of the Muyu border refugees through a framework of risk perception. The border refugees are faced with a variety of risks and persist in harsh conditions yet have thus far resisted all attempts to be relocated to what both the PNG government and the UNHCR perceive to be a safer, more secure and prosperous environment. A key question for the UNHCR and the PNG government is how to understand why the refugees choose to remain at the border and in doing so, from an outside perspective of risk, make seemingly irrational decisions in the face of an increasingly severe risk environment. By examining the actions of the border refugees through a framework of socially constructed risk perception, the motives and actions of the border refugees can be understood in terms of the broader historical, political, cultural, and ecological forces that have formed and continue to shape their own world view.

*Field Work*

This thesis is based on ethnographic data collected during three weeks of field research based out of Kiunga in PNG's Western Province in January 2014. Interviews were conducted with members of the West Papuan refugee community based at both the town of Kiunga and the East Awin refugee camp, as well as visits to the refugee camps of Niogamban and Kaikok located on the Fly River directly at the

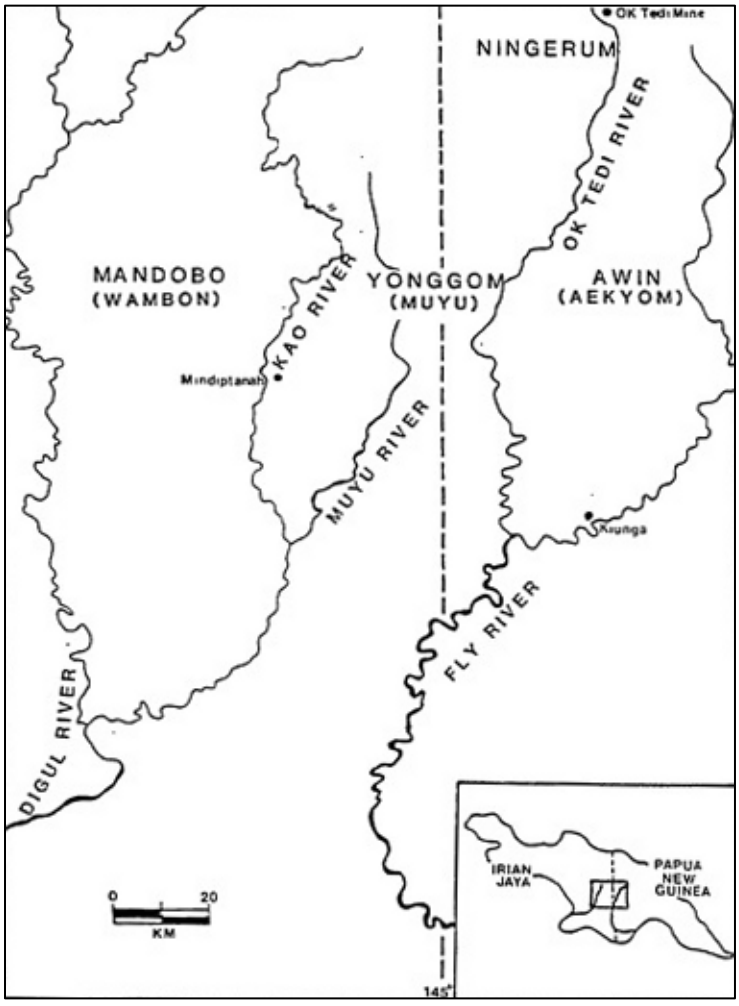
border with West Papua. Interviews were also conducted with Bishop Gilles Cote and Father Andrew Moses of the Kiunga-Daru Catholic Diocese, Sister Moreen Sexton of Mercy Works NGO, Robin Moken of the Provincial and Local Government Affairs office in Kiunga, as well as various health workers and others associated with the Catholic mission. Aside from interviews important information was obtained from time spent accommodated at the under-developed border camps within the tailings-impacted landscape of the Fly River floodplain.

## 2. BACKGROUND AND SETTING

### Muyu Location and Tradition

Muyu land straddles the international border between Indonesia and PNG. The establishment of the border along the 141st parallel was an arbitrary cartographic decision made between the Dutch and Australian governments that ignored the contoured extent of cultural groups that existed on either side (Kirsch 1989). Muyu land extends from the base of the Star Mountains south to Lake Murray in PNG and west as far as the Muyu and Kao Rivers in West Papua (Kirsch 2006b, p. 6). Approximately three quarters of Muyu land is within West Papua. Figure 1 shows the approximate extent of Muyu and surrounding lands.

**Map 1 – Muyu and Surrounding Lands**




From Kirsch (1989)

Historically, Muyu people lived together in isolated family households rather than villages, and the Muyu language does not have a word to describe the concept of a village (Kirsch 1989). The Muyu occupy low-lying flood plain areas dominated by major rivers and tributaries, ox-bow lakes, swamps and dense rainforest. Muyu harvest sago as their staple food, which provides the bulk of their carbohydrate intake. The leaves of the sago palm also provide roofing material for Muyu houses. Sago plays a central and defining role for the Muyu, so much so that they use the term "sago person" as a form of self-designation (Glazebrook 2008, p. 96). The Muyu also cultivate bananas and various root crops using the practice of swidden horticulture because of the poor soil quality of the rainforest floor (Kirsch 1989). A garden will only produce for two or three years before being left fallow for a decade or more. Prior to the toxic effects of mine tailings from Ok Tedi, soil quality generally improved with proximity to the riverbank. The mine tailings have also diminished the previously abundant stocks of fish, prawns, shellfish and turtles in the Fly River and associated creeks and lakes (Kirsch 1989). During my travels along the Fly River people expressed their concerns about the levels of copper in the barramundi they were eating but made no mention of any other river food source.

During the colonial era the Muyu were organised into villages by Catholic missionaries and Dutch bureaucrats for the purpose of administration (Glazebrook 2008, p. 92). However, the concept of village life has never sat comfortably with the Muyu. Traditional households are located within areas of land that are owned along patrilineal lines that provide access to resources such as sago crops, garden areas, hunting grounds, water ways and trees for constructing canoes and building houses

(Kirsch 1989). West Papuan Muyu use the Indonesian term *dusun*[3] to describe these areas of land, which also contain the graves and spiritual presence of their ancestors. The Muyu consider the *dusun* house to be their "true house" in contrast to a village house which is considered to be a visited place located outside one's *dusun*, and Muyu refugees in PNG speak longingly of the *dusun* they have left behind and to which they hope to return once West Papua has gained its independence (Glazebrook 2008, p. 92 & 65). The Muyu system of land ownership and social organisation produces a very intimate sense of connection to land. Kirsch (1989) describes the absence of "big man" style tribal leadership as a characteristic feature of Muyu society. Any leadership that does emerge is generally restricted to kinship boundaries, leaving a vacuum when it comes to leadership of groupings over a larger scale (Kirsch 1997, p. 126). This feature can be linked to Muyu expressions of their intimate attachment to land. A Muyu refugee named Octovanius[4] Tamarap, currently living at the East Awin refugee camp and chairman of the rice-growers cooperative at the camp, explained to me that it is very difficult for Muyu people to come under one leadership. No matter your educational status or list of achievements you are considered on an equal plane with everyone else. Octovanius related this to the lack of organised cooperation evident among Muyu society. Family members may cooperate with each other but otherwise any attempt at large-scale organised leadership is largely ignored. This characteristic would seem to be related to the isolated, kinship-bound housing and land-ownership structure of traditional Muyu

[3] *Dusun* literally means 'orchard' in *Bahasa Indonesia.* The West Papuan Muyu use the term to refer to "a bounded area of land that has been passed down from fathers to sons for many generations, containing cultivated areas such as rubber, coconut and rambutan plantings, naturally occurring and planted sago gardens, forested areas for hunting, as well as rivers and rockpools. Ancestors are buried in their dusun, and the spirits of some continue to occupy it. A person's history and that of their lineage is inscribed in the features of their dusun" (Kirsch 1997, p. 126).

[4] According to (Glazebrook 2008, p. xiii) many Muyu parents gave names to children born during the time of movement to PNG to reflect the circumstances of their flight. The name Octovanius would refer to the month (October) that their flight began.

society. For the Muyu, society means family and home is their *dusun.* Outside the ties of kinship society does not exist in any organised form and there is no reason to pay attention to anyone beyond the confines of your own family group. The deeper requirements of life – food, shelter, family, lineage, ancestry, and meaning – are provided by and located within one's *dusun*.

**Politics and Becoming a Refugee**

The Muyu refugees are part of a larger cohort of West Papuan people from various parts of the island who have crossed the border into PNG at different periods of time since 1962. Diana Glazebrook (2002) has provided a detailed summary of the history of West Papuan border crossings into PNG and the background political situation behind this activity. The information contained in this section is a brief summary of Glazebrook's material that relates specifically to the Muyu border crossers.

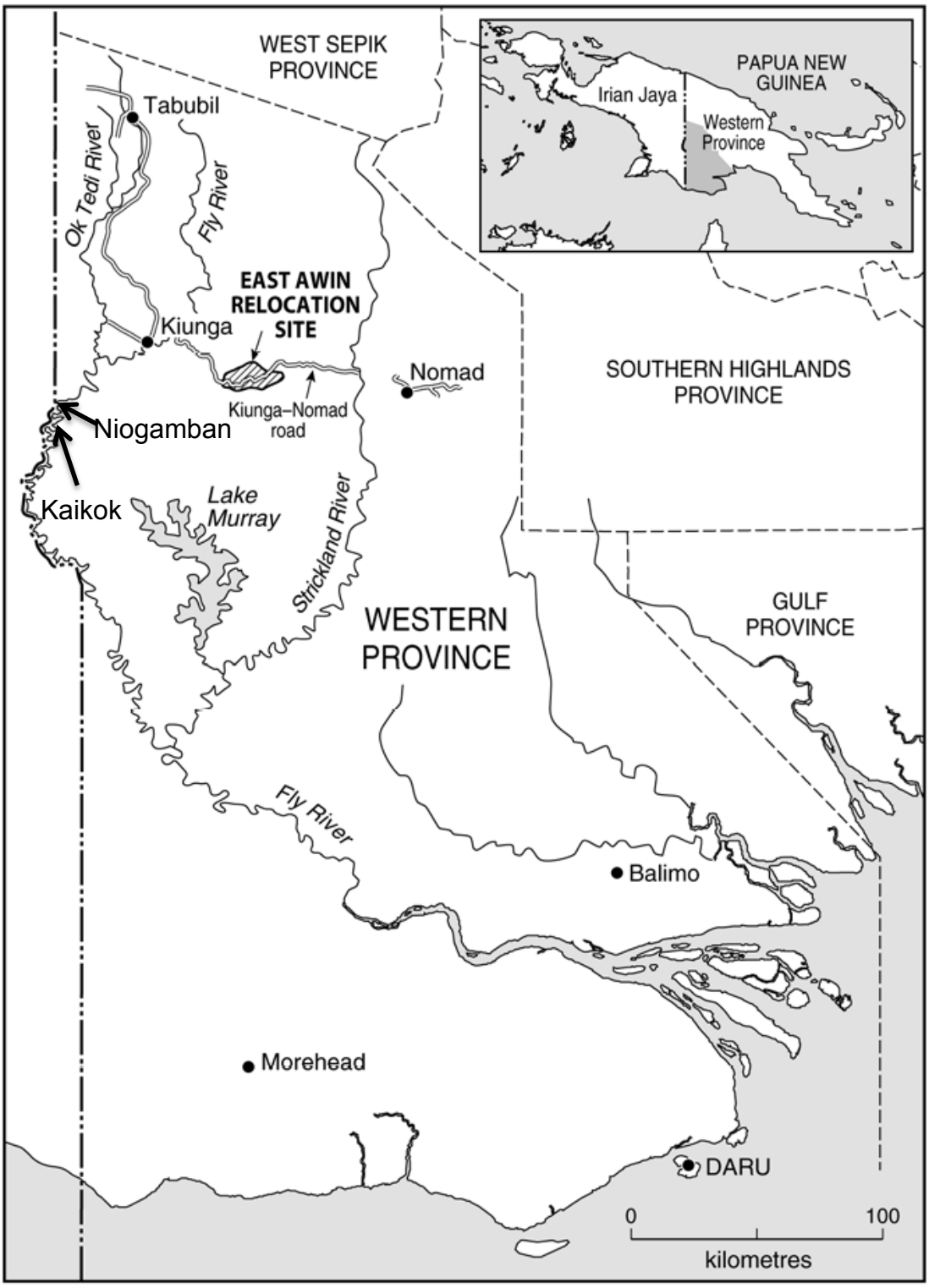
Prior to 1984 there were two major phases of West Papuans from all over the province crossing into PNG to seek asylum. Between 1962 and 1969 border crossings were made in response to a series of political changes including: the accession by the Dutch of control of West New Guinea to Indonesia in August 1962, the assumption of full control of West Irian by Indonesia in May 1963, and the declaration of West Irian as Indonesia's 17$^{th}$ province in August 1969. During the early 1970s the PNG government started to take a harder line towards the refugees over concern about relations with Indonesia and the flow of refugees slowed. However, between 1977 and 1980 increasing conflict between the Free Papua Movement, or *Organisasi Papua Merdeka* (OPM), and the Indonesian military resulted in an increase in the number of border crossings. The mass influx of Muyu refugees occurred between April 1984 and September 1985. This followed the raising

of the West Papuan flag in Jayapura on 5th February 1984 and an OPM military uprising that provoked a heavy response from the Indonesian military. This response included troops and aircraft deployed to the border region where Muyu OPM activity had been increasing. The Muyu had become frustrated with the Indonesian policy of transmigration to the province and the compulsory acquisition of land, much of which was Muyu land. The influx of Muyu refugees was closely documented by the Jayapura Catholic Sectratariat who published their findings in 1986. On 9th April 1984 the body of a girl who had been raped by a security officer was found in the Muyu village of Waropko. Several attacks against the Indonesian military by OPM activists followed including the attack of a soldier at Kanggewot on 11th April and the attack of an army group on 12th April. The Indonesian military sent more troops resulting in further clashes and OPM attacks on several villages. These attacks caused entire villages to flee until it was reported that by September 1985 the Muyu region was deserted.

Between 1984 and 1986 approximately 11,000 West Papuans crossed the border into PNG, of which some 9,500 were Muyu. The refugees established themselves in 17 different along the border. Initially the PNG government regarded the refugees as "border crossers" according to the border agreement between the PNG and Indonesian governments (PNG 1984). Article 4 of this agreement allows for border crossings to be made for cultural purposes such as marriage ceremonies, hunting, fishing and trade. The PNG government desired to have the border crossers repatriated and agreed with the Indonesian government that the reasons for the crossing were economic rather than political. However, intense criticism following the death of 51 refugees due to starvation at a border camp forced the PNG government to accept the intervention of the UNHCR. In 1986 the PNG government

signed the 1951 Geneva Convention and the 1967 Protocol on the status of refugees, although in doing so the PNG government made specific reservations around certain provisions including housing, employment, education, freedom of movement, expulsion and naturalisation. On 6 September 1986 the UNHCR determined that all those in the border camps were genuine refugees and agreed to administer the camps.

**Map 2 – Location of East Awin Camp and Niogamban & Kaikok Border Camps**




Map modified from Glazebrook (2008, p. 7)

*East Awin Camp*

East Awin was the site of a rubber plantation that had failed in the 1960s partly because of poor soil quality and climate "difficulties" but mainly because the government had not provided sufficient marketing infrastructure to make the project viable (Preston 1992). The resettlement of refugees to East Awin was in part due to the vision of a PNG-naturalised Australian named Warren Dutton who was then an elected member of the Western Province government and saw in the refugees a convenient source of labour that could revive the rubber industry in the area (Stuart Kirsch, pers. comm.). Dutton had negotiated with the Awin people to allow the refugees to be settled on Awin land. Other reasons cited for relocation away from the border included better security for the refugees, elimination of conflict between refugees and landowners over resources, reduction of problems related to sorcery accusations that were resulting from health problems occurring in the informal camps, preventing OPM finding refuge in the camps and incursions by the Indonesian military, and preventing the transmission of animal and crop diseases into PNG (Glazebrook 2002).

In 1996 the PNG government offered Permissive Residency status to all refugees at East Awin who wished to remain in PNG. The status of Permissive Residency allows the refugees freedom of movement within PNG with the exception of the border areas, engagement in business activities and employment, enrolment in schools and tertiary institutions throughout PNG, and access to health services and courts (Glazebrook 2008, p. 123). Permissive Residency prohibits any political activity that may be damaging to PNG-Indonesia relations, any engagement in OPM activities, voting in PNG elections and being members of political parties in PNG. Those who qualify as Permissive Residents are eligible to become full PNG citizens

after a period of eight years. Those refugees who remain at the border camps are not recognised by the PNG government (UNHCR 2012b).

*Muyu Camps on the Border*

In 1987 around 2,500 Muyu were relocated to the East Awin camp leaving around 4,500 who refused to relocate choosing to remain in their camps along the Fly and Ok Tedi rivers (Glazebrook 2000, p. 84). These refugees were designated as "non-citizen populations" and in 1996 both the PNG government and the UNHCR withdrew assistance in the form of food and health services. In spite of the increased risks to their livelihoods associated with the withdrawal of support the refugees remained in their camps along the border and it is currently estimated that there are approximately 4,600 people located among seven remaining settlements (UNHCR 2012b). The UNHCR has consistently supported the PNG government policy of withholding support to the border refugees as part of their policy of having the refugees relocated to East Awin. Limited support in the form of aid posts, elementary schools, women's club facilities, rain water tanks, and transport along the river is provided by the Daru-Kiunga Catholic Diocese[5] (UNHCR 2012b). In 2009 the UNHCR became concerned about the protracted nature of the border refugee situation and began to profile and register the border refugees "to see what solutions could be pursued" (UNHCR 2012b).

According to Sister Anna who runs the health centre at the Catholic Diocese in Kiunga, the church's position has been to provide care to all people regardless of their political situation. However, the health centre is understaffed and they are unable to service all the border villages. Educational training is provided by Mercy Works, which is the Catholic non-government organisation (NGO) associated with the

[5] With the help of unofficial yet significant funding from the Ok Tedi Development Foundation.

Diocese. A teacher at East Awin told me that the border refugees assert "we are refugees on our own land" because they are occupying the land of their ancestors.

In 2013 the UNHCR pulled out of PNG citing the growing demand for refugee services in other parts of the world and decreasing levels of funding for UNHCR operations. The UNHCR has produced Memorandums of Agreement (MOAs) for continued service delivery and support for the refugees at East Awin as well as those living along the border area. Parties to the MOAs include the PNG National Government Department for Provincial and Local Government Affairs, the Fly River Provincial Government, the Catholic Diocese of Daru-Kiunga, the Iowara Central Committee[6], and the UNHCR (UNHCR 2012a, 2012b). The MOA for the border camps describes the living conditions as "harsh" and "impacted by repeated flooding of the villages throughout the year, which is caused by sediments of the copper mine in Tabubil." The refugees suffer from "lack of access to safe drinking water and sanitation facilities" and their reliance on subsistence agriculture "does no longer provide a real income given the level of water/river pollution in the area." Thus the border refugees are faced with a combination of risks associated with health and well-being as well as missed educational opportunities and participation in economic activity. Under the MOA the responsibilities of the PNG government include border security, law and order problems, conducting census and registration of border refugees, develop a new policy to deal with the border camps, and to issue birth certificates for all children born in PNG. The provincial government is required to provide medicines; materials for schooling; accept patients at the Kiunga hospital;

[6] Iowara is the name of the UNHCR camp that was set up in the territory of East Awin. Iowara consists of several camps and garden areas spread along the Kiunga-Nomad Road. The terms East Awin and Iowara are used interchangeably by the refugees, although the tendency is for the refugees to use the term East Awin. This seems to reflect the awareness among the refugees that the camp is located on someone else's land. In this thesis I have used the term East Awin to refer to the surveyed area of the Iowara refugee camp.

accept refugee enrolments at all schools; include the border camps in any future relocation and development plans for the area; allow the refugees to sell their goods at town markets, and to access health and education services within their respective camps. The Catholic Diocese is required to conduct health patrols, manage and staff the aid posts, manage women's club programs, undertake pastoral visits, organise birth certificates, provide tertiary scholarships from donated funds, establish and maintain elementary schools, and provide lodging for students from the border camps on Mission land. The MOA represents a dramatic change in policy towards the border refugees that has been made in response to the protracted nature of the issue.

*The Muyu and the OPM*

A distinction can be made between OPM as a political movement dedicated to the establishment of West Papua as an independent nation state and OPM as a military group dedicated to the same ends. The situation is somewhat analogous to the Irish Sinn Fein in that the OPM is a political movement that has a military wing. All the Muyu refugees I spoke to living in both the border camps and at East Awin identified as OPM. Being OPM can mean anything from direct involvement in military activity to living in hope that the international community will eventually provide political support to the movement and *merdeka*[7] will be achieved.

The relationship between the Muyu refugees and the military arm of the OPM is ambivalent. The Muyu were forced to flee West Papua because of the fighting between OPM rebels and Indonesian soldiers (Glazebrook 2008, p. 67). Glazebrook (2008, p. 68) mentions Muyu experiences of violence at the hands of OPM rebels. Octovanius described to me the practice of some OPM activists of punishing West Papuans for engaging in what they perceived as activities that supported the

[7] *Merdeka* means 'free, independent or liberated' in *Bahasa Indonesia*. The West Papuans refer to the time when *merdeka* will be realised, meaning a free and independent West Papua.

Indonesian state. Some people were punished for walking with an "Indonesian". Octovanius claimed that a teacher working for a school established by the Indonesian state had his fingers cut off and was told to dig his own grave. He claimed that when the OPM encouraged the Muyu to leave in 1984 it was hasty, poorly planned and undertaken under the assumption that the emigration would only last for a short period of time.

The Muyu felt a great deal of frustration at the lack of development provided by the Indonesians and believed that they were not being treated as equals in their own land (Glazebrook 2008, p. 67). Supporting the OPM movement and the establishment of a West Papuan state was a way of responding to this problem, but the intention was always to return once the OPM had achieved its objectives.

**The Muyu and the Mine**

In May 1984, one month after the Muyu refugees began settling in makeshift camps along the Fly and Ok Tedi rivers, the Ok Tedi gold and copper mine commenced operations and thus began its practice of riverine tailings disposal[8]. The effect of the mine tailings disposal was initially felt by the Yonggom people living along the Ok Tedi river and it was Yonggom activists who, in 1994, took up the legal case against BHP in their demands for compensation and mitigation of any further

[8] The reasons for riverine tailings disposal at Ok Tedi are complex and a detailed description is beyond the scope of this thesis. In summary (see Townsend and Townsend (2004)), construction of the mine began in 1981 before the Environmental Impact Study (which was a requirement of the PNG Mining Act 1976) was completed approximately one year later, thus eliminating a no mine alternative. Although construction of the original tailings dam was behind schedule, in 1983 the PNG Government rejected a plan for interim riverine tailings disposal. However, work began on construction of the dam before a geological assessment had been undertaken and in 1984 a landslip at the site prompted a second request for temporary riverine tailings disposal, which was subsequently approved. A suitable alternative to the initial dam has never been found. Once mining commenced waste rock was disposed into waste dumps which, in 1989, caused a massive landslide that resulted in riverine disposal of both tailings and waste rock. At the same time the mine had expanded from its initially projected 16 million tonnes per year to 30 million tonnes per year. By this time any connection between the mine's operations and the various impact studies that had been commissioned had been completely removed. The forced closure of the Panguna mine at Bougainville in 1989 resulted in significant economic incentive for the PNG Government to continue to allow the operation of Ok Tedi (Kirsch 2006b, p. 15).

damage to the river system and surrounding land. The Yonggom case against the mine and the resulting compensation package and withdrawal of BHP from PNG has been the subject of a great deal of research and intense debate regarding the impact of development versus the human cost of environmental damage (see Kirsch (1997, 2006b); Jackson (2003); Filer (1997)). What is not under debate, however, is the fact that impacted populations have deservedly received compensation and numerous development initiatives with the intention of improving their lives and mitigating the negative impacts of the pollution, and that without such compensation the detrimental impact of the pollution to the lives of the people along the river would have been far more severe (as acknowledged by Jackson (2003)). The status of Muyu border refugees living along the river has meant that they have not been eligible for any of the compensation received by their Yonggom counterparts. The Muyu border refugees provide a window into an alternate reality where the legal action taken against BHP never occurred and assistance in the form of compensation and development programs never arrived.

In addition to the compensation package the 1996 settlement reached in the case against BHP required the mine to implement "the most practicable form of tailings containment" which was to be decided following a review of options by the PNG government (Kirsch 2006b, p. 211). The original agreement was therefore based on compensation for damage already done in the expectation that future damage was to be prevented. However, after taking three years to complete a review of containment options the mining company reported in 1999 that damage being done by the tailings already in the river system would not be significantly mitigated by any tailings containment method (Kirsch 2006b, p. 23). This decision resulted in BHP being sued for breach of contract, which caused BHP to completely withdraw from

Ok Tedi and transfer its 52% share into the Sustainable Development Fund (SDP) in return for indemnity against future claims relating to the environmental impact of the mine (Kirsch 2006b, pp. 23-4). The result has been continued disposal of mine tailings into the river system at a rate that in 2008 was estimated to include 164,000 tonnes of waste rock and 82,000 tonnes of tailings per day (Pollino, Hart & Bolton 2008). This practice has resulted in a progressive worsening of the socio-ecological situation downstream.

In 2001 Ok Tedi Mining Limited (OTML) negotiated Community Mine Continuation Agreements (CMCA) with 14 separate communities spread over 152 villages from the immediate mine area down to the Lower Fly district (OTML 2006). The CMCAs, which cover approximately 50,000 people, involve a system of payments to separate communities or trusts in return for community agreement for the continuation of the mine and for no further claims to be made against OTML. In 2006 OTML negotiated a revision to the CMCA agreements because "the environmental predictions have changed and sediment deposition, flooding and acid rock drainage may have a greater impact that [*sic*] predicted before" (OTML 2006). Currently the situation is so dire that the Fly River Provincial Government and OTML are working towards relocating all impacted communities along the Fly River to be resettled along major road corridors that are yet to be constructed (UNHCR 2012b). According to Robin Moken (pers. comm.), advisor to the Provincial and Local Government Affairs office in Kiunga and one of the Yonggom representatives who took the original action against BHP, both the government and the mine now recognise that land along the Fly River flood plains is becoming uninhabitable. The PNG government has been trying unsuccessfully to relocate a few thousand uncompensated Muyu from the border region for the past 30 years. The government

is now being faced with the task of relocating tens of thousands of people spread over hundreds of kilometres of river from several different cultural groups. The mine tailings are acting as a great equaliser, wielding an ecological hegemony more powerful than the political forces that have kept the Muyu refugees economically and politically marginalised for the past three decades.

**Muyu National Identity and Risk**

The raising of the West Papuan flag at Jayapura in 1984 is an example of a wilfully made high-risk decision that has engaged people from all across West Papua since the advent of Indonesian rule. Flag raising ceremonies have, since 1961, resulted in West Papuans being shot by Indonesian soldiers (Glazebrook 2008, p. 1). Yet the importance of this symbolic activity in the galvanising of collective will towards the establishment of an independent West Papuan state is enough to outweigh the mortal risk associated with its undertaking. The risk decision in the raising of the flag can only be understood in its historical and political context. Flag raising ceremonies are also illustrative of the nationalist identity that has been constructed by West Papuans in relation to the Indonesian state rather than the more dominant tribal identity that exists throughout PNG. Glazebrook (2008) describes flag raising ceremonies held at the East Awin refugee camp on certain dates that are the anniversary of historically important events, such as the inaugural raising of the flag on 1st December 1961 and the Jayapura uprising on 11th February 1984. West Papuans are also connected by the common language of the Indonesian state that is shared across the vast numbers of people living throughout the Indonesian archipelago as well as Malaysia. The colonial experience of the West Papuans has exposed them to distinctly different South East Asian values that includes a nationalist work ethic and a centrally planned model of economic development.

The act of raising the West Papuan flag makes sense when viewed in opposition to another perceived competing risk; that is, the continued occupation of West Papua by Indonesia. These two risks have a hierarchical relationship so that one is given preference over the other to produce the chosen outcome. The Muyu border refugees remain in their villages along the Fly River by choice. In choosing to remain at the border and shun all efforts to move them to the established UNHCR refugee camp at East Awin the refugees are confronting an extensive variety of risks that have tangible consequences for all members of their community. Yet the story for all West Papuan refugees in PNG is one of confrontation and risk. Opposition to Indonesian rule, their journey into PNG and their continuing struggle for recognition all involve a broad range of risks experienced at all levels of society both individually and collectively. The complex and risk-laden decision to remain at the border requires a detailed contextual analysis in order for a comprehensive understanding of the motivations and actions of the Muyu border refugees to be established.

## 3. DEVELOPING A RISK FRAMEWORK

The vast majority of research into the social context of risk and risk perception is dominated by studies into developed world societies and the struggle with the impacts of modern technology and increasing social complexity. Writers such as Beck (1992, 2000) are concerned with developing models for understanding the social effects of rapid technological change on modern societies in terms of new regimes of risk to which societies have become exposed. A great deal of risk research focuses on the perception of risk from a psychological perspective, the general consensus being that humans are not very good at making rational decisions when it comes to risk (Lewens 2007, p. 15). Attempts to understand risk perception from a cultural perspective were largely pioneered by Douglas and Wildavsky (1982) who argued that the perception of risk is culturally constructed and varies between different cultures depending on social structures and the construction of knowledge. However, this approach has been criticised for its constructivism and dependence on "naïve realism" that regards nature as the "ultimate determining force" for risks and assumes that the true nature of risk is only accessible via the sciences (Strydom 2002, pp. 47-8). There is a vast and complex body of literature on the theorisation of risk which can be broadly divided into two main camps: the sociological approach taken by Beck and the cultural approach taken by Douglas (Scott 2000, p. 34). However, common to most approaches to the theorisation of risk is the assumption that risk is about physical harm to human beings. Be it physical injury via accident, disease, pollution, radiation, violence or mystical belief; theories around risk are interested in the animal desire to preserve life and limb. My attempt to understand the motives of the Muyu border refugees through a lens of risk perception has required me to develop a

framework for risk that incorporates a far broader range of human concerns that extend beyond the basic need for health and wellbeing.

**Risk Regimes**

A framework for conceptualising risk can be developed by applying the insights of Escobar (1999) where he describes "three regimes" of nature to account for the ways in which nature is perceived and experienced differently according to forms of production and social relations. The three regimes described are "capitalist nature", "organic nature", and "technonature". To briefly summarise, capitalist nature involves the "examination of nature as a commodity", organic nature involves the local construction of nature through culture and local knowledge, and technonature involves scientific and technological views of nature, which Escobar regards as being purely antiessential. Escobar stresses the relational qualities of these regimes, coexisting and overlapping to produce localised "hybrid natures" where boundaries between traditional and modern views are crossed and both local and global knowledge are combined. My observations of the Muyu refugees led me to perceive different regimes of risk in a way that was, to a certain extent, analogous to Escobar's regimes of nature. It is possible therefore to describe regimes of risk along similar lines; that is, capitalist risk, organic risk, and technorisk.

Once the concept of risk is separated out into distinct regimes it can be seen that different types of risk are built upon different ontological foundations. These different risk ontologies allows for the application of Actor Network Theory (Latour 2005) to describe the relational quality of different types of risk. The following sections describe the separate risk regimes that are examined in this thesis before Actor Network Theory is used to explain the relationality between these different risks.

*Capitalism and the Etymology of Risk*

The modern idea of risk as it exists in the developed world originated in the need for capitalism to develop an economic understanding of risk. Capitalist risk can be traced back to the marine insurance industry that first developed in Italy during the Middle Ages. The word 'risk' in English is derived from the French *risque* via the 14th century Italian *risco* (OED). Italian merchants during the Middle Ages were the first to invent insurance contracts which they applied to the trade of goods by sea for which the *risicum maris* (perils of the sea) could be taken on by an investor (de Roover 1945). Thus the Italians, along with many other inventions of commerce such as banking and bookkeeping, were the first to draw up contractual agreements for sums of money that paid for *securitate et risico* (insurance and risk) (de Roover 1945). The Italian dominance of the international sea trade prior to the 17th century resulted in uniform sea-risk insurance laws spreading across Europe (de Roover 1945). The etymological imprint of this can be seen in Middle French *risicq* (possibility of damage to or loss of merchandise); and Spanish Netherlands *risicque* (possibility of damage to merchandise) (OED). The insurance industry began to develop in England during the 17th century and was greatly enhanced following the Great Fire of London in 1666 (Covello & Mumpower 1985). It was during this time that the word 'risk' and 'risque' (used interchangeably) first entered the English language. Many of the 17th century examples provided in the OED are included in a commercial context. After Lloyd's was founded in 1688 London became the centre of the international marine insurance market (Covello & Mumpower 1985) thereby also becoming the centre for insurable risk. The concept of risk in English has therefore been associated with assigning a monetary value to harm from the very beginning of its use. Central to the viability of the insurance industry is the ability to

calculate the probability of the insured risk occurring, thus enabling an appropriate insurance premium to be set. The mathematics of chance and probability was first developed in Europe around the same time that the insurance industry was beginning to develop in England. Before probability theory was invented by Pascal in 1657 there had never been a mathematics of chance, but once developed this new method spread rapidly across the European continent (Covello & Mumpower 1985). The methodologies developed for capitalist risk underpin those used in technorisk, however capitalist risk uses money as a proxy for all types of value, including human life.

*Technorisk*

Technorisk represents the attempt by the sciences to develop a measurable and quantifiable understanding of risk that transcends subjective human experience and any understanding of risk as a social construct; it is an attempt to develop an essentialised understanding of risk. Technorisk incorporates the mathematics of statistics and probability as well as empirically-derived theories of cause and effect. It is technorisk that links the germ theory of disease to the practice of washing your hands. Technorisk's essentialism extends to the ethical domain within which it operates. Technorisk values all human life equally and does not attempt to place a monetary value on life. Technorisk may be utilised by capitalist risk for its empirical reliability, but the outcome of a capitalist risk regime will not necessarily coincide with the outcome of a technorisk regime, as technorisk does not take monetary value into account. Technorisk can be applied to concerns other than human wellbeing, such as the risk of structural failure (for example, a dam wall) that has the potential to cause monetary loss.

*Organic Risk*

Organic risk can be described as the lived experience of risk that is mediated through local and cultural experience and understandings. Organic risk is concerned with health and wellbeing, it incorporates basic instincts for survival as well as culturally mediated metaphysical concerns such as sorcery or the agency of the spirit world. Organic risk tends to be temporally bound and driven by immediate concerns or the possibility of future consequences as a result of immediate acts. Unlike capitalist risk, organic risk does not have a universal language. Douglas (1992a) links the idea of risk in modern societies to the idea of taboo, suggesting that the difference is only a matter of degree and that both can be incorporated into the term 'danger.' But this idea ignores the role of empirical risk calculation in the modern concepts of technorisk and capitalist risk. Organic risk incorporates Douglas' idea of danger and creates the space for cultural understandings of risk to flourish. By dividing risk into different regimes it can be seen that various understandings of risk may coexist rather than be displaced by one another, and it is this cocktail of risk regimes that describes the experience of risk in the modern world.

*The Risk Regimes of Politics and Culture*

It is possible to delineate a regime of risk to provide a lens with which to view any group or society from just about any angle. For the purposes of my study of the Muyu border refugees I will add the regimes of political risk and cultural risk. Political risk has power as its currency and it is the damage to or loss of power that constitutes the harm that is the concern of political risk. The seat of power may reside at various levels. For example, local power may reside in the role of a village leader; regional power may reside in the representative of an entire cultural or linguistic

group; and national power may reside at the top of a group defined either by internationally recognised national borders or the desire to establish such borders.

In the Papua New Guinean context political power is diversified via the national government to provincial governments throughout the country. The PNG Constitution (Section 187c) allows for the "distribution and delegation" of "substantial powers" to provincial and local governments, including the collection of taxes. This situation reflects the degree of cultural, linguistic and geographic diversity that comprises PNG as a nation. Coupled with a chronic lack of transport and communication infrastructure PNG's diversity makes the centralisation of power very difficult. The limited reach of the central government and weak and ineffectual local and provincial governments has resulted in much of the traditional role of the state being taken up by missionaries and, more recently, mining companies.

PNG's Western Province government is notoriously corrupt and ineffective and life in the province is overshadowed by the Ok Tedi mine. Public infrastructure projects throughout the province are replete with signs advertising Ok Tedi or the mine-funded Sustainable Development Program (SDP) as being the source of initiative and funding. From the point of view of West Papuan refugees the Indonesian province of West Papua is heavily controlled by the central government in Java. West Papua is more developed with much better road infrastructure than PNG and the Indonesian army and police have far greater access in far greater numbers. Their status as refugees precludes the West Papuans from participation in PNG politics and their exile from West Papua creates a hostile relationship with the seat of political power in their former home.

*Cultural Risk*

Cultural risk is closely related to political risk in that the boundaries of power are culturally defined. The currency of cultural risk is culture itself and harm is constituted by forms of cultural change that are perceived in terms of cultural damage and/or loss. Legislation in France that seeks to protect the integrity of the French language is an example of the perception of cultural risk. Cultural risk can overlap with organic risk, for example where cultural knowledge of food production is not easily transferrable to a new cultural setting, resulting in the risk of malnutrition. The desire to preserve culture can also give rise to political movements in order to obtain the power needed to defend cultural values.

**Towards a Risk Network Theory**

The Muyu border refugees make choices in a turbid world of mixed and competing risk regimes that extend far beyond the impact of the muddy mine tailings that constantly flow through their lives beside the waters of the Fly. Like Escobar's regimes of nature, these regimes of risk are relational. Different risk regimes can "coexist and overlap", they can "co-produce each other", and they can also compete with each other. Competition between risk regimes is driven by competing sets of values, and these values cause people to privilege certain risks over others. The desire for political independence; that is, the gaining of political power (the risk of the continued loss or absence of power), may outweigh the risk of losing one's own life. Yet as Peterson (2007, p. 76) points out, it is not possible to make value comparisons between different risk regimes because the nature of value is a metaphysical question rather than an epistemological one. Thus it would be a mistake to attempt to understand the decision of the refugees to remain at the border in terms of a multi attribute risk analysis.

The problem of the relationality between risks can be solved by examining different risks as being derived from different ontologies. Risk can then be viewed as a network of multiple ontologies following the insights of Latour (2005). For Latour (2005, p. 39 & 118), any hope of unitary understanding relies upon the collection and assemblage of multiple ontologies that requires our focus to be shifted from "an impoverished repertoire of intermediaries" (which for this thesis becomes the identified risk regimes) to "a highly complex and highly controversial set of mediators" who "transform, translate, distort, and modify the meaning or the elements they are supposed to carry" (which become the individuals and groups who are the subjects of this thesis). The idea of a multi-ontological risk network is useful because, from an outside perspective at least, the border refugees remain where they are *in spite of* their situation. Applying the idea of risk regimes to a continually mediated multi-ontological network that produces the unitary decision to remain at the border removes any need to resort to normative ideas around rational choice or moral arguments around ethical responsibility.

## 4. MUYU BORDER REFUGEES AND THE MEDIATION OF RISK

### The Lived Experience of Organic Risk

> *Nombaranen* is the word I use for risk. It means extinct; you will become extinct, you will be wiped out. But I don't think they believe me. They don't get that it is a slow process. Like when Adam ate the fruit he didn't die so he thought, 'what is God talking about?' They think, 'what is Robin talking about?'

Robin Moken was originally a Muyu refugee brought over as a child during the 1960s. After growing up in PNG he became one of the Yonggom representatives who took the case against BHP for compensation for damage caused by Ok Tedi. From his position as advisor in the Western Province government office in Kiunga, Robin has struggled to obtain government recognition of the Muyu border refugees. But Robin also wants the Muyu on the border to move to East Awin. He perceives the risks they face in terms of the ecological and bacteriological impact of the mine tailings in the Fly River. When Robin uses the Muyu word *nombaranen* he is referring to the risk of typhoid and cholera that threaten to wipe out entire Muyu refugee villages during times of flooding along the Fly River.

*Kaikok*

The village of Kaikok is one of six Muyu refugee settlements located on the Fly River along the 'bulge' section where the Fly forms the international border with West Papua. Kaikok consists of a series of bush material houses along with a women's club and community hall provided by the Catholic Diocese, spread out along the riverfront. There is no sewerage or power and the village is situated on low-lying land that is subject to frequent flooding. The Muyu traditionally rely on pit

toilets and the use of wells to collect rainwater. During times of flooding the water carries a load of suspended mine tailings that get deposited over the landscape after the floodwaters recede. The tailings are a fine-grained sand that form a grey, undulating, infertile blanket throughout the village. Photo 1 below shows Kaikok with the community hall on the left with a few houses and mine tailings in the foreground.

**Photo 1 – Kaikok Village**

According to Sister Moreen Sexton who runs Mercy Works in Kiunga, the Middle Fly is experiencing between three and four floods per year and each flood can last up to ten weeks. The deposition of mine tailings in the river channel has increased the "frequency, duration and extent of floodplain inundation" during times of high water levels (Campbell 2011, p. 588). Flooding of this nature is highly disruptive and threatening to the lives of people who rely on pit toilets for sanitation and gardens for their food. In November 2010 PNG's Western Province experienced an outbreak of cholera that extended from Daru into villages along the Fly River delta where access,

detection and treatment made the disease very hard to contain (Parnell 2010). Furthermore, frequent flooding and sediment deposition means that it is not possible to maintain rainwater wells and the refugees must either rely on drinking water from the river or the rainwater tank supplied by the mission. According to Sister Florentina, the nurse who runs the aid post at the village of Niogamban, the most common diseases that present are malaria, diarrhoea, pneumonia and tuberculosis. Diarrhoea is endemic due to the high levels of bacteria present in the Fly River, although the main source of fear for the refugees is the presence of copper in the mine tailings contained in the river. The village rainwater tank holds 1,000 litres of water, requires maintenance and is subject to damage from the flooding and the tap constantly leaks. According to the villagers the single tank is not sufficient to supply the whole village and is frequently dry.

**Photo 2 – Rainwater Tank at Kaikok**

The villagers at Kaikok had an acute perception of the risks that were being imposed by pollution from Ok Tedi. The mine tailings also destroy gardens and

damage shallow-rooted trees such as coconut that are a staple part of the diet and one of the few regular sources of fat (see Photo 3). The villagers explained that they are forced to find land on higher ground far away from their village where they can grow crops. When asked about how the damage to the river is affecting their lives one elder pointed around the landscape and told me, "The situation is like this, yourself you already observe it, the life is like this[9]." When I pointed out that, as I was only in the village for a short amount of time I wanted to understand how the river damage, the *monarun*[10], was affecting them over a longer period of time I was told, "Many of them [people in the village] die from drinking the [river] water and also get sick." Other villagers explained to me that before the mine they were able to hunt abundant fish in the river with spears, but now the fish contain sores, not on their skin but inside their bodies, mainly in the gills. Observations around the effect of pollution as well as the chain of cause and effect were very specific. When asked how they could tell exactly what was making them sick the elder explained that when people get sick or die they know that they have eaten fish from the river and from that they know that they are sick because of the river. Others described the experience of feeling ill after drinking river water; "When we drink the water it is like a burn, we get weak and our body burns, our stomach burns, get diarrhoea also." Kirsch (2006b, p. 124) describes an analogous relationship between the "paradigm for sorcery", where harmful events such as illness or injury are attributed to human agency, and the attribution of the cause of harmful events to the mine tailings. Like the PNG Yonggom described by

[9] Interviews at Kaikok were partly conducted in the West Papuan dialect version of *Bahasa Indonesia* and partly conducted in English. My translator was also a West Papuan refugee but from the north and had attained a degree in International Relations at Cenderawasih University in Jayapura. Transcriptions are those of the translator.

[10] The Muyu term *Monarun* translates as 'damage', although Robin Moken also explained the term could describe impending doom: "Something bad is going to happen to you. You think you're okay now but something bad is going to happen."

Kirsch, the Muyu refugees keep separate the notion of sorcery and the perception of harm caused by environmental pollution. When I asked whether people at Kaikok believed in *sanguma*[11] I was told, "Yes, I believe it!" But when questioned whether anyone blames sickness from the river on sorcery the response was an unequivocal, "No no no". The impact from the river is as plain as the ground beneath their feet.

**Photo 3 – Coconut Trees at Kaikok[12]**

[11] The word *Sanguma* is used throughout PNG and can be glossed as 'witchcraft' or 'assault sorcery' (Franklin 2010).

[12] The black section at the base of the trees shows the level of the flooding.

When asked about sickness in the village all responses centred on the pollution in the river and the toxic effects of eating fish and drinking river water. No mention was made of malaria or any other hazard related to the difficult living conditions in the village, such as poor sanitation and the pools of water beneath their houses that breed mosquitoes in plague proportions. The altered land surface results in poor drainage so that water pools beneath the stilted houses, which is shaded during the day from the evaporative power of the sun. Photo 2 above shows pooled water beneath the village hall, and the same can be seen for every building in the village. During my stay at Kaikok I was confined to a mosquito net from sunset as a black cloud of mosquitos enveloped the room emerging from the stagnant pond beneath the raised, stilt-supported, bush-material floor. All of the villagers were similarly confined to their houses and their mission-supplied mosquito nets. Sister Florentina at the aid post in the nearby village of Niogamban reported that malaria was the number one health concern for the area.

*Niogamban*

The villagers at Niogamban had a similar perception of risk in relation to the health impacts of the river. Niogamban is situated on high ground on top of a limestone outcrop that becomes an island in times of flooding. Because of its protection from floodwaters Niogamban is the site of an elementary school and an aid post provided by the mission. As soon as I arrived a local person pointed to an abandoned house and told me that a whole family had died at the same time after eating sago that was prepared using water from the river. A teacher told me, "Some of these people are dead by the chemical… We don't know where in our body parts it has already reached, like today I speak with you but I don't know where in my body

affected by the chemical." [13] Another villager explained that some of the children experience hearing problems because of the river water. Upon arrival at the village travelling by small boat I observed children playing and swimming in the river, yet I was told that illness can occur, "When some of the children are swimming in the river, then a boat comes and makes a wave and the children drink the water." The injurious nature of the river water was described in terms of a singular harmful agent, "the chemical", but also specifically "the copper." Tailings deposition causes damage to sago plants and weakens the leaf material that is used for roofing. The teacher pointed to the roof of a house and said, "Our roof was damaged by the copper, the chemical." This phenomenon offers a clear visual link between the presence of a chemical agent and damage to the human body. If the chemical is powerful enough to ruin a built structure, to destroy the roof of a house, then one can only imagine what it does to the inside of a human body.

*Perceptions of Time*

Some of the Muyu residing at East Awin told me, "Ok Tedi warned people that after 30 years signs or symptoms will start to appear, people will start to get affected… Because most of the people survive from the river." Presumably this warning relates to the slow accumulation of copper in the body when exposed to high concentrations over a long period of time. This type of prediction may be expected to be found in the human health risk analysis reports that have been commissioned by Ok Tedi over the years, although pressing the concept of long-term accumulated impact from the river may also be an attempt to convince the border refugees to relocate. An older Muyu refugee who lives at East Awin told me that older or less educated people will often blame *sanguma*, but he believes that sickness is caused

[13] All interviews at Niogamban were conducted in English and all quotations are directly transcribed.

because, “We don’t know how to construct our healthy living.” Father Andrew Moses of the Catholic diocese in Kiunga explained that long-term health problems tend to get blamed on *sanguma*. When there is no obvious immediate cause, or the illness has outlasted the immediate memory of that cause then people are more likely to resort to *sanguma* for an explanation. Given the perception of immediate and deadly impact from the pollution that is already prevalent among the border refugees, the threat of slow acting accumulative harm is of comparatively small concern.

*Organic Risk as Ontological Intermediary*

Robin Moken’s warning of *nombaranen* does not carry the idea of slow-acting, accumulative harm. The health impacts from flooding in an insanitary environment are sudden, random, chance-based, and yet to occur. From an organic risk perspective the “chemical” in the water is providing a large enough ontological platform to carry explanations for all types of illness as well as other hardships such as damage to sago and gardens. The organic risk perception of copper assigns a far greater level of toxicity than does the science contained in the risk assessment reports commissioned by the mine. The threat of cholera suggests that the greatest risk faced by the refugees is caused by the physical changes to the river system and does not involve any chemical at all. Yet the border refugees do not construct their perceptions of health risks and environmental damage within a scientific paradigm. Information that is provided by OTML or government officials is not incorporated in terms of the scientific understanding of cause and effect that has produced the information being dispensed. The refugees have been provided with a lexicon, but not the web of knowledge with which to apply the terms. Much like Sister Anna’s complaint that when the refugees were first issued with mosquito nets they ruined them by using

them as fishing nets, the web of words provided through technical reports can only be held together by the ontological foundation that is used to support them.

**Human and Ecological Health and Technorisk**

*The Science*

Current scientific understandings of the risk to human and ecological health along the Fly River is based on numerous studies that have been commissioned by the mine since operations began. As one of the largest copper mines in the world it is not surprising that the word most frequently used to denote, in general terms, the harmful and injurious impact of mining operations is 'copper'. However, the scientific studies have investigated not only copper but other metals associated with the mine tailings as well as various physical and physio-chemical parameters that impact both plants and aquatic animals along the river system. These include investigations into the toxic effects of naturally occurring parameters that pre-existed the mine. Early studies demonstrated that the ore body at Mount Fubilan (the site of the Ok Tedi mine) is relatively "clean" in comparison with other porphyry copper deposits around the world and does not contain elevated levels of toxic metals other than copper that are typically associated with this type of mineralisation (Hettler, Irion & Lehmann 1997). A major investigation into levels of copper and other metals in food being consumed by communities downstream from the Ok Tedi mine found that, with the exception of mercury at Lake Murray, there were no elevated concentrations of metals in the food being consumed (Bentley 2007). The dietary intake of mercury in the Lake Murray region was found to be between three and fifteen times the recommended guidelines set by the World Health Organisation. This result confirmed previous pre-mine assessments of mercury concentrations in fish at Lake Murray as well as very high concentrations found in hair and urine samples taken from the local population. Lake

Murray is not being impacted by mine tailings from Ok Tedi and was used as a control region for the investigation.

The scientific reports also debunk the notion that it is the copper that is killing the vegetation along the river system. According to the Marshall and Rau (1999) report, vegetation dieback is caused by three main factors related to the mine tailings: severe flooding causes waterlogging of the root zone which robs the plants of oxygen; plants are physically damaged by fast flowing flood waters; and the sediment deposits cause further anoxation and also prevent the growth of seedlings. Although copper is taken up by plants that have been impacted by the tailings, the presence of copper is not the main contributing factor that is causing them to die. Studies into copper uptake by plants, such as Yaru and Buckney (2003), have demonstrated higher concentrations of copper in plant material along the Fly River flood plains but stress the importance of this work in understanding the presence of copper in the food chain[14].

Other studies show that rather than copper, the biggest chemical risk contained in the mine tailings is the presence of sulphur. Sulphur has a ubiquitous association with mineralisation in the earth's crust. Ore that is mined at depths below which rock material becomes reduced contains sulphur in its reduced sulphide form. Sulphide that is extracted with the ore and disposed as a component of mine tailings can become oxidised when exposed to the atmosphere and the presence of oxygen-rich waters where it will form sulphuric acid. The subsequent lowering of pH in the river and saturated soil has the effect of dissolving the metals that are contained in the

[14] Yaru and Buckney (2003) describe concern about "metal cycling from both the geochemical and food chain perspective" given that the Fly River is an important source for fish. Although the authors don't provide any human health criteria or describe the toxic effects of copper when consumed by humans, other investigations into human health along the Fly River (Flew 1998) reference the World Health Organisation's (WHO) recommended maximum dietary intake for copper in humans of 0.5mg/kg/day and conclude that elevated levels of copper in fish of the Fly River system would be unlikely to result in an exceedence of the WHO criterion.

soil and mine tailings, thus polluting the water with high levels of toxic metals. The acidification of mine tailings, known as acid rock drainage (ARD), has been the cause of major environmental disasters at mine sites in many parts of the world. Studies into the tailings from Ok Tedi have raised serious concerns about the potential for acid rock drainage in the Fly River system. The risk assessment undertaken by Hart and Pollino (2006) included modelling of the potential for ARD and reported that "without mitigation of tailings, ARD will result in unacceptable changes to OTML environmental Regime values in the Ok Tedi and Fly River systems." The report pointed out that the liberation of metals caused by acidification will result in levels of metals in river water that exceed those considered acceptable for drinking water. Interestingly the report endorsed earlier reports of a major decline in fish stocks in the Fly River system since mining operations began, but attributed this to "channel aggradation[15]" the rather than deterioration in water quality. The report suggests that "ARD is highly likely to cause further major declines in the fish communities in the middle Fly River and possibly also fish kills."

An examination of the history of environmental risk modeling of the Ok Tedi and Fly river systems is revealing. Investigations into the potential for ARD prior to the start of mining operations in 1984 predicted that the amount of limestone in the waste rock together with the alkaline nature of the Ok Tedi river would mitigate any potential for ARD. However, a risk assessment conducted in 1998 "confirmed" that there was a real danger of ARD generation and this prompted OTML to conduct a further assessment and design an ARD management program (Bolton et al. 2003). In spite of the findings in the 1998 risk assessment, the 1999 corporate review undertaken by BHP found that nothing could be done to prevent further damage to the

[15] Aggradation is a geological term that refers to an increase in land elevation due to the deposition of sediment.

river system (Kirsch 2006b, p. 23). The results of the 2005 risk assessment were alarming and prompted OTML to spend US$212 million on a sulphide recovery plant at the mine site (Pollino, Hart & Bolton 2008). The most recent available prediction for ARD generation estimates that peak acid production will occur between 2020 and 2030, yet this was based on the assumption that the mine would cease operations in 2012 (Hart & Pollino 2006). In 2012 OTML put forward a proposal to extend the life of the mine to 2025 (Wilkins 2013). The 2001 CMCA agreement had to be revised in 2006 due to underestimation of environmental impacts, and currently the environmental impacts are estimated to be so severe that the government is making plans to relocate all communities along the Fly River that are being impacted by the mine to "Growth Centres" that are to be established along yet to be developed "major road corridors" in Western Province (UNHCR 2012b). Over the course of the life of the Ok Tedi mine there has been a demonstrable relationship between time and the severity of environmental predictions, and it is this relationship itself that has so far proved to be the only reliable predictor of environmental impact from Ok Tedi.

*The Aid Post*

Information on health risks provided by Sister Florentina at Niogamban was in direct contrast to claims made by the locals. Florentina gave a list of the most prevalent diseases facing the community; "Most of it is malaria, then pneumonia, diarrhoea. Those are the main illnesses we see every day." When asked about eating the fish in the river Florentina responded, "Yes, we are eating it every day. It's okay." And regarding the health impacts of the river on the people, "I think they're okay. Only the trees and gardens along the river is damaged." She later added tuberculosis to the list of most common illnesses. Florentina's observations regarding the impact of the mine tailings on the ecological environment versus the human

population were in accordance with scientific understandings around the impacts of the mine tailings; that is, the physio-chemical impact is to plant organisms rather than the human organism.

Mosquito-borne viruses and diseases related to hygiene and the bacterial content of the river are endemic to the area. Where once illness and death was perhaps understood in terms of *sanguma* or incorporated in other ways, "copper" and "chemical" are the first to be called upon as sources of explanation for such unpleasant events. At Kaikok I was given boiled water to drink and told that the fish had to be boiled to get rid of the copper. All understandings around risk to human health were viewed through the lens of copper. This organic risk perception of copper is akin to the idea of danger. Douglas (1992b, p. 39) describes the transformation of the risk concept as it moves from an objective, probability-based analytical tool to public conceptions of unacceptable danger. A very similar transformation takes place between the offices and laboratories of the risk assessment consultants employed by the mine and Muyu constructions of the dangers posed by the copper in the river. Technorisk assessments are calculated based on the product of the severity of impacts from an event should it occur and the probability of that event occurring. The Muyu are experiencing a variety of severe impacts from a variety of sources but are observing the occurrence of one event being caused by the mine. For this singular event they have one word: 'copper', which has become a unitary concept used to denote the danger posed by pollution from the mine.

**Photo 4 – Sister Florentina and the Aid Post at Niogamban**

*The Mediation of the Ontological Intermediaries of Technorisk and Organic Risk*

Yet the refugees were also right. Although it is mosquitos and bacteria that are the cause of most of the illness among the refugees; it is also true that the mosquitos and bacteria are made worse by the mine tailings. Technorisk and organic risk perceptions converge depending on the scale of observation. At a detailed level technorisk sets aside copper as the cause for the dieback of vegetation, whereas organic risk sees copper as the poisoning agent. But from a broader perspective the mine tailings are the cause of dieback and the presence of copper is the single reason for the existence of the mine and the spread of those tailings. Both ontological perspectives attribute cause to the tailings. Although the refugees are not falling ill because of their consumption of copper, they are falling ill more often and in greater numbers because the flooding is exposing them to higher levels of bacteria and a larger population of mosquitos. Again both perspectives blame the tailings. Although an organic perspective of risk does not make calculations about the severity

and extent of impact, this perspective is able to predict that the act of crushing an entire mountain and pouring it into a river is going to cause severe human and ecological consequences downstream. Such an assessment is perfectly in accordance with the conclusions of a technorisk ontological perspective.

The response from the elder man at Kaikok regarding the association between eating fish and becoming ill represents the nascent development of a technorisk ontology. This causal link was made on the basis of an empirical observation: people are observed eating fish and later those same people are observed becoming ill. This coupled with the observation of sores developing inside the fish leads to a not unreasonable conclusion. In this way the difference between technorisk and organic risk is a matter of the degree of the accumulation of empirical knowledge. But it is also a matter of scale. At the closer level of eating fish the organic risk perspective sees the risk from the tailings as being far more severe than the risk provided by perspective of technorisk. However, from a broader perspective the risk of illness and death is the main reason why the area is considered to be on the way to becoming uninhabitable, and it is to this perspective that the refugees are currently unwilling to subscribe.

Technorisk is rightly concerned with the detailed accuracy of its scientific assessments, but in doing so it ignores the role of human intuition in the broader perception of danger. Any fully comprehensive assessment of risk along the Fly River would require a vast array of scientific fields resulting in impossible amounts of data to feed into a model so large and complex as to be indecipherable. Beck (1992, p. 156) warns that "as science becomes more differentiated, the flood of conditional, uncertain and detached results increases and becomes impossible to survey." Technorisk, in other words, can't see the mud for the tailings. This gap in perception

is filled by the intuitive power of human (organic) reasoning. As Douglas (1992b, p. 51) points out, if humans had not developed the ability to make such intuitive assessments of risk "they would not have survived even through the Palaeolithic…". This explains the convergence of the techno- and organic risk perspectives that occurs at a scale where scientific detail is no longer visible. This also explains the poor performance of technorisk in making predictions about the severity of risks into the future. In order to make these predictions technorisk requires such vast amounts of data that its predictive power soon grinds to a halt while human intuition is able to at least be in sight of the target.

When it comes to the question of the social acceptability of particular risks (or dangers), the technical risk assessment industry has nothing to say (Douglas 1992b, p. 38). In spite of the risks as they are perceived it is unacceptable for the border refugees to consider moving to the UNHCR camp at East Awin. By considering further regimes of risk it is possible to expand and offer a more comprehensive perspective on the world of risk in which the refugees are formulating their decisions.

**The Unbreakable Will of Political Risk**

Inosensius[16] pointed to a low mountain several hundred metres downstream from the village of Kaikok: "In 1987, 15th June, Indonesian soldiers came and invaded the mountain and chased the people away." Stories of Indonesian military incursions into PNG are not uncommon and have been a source of tension between the Indonesian and PNG governments. Inosensius was pointing to a hill that he called Ambotveng Mountain, located on the eastern side of the Fly River around which the river makes a hair pin bend. There is a village called Ambotveng on the West Papuan side that appears on maps located a few kilometres north of the mountain. According

[16] Inosensius Kiandim, a Muyu refugee "youth leader" at Kaikok village.

to Oktovanius, Ambotveng mountain was used as a place for OPM meetings, military training, and a place to celebrate West Papuan independence day on 1st December and raise the West Papuan flag. Its location on high ground made it strategic but its remoteness made it vulnerable to incursion.

The Indonesian military patrol a road along the length of the border and have military posts every 5km. Yet the border region, with its refugees who fled the Indonesian military who are under constant observation and threat of incursion, is highly porous and subject to constant movement and trade. When I asked Bishop Gilles Cote of the Daru-Kiunga Diocese about the logistics of movement across the border I was told that 5km is a long distance and the people can easily move through the jungle at night. But not all West Papuan refugees are fearful of crossing the border into West Papua, and many hundreds have been voluntarily repatriated. Both Glazebrook (2004) and Kirsch (1989) have described Muyu reasons for their flight into PNG in terms of their economic and cultural marginalisation caused by Indonesian occupation and rule. Yet for those who are suspected of OPM involvement or sympathy the risks of returning to West Papua are far greater.

The political and/or military status of the Muyu border refugees is difficult to determine. Sensitive information is kept hidden from the outside observer, but it is also clear that their lives do not correspond to conventional political definitions. Oktovanius was of the opinion that the border refugees claim to be OPM rebels but do not conduct their lives according to this claim; in reality the border refugees live their lives as anyone else. According to Oktovanius the border area is part of the southern region of OPM and is under the rebel command of a man called Bennet Mawin, who lives on the border. Another OPM leader called John Suma Coconut also claims to be the leader of the southern region and their rivalry is dividing the people. Oktovanius

feels that these two OPM leaders want the border refugees to remain so that the OPM has a presence in the area. Steven Dude, the Community Development Officer at Mercy Works told me that the border refugees possess home made guns as well as high-powered weapons, although these arms are not taken up against the Indonesian military. According to Steven, "Sometimes they shoot each other." Regardless of their actions, the presence of the border refugees is itself a highly political act that, like the raising of the West Papuan flag, carries a significant set of risks.

*The Role of Education*

Initially the teacher at Niogamban did not want to talk about politics: "We have got our leaders struggling to get independence, so today I want to talk about our services. Important is service for our life. Special people they can talk about politics but for us as a society we're talking about our life, to protect our life." The refugees on the border are desperate for the services afforded to other villages that are part of the CMCA agreement. Refugees don't express a desire for cash compensation, rather they provide a list of basic needs that are crucial to their survival. Yet when talking about their needs an underlying political motive was quick to surface. While I was talking to the teacher another man interjected:

> So what we are talking about services? Like health, we are already affected by chemical. So one: that good health must be established. Two: survival, like water. Three: we need the education because here more population are increased, we want to protect our aim and objectives here through education. Our generation must be educated to fight our aims and objectives.

When I asked him to tell me about their aims and objectives the teacher interjected:

> Independence. We want to get independence. Some other countries they get independence. They have their right. But us, what about me? I have got my right. So when I stay here my life here, we need good services. Important is services… Our aim is independence, for freedom, for my own country.

The struggle of life for a Muyu border refugee is the struggle for West Papuan independence. To give up that struggle and move to another place is to give up the struggle for political freedom. Father Andrew Moses of the Daru-Kiunga diocese regularly visits the border camps to provide pastoral care. Father Andrew described to me the level of faith and hope the border refugees have in the coming of *merdeka* and their giving of what little money they have during mass and asking the priest to pray for their independence. He said that he meets a lot of sick people on his patrol and there are always stories of death, including the deaths of children. According to Father Andrew the border refugees keep having more children as part of their policy to populate as West Papuans.

*Political Risk as Ontological Intermediary*

There is a political risk in failing to maintain an educated population that is able to engage effectively in the struggle for independence. There is also risk in abandoning their place along the border that is situated in direct defiance of the Indonesian military. Father Andrew confirmed the story of the refugees being chased off Ambotveng Mountain by the Indonesian military and explained that the refugees around Kaikok are fearful of occupying higher ground again. Yet they maintain their position and agitate for the services they are due because, as it was put to me at Niogamban, "There must be equal rights to the citizens and non-citizens." The

language of rights is at the top of the rhetorical agenda for the refugees, and education is crucial to maintain and strengthen the armoury of language and intellectual vigour that may be deployed in the fight for their aims and objectives.

The desire for educational services was expressed in terms of political rather than economic objectives. The goal of *merdeka* is so highly valued that it is privileged over other considerations of risk. This type of value is what Hansson (2007, p. 22) calls a "controversial non-epistemic" value. According to Hansson conventional risk assessments involve epistemic values (such as scientific accuracy is good) and non-controversial non-epistemic values (such as a decrease in cancer rates is good), but the controversial non-epistemic values turn the conventional assessment of risk into a highly value-laden activity. These values are highly influential when it comes to human decisions about risk. The regime of political risk is almost by definition controversial. But controversial values lead to controversial risks taken for controversial rewards, and in order to understand these risks they need to be considered through a framework of ethics.

Entire communities including children and infants are being exposed to risks for the sake of a perceived communitarian good. Hansson (2007, p. 31) points out that the *prima facie* right of individuals not to be exposed to risk by others must be overridden "since social life would be impossible if we were not allowed to expose each other to certain risks." Glazebrook (2008, p. 125) describes the concern of refugees returning to West Papua before *merdeka* had been achieved as being a betrayal of those who had died in the struggle and also of the families of those who had died. Ethical considerations are therefore extended even beyond the world of the living for the sake of the West Papuan society that the refugees are trying to construct. Thus the metaphysical foundation of value in political risk trumps many other

considerations in the production of other types of risk. The risk of political failure is the loss of the chance for a meaningful life, but it is also the loss of meaning contained in the sacrifices already made.

**Photo 5 – School Sign at Niogamban**


*Political Risk as a Network of Multiple Strategies*

For Muyu the concept of citizenship, much like the border drawn along the 141st parallel, is treated as a meaningless construct of the state that has nothing to do with a universal concept of human rights. But not all Muyu refugees who are actively engaged in the fight for *merdeka* are living along the border. An elder Muyu refugee who lives at East Awin told me that he was organising a general strike to take place throughout West Papua. From his point of view different people are engaged in different strategies in their struggle for independence. His strategy was based on non-violent civil disobedience. But of the OPM military struggle he said, "We are one aim with rebel and political community, because Indonesia is treating us not well." When I asked why he chose to live at East Awin he said, "Why we move here is to

tell the world about the situation." And of the border refugees, "Some of us stay along the border because of political reason…Some of us follow UNHCR to Iowara but some are afraid that if everyone moves then our political cause will be lost."

The West Papuan struggle for independence, like any organised political strategy, is multi-pronged. Muyu refugees living away from the border are not necessarily less devoted or active towards their cause nor want it with any less intensity. The choice to remain on the border is based, in terms of political objectives, on the way those people choose to contribute and what they are prepared to endure for the cause of obtaining the political power to establish an independent West Papua. The political act of remaining on the border can be viewed in terms of the theory of social solidarity. Douglas (1992c, p. 151) links the notion of individual wants with "the processes that establish social solidarity" so that the individual getting what they want enables them to partake in future reciprocal exchanges. There is risk in not obtaining what you want. But this idea can be extended to collective wants. If political power is the currency of political risk it is worth asking what it means for a group of people to want this power. Kirsch (2006a, p. 226) describes Muyu feelings of "unrequited reciprocity" as the driving force compelling them to flee West Papua. Remaining in West Papua under Indonesian rule meant that they were unable to partake in fair and equal reciprocal exchanges with the state. There is a risk that the Muyu refugees will not obtain the political power required to establish a state where reciprocal rights are guaranteed, and this risk is one of the reasons keeping them at the border. In terms of the broader collective, the border refugees are playing their part in a struggle that extends far beyond their border home.

**Cultural and Capitalist Risk and Development**

The Muyu refugees I spoke to living at East Awin wanted to make it clear that the reason for their compatriots living on the border involved not just political but also cultural factors as well. I was told (in English), "The border is not following our cultural boundary. But that is international boundary. Not straight but in and out, zig zag, is our cultural boundary… They stay at that border because of traditional boundary and another reason is for political reason." The cultural reasons for the border refugees remaining on their land extend beyond emotionally-based feelings of attachment to *dusun* or a determination to face down state-imposed boundaries that refuse to recognise Muyu cultural expanse. Muyu knowledge of their natural environment and modes of survival do not translate well into the alternative landscape that has been provided by the UNHCR. Any move to East Awin involves significant changes to a way of life that has been reproduced through generations and is thus far adaptable to the environmental pressures being created by Ok Tedi.

*The Cultural Ecology of East Awin*

Diana Glazebrook (2008, pp. 95-105) describes in detail Muyu struggles at East Awin because of its poor soil, its unsuitability for shifting agricultural practices, and in particular its lack of sago. The most common and consistent set of complaints I heard from people living at East Awin was the poor quality of the soil, the poor quality of the road, and the lack of available land compared to the number of people who were expected to live there. The PNG government has divided 6,000 hectares of land that extends for one kilometre either side of a 30km stretch of road into blocks to be assigned to individual families. Yet the Muyu way of life is to shift their gardens along the waterways and many of them lack adequate tools for working the land at East Awin. The topsoil is thin, people report that there is only 3cm, and beneath the

topsoil is hard clay. When the Muyu arrived many of them had brought little more than sago mattocks as an essential tool for survival (Glazebrook 2008, p. 97). Sago plays a central and defining role in Muyu cultural identity, so much so that deaths have even been attributed to the yearning for sago in a context where alternative foods were available (Glazebrook 2008, p. 95). A teacher at East Awin explained the difference between the relationship to the ecological environment of Muyu and Awin people thus: "You can put a buffalo close to the water but you can't put a pussy cat close to the water." The practical implications of cultural difference are expressed in fundamentally intractable terms. But life at East Awin is also made difficult by the imposed restrictions around land allocation that make it impossible for the refugees to establish a life that is independent of outside assistance. The population density at East Awin is more than twice that of the surrounding region and game within the relocation area has been hunted out (Glazebrook 2002). There is not enough land to support subsistence agriculture and the traditional Muyu practice of shifting cultivation. Lack of productive land and animals, absence of rivers and fish, a high population density and a fixed administrative system of land allocation means that the introduction of development projects and income generating activities is the only viable option for the refugees who live there. An intertwining of cultural and capitalist risk associated with any move to East Awin provides motivation for the refugees to remain at the border.

**Photo 6 – Muyu Preparation of Sago**

*Risk, Development and Change*

Oktovanius was scathing in his assessment of traditional Muyu cultural practices and their incompatibility with development. From his position as leader of the rice grower's collective at East Awin and his movements between East Awin and the river port of Kiunga he perceived a rapidly changing world with many outsiders bringing in much foreign investment and working collaboratively with PNG nationals towards common developmental goals. For Oktovanius the Muyu "have to change their way of life" because they are "falling behind in development" and if they remain "in their old cultural individualistic ways they will not benefit from development. They are facing rapid changes… Outside people are coming… They have to stand together so they will not become victims of development." Oktovanius was afraid that the Muyu will be "wiped out" if they remain "selfish, individualistic and don't help themselves." "See this house we are in." Oktovanius gestured around the traditional bush material house on the water's edge at Kiunga that was being used by

Muyu residents of East Awin during their visits to the town, "Why don't we think to maintain this house we are in? We have the same need for shelter but don't work together to maintain this house." Oktovanius feared that development was threatening to push the Muyu out into the bush where they would be wiped out as a result of disease and poor diet.

**Photo 7 – Muyu House at Kiunga**

Oktovanius' fears for the future of his people were also informed by his experience of the changes that are taking place in West Papua. It is Muyu cultural tradition to expect a bride price and, according to him, in earlier times the punishment for failure to pay would have included being killed and eaten. Javanese migration has resulted in many Muyu men choosing to marry Javanese women to avoid the requirement of paying the bride price. The male children of these unions carry Muyu names and the first-born male has rights to Muyu tribal land, however mixed-race children prefer not to marry West Papuans. Oktovanius fears that rigid adherence to

cultural traditions is resulting in the Muyu being slowly bred out of existence. The Muyu language is being lost as young people are mainly speaking *Bahasa*.

Oktovanius is simultaneously scathing and sentimental about Muyu culture. In many ways he is the embodiment of Sahlins' idea of *developman* that holds that when people are first confronted by capitalist development their initial reaction is to "become more like themselves" in their adoption of outside influences as if they were of their own culture (Sahlins 1993). Oktovanius wants the Muyu to change in order to stay the same. On one level the cultural risk faced by the Muyu translates into the risk of poverty and disease, yet the concern around cultural loss – of language, land and ethnicity – carries a distress of equal magnitude. In this way cultural risk involves an interweaving of both controversial and non-controversial non-epistemic values. The border refugees are also concerned with the twin desires of preservation and change. On the one hand remaining at the border is represents a desire for cultural continuity, and the associated struggle for *merdeka* is partly about maintaining West Papuan identity. Yet the refugees also want to create an independent state that will facilitate the changes associated with economic development. The risk of not changing is directly linked to the risk of not staying the same.

*Development at the Border*

People at both Kaikok and Niogamban were keen to express their desire for development opportunities, which they hope will be afforded to them by the mine. At Kaikok chickens were being kept and I was asked if I knew any ways that their eggs could be marketed and sold throughout PNG. Their main concerns regarding lack of transport along the river revolved around access to markets as well as health facilities. At Niogamban the teacher made a direct appeal for development projects to help their

society, “We need projects like chicken farm, coconut farms and so forth. We can do that but where is the buyer? Who will come and buy our farms? Rice project. We as a society we need this project. Any project.” The refugees at the border are taking a capitalist risk by remaining on their own land in the bargain that their plight will be noticed and development will come. Their PNG Yonggom counterparts who enjoy cash and development projects supplied by the Ok Tedi Development Foundation (OTDF) do not share this risk. The border refugees are keenly aware of the benefits distributed to PNG Yonggom villages, but their perception extends beyond the material wealth and better health and education services that are available to them. Knowing that the mine tailings do not discriminate between CMCA villages and border refugee villages I was curious to know whether the border refugees perceived the Yonggom villagers as being happy:

> They are happy. They enjoy because company paid them, and company give out services. How about us? Because we are staying in the same environment, we are facing the same environment and same area. We are affected, they are affected, and we are also affected because of chemical because we are staying along the river. No differences here. Chemical make no differences, but human being make differences.

But would life have been better with no mine and no pollution and no services? “The mine is needed for the country.” The refugees perceived that development and services were able to ameliorate the ill-effects of mine pollution and that if these benefits were afforded to them they would be able to maintain a strong and healthy society that could hold its own within their Muyu land and continue in the long struggle towards *merdeka*. This perception views chemical poisoning as a

function of poverty and it is only human beings who can stand in the way of the refugees being able to develop their way into health and prosperity. The unitary concept of 'chemical' has an epistemological foundation that is not delinked from the agency of development. The western technorisk view sees both the Muyu refugees and the PNG Yonggom as being equally at risk of copper poisoning from contact with the river. The refugees, however, perceive that poverty itself is making them more susceptible to chemical poisoning. Yet they also believe that if the mine is helping to develop PNG then the mine is good for the country.

*Development and the Mine*

A similar view regarding the nationalistic importance of mining and the agency of mining development was expressed by a Muyu refugee from East Awin: "Freeport is because our ancestor's lord will have a special plan for us... Freeport brings people from the outside world. That is God's plan for us to get development from the outside world." The much maligned and highly environmentally destructive Freeport mine is viewed in instrumental biblical terms that echo the relationship between human beings and the natural world as proclaimed in the Book of Genesis where God has given man dominion over all the earth (Gen. 1:26-28) including the gold of the land that God proclaimed as good (Gen. 2:11-12). Macintyre and Foale (2004) report similar observations around Lihirian attitudes towards mining development and their belief that they "must use 'God's garden' 'based on the fact that nature provides for all livings things.'" For the West Papuan refugees God, in granting people dominion over all the earth, has provided the resource at Freeport for the West Papuans to utilise in their righteous struggle against their oppressors.

Muyu attitudes towards the Ok Tedi mine contrast sharply with descriptions of Yonggom expressions of sorrow over damage caused to the land by mining pollution

provided by Kirsch (2006b, pp. 190-5). Yet Kirsch was describing Yonggom feelings as they were in 1996, the same year that the lawsuit against BHP was settled out of court and before any compensation benefits had been seen. The Muyu border refugees feel marginalised in economic terms ("human being make differences") but not in environmental terms ("chemical make no differences"). If the Yonggom can benefit from the mine then why can't they? The Yonggom interviewed by Stuart Kirsch in 1996 clearly expressed their anguish over the damage to their natural environment and their way of life, including loss of cultural knowledge in the younger generations (p. 195). Eighteen years after those interviews were conducted the children born into that changed landscape have become adults for whom the sorrow and loss expressed by their parents relates to a world they have never known. By contrast the Muyu refugees have never known the world that they are struggling to create. The concept of freedom embodied in *merdeka* has its origins in the economic marginalisation imposed through Indonesian rule. The Muyu want their world to change in ways that will provide them with an economic freedom similar to that enjoyed by their Yonggom neighbours. The environmental risks posed by the mine tailings are therefore not unreasonable, as these risks are shared by everyone. It is only economic development that is mitigating these risks for others. The Muyu, in occupying their own tribal land, believe that they should regarded on an equal footing with the Yonggom and other groups along the Fly River that are enjoying perceived economic development and its associated diminishing of risk.

*A West Papuan Mindset*

Several different people expressed to me their belief that West Papuan refugees are strongly influenced by an Asian mindset that is more communitarian, nationalistic, and results in a stronger work ethic than that generally found in the

people of PNG. Robin Moken had no reservations in telling me, "The PNG people are lazy people." Robin believes that because of their experience of struggle in West Papua, refugees are hard working people who would make a good contribution to PNG if they were given the opportunity. Steven Dude at Mercy Works told me that he could tell a West Papuan refugee just by looking at the state of their clothing and the way they keep themselves. Sister Moreen admitted she was impressed by their canniness and ability to "play the system" that is a result of their long struggle to survive. In a house in the West Papuan refugee settlement on the edge of Kiunga it was explained to me that the materials used to build those houses were obtained from CMCA villages downstream. Building materials had been "just dumped" at villages along the Ok Tedi and Fly Rivers as part of the compensation agreement but initially the locals didn't know how to use them. The refugees were able to trade other goods for the building materials and construct a village along the Kiunga waterfront.

*Cultural and Capitalist Risk as Co-Produced Ontological Intermediary*

By remaining at the border the refugees put at risk their ability to utilise their skills and resourcefulness to develop the capital they need to survive and maintain their cause. However, thus far the alternatives offered at East Awin have hardly demonstrated to be a viable alternative. Although health and educational opportunities at East Awin are superior, the ability to survive on the land and adjust to the structures and limitations of the camp require cultural changes that put at risk both the refugees' emotional well-being and their political cause. From their point of view a mine that is good for the nation and good for the PNG Yonggom can also be good for the border refugees who choose to remain on their own land to pursue their political cause. The central ambition of the Muyu border refugees is the establishment and development of a modern, independent West Papuan state. In this

way mining, as an activity that is good for development and good for the country, is to be welcomed. If damage to human health from mining can be mitigated through economic development then mineral resources can be seen as a gift from God to be utilised towards development goals. For the Muyu refugees at the border, the environmental risks they face are not being imposed by the act of mining, but by the refusal of capital to include them in its gains.

Capitalism and culture are linked by the nature of change. Ortner (1984) describes change as a failure of reproduction, but development provides an alternative for the ways in which society does not want to reproduce. Cultural ontologies and their associated value production intersect with development as an agent of desired change to construct a complex risk environment. The border refugees simultaneously risk both not changing and not staying the same. Cultural identity in terms of connection to land and *dusun*, the difficultly of adapting to different ecological environments, as well as West Papuan national identity are all at risk of change. Poverty, ill health, lost educational opportunities, lack of community development and absence of *merdeka* are all at risk of remaining the same.

## 5. CONCLUSION: RISK AS A MULTI-ONTOLOGICAL NETWORK

Although I have separated out an analysis of risk into separate regimes, the regimes themselves are constructed because they possess a certain logic that is useful in providing an intelligible framework. The term 'risk' is used here in its broadest form. From its narrow origins in determining by calculation the probability of physical harm to valuable goods – that is, the risk involved in the *struggle* to get goods to market – the word risk is applied here to cover all concerns in relation to individual and social struggle. Muyu refugee society is defined and enclosed by struggle: the struggle to attain *merdeka*, the struggle against environmental impacts, the struggle with poverty, and the struggle to survive both physically and culturally. Employing the risk concept allows these struggles to be understood in terms of their centrality in the decision making process.

The more important analogy with Escobar's regimes of nature is the relational quality of these regimes. If the question to be asked of the Muyu border refugees is to be reduced down to a single decision problem; that is, to remain at the border or move to East Awin, then it is important to avoid the trap of viewing this problem as a weighing up of a set of competing risk attributes. This type of multi-attribute risk analysis assumes that different attributes (such as risk from copper poisoning, risk of losing cultural identity, etc.) exist independently of each other and are comparable according to some type of scaling system (Peterson 2007, pp. 71-2). However, this idea requires values to be comparable across different risk regimes and that the regimes themselves are sufficiently isolated to be weighed against each other, and this would raise the metaphysical problem of comparing values as described earlier. Just as concepts of nature are constructed out of "discursive processes" and the meanings it is given (Escobar 1999), the construction of risks occurs hand in hand with the

construction of values produced within a multi-ontological landscape of history, pollution, disease, memory, religion, money, weaponry, food production, ancestry, and all other effects extant. Concepts of risk are drawn from different epistemological models where some are given privilege over others and the overall understanding of risk does not fit into a single ontological framework. As Escobar (1999) says of regimes of nature, "What matters is examining their mutual articulations and contradictions – the ways in which they vie for control of the social and the biological." It is this relational attribute of risks, one that resembles a Latourian network of ontological intermediaries, that is the main determinant in the decision making process for the Muyu border refugees. In order to obtain an understanding of how different risk regimes relate to each other it must be recognised that "literally there is nothing but networks" (Latour 1996). Actor-network theory provides a method for examining how different social elements relate to each other (Block & Jensen 2011, p. 23). So a mosquito net provided by the mission has been damaged in its use to catch decreasing numbers of fish that are perceived to contain toxic levels of copper now contains holes that allow mosquitos to enter in plague proportions because of the constant flooding that is spreading unfathomable diseases caused by lack of development providing adequate sanitation that will not be an issue in the event of *merdeka* that will only be achieved if constant pressure is applied which requires a continued presence and the education of successive generations to maintain both a uniquely Muyu and West Papuan cultural identity that resists the creeping hegemony of Javanese military rule that patrols the border making it more necessary to maintain a presence in opposition that would otherwise render meaningless the sacrifices already made by previous generations both living and dead and also would also render current lives wasted that have been lived in the name of

struggle in the face of poverty and economic marginalisation that results in the charitable provision of mosquito nets that in the pursuit of an easier existence have been used to catch the poisonous fish. The risk regime is the network itself. Risk is at once social and cultural and includes technical, capitalist, political and any other attribute that one may wish to identify and classify. The Muyu border refugees make decisions in a multi-ontological interrelated network of risks that has resulted in a logic of defiant ambition that for the past 30 years has maintained their continued presence on land that nobody else wants and where nobody else wants them to be.

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