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**Livelihood Dynamics on the Lihir Islands,  
Papua New Guinea**

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A thesis  
submitted in partial fulfilment  
of the requirements for the Degree of  
Doctor of Philosophy

at  
Lincoln University  
by  
Mathias Sabu Boea Liu

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Lincoln University  
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Abstract of a thesis submitted in partial fulfilment of the requirements for the Degree of Doctor of Philosophy .

## **Livelihood Dynamics on the Lihir Islands, Papua New Guinea**

by

Mathias Sabu Boea Liu

This thesis is based on an empirical study of livelihoods conducted on the Lihir Group of Islands in the New Ireland Province, Papua New Guinea. The Lihir group is part of the Tabar-Lihir-Tanga-Feni chain of volcanic island groups which lie parallel to New Ireland Province. The islands of Niolam, Mahur, Mali and Masahat make up the group. The purpose of this study was to investigate the dynamics of the livelihood systems on this group of islands where historical interventions and a mining operation have caused socio-economic changes, and continue to influence the people's livelihoods. To that end, appropriate livelihood strategies have to be formulated to mitigate the negative impacts of these interventions.

The study was characterised as inductive within the constructivist-interpretive research paradigm underpinned by the qualitative approach. The philosophical framework of inquiry was exploratory, naturalistic and contextual to Lihir. The overarching construct viewed the livelihood system on Lihir as a human system of interacting elements consisting of people applying their capabilities to use assets within a vulnerable context, so as to construct and sustain their livelihoods. The inductive nature of the grounded theory was used to categorise primary data for the purpose of analysis and understanding. In so doing, primary data was incorporated with secondary data to provide a narrative description of the dynamics of the Lihir livelihoods. As such, primary data and secondary data were not treated as separate bodies of data.

The research strategy was a case study in which 66 respondents were interviewed with multiple units of analysis. Generalisation was increased by taking a holistic approach in the selection of the units of analysis covering a broad variety of roles and activities from 10 strategically located villages. The selection of units of analysis included institutions and business owners.

Respondents were purposively selected from these villages and institutions to capture the dynamics of livelihoods in their natural setting. Respondents were interviewed either in 2007 or 2008. Additional information was obtained through observation and secondary data sources.

The results show that Lihirians have witnessed positive economic transformations in their livelihoods, from a subsistence base driven by traditional culture, to a cash economy largely dependent on the gold mine operation. Access to and use of assets varied between institutions, households and individuals. Matrix analysis of the institutions revealed that authority, influence, and power play to varying degrees between the institutions. These have impacted on institutional linkages, which are in turn impacting on service delivery, thereby either inhibiting or enhancing livelihoods. Similarly, stratification of households has occurred as a result of differing access to livelihood assets by household members.

Notably, the mine has become an economic engine room for the affluence of Lihirians who are direct beneficiaries of the economic outcome of the mine through wage employment, business contractors, and recipients of mining royalties and allowances. Further, the multiplier effects of these economic outcomes have greatly influenced households to inevitably derive income earning livelihood strategies in order to sustain their livelihoods in a dynamic socio-economic environment.

Overall, Lihirians have been drawn into engagement with the capitalist system, initially through the colonial labour trade and more recently through a large-scale gold mine operation. It is evident that consumerism and capitalism have taken a strong hold on the Lihirian livelihoods. However, the risk of this process ending with the ‘resource curse’, articulated through the ‘Dutch disease’, becomes a major threat. In this regard, it is vital that non mining interventions are introduced to mitigate the impact of the mine’s cessation. To this end, community based commercial fishing, ecological tourism and commercial vanilla production are possible interventions that could be pursued. In addition, enhancing advanced education and investment of mining royalties and personal income external to the Lihir Islands are paramount.

**Keywords:** Exploratory, Naturalistic and Contextual to Lihir, Sustainable Livelihoods, Assets, Households, Livelihood strategies, Capabilities, Vulnerability, Enhancing Livelihoods,

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*To God Be The Glory*

*Em tasol*

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## List of Acronyms

BDO	Businesses Development Office
CER	Certified Emission Reduction
DFID	Department for International Development
ENBP	East New Britain Province
IATP	Integrated Agriculture Training Program
IBP	Integrated Benefits Package
LBDAG	Lihir Business Development Advisory Group
LGL	Lihir Gold Limited
LLG	Local Level Government
LMALA	Lihir Mining Area Landowner Association
LSD	Lihir Sustainable Development Limited
LSDP	Lihir Sustainable Development Plan
MRL	Mineral Resource Lihir
NI Ltd	Nimamar Investment Limited
NIP	New Ireland Province
NIPG	New Ireland Provincial Government
NRLLG	Nimamar Rural Local Level Government
NSPA	Nimamar Special Purpose Authority
PIP	Policies Institutions and Processes
PNGCMP	Papua New Guinea Chamber of Mining and Petroleum.
PV	Personal Viability
SPA	Special Purpose Authority
TFA	Tutome Farmer's Association
TKA	Tutukal Kuvul Asiok
TWA	Tutome Women's Association.
UNDP	United Nations Development Program
VDS	Village Development Scheme
VPC	Village Planning Committee
WDC	Ward Development Committee

## List of Local Terms and their Meanings

<i>Amuat</i>	Name of a Lihir sub-clan
<i>Apet</i>	Thanks
<i>Bilong olgeta</i>	For all in Pidgin
<i>Bikpisin</i>	Big bird
<i>Dokta boi</i>	Medical Assistent
<i>Kago</i>	Cargo
<i>Kaikai</i>	Food
<i>Kulau</i>	A young, soft green coconut
<i>Luluais</i>	Local chiefs appointed by the Germans
<i>Nielik</i>	Name of one of the major clan on Lihir
<i>Nissal</i>	Name of one of the major clan on Lihir
<i>Mami</i>	A species of yam known as lesser yam or <i>Dioscorea esculenta</i>
<i>Mis</i>	Traditional Currency used widely on Lihir
<i>Pasin bilong Lhir</i>	The Lihir way
<i>Small pisin</i>	Small bird
<i>Tinietalgo</i>	Name of one of the major clan on Lihir
<i>Tok Pisin</i>	PNG English Pidgin
<i>Tuk Kuvul Aisok</i>	Stand together to work
<i>Tuktukal Isaku</i>	Stand up together and plant
<i>Tultuls</i>	Assistents to the local chiefs appointed by the Germans
<i>Votim</i>	Vote in Pidgin

# Chapter 1: Introduction

## 1.1 Overview

This thesis is about the dynamics of livelihood systems on the Lihir Islands, Papua New Guinea (PNG). The Lihir Islands are host to a large gold mine operation that has been a major intervention on the people's livelihoods since the exploration phase in the 1980s and more prominently when the mine commenced operation in 1995. Lihir has experienced dramatic social, economic and political changes. Elements of these changes have been obvious in the utilisation and management of wealth and resources, participation in customary activities, physical changes in terms of housing, communication, electricity and road infrastructure, and changes in their traditional gender roles and social networks. As a result, livelihood on Lihir is shifting to a cash-based livelihood system. Through this the traditional, reciprocity-based social relationships are enhanced. However, these dynamic changes derive contentious issues regarding the management of wealth and the subsequent sustainability of livelihoods after the mine ceases operation. The miner is Lihir Gold Ltd (LGL).

Prior to this major intervention, Lihir had over a century of historical interventions by merchants, labour recruiters, missionaries, colonial administrations, and a cargo cult movement Bainton (2006). This thesis covers the traditional livelihood system where the people's livelihoods were based on their natural resource and influenced by culture. The thesis also reports on how the traditional livelihood system has changed into cash based livelihood system deriving from the mining operation. Based on these changes suggestions on how livelihoods can be sustained in the future are presented. In this study, 'dynamics of livelihoods' is defined as changes in people's lives. The research is inductive, and uses case study as a research strategy. The study uses the sustainable livelihoods framework as a research lens, complemented by grounded theory, systems thinking, and the sustainable development concept.

This chapter presents the research context, research interest, research problem and justification, research aims, objectives and questions, research theoretical scope, and the thesis structure. The section on research context covers background information on the study location – PNG and the Lihir Islands. The research interest section covers the genesis and

evolution of the author's interest in development studies. The sections on research problem and justification, research aim, objectives and questions, cover the boundaries of the study that influenced the research methodology. The final section outlines the research structure.

## **1.2 Nomenclature**

To avoid confusion and for clarification, the researcher for this study will be referred to as the 'author' in the ensuing chapters. The Lihir group of islands will sometimes be referred to as 'Lihir'. The people from Lihir will be referred to as 'Lihirians'.

## **1.4 Research Context**

### **1.4.1 Papua New Guinea**

The study area is the Lihir Islands in PNG (Figure 1.1). PNG includes the eastern half of New Guinea and 600 small islands. The biggest islands are New Britain, New Ireland, Manus and Bougainville. The country is divided into a number of coded hierarchical geographical areas for census purposes, and most importantly for ease of governance, administration and provision of services. Geographically there are four regions, the Southern, Highland, Northern and Islands. According to ACNARS (2001), cultural, bio-physical and socio-economic differences exist within these regions.

Existing within the regions are provinces, and in total there are 20. Each province has its own Provincial Government. The provinces are further divided into Districts. Each District is then divided into Local Level Governments (LLG), which are categorised into urban and rural (NSO 2002, Hanson et al, 2001). The LLG is determined on the basis of culture, geography and population. By contrast, Districts are broad geographical areas, and not necessarily determined on a cultural basis (Hanson et al, 2001). Each LLG is divided into Wards which can either be urban or rural. A Ward comprises Census Units. In the rural areas, Census Units are either rural villages or rural non-villages. Examples of rural non villages are schools, aid posts, and government stations. Each Ward is represented by a democratically elected councillor or a member to serve for a term of five years.

### 1.4.1.1 Population

Papua New Guinea has a population of 6.06 million people of whom 85 percent are subsistence farmers (CIA, 2010). Approximately 40 percent lived in the Highlands Region, 17 percent occupied the Southern Region, 26.5 percent lived in the Northern Region, and 16.5 percent live in the Islands Region (NSO, 2003). The population is expected to double by the middle of the 21<sup>st</sup> century, and 90 percent of this will happen among the resource-poor subsistence farmers in rural areas. This will put tremendous pressure on the country's natural resources and economic development (ACNARS, 2001:2, Hanson et al, 2001:10).

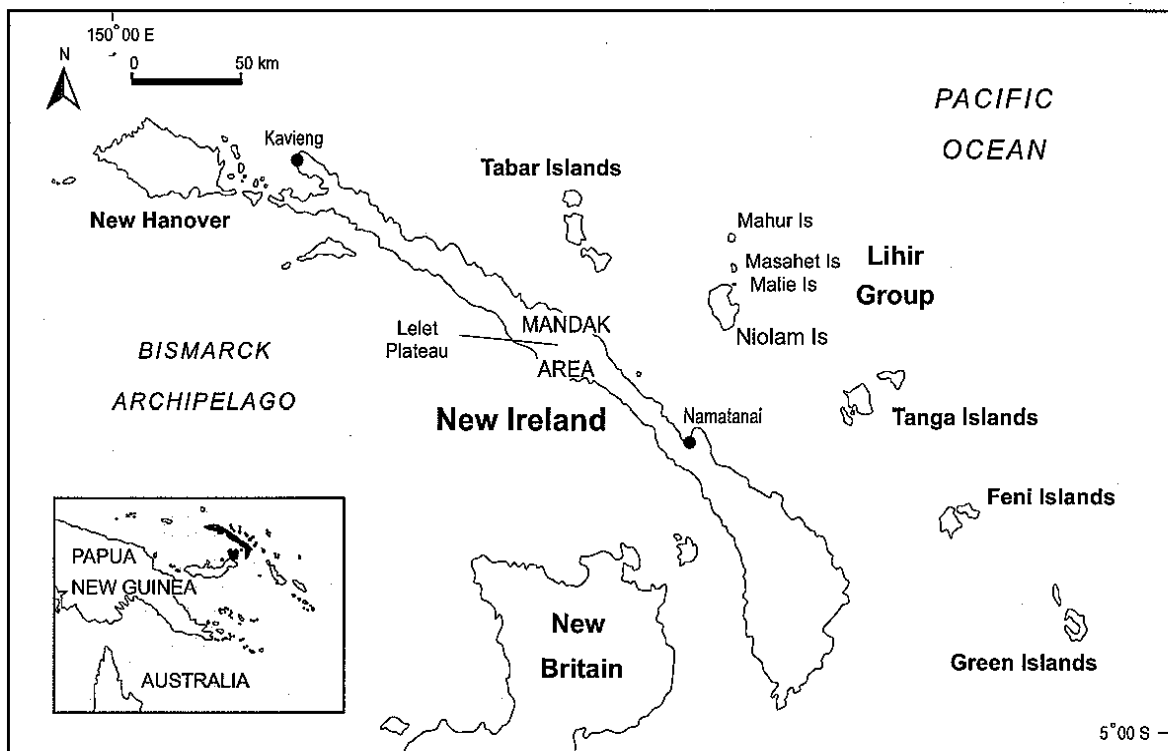


Figure 1.1: New Ireland and the Lihir Group PNG Map Insert (Source: Bainton, 2006)

### 1.4.1.2 Land area and natural environment

PNG has a land area of approximately 462,800 square kilometres. Contrary to the popular opinion that the country is well endowed with natural resources, 52 percent of the land area is mountainous and classified as low or very low quality, and less than 1 percent of the total land area is classified as very high quality land. Thirty million hectares (70 percent) of the country's total land area is covered by natural forest. The natural environment ranges from extensive mountain ranges with peaks over 4000 metres, to deep valleys and rivers associated

with swamps and seasonally inundated floodplains that cover large areas. The average annual rainfall varies from extremely high and non-seasonal, with more than 8000 metres in some mountainous areas, to relatively low and seasonal, with 1000-1500 metres in a number of coastal areas. People live from sea level on small atoll islands in the coastal areas to more than 2000 metres above sea level in the highlands region (ACNARS, 2001; Hanson et al, 2001).

#### **1.4.1.3 Natural Resources**

Agriculture – supported by livestock, fisheries, forestry and the associated input supply and marketing services – remains the mainstay of rural livelihoods. The significance of the agriculture sector is that 85 percent of the population derives its livelihood from it, somewhere in the continuum from subsistence to semi-commercial to commercial activities. Agriculture, forestry and fisheries (micro, medium-scale enterprises at the farm and non-farm level) provide 27 percent of the formal employment market involved in income generation. Furthermore, the sector provides markets for the industries and services sector, a source of capital, labour and products for the other sectors. It also contributes 14 percent in foreign exchange earnings and 27 percent in domestic product (Gwaiseuk, 2000).

Another natural resource industry that is currently the most significant contributor to PNG's economy is the mining and petroleum industry. Over the last 40 years, a number of mining operations have been developed and further mineral deposits have been identified (Moiana, 1997). The contribution of the mining industry to the economy is significant and multi-faceted. The Government receives significant taxation, royalty and dividend revenues from the industry. Employment is generated both directly and indirectly through service providers. The non-mining areas also benefit from the spin-off business activities (Banks, 2001). In the minds of most Papua New Guineans where mining is in operation, mining is a way to gain wealth rapidly and to ensure dreams of development and modernity come true (Filer and Macintyre, 2006).

#### **1.4.2 Lihir**

The Lihir group is part of the Tabar-Lihir-Tanga-Feni chain of volcanic island groups within the New Ireland Province (Hunt, 2002). Niolam Island, which is about 22 kilometres long and 14 kilometres wide, is the biggest among the Lihir group. Masahet Island is a raised coral island with limestone terraces and steep cliffs around the perimeter. The island is situated to the north of the main island of Niolam. It is approximately 3.5 kilometres long and 3.3

kilometres wide. Mahur Island is 3.6 kilometres long and 2.7 kilometres wide, and Malie Island is approximately 2.5 kilometres long and about 1 kilometre wide. Sanambiet is the smallest of the Lihir group and has an area less than one percent of the total area of the Lihir group (LMC, 2001), (see Figure 1.2). Geographically and administratively, Lihir comes under the Namatanai District, which administratively falls under the New Ireland Provincial Government. The Provincial Government is constituted by a Provincial Assembly, which is chaired by the Provincial National Parliamentarian.

#### **1.4.2.1 Population**

The population of Lihir in year 2006 was 18, 353, of which 19 percent were non-Lihirians. Most of the non-Lihirians are employed by LGL and its contracted companies, including other associated suppliers of goods and services, (see Chapter 5) (LGL, 2007b). According to the Lihir LSDP (2007), the population on Lihir Islands has increased significantly since mining operations began in 1997. Before the mining operations, the population was approximately 6000; within four years, it had almost doubled to 11,100. Ten years after mining operations commenced, the population has almost tripled to 18,353 of which 19 percent are non-Lihirians.

Together, the villages of Kunaie 1 & 2 and Zuen Village have the highest population (3,388) and an almost 50-50 breakdown of Lihirians and non-Lihirians (1,840 and 1,548 respectively). Kapit and Londolovit are the second most populated villages with 2,013, and also have an almost 50-50 breakdown of Lihirians and non-Lihirians. With mining operations concentrated near these two villages, access to services for the mine workforce, and for the broader population, is high.

#### **1.4.2.2 Ethnographic Studies on Lihir**

Lihir has been a subject of a number of ethnographic studies. As reported by Macintyre (1989), a German missionary named Father Neuhaus wrote a word list and some observations of customs in the 1920s. A Norwegian student, Yngvar Ramstad, did fieldwork there in about 1970, but did not complete his thesis and hence no papers were published. A detailed ethnography study on Lihir was done by Filer and Jackson (1989), who conducted a social impact study of the gold mine. The study was commissioned by the mining company to comply with the government's direction to assess how the mining operation would affect the people's lives. Macintyre studied the traditional exchange system on the Island, comparing it

with her experience on the subject matter on Misima. Awart (1996) did a baseline study of the cultural change and psychological effects of colonialism on Lihir women. Hemer (2001) studied emotions; personhood and relations exhibited through the people's daily lives on Mahur Island (see Figure 1.2). Bainton (2006) studied the on socio-economic changes, cultural changes, local leadership, and the Lihir Destiny and Personal Viability at the village level. In addition, Foster (1995) also conducted ethnography of the nearby islands of Tanga. Similarly, Holding (2000) studied the Tangan views on illness. This thesis identified and categorized culture and tradition as a livelihood system.

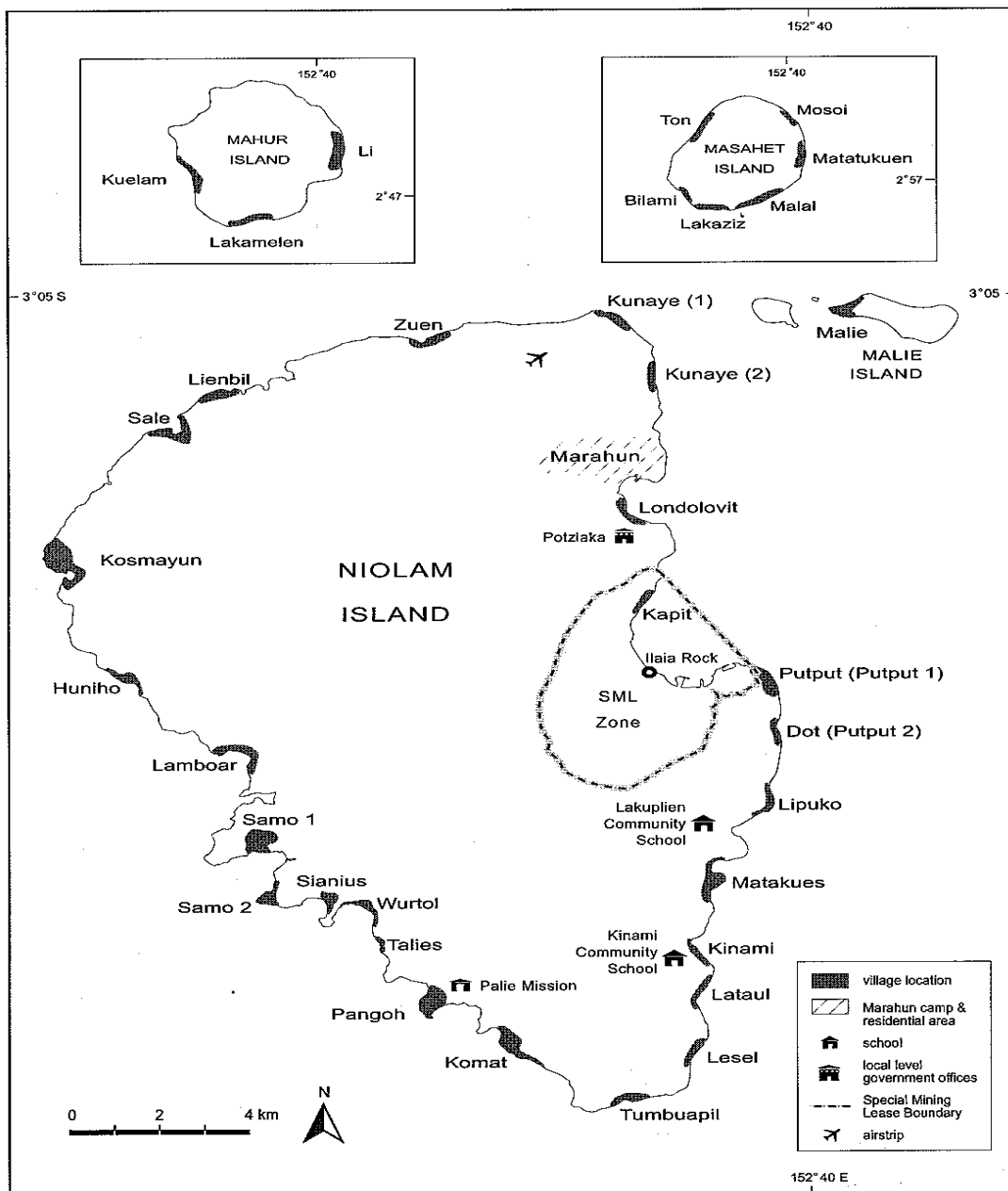


Figure 1.2: Lihir Islands (Source: Bainton, 2006)



Historically Lihirians are related to the people of Tanga, Tabar Islands, as well as the people of north-east central New Ireland. Lihirians speak their own language, called *Lir*, now widely known as Lihir. Most Lihirians also speak and understand Tok Pisin (Lagisa, 1997).



Figure 1.3: Aerial view of Niolam Island, the biggest island amongst the Lihir group. The gold mine operation is visible to the right. (Source:Bainton, 2006)

#### **1.4.2.3 Livelihood Changes.**

In the context of this study qualitative data from interviews indicate that Lihir had predominantly a subsistence livelihood system based on gardening, producing an abundant supply of yams to feed and feast the population and rear large number of pigs for feasting (described in Chapter 3). Many people that the author talked with indicated that prior to the gold mine operation (see Chapter 5), Lihir was self-sufficient in food and the fact that sea voyages to and from the island can be extremely hazardous possibly contributed to the isolation of Lihir.

Despite over a century of interaction with merchants, labour recruiters and missionaries (see Chapter 4), Lihirians existed in an economically circumscribed and internally focussed

cultural environment. Culture plays an influential role in the lives of Lihirians, as it contributes to upholding and fulfilling customary obligations. This keeps the coerciveness of the livelihood system in place (Bainton, 2006). Since at least the 1960s, even communities throughout the neighbouring district regarded Lihir as peculiarly insular (Filer and Jackson, 1989). Many interviewees suggested that prior to the coming of the mine in 1995 Lihir was geographically remote and marginal. However, these economic and social conditions have changed and are still changing. Qualitative data indicate that the mining operation is the biggest intervention on the traditional livelihoods of Lihir (as explained in Chapter 5). It plays an important role in propelling the economy of Lihir. For example, the people want modern goods and services and a way of life-style that does not involve constant toiling on their land to sustain their livelihoods. They want to be wage earners and own businesses. However, this strategy is under threat, as the period for bush fallow is being reduced as a result of uncoordinated land allocation for gardening by clans and the movement of the relocated people into other villages to make gardens. In addition, some employed Lihirians regard gardening as a backward livelihood strategy. Indeed, out of the 92 percent of Papua New Guineans employed by the mine, 36 percent are Lihirians. All business activities are wholly owned or partly owned by Lihirians (LGL, 2006).

Qualitative data from interviews also suggest that since the mine started in 1995 the yearly cash flow into the villages has increased from almost zero Kina (official PNG currency) in some villages to thousands of Kina. This has come about through the provision of mining royalties, allowances and wage employment, and spin-off business entities both in the formal and informal sector. Handling cash was a strange phenomenon in the lives of most ordinary gardeners who suddenly had become wage earners and recipients of royalties and allowances. Village women enter into cash earning opportunities by selling betel nuts and garden produce. Overall, Lihirians have one billion Kina equity in the gold mine. Conversations with a local politician revealed that in 2008, LGL paid royalties, levies and production taxes totalling US\$17.8 million (K28 million), with the bulk of the windfall going to the Government. On the flip-side, many interviewees are concerned about the likelihood of their income ceasing when the mining operation ceases. Furthermore, the mine has introduced a cash-based life style, where drugs, abuse of alcohol, land disputes, and social issues such as prostitution and squatter settlements have emerged. In addition, traditional practices and subsistence skills are being eroded. For example, the men's house culture is in the process of losing its cultural value, and young people have lost gardening skills (see Chapter 3). Given the inevitable

changes that have penetrated the traditional livelihood system of Lihir, the people are en route to a changing and modern livelihood system, where culture is changing and where the people are being drawn into the accumulation of material wealth or the capitalist system. These changes are further explored expounded in this study.

## **1.5 Research Interest Linking with Development Theories**

### **1.5.1 The Beginning**

The author's journey in development studies began in 1989 when he was undertaking a postgraduate diploma program in systems thinking and practice in agriculture at the University of Western Sydney, Australia. His experience with development issues was in contrast to the undergraduate agricultural principles complementary to classical natural science. Prior to undertaking the course in systems thinking, the author was immersed in horticulture, hence perceiving the activity from a reductionist orientation. He was then teaching the subject at Vudal Agricultural College, in PNG between 1981 and 1988. The college is now the PNG University of Natural Resources and Environment.

### **1.5.2 Application of Development Theories in University Classroom Learning**

Through the course in systems thinking and practice, the author began to appreciate and approach agriculture and rural development as components of the whole development issue, consisting of different elements connected together. He began to appreciate that each part has a role to play in development, and started to develop an integrative approach to the subject of development, which influenced his teaching. Subsequently, the author developed and taught undergraduate courses in systems agriculture, sustainable and rural development as integrative subjects at the University of Vudal. The experience led him to undertake the Master of Rural Systems Management at the University of Queensland in 2002. The program contributed to and enhanced his understanding about development theories and concepts.

### **1.5.3 Learning in Real World Situations**

In 2002, the author began to apply development theories and concepts in real world settings in PNG. It became apparent through exposure to practice that he had a lot to learn. His first real world learning situation was when he was involved in the design, implementation, monitoring and evaluation of an outreach program known as the Integrated Agricultural Training

Program (IATP) at the University of Vudal. The design of IATP entailed participatory approaches involving farmers, academics, development practitioners, credit providers and researchers.

The program was designed to enhance the University's vision in bringing the benefit of teaching to the community. It exposed academics to real world situations where their academic world views were either confirmed or denied, which enriched their classroom-based university teaching.

IATP is a demonstration of a concerted effort by a number of stakeholders in enhancing the systems, process and capacities of extension in rural development. The program is focused on providing an opportunity for the farmer and villager; human capability to have access to a wide range of livelihoods and planning tools and business management concepts (Liu et al., 2006). Initially funded by the Australian Assistance in Development (AUSAID) for three years (2003-2005), IATP is now self-sustaining. The choice of this research topic was partly influenced by IATP, as it was introduced into Lihir Islands in 2006 at the invitation of the Nimamar Rural Local Level Government (NRLLG).

A multidisciplinary approach was taken in implementing, monitoring and evaluation of the program, involving farmers, trainers, villagers, academics, researchers, credit providers and extension officers. Through the evaluation of the program, the participants, trainers and other stakeholders point out where topics or sections of the training have been useful or irrelevant. They also provide useful information in the delivery process. The approach and the author's involvement in IATP enhanced his interest in integrated development fields of study beyond his disciplinary background in horticulture. Thus, the author is continually striving to better understand the sustainable livelihood theory and its application. This understanding helps the author and others (e.g. politicians, policy makers, etc.) to make appropriate, timely and culturally relevant judgments in their work. Chambers (1983) argues that in the practical world, criteria and ways of thinking are needed in order to make judgments on what to do and how to do it.

Between 2004 and 2005 the author was also involved in designing and implementing two rural development projects. The first was aimed at empowering selected villagers in West New Britain Province through village-based training in sustainable livelihoods, decision-making and business management. Participants of the training were drawn from dualistic

livelihood systems who are subsistence food producers and, at the same time, earning money from either cocoa or oil palm. The second project involved formation of land care groups in four locations in East New Britain Province. This project was designed to empower the villagers to initiate strategies aimed at minimising unsustainable land use leading to soil erosion in their villages. Soil erosion was affecting many people whose livelihoods depended on their land. Both projects were funded by the Agricultural Innovative Grant Facility, an initiative of AUSAID to encourage academics and novice researchers to assist in tackling practical rural development issues.

## **1.6 Research Problem and Justification**

This study stems from suggestions by Macintyre and Foale (2001) and Petheram (2001) concerning the need for adoption of sustainable livelihood strategies on Lihir. Reports from other mining areas in PNG by Wissink (2001) and Wissink et al. (2001) also point to the need to study and understand livelihoods in mining areas. Further, Baxter (2001) suggests that in PNG there is little to show among the vast majority of the population who live in rural areas that revenue generated by the mining sector and other natural resource extraction developments has been used effectively to enhance livelihoods in those areas. As expressed by MOAR (2002), resource extraction industries, and the mining industry, in particular, which often operate in remote regions amongst marginal people, create vulnerable environments that lead to long lasting negative impacts on the people's lives. Helmore and Singh (2001) also suggest that development interventions can go tragically awry. Instituting the right elements to minimise unsustainable livelihood activities and the dependability syndrome deriving from development interventions becomes paramount.

Therefore, in the Lihir context, there is a need to construct and understand the dynamics of livelihood systems stemming from the various interventions (see Chapters 4 and 5). Without understanding the insights and dynamic of the livelihoods deriving from these interventions (especially the gold mine operation), sustainability of livelihoods will be at stake, continuity will not be guaranteed, and intergenerational inequity could lead to poverty and misery. As discussed by Helmore and Singh (2001), it is the ethical obligation for one generation to pass on to the next generation an equitable access to resources to sustain and enhance livelihoods.

## **1.7 Research Aim**

This thesis study aims to understand the dynamics of livelihood systems on the Lihir islands, where historical interventions and a mining operation have caused social-economic changes, and continue to influence the people's livelihoods. These insights would identify how the sustainability and enhancement of the livelihood systems can be attained.

## **1.8 Research Objectives**

The following objectives are to be achieved in order to answer the overall aim:

- a. To understand the existing livelihood systems and how they have been changed by the mine and other interventions.
- b. To suggest how the sustainability and enhancement of these livelihoods systems can be attained.

As the research evolved, a number of lower level subsidiary objectives were formulated:

- a. To explore, understand, interpret and construct a description of people's lived experiences within their own context.
- b. To generate a narrative explanation of the dynamics of livelihoods of Lihir.
- c. To suggest strategies aimed at sustaining and enhancing the livelihood systems of Lihir.

## **1.9 Research Questions**

The following research questions were formulated and addressed in order to achieve the objectives:

1. What are the major livelihood systems of Lihir; how are they changing as a result of the historical and recent interventions?
2. How have the mining operations impacted on livelihoods of Lihir?
3. How can the livelihood systems of Lihir be made sustainable and enhanced?

## **1.10 Complementary Theories**

The complementary theories which underpin this thesis are outlined in this section. The theories include sustainable livelihoods, sustainability, grounded theory and systems thinking. These theories are elaborated in Chapter 2.

### **1.10.1 Sustainable Livelihoods**

The term ‘sustainable livelihood’ is widely used in development discourse with varying perceptions and interpretations, depending on who is using it and in what context (Scoones and Wolmer, 2003:4). With this in mind, a way of thinking about the term and its application in poverty reduction and famine analysis evolved into what is now known as the sustainable livelihoods approach in the 1980s and 1990s (Chambers, 1983; Chambers and Conway, 1992; Sen, 1981; Swift, 1989). Although the application of the approach in development work has been widely debated, it provides clear principles to guide analysis and development practice (Carney, 1998:5; DFID/FAO, 2000:11; Ellis, 2000:30). The research leading to this thesis was conducted within the conceptual framework of the sustainable livelihoods approach. While the framework has been adopted rapidly around the world, relatively little empirical work has been done to operationalise the framework in local contexts in PNG. The research has also focused the author’s attention on developing a framework for sustaining and enhancing livelihoods in a natural resource extraction or development area. A major component of the framework is the empowerment of the people within the Lihir livelihood system with appropriate and relevant skills to sustain and enhance their lives in the transformed livelihood system.

#### **1.10.1.1 The Asset Pentagon**

DFID (2000:5), distinguishes five categories of assets (human, social, financial, natural and physical). A livelihood asset is defined as anything owned that can produce a future livelihood benefit, whether in possession or by right to claim possession. These assets are depicted in the sustainable livelihood framework as an asset pentagon (Figure 6.1). The asset pentagon lies at the core of the livelihoods framework, within a vulnerability context. The pentagon was developed to enable information about people’s assets to be represented visually, thereby bringing to life important inter-relationships between the various assets. Assets in the context of this study falls under three broad categories: a) macro level assets, b) meso level assets, and micro level assets. At the micro level assets can be further divided into community assets, household assets and individual assets.

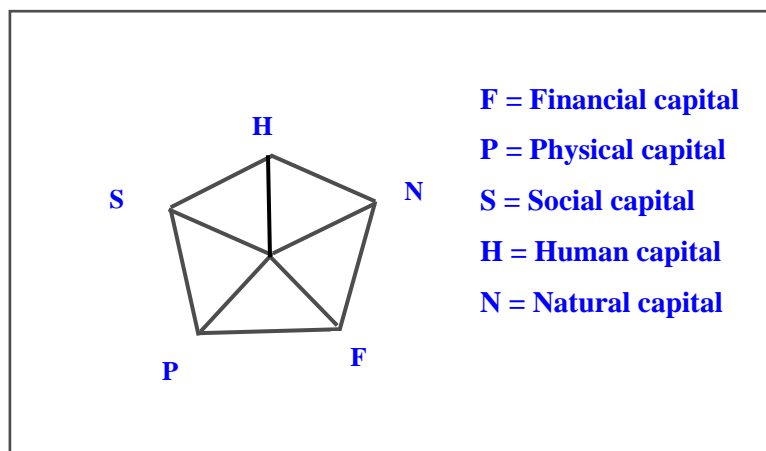


Figure 1.4 : The asset pentagon (Source: DFID, 2000)

Assets can sometimes be traded, substituted or transferred. Assets can also be played off against each other. No one distinct type of asset can adequately provide the needs that people try to fulfill in a livelihood system (DFID, 2000). Ellis (2000) argues that an analysis of assets in a livelihood system is a view of what people have, and recognising what people do not have, rather than focusing the analysis on the people's needs. Bebbington (1999:2022) indicates that assets that people draw upon for their livelihoods also vary between social groups, including gender, age, social status and people's contextual roles. Further, Carney (1998:8) states that asset analysis also considers how access to assets change over time, what is predicted, what the cause of changes are, and how access and control of assets differ between social groups. In essence, each person in a livelihood context has a portfolio of capital assets, which he or she is entitled to, so assets are about entitlement and access. In the context of this study, this section presents these livelihood assets, their strengths and weaknesses, their scarcity, how people are accessing them, and the opportunity these capital assets provide for the people in the long term. The generic meanings of these assets appear in Figure 1.5.



**Financial capital**

The financial resources which are available to people (whether savings, supplies of credit, regular remittances or pensions) and provide them with different livelihood options.

**Human capital**

The skills, knowledge, ability to labour, and the health to pursue different livelihood strategies.

**Natural capital**

The natural resource stock from which livelihoods are constructed (land, water, forest biodiversity, environmental resources).

**Social capital**

The social resources (networks, membership of groups, trust relationships, access to wider institutions) upon which people draw in pursuit of livelihoods.

**Physical capital**

The basic infrastructure (transport, shelter, water, energy and communication) and the production equipment and means which enable people to pursue their livelihoods.

Figure 1.5: Capital assets derived from DFID (2000)

### **1.10.1.2 Mining and Livelihood Assets**

Assets refer to resources that people have, and are also referred to as ‘capital’, depending on the context in which they are applied. Based on DFID (2000), these terms will be used interchangeably in this thesis. At the heart of the Sustainable Livelihood Framework is the five-sided pentagon of livelihood assets, divided into five categories: financial, human, natural, social and physical. The asset pentagon appears in Figure 1.4.

According to Ellis (2000:31-32), the livelihoods approach is based on the premise that the asset status of the poor is fundamental to understanding the options available to them, the strategies they adopt or choose to attain their livelihoods, the outcomes they aspire to, and the vulnerability context under which they operate. Bebbington (1999:2022) also indicates that people’s assets are not just means of living, but also give “meaning to a person’s world”. Further, Bebbington points out that these assets are not only resources that people use in constructing their livelihoods, but that assets also provide the capabilities “to be and to act”. Moreover, Bebbington argues that access to resources could be considered the most important asset in building sustainable livelihoods. Sen (1997) noted that assets, especially human capital, not only mean people produce more, and more efficiently, but that they also give them the capability to engage more fruitfully and meaningfully. Bebbington (1999:222) claims that the same could be true in other ways for other types of capital. Bebbington’s (1999:2028)

work in the Andes suggests that the more viable households are able to sustain or increase their access to resources, such as land, skills, labour and credit. These households increase their opportunities to use resources to enhance their livelihoods, and by so doing increase their access to networks with institutions.

### **1.10.2 Sustainability**

Since the release of the report *Our Common Future* in 1987 by the World Commission on Environment and Development, sustainability has become an important concept within the rural and natural resource management literature and public debates. The concept is central to sustaining and enhancing livelihoods on Lihir, as it attempts to deal with the changes to the economic, social, physical and natural livelihood strategies on the Islands. The research has suggested other interventions (see Chapter 7), which would diversify the livelihood system on Lihir, in an attempt to sustain and enhance it.

### **1.10.3 Grounded Theory and Systems Thinking**

Grounded theory methodology (Glaser and Strauss, 1967) is used to gain theoretical and lived insights of the changes in the livelihood systems of Lihir and how the people are dealing with the changes. Grounded theory is complemented by systems thinking. The author has used systems thinking to perceive livelihoods on Lihir to capture the cohesive and dynamic interplay of the various elements which make up the whole livelihood system. The various elements, in essence, are sub-systems of the livelihood systems on Lihir. An attempt is made to avoid the use of the term ‘systems theory’, as it could literally be taken as the “theory of systems”. Systems’ thinking, instead, is the process of thinking and using systems ideas rather than the systems theory (Bawden, 1991).

## **1.11 Treatment of Literature and Primary Data**

Reviews of literature also appear in all the chapters pertaining to the context and content of the respective chapters. Treatment of the literature in this manner is done to align the discussion within the grounded theory methodology. Further, primary data & secondary data were not treated as separate, but incorporated to complete the whole story, as each set on its

own would be incomplete. Therefore, treating the data in this manner strengthens the narrative nature of the thesis.

## 1.12 Thesis Structure

Apart from this chapter, there are seven other chapters which make up the whole thesis.

Chapter 2 presents the research design that guided the inquiry process. The qualitative research paradigm as the inquiry process is discussed. A review of the complementary theories and relevant concepts to the research is presented. The review covers the sustainable livelihoods framework, sustainability in development, grounded theory and systems thinking.

Chapter 3 presents the Lihir traditional livelihood system. The presentation moves from a generic discussion about culture to culture in the Lihir context; commonly expressed in English Pidgin as *pasin bilong Lihir* (the Lihir way). The main livelihood strategies through which Lihirians express *pasin bilong Lihir* are presented. These include gardening, raising pigs, mortuary feasting and other rituals. The role of *mis* (local currency), pigs and yams (*discorea alata*) in enhancing the Lihir traditional livelihood is discussed. The chapter also includes the Lihir's men's house, which is regarded as the centrepiece of the Lihirian traditional livelihood system. It is a site where men identify with other men, where feasting and reciprocal exchanges take place, and where clans manifest their authority. It is an important institution, or a subsystem, of the traditional livelihood system. Social capital, which is an important asset in the traditional livelihoods system, is given special attention in this chapter. It is one of outcomes of the traditional livelihood system, besides the accumulation and endowment of physical and natural wealth. A holistic view of this livelihoods system is presented before the Conclusion (Chapter 8). An illustration of the interactions between the subsystems of the livelihood system is presented in Figure 3.9.

Chapter 4 is about the historical interventions which exposed the traditional livelihood system of Lihir to the outside world. Lihir was first sighted in the 16<sup>th</sup> century by the Dutch explorers. The sighting led to an apparent intervention in the 18<sup>th</sup> century when the Europeans recruited Lihirians to work in their plantations in Samoa and Queensland. This was followed by the German imperial Administration which recruited Lihirians to build roads and work in coconut plantations in the then German colony of New Guinea. These two interventions introduced

modern goods to the Islands, especially steel tools (bush knives and axes), which have become essential in rural households on Lihir. Intervention by the Catholic Mission in 1936 made an impact as they established schools, health facilities, and a modern station that consisted of copra buying depot and a trade store. The activities of the Catholic Missions also contributed to loss of certain cultural activities. The early economic activities and efforts by Lihirians to go into cash crops and other trading activities are mentioned. The chapter also covers development attempts by the Australian administration to develop Lihir economically, only to be stifled by a *cargo cult* movement. The local perceptions and world views leading to the coming of the gold mine are also presented.

Chapter 5 covers the evolving livelihood system stemming from a gold mine operation. In the context of this study, the gold mine operation is viewed as a major intervention on the traditional livelihood system of the Lihir Islands. The focus of this chapter is to expose the influence and changes stemming from the gold mine operation on the people's livelihoods. To this end, the chapter begins with mining and its contribution to the PNG economy, and narrows the focus to the influence the mining operation has on the Lihir livelihood system. The major changes as influenced by the mining operation includes the integrated benefit package and, the emergent of institutions and organisations to facilitate the mine's influence on livelihoods. Spin-off activities, such as wage employment and businesses are discussed. In the former, the people's motives in seeking employment with the gold mine, while in the latter, the types of businesses and their operation in the context of the Lihir culture.

Chapter 6 presents the implications of this major intervention with its multiple effects extending into the cultural, economic and human facets of livelihoods in the villages. The typology of households deriving from the mine operation is presented. Vulnerability of livelihood strategies driven by the economic buoyancy deriving from the mine operation is discussed. The chapter also covers the marginalisation of villages, households and individuals as a result of the economic buoyancy. The operation of modern business in the Lihir cultural context is discussed.

Chapter 7 presents how livelihoods can be sustained and enhanced on Lihir. The interventions and strategies discussed in this chapter stem from the discussions in the earlier chapters. The chapter begins with the 'resource curse' or 'Dutch disease' theory leading to signifying the importance of sustaining and enhancing livelihoods on Lihir. The chapter ends with strategies

to avoid the resource curse in order to ensure livelihoods are sustainable after the ceases operation on the Lihir Islands.

Chapter 8 concludes the thesis. Here the discussion focused on how the research questions have been answered, the insights and contribution to existing literature and knowledge pertaining to the study, recommendations and limitations of the research, and suggestions for further studies.

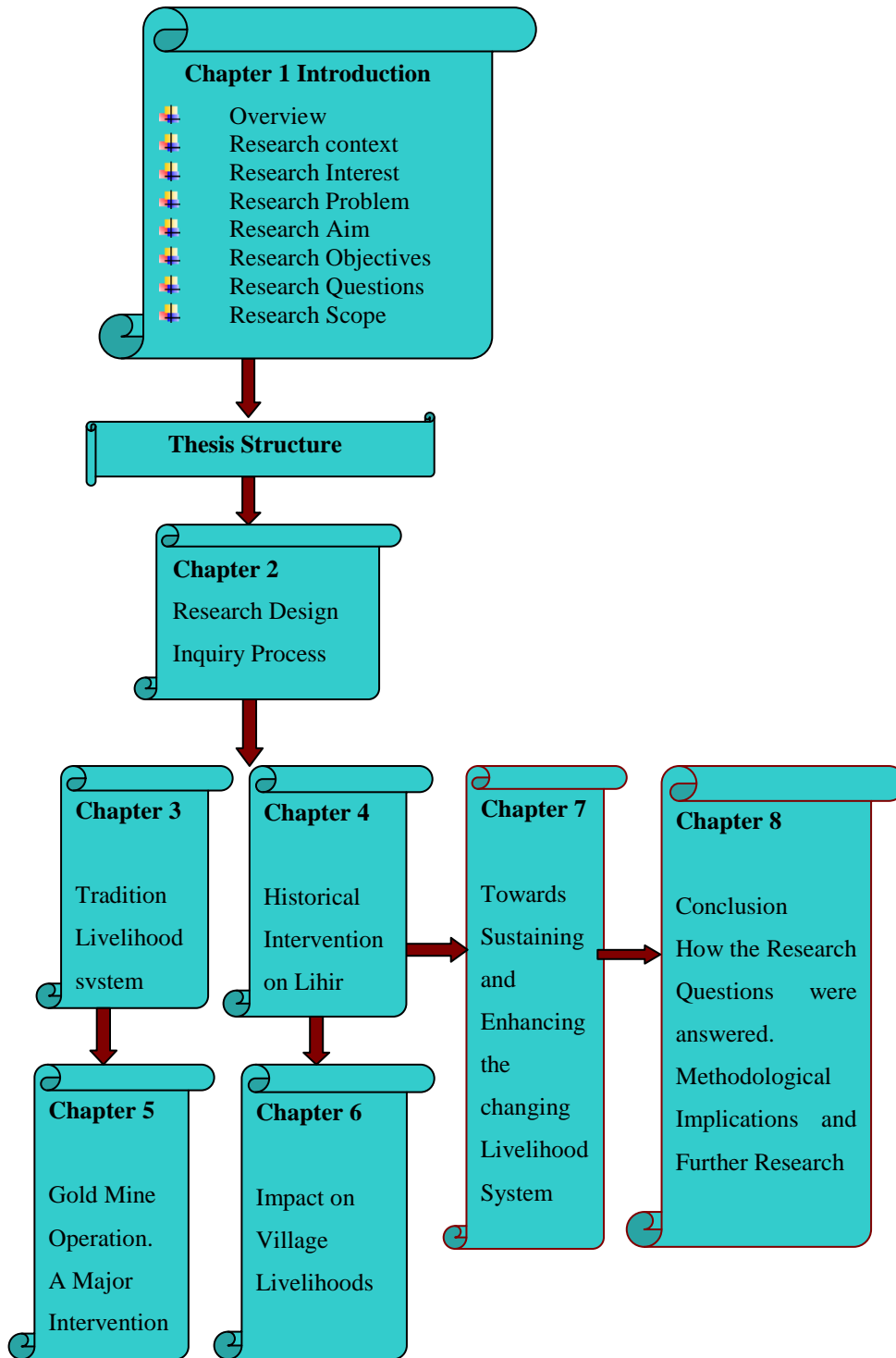


Figure 1.3: Summary of thesis structure

## **Chapter 2: Research Design**

### **2.1 Introduction**

The purpose of this chapter is to establish the research design and the subsequent research enquiry process which underpins the aim and objectives of this study. With that in mind, the aim and research objectives are restated and elaborated in Section 2.2. Before any knowledge claims can be made about Lihir livelihood systems, it is necessary to first pose the questions of (i) what is to be known about the Lihir livelihood systems, and (ii) what and how knowledge can be obtained about the Lihir livelihood systems. The first question relates to ontology and the second relates to epistemology. These are covered in Sections 2.3 and 2.4, respectively. Subsequently, the application of the methodological and logical research strategy, methods and analysis within the qualitative research genre is justified in Section 2.5. This is based on the argument that ontology logically precedes epistemology, and methodology logically flows from establishing the ontological and epistemological positions in designing research projects. Further, methodology logically precedes methods, which logically precedes data source (Grix, 2002:178-179). However, the missing link in Grix's logical flow is the research strategy which becomes an addition to the logical flow (see Figure 2.1). The chapter also elaborated on the sustainable livelihoods theories, soft systems thinking, and grounded theory, which were used to complement the epistemological position and the ensuing qualitative methodology applied in the study.

### **2.2 Research Aim, Objectives and Questions Restated**

According to Grix (2002:179), the ontological and epistemological position of the researcher shapes the research questions; how the researcher poses them and how the researcher goes about answering them. The research questions were stated in Section 1.7. In this section, the research aim and objectives are restated, which logically determines the choice of a research methodology appropriately discussed in this chapter.

As stated in Section 1.8, the general aim of this research is to gain an understanding of the dynamics of livelihood systems on the Lihir islands where historical interventions and a

mining operation have caused social-economic changes, and continue to influence the people's livelihoods. Relative to the period prior to the mining operation, there is marked improvement in terms of the cash flow into the villages and the development of physical infrastructure on Lihir. However, the sustainability of these aspects of development is not clearly understood. In that regard, the upshot of this aim would identify suggestions on how livelihoods on Lihir might be enhanced. To address this aim, the following research objectives were formulated to elicit the facets of livelihoods in the Lihir context:

*Objective one:* To understand the existing livelihood systems and how they have been changed by the mine and other interventions. The crux of this objective is to interpret and descriptively construct the people's lived experiences relative to the changes deriving from the historical interventions and the mining operation in the Lihir context.

*Objective two:* To suggest how livelihood systems in a mining area can be enhanced. The objective stems from the perception that mining operations bring dramatic and complex transformations to livelihood systems in areas where they are allowed to operate. In the Lihir context, the current mining operation is regarded as a major intervention into the livelihood systems which has physically, economically and socially transformed the livelihoods on the Island. Inevitably, the Lihir people, who were once predominantly subsistence farmers, have shifted to become largely dependent on the mining activities for their livelihoods.

## **2.3 Ontology**

Ontology' refers to the nature of what exists and how it exists. As social scientists, our ontological assumptions about the world underpin the structure and scope of our explanations (Marsh and Furlong, 2002; Patton, 2002; Guba and Lincoln, 1994). Blaikie (2000) suggests that ontological claims are claims and assumptions that are made about the nature of social reality, claims about what exists, what it looks like, what units make it up, and how these units interact with each other. According to Grix (2002:175), it is the starting point of all research, after which one's epistemological and methodical positions logically follow. For the purpose of this study, the researcher's ontological position is that livelihoods are social systems. As such the ontological concepts central to this study are socially constructed. Therefore, the nature of livelihoods on Lihir needs to be investigated in order to address the



issue of sustainability. This is the central ontological position in this study. Guba and Lincoln (1994: 111) argue that the notions of meaning and reality are to be understood from the perspective of the social actors, where relationships are defined and enacted, and from the way respondents subjectively view themselves within their own context.

## **2.4 Epistemology**

The appropriate epistemology for the social constructionist's ontology is the interpretive or hermeneutic approach that aims to understand how actors subjectively make sense of social phenomena. As suggested by Guba (1990:26), subjectivity seems to be the only means to unlock multiple constructions of social phenomena. Having established the ontological assumptions embodied in this study, this section focuses on epistemology, which is one of the core branches of philosophy. It deals with the theory of knowledge, especially in regards to its methods, validation and the possible ways of gaining knowledge on social reality, the knowledge production process. Thus, what and how knowledge can be obtained about the nature of what exists and how it exists are epistemological questions (Grix 2002:177; Guba, 1990:26). There are a number of ways of classifying epistemological positions and there is no agreement as to the best way. Probably the most common classification is the one which distinguishes between scientific (positivist) and the hermeneutic or interpretive positions or traditions (Marsh and Smith, 2001: 529). To this end, Grix (2002: 178) argues that the epistemological position of a researcher influences the choice of a research methodology. This study is classified within the hermeneutic or constructivist interpretive tradition or position, as the focus is on understanding the meanings of the actions, incidents, roles, interactions, decisions and relationships of the actors entrenched in the livelihoods system of the Lihir Islands. The knowledge gathering process of this study began by drawing upon existing empirical literature on the sustainable livelihoods framework, and livelihoods in Papua New Guinea and on Lihir.

## **2.5 Methodology**

Having established the ontological and epistemological assumptions embodied in this study in Sections 2.3 and 2.4, this section presents the methodology – the knowledge gathering

process. Grix (2002:179) suggests that the methodology logically links and relates to the ontological and epistemological positions researchers bring to their studies. Methodology poses the question of how one can go about acquiring the knowledge one wishes to acquire in their study.

Methodology is concerned with the logic of scientific inquiry (Grix, 2002:179). It defines the procedures used to research, and seeks answers to, problems and issues concerning society (Davidson and Tolich, 2003:25; Guba and Lincoln, 1994:107). It also defines and identifies procedures to be applied in uncovering knowledge (Krauss, 2005:758). According to Grix, (2002:179), a researcher's methodological approach, underpinned by and reflecting specific ontological and epistemological assumptions, represents a choice of research paradigm and research methods adopted in a given study. The building blocks of the conceptual steps of the research process are shown in Figure 2.1.

The methodology in this research falls within the qualitative genre underpinned by the constructivist interpretive paradigm. Before discussing the choice of the paradigm, the differences between quantitative and qualitative research paradigms are presented. This is done to situate and justify the choice of the qualitative research methods employed in this study.

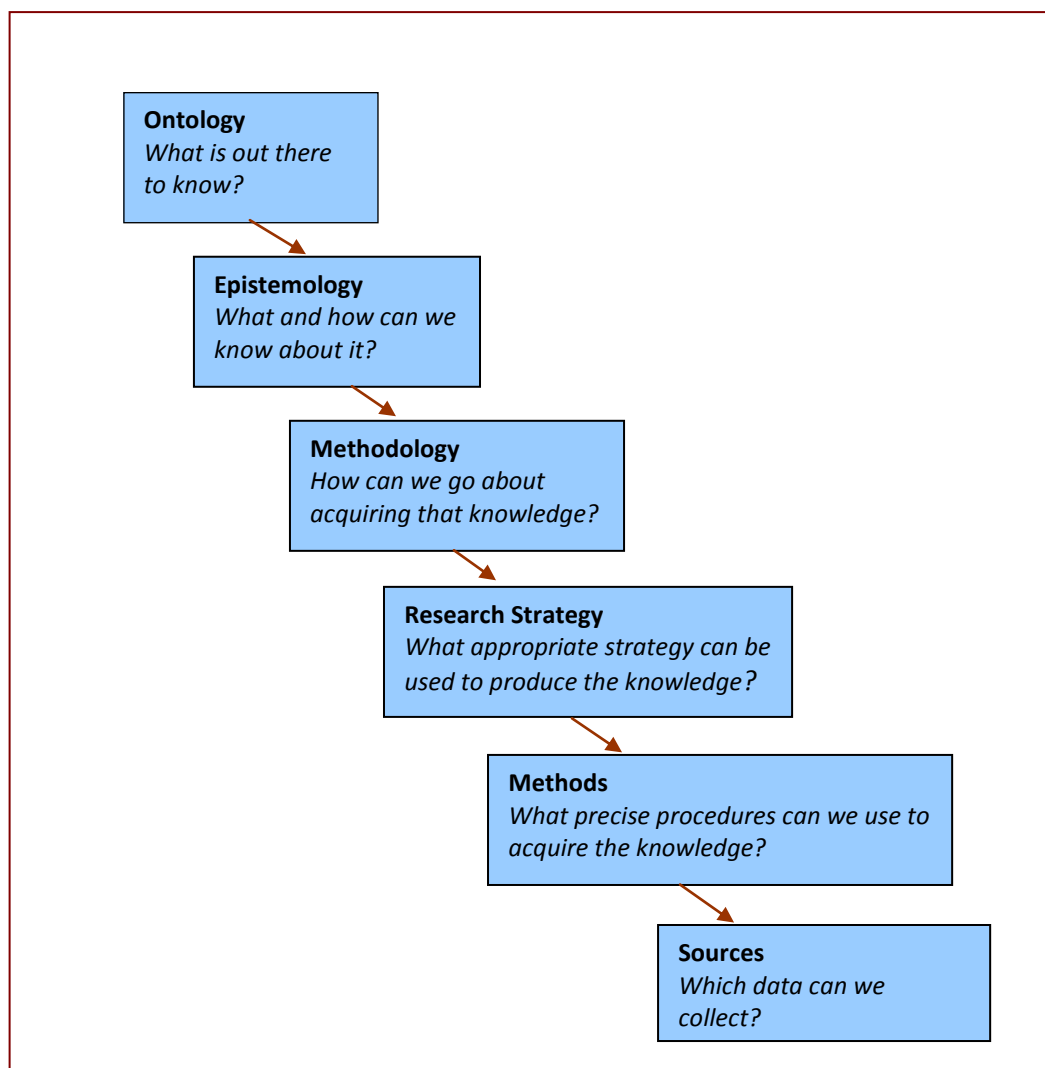


Figure 2.1: The relationship between the building blocks of research

### 2.5.1 Quantitative Versus Qualitative Research Paradigms

Research can be broadly categorised as quantitative and qualitative paradigms. The paradigms can be applied independently or in conjunction. However, their application is largely determined by the research questions (Strauss and Corbin, 1998; Kuhn, 1970; Patton, 1990). The differences between the paradigms are presented below.

Generally, in quantitative research, the settings are controlled or manipulated by the researcher. Quantitative researchers use statistical processes in their research design, data collection and analysis such as random sampling and replication of treatments and numerical data to quantify their findings of the research. The results are representative of a sample

population. They tend to be deductive, in which hypotheses are tested for acceptance or rejection (Hatch, 2002:7; Pickard and Dixon, 2004:4).

On the other hand, the qualitative research paradigm is used to elucidate an understanding of a phenomenon from the perspectives of the actors within their own natural setting. Qualitative research is not designed to test hypotheses. Rather, it is exploratory and naturalistic, and aims to construct and interpret real life situations and issues of concern to society. It gives the researcher the opportunity to collect and examine narrative accounts of social reality (Patton, 1990:150).

### **2.5.2 Choice of Qualitative Research Paradigm**

The choice and design one uses in research links to and impacts on the kinds of knowledge that the research produces. Underpinned by the constructionist and interpretive positions brought into this study, the concern was to elucidate the dynamics of experiences in the people's livelihoods in their natural settings on Lihir. The experiences include the organisational and institutional functions and interactions between individuals and how they influence livelihoods on Lihir. The actors within the phenomenon being studied and the researcher together construct a picture of the activities and experiences in their natural setting from the actors' view points.

A total of six months was spent on Lihir interacting with people in their natural setting. The naturalistic and constructivist methods were used to construct and interpret real life experiences of the people's livelihood systems. According to Lincoln and Guba (1985:199), the ontological position in qualitative research is that reality constructions cannot be separated from the situation in which they are experienced so that observations are contextual. As this research is qualitative, the data collected was analysed inductively (see Section 2.5.5). Patterns and their relationships were discovered to form categories, moving from specific to general patterns of understanding (Glaser and Strauss, 1967; Patton, 2002). Thus, the view is that knowledge about Lihir livelihoods does not consist of absolute truths, but of assumptions which may be temporary. Therefore, the quantitative research paradigm was considered to be of limited value in this study.

### **2.5.3 Research Strategy and Methods**

The purpose of this section is to explain why case study is a viable research strategy used in a study. The research methods used in the study are also discussed as part of the research strategy. The choice of methods used in research is guided by the research question and the ensuing research methodology.

#### **2.5.3.1 Case study as a research strategy**

Case study has been used within both the positivist and constructivist interpretive philosophical traditions (Yin, 2003). In this study, the case as a research strategy is underpinned by the interpretive tradition based on an ontology in which reality is subjective; a social product constructed and interpreted by humans as actors in their real-life context. The thrust is to understand the phenomena through accessing the meanings that the actors assign to them. Thus, it is used when the research centres on answering a ‘how’ or ‘why’ question about contemporary real-life issues in their natural settings (Yin, 2003:5). Case study as a research strategy also satisfies the three creeds of the qualitative research paradigm, which are describing, understanding, and explaining. Thus, this study draws on the people’s experiences in their natural context on Lihir in order to understand the dynamics and evolving facets of their livelihoods. The study did not aim to test theories, but instead constructed an understanding of livelihoods on Lihir (Chapters 3 to 6). The understanding provided some basis for generalisation (Chapter 7) that can be viewed in areas where major natural resource extractions are regarded as major interventions into livelihood systems. As suggested by Strauss and Corbin (1990), results from case studies provide not only the real-life context of the studied phenomenon, but can also offer suggestions and framework for future decisions. To this end, the final reason why case study was selected as a research strategy is depicted in the definition by Yin (2003:13) ‘a case study as an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident’.

Case studies can be either single or multiple in design, depending on the focus of the research question. Multiple case designs are normally applied in theoretical replication and cross-case comparison. In reality, there appear to be overlaps in these dimensions in their design and application (Yin, 2003:5). This study is viewed as a single case study with multiple embedded units of analysis. The units of analysis were sampled from three villages, government agencies, and other institutions as presented below (Section 2.5.3.2). Having multiple

embedded units of analysis provided sufficient breadth and depth to provide rich description and understanding about livelihoods on Lihir. Moreover, it made it possible to triangulate information as they are collected and to capture the diversity and dynamics of the studied phenomena. However, Yin notes that having several units of analysis pose the risk of diverting attention from the holistic aspect of the case study to the particularities of the units of analysis. This pitfall was avoided by constantly cross-checking the collected data with the research questions to ensure that they were adequately answered.

### ***2.5.3.2 Entering the case study site and sampling of the units of analysis***

The field study for this research was executed in two phases: from September to November 2007, and from September to November 2008. The first phase was the most important as it was the author's first time on the Lihir Islands, and it therefore entailed building rapport and trust with the key informants. The initial entry into Lihir was facilitated through IATP (alluded to in Chapter 1), which established itself on the Island in 2006 on the invitation of the NRLLG to train villagers in crop and animal husbandry and business management. However, the entry would have been more difficult without the assistance of a final year student from the University of Vudal who also travelled to Lihir on a six-month field attachment with the Division of Primary Industry. During the first phase the author went through a honeymoon period, a term used in the acculturation process. According to Pederson (1995), the honeymoon stage entails people going through the process of settling into a new culture. As such, entering Lihir for the author was a first experience and from the outset it was fascinating, exciting, adventurous and full of optimism. During the first few weeks in the case study village, it became apparent that the author was a stranger and the people were wondering what on earth he was doing in their village. In that regard, this was a very important stage in the execution of the field work, as it entailed building rapport with key informants, observing, learning and appreciating what was going on in the case study village and on the whole Island. The host brought the author along to a village meeting in the second week of his stay where he had the opportunity to meet the village councillor, a few clan leaders, and members of the Village Planning Committee (VPC). In addition, he was introduced to the whole village by the Chair of the VPC and was asked to explain the reasons for his trip to Lihir and his stay in their village. The Chair of the VPC assured that his people were ready and willing to assist in the study. Prior to that meeting, the author had attended a village mortuary feast, a Sunday service, had gone on a fishing trip with a few local boys, and had spent some times chatting with men and boys in their men's houses. He was also introduced to the public servants and the President of the NRLLG by the Coordinator of IATP on Lihir. On a few occasions, he was

invited to join them in their social gatherings. The author's participation in these activities, together with his observations, helped him to learn a great deal about the village and the Lihir Islands on the whole. Likewise, the people began to appreciate who he was and his intentions as a researcher.

No interviews were conducted during the honeymoon stage basically for the reason that no trust and rapport had been established between the author and the people; the sources of his primary data. The honeymoon period took about one month. Taylor and Bogden (1975:75) caution that researchers face the chances of going native, and could fully join the culture in the research setting. If this happens, it is highly likely the researcher will over-identify with those they are studying and lose their perspectives as researchers. It was important in this study for the author to get to know as many key informants as possible to establish where trust and rapport were established.

Having established trust and rapport with at least the key informants, the second stage was the sampling of interviewees. Sampling in qualitative research is not concerned with ensuring that the findings can be statistically generalised to the whole population, as in quantitative research. In this regard, the non-probability sampling method is normally applied. Therefore, in this study, the units of analysis were purposively sampled. In this method, researchers use their own judgement in the selection of units of analysis, and the laws of probability do not apply (Babbie, 1989; Singleton Jr et al. 1993; Patton, 2002). Villages, people, events, incidences were selected on the bases that they would provide and illuminate useful manifestations of livelihoods on Lihir. Based on these arguments, the Kunaie 1 and 2 villages and the Putput 1 and 2 villages were selected for the first phase of the study. Kunaie 1 and 2 put together is the biggest village on the Lihir Islands, with a population of 3,388 people (LSDP, undated). It is easily accessible by road, with proximity to the township, the mine site and the relocated villages of Kapit and Puput 1 and 2. On the other hand, Putput 1 and 2 villages were selected because they were relocated to make way for the establishment of the mining pits and processing facilities. In addition, all individuals from the Putput villages are receiving mining royalties and allowances. This is in contrast to the people of Kunaie 1 and 2 villages. According to an influential leader on the Island, these villages are referred to as 1 and 2 for census purposes, but they are commonly known on the Island as the Kunaie and Puput villages.

Units of analysis were sampled from the Matakues, Komat, and Samo villages during phase two of the study. These villages were selected based on their distance from Londolovit Township, the relocated villages, the mine site, their low to medium pressure population densities, and higher number of people working in the mine operation and related activities. Based on these factors, it was assumed that the livelihood activities and the issues affecting them could be different to the issues encountered in the biggest village of Kunaiye 1 and 2 and the relocated villages. Furthermore, units of analysis were drawn from the government agencies, politicians and other institutions. The institutions included the Business Development Unit of LGL, the Agriculture Department of LGL, LMALA, and the Lihir Grower's Association. A total of 66 respondents (inclusive of married couples) were interviewed.

Based on the above parameters, it was assumed that the primary data collected from these units of analysis would establish some initial findings about livelihoods on Lihir which could be subjected to further investigation. Yin (2003) cautions that any generalisations should be handled with care, as they might not depict the reality of the context of a case study. However, Blaxter et al. (2006:72) suggest that generalisation of results from case studies can be increased by strategic selection of cases. In this study, the generalisation was increased by taking a holistic approach in the selection of the units of analysis from a broad variety of roles and activities, and also from strategically located villages. According to Lofland and Lofland (1995:105), the term 'role' is a label that people use to organise their own activities and one that they apply to others as a way of making sense of their activities. These include leaders, youths, husbands and wives, councillors, church workers, the employed and unemployed, businessmen and women, migrants, people receiving mining royalties and allowances, and ordinary village men and women. 'Ordinary men and women' in the context of this study refers to villagers who do not play any particular role as leaders in their villages, are not employed in the mining operation or related activities, do not own and operate a business, and do not receive mining royalties and allowances. The case does not only include the physical and natural environment of the village as such, but most importantly, it includes the people's broad roles, activities, actions and processes and their meanings, outcomes of their actions, worldviews, and life styles embedded in their livelihood system.



## **2.5.4 Primary Data Collections**

Primary data collection methods derive from the methodology in the research design. Thus, this study's constructionist interpretation of livelihoods required qualitative methods to obtain the real life experiences in the Lihir context. In phase one primary data collection was done in Kunaie 1 & 2 villages, and Putput 1 & 2 villages. While in phase two data was collected from Matakues, Komat and Samo villages, including the employed Lihirians, business people, politicians and personals from government agencies. This section presents the type of interviews and observations which ideally suit the overall aim of the study.

### **2.5.4.1 Interviews**

According to Chase (2005:642), an interview is a conversation, the art of asking questions and listening. It produces situated understandings which are grounded in specific experiences. Hatch (2002) explains that qualitative researchers use interviews to uncover the meanings behind the participant's actions and experiences. Indeed, as stated by Fontana and Frey (2005:698), the focus of the interview in qualitative studies is to encompass the *hows* of people's lives (the constructive work involved in producing order in everyday life) as well as the *whats* (the activities of everyday life). In essence, the most common method of generating data in qualitative study is through interviews, because the ontological position of the qualitative researcher suggests that people's views, understandings, interpretations, lived experiences and interactions are meaningful properties of the social reality which one's research questions are designed to explore. Secondly, the qualitative researcher's epistemological position suggests that a legitimate way to generate data on these ontological properties is to interact with people, to talk to them, to listen to them and to gain access to their accounts and articulations (Mason, 1996:39). Interviews also revealed the things researchers cannot directly observe. Central in Patton's argument is that researchers cannot observe thoughts, intentions, and behaviours that happened at some previous point in time. Researchers have to ask questions in order to elicit these things from the interviewees (Patton, 2002:340).

### **2.5.4.2 Interview Methods**

There are various methods of interviewing: structured interviews, unstructured interviews, open-ended interviews, active interviews, and semi-structured interviews (Liamputtong and Ezzy, 2005:56). Literature suggests that structured interviews are more suited to survey research methods at one end, and unstructured interviews at the other end. Semi-structured

interviews sit somewhere between fixed questions and forced responses surveys, and open-ended and exploratory unstructured interviews which have no fixed interview schedule (Minichiello et al., 1990:88).

Unstructured interviewing can provide greater breadth and depth than other types, given its qualitative nature. This is because it is flexible in approach and the content of the interview is shaped by what the respondents tell the researcher. It is more like a deliberate conversation than a questionnaire (Fontana and Frey, 2005:705; Davidson and Tolich, 2003:136). Semi-structured interviewing, on the other hand, involves having some defined questions, themes or prompts in mind (or written down) when going into the interview situation, but modifying the interview agenda as it progresses to take account of things that are said. Both types of interviews can be seen as purposeful conversations. They can be the most appropriate forms of interview early in a study in order to sort out the key issues. As key issues emerge within the study, more interviews can be conducted (Minichello et al., 1990; Patton, 1980). Because most qualitative research is inductive, it is assumed that all relevant questions are not known prior to the research. It makes use of the assumptions of grounded theory that attempt to build up understandings of general patterns and important issues through the process of interviewing (Minichiello, et al., 1990).

Nevertheless, in-depth interviewing is a conversation with a specific purpose between a researcher and an informant, focussing on the informant's perception of self, life and experiences in their own words. It is the means by which the researcher gains access to live experiences of the informant (Minichello et al., 1990:870) In-depth interviews in qualitative research emphasises that meanings are continually constructed and reconstructed in an interaction between the researcher and the interviewee (Fontana and Frey, 2005).

The primary method of interview used in this study was the unstructured method as it provided greater breadth and depth, given the qualitative nature of the study. In addition, it is flexible and the content of the interview is shaped by what the respondents say. According to Fontana & Frey (2005:75) unstructured interview is like a deliberate conversation rather than a questionnaire type answer process. However, in ten cases the semi-structured type interview was employed in order to pursue particular issues that were unclear, which had stemmed from either the unstructured interviews or observations.

Interviews in this study always began with shaking of hands, introduction of names, and appreciation of the interviewee's settings. This was followed by a loose question about their environment, the weather, and other general issues to put people at ease and in a relaxed mode. In most interviews in the villages, interviewees offered betel nuts as a way of welcoming the author to their homes. Chewing of betel nuts adds to the interview atmosphere, putting the researcher at ease, to start the interview.

In the villages, the most common question used in starting interviews with ordinary village men or women was, "*What did you do yesterday?*" This was followed by the *why* question. For a leader of a social group, the common leading question was, "*What is the purpose of your group?*" or "*Why did you form the group?*" For a businessman or woman, "*What is the biggest challenge in doing business on Lihir?*" In using unstructured interviews, it is very easy to go out of focus. However, it is important to keep the line of questions in pursuit of issues. It is also important to follow with *why* and *how* questions to *yes* or *no* answers. Most of the interviews were done in *Tok Pisin*, the local common language. However, there were a few cases where the interviewees were able to fluently express themselves in English.

There were cases that the real identity of the interviewees, in terms of their primary roles and livelihood activities, were not revealed until towards the end of interviews. In a few cases, their primary livelihood activities and their identities were revealed through the process of triangulation. For example, an interviewee who was sampled as an ordinary villager was in fact a small village businessman, as he was involved in selling petrol and kerosene in his village. This was his prime livelihood activity; he is single and did not have a yam garden. In other cases, further probing uncovered multiple income strategies, especially amongst women interviewees.

Most respondents were probed for their life history, household activities and consumptions, major events, and shocks, responses, challenges, reactions to their contemporary lives, and how they foresee their future. There were cases where the husband and wife were interviewed together. No attempt was made to separate the couple, bearing in mind that the data given could easily be influenced by the presence of the other. Contrary to the notion that women are shy and not outspoken in the Melanesian culture, a few wives dominated the interviews in the presence of their husbands. Most interviews ended with questions such as, '*What would be the nature of your situation in the future?*'. '*How would you manage it?*' These questions were

constructed during the field work and, at times, inevitably popped up during the interview process. There were cases where the semi-structured interview method became handy, especially in zeroing in on specific issues that needed clarification. In this case, the questions were prepared with prompts before conducting the interviews.

#### **2.5.4.3 Observation**

Observation is the fundamental base of all research methods in the social and behavioural sciences (Adler and Adler, 1994:389) and is the mainstay of ethnographic research (Werner and Schoepfle, 1987:257). Even studies that rely mainly on interviewing as a data collection technique employ observational methods to note body language that lends meanings to the words of the interviewees. For qualitative observation to be meaningful, it has to occur in the natural context of occurrence among the actors who would naturally be participating in the interaction, and follows the natural systems of the everyday life. Observers carefully observe in an effort to acquire participant's knowledge about what they do and the meaning of what they do within their natural setting (Patton, 1990:202; Angrosino, 2005:729). Based on these views and assumptions, and besides the unstructured and semi-structured interview techniques, observation was also an integral part of this study. Observation involved recording what the author sees in the physical environment during the interviews including the physical activities that people are involved in. Information obtained from observation led to formulating prompts for semi-structured interviews; thus, an effective way of triangulating observations. In some instances in this study, these observations had kick started conversations with interviewees, and inescapably led to active interactions. For example, physical structures such as permanent houses, a well-maintained road, power lines and reticulated water supplies indicated a generally high standard of living in villages near the Township and the mine site. On the other hand, leaking water taps and the bad state of some of the houses were indicative of different stories which were uncovered through in-depth interviews.

#### **2.5.5 Triangulation and Respondent Validation**

In this study, most of the interviewees were interviewed on a one-to-one basis. In order to minimise bias response, triangulation of data was done by cross-checking written field notes with other interviewees. Thus, it was important to have multiple embedded units of analysis in single case studies, as mentioned in Section 2.5.3.2. Triangulation of data was also effectively

done by employing the snowball sampling technique in the interview process. This was especially evident as the same or similar information was obtained from a chain of other interviewees. However, at the same time, it was recognised in this study that snowballing resulted in early saturation of certain issues, whereas later information demonstrated that true saturation had not occurred. For example, it was reasonably evident from a number of interviews that a pathway for inheritance of land under the Lihir matrilineal land tenure system is by way of contributing pigs in mortuary feastings hosted by their clans. However, further interviews revealed another angle to the issue, as discussed in Chapter 3.

The need for triangulation arises from the ethical need to confirm the validity of the data which is effectively done through respondent validation, or comparing interviewee's perspectives (Patton, 2002:259). This researcher had the opportunity to validate the information with individual interviewees during both phases of the field trip. In most occasions, validation was done at the end of the interviews by going through the researcher's notes to ensure it reflected what the interviewees had said. In a few atypical cases, few chairpersons of VPC on the islands who were interviewed requested written summaries of interviews conducted in their village. Apparently, they used the summaries as a basis for discussing certain issues in their villages. One of them said, *'The information you gave me was useful as it showed issues which we did not know. The suggestion by some interviewees to look into the possibility of buying run-down plantations to resettle some of our people on the main island of New Ireland was a good one, as it generated a lot of discussion in our VPC meeting. We have decided to seriously look into the matter to find out if it will be possible. We have the money, but we have to find out if the owners of these plantations will be willing to sell them to us'*.

### **2.5.6 Data Analysis Using Elements of Grounded Theory**

One of the first steps in qualitative data analysis is identification of units of analysis which, in reality, is part of the research design. Once the unit of analysis has been identified, the researcher begins to ask questions about them as they appear in the data. Through this process, units of analysis are refined with further analysis later in the study (Liamputtong and Ezzy, 2005:259). According to Lofland and Lofland (1995, a number of data analysis techniques are available to qualitative researchers. These are content analysis, discourse analysis, semiotic, narrative and grounded theory, all of which require identification of units

of analysis. In this study elements of grounded theory procedures (theoretical sampling and coding) derived by Glaser and Strauss (1967) was used in the analysis of the primary data. Grounded theory was initially developed by two sociologists, Glaser and Straus, while studying experiences of chronically ill and dying patients. The discovery of the theory led to the publication of their seminal text, 'The Discovery of Grounded Theory'. The method is labelled '*grounded theory*' to reflect the source of the developed theory, which is ultimately grounded in the *emic* experiences of the actors in the situation being studied. The researcher's task is to understand the reality of the research situation with minimal *etic* assumptions. To this end, the rationale of grounded theory studies is to investigate phenomena to build theories rather than test them, as opposed to deductive research (Glaser and Strauss, 1967). These arguments complemented the significant development of qualitative analysis during the 1960s (Goulding, 1999). Further, grounded theory was developed when applied ethnographic research was becoming distant from interacting with people (Charmaz, 1994:71).

The analysis involved two processes. Firstly, the data was continuously reflected upon through reading and re-reading of the written interviews during the field work with these questions in mind: (a) What is this data? (b) What are the interviewees saying? (c) What is the situation here? and (d) How is this person managing this situation? Answers to these questions were treated as reflections, which were written at the end of the field notes for each interview. Similarly, this would be referred to as 'memoing' in the language of grounded theory. In simplicity, memos of this author's were more about the categories of the themes coded, their relationships, and the author's reactions about the interviews. The reflection process also drew attention to the interpretation of the primary data, where meaning of the empirical data was drawn. As suggested by Taylor and Bogdan (1998) in qualitative research, data collection and analysis go hand in hand throughout the study to look for emerging themes.

The second process was the tentative coding of themes. These were written on the margins of the notebook as they were identified. These processes facilitated theoretical sampling, which involves continuous comparison of data collected from the interviews and from the observations. These processes led to focus on obvious informants in search of further properties and categories of the emerging themes. As Simmons (1994:28) suggests, the process of theoretical sampling is an evolving analysis of data throughout the research process. Similarly, Glaser and Strauss (1967:62) emphasised that this is one of the qualities of

grounded theory, as the identification of themes and concepts in the data from obvious individuals, situations, incidents and places during the data gathering process eventually leads to theory development. Theoretical sampling and interviews reach saturation when no new information regarding the theme is emerging. Charmaz (1994:69) points out that, in qualitative research, it is impossible to know in advance how many people will need to be interviewed before theoretical saturation is achieved.

Interviews from phase one of the field work were transcribed, followed by further tentative coding of themes. Relevant themes were extracted from the transcribed interviews and entered under each research questions according to three headings: (1) What do I know? (2) What do I partly know? and (3) What don't I know? Subsequently, answers to question three led to further theoretical sampling in phase two to fill in the gaps. The aggregated texts from the transcribed interviews, field observations, and the memos in both phases of the field work were read from beginning to end as a whole. This process was repeated several times with two aims in mind: to confirm the tentative themes, and to interpret the texts. The meanings of the texts were written on the margins of the transcribed texts. Sometimes the themes were contained within the text, again these were coded. Constant comparison between data was done to validate, verify and refine emerging themes. Subsequently, the core themes were finalised as: the Lihir traditional livelihood system (Chapter 3), the historical interventions on the Lihir traditional livelihood system (Chapter 4), livelihoods in transition, resulting from the gold mine operation (Chapter 5), and the impact of the gold mine operation on the village livelihoods (Chapter 6). Primary data pertaining to these themes was extracted as coded and incorporated with the relevant secondary data to complete a whole story. Treating data in this manner strengthens the narrative nature of the thesis.

There are differing views perceived by researchers about grounded theory that one needs to take note of in applying it. These differing views have stemmed from distinct approaches to practicing grounded theory associated with the original authors Glaser and Strauss, who have had diverging opinions over the years. The central differences between Glaser's and Strauss's versions of grounded theory seem to hinge on the epistemological and methodological differences between their approaches. Glaser was more committed to grounded theory as a qualitative paradigm that is flexible and guided by informants in their natural settings. On the other hand, Strauss placed more emphasis on replicability, significance and verification that may lend more to the quantitative paradigm (Babchuk, 1996). Boneliel's (1996) analysis of

some grounded theory research published between 1980 and 1994 indicates that researchers had described grounded theory as grounded theory approach, grounded methods and grounded theory research; thus some studies were a divergence from the original method. Glaser (1998) described grounded theory as both a methodology and a method. To that end, for this study, the author also used grounded theory as a method, thus, applying theoretical sampling and coding. The other compelling reason is that the author had a question prior to conducting the research. This is in contrast to Glaser's stand that researchers should commence with what he calls a "general wonderment" – that is, a researcher does not commence his or research with explicit research questions, but allows the data collected to derive the description of the situation towards theory building. The other argument is that researchers should not read literature prior to field work to prevent them from having preconceived ideas regarding the key issues about the case study (Glaser, 1992:22). However, lack of precision in the research aims, objectives and questions is a good ingredient for considerable difficulties for research ethics committees in institutions. Furthermore, from the outset, it would be impossible to make a justifiable case for securing funds for research. In this study, relevant literature on sustainable livelihoods, including secondary data on mining on Lihir, was read prior to conducting the study. This was essential towards formulaing the research proposal. After the first phase of the field trip, the author had access to two PhD theses (Bainton, 2006 and Hemer, 2001), a masters thesis (Baput, 2003), and a paper by Awart (1996), that were focused on Lihir.

## **2.6 The Sustainable Livelihood Framework and its Emergence**

The 'sustainable livelihoods' concept first came to prominence in the report by an advisory panel of the World Commission on Environment and Development (WCED) in 1987. The concept was published in the publication, *Food 2000*. The report highlighted sustainable livelihoods as an integrating concept vital to food security and environmental degradation. The report also linked sustainable livelihood security to basic human needs, food security, sustainable agricultural practices and poverty. In its definition of a livelihood, the WCED panel referred it to access to resources, income earning strategies, assets and reserves to offset risk, minimise shocks and meet contingences. In addition, the panel defined sustainability in terms of the maintenance and the long-term enhancement of resource productivity, and the diversity of strategies in which a household could attain sustainable livelihood (WCED,



1987a: 3-4). To that end, the Bruntland Report formally heralded a shift in the Western paradigm, through identifying the need for development that meets the needs of the present without compromising the ability of future generations to meet their needs (WCED, 1987b:43). The report argued that the main challenge for development was to meet the basic need for a livelihood. In particular, it highlighted the important natural resource-based livelihoods and acknowledged the diverse livelihood systems in developing countries, which often operate outside of the mainstream economy.

Based on the sustainable livelihoods concepts developed by WCED (1987a; 1987b), Chambers and Conway (1992:3) disputed 'conventional' ways of perceiving production, employment and poverty, especially in viewing lack of food as a function of production, as lack of food is more a function of 'entitlement'. Chambers and Conway argue that viewing people's access and rights to food is central in the livelihood concept. This argument stems from Sen's (1981) notion of lack of food, which is influenced by poor functionings of societies and economies, leads to lack of entitlements for households and individuals. These lines of thinking led to a shift towards understanding people in their context; placing them at the centre of development. As Freire (1986) indicates, people were no longer the objects of development, but should be encouraged to state their reality through articulating their personal circumstances and resources, opportunities and constraints inherent within that reality. Similarly, Chambers (1992) argued that the aim is to embrace local knowledge in development; shifting the focus from 'top down' to 'bottom up' planning. The shift towards placing people at the centre of development took place at a time when the focus on environmental sustainability was a key goal of development (Overton, 1999:1). Chambers (1992:12) claims that people-centric approaches bring forth issues of equity, wellbeing and sustainability (environmental, social, economic and institutional). Overall, the development and expansion of these ideas led by Chambers and Conway's seminal publication on the subject: *Sustainable Rural Livelihoods: Practical Concepts for the 21<sup>st</sup> Century*.

Since the *Food 2000* report, concurrent discourses on poverty, sustainability, livelihood systems and diversity, and a focus on participation and the reality of the poor has led to the formalisation of the sustainable livelihood approach. The approach has been adopted by a number of government, non-government and multilateral organisations – such as the Department for International Development (DFID), UK United Nations Development Programme (UNDP), OXFAM, CARE and FAO – as a basis for rural development research

and practice. The most common livelihoods framework is that developed by DFID (2000), as shown in Figure 2.2. The conceptual basis for the approaches adopted by these different agencies is broadly similar, and builds on the work of Chambers and Conway (1992).

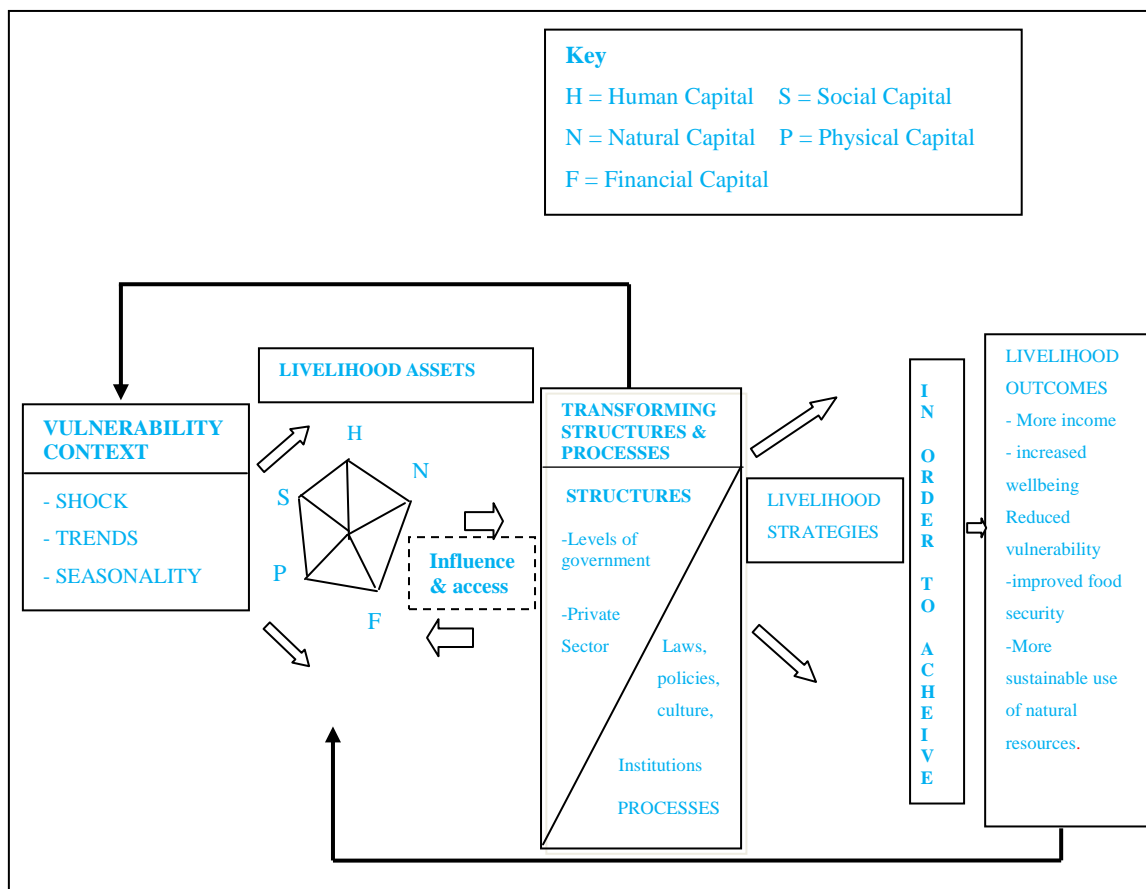


Figure 2.2: The Sustainable Livelihood Framework. Source: DFID (2000)

It is argued that any approach that fosters sustainable livelihoods could prove effective in understanding poverty in developing countries, especially in understanding how development interventions are designed, implemented and evaluated (Toner, 2003: 774). Recognising that poverty is dynamic and has many dimensions, DFID popularised the livelihoods concept and developed a Sustainable Livelihood Framework: a typology of assets which poor individuals, households and communities deploy to maintain wellbeing under changing conditions (Norton and Foster, 2001: 12).

At the centre of the framework are the assets on which households or individuals draw to construct their livelihoods. These assets are introduced here, as depicted on Figure 2.2, but are considered in greater detail later in the appropriate chapters. They are influenced by the

context, which refers to the sources of insecurity to which people and their assets are vulnerable. Access to and use of assets are influenced by policies, organisations or institutions and their relationships between people in their given context. The strategies, which individuals and households adopt, produce outcomes, which are defined in terms of greater or less wellbeing (DFID, 2000; Rakodi and Lloyd-Jones 2002).

The framework as depicted in Figure 2.2 is in schematic form and attempts to holistically simplify the diversity of livelihood systems. In its simplest form, the framework views people using their capabilities to access five types of assets or capital (Financial, Physical, Human, Natural and Social) in a context of vulnerability (Ashley and Carney, 1999; DFID, 2000). The terms “asset” and “capital” are interchangeable in the framework, except that the term capital emphasizes the concept of potential investment or depletion (Pretty, 1999). Individuals or groups may either own or have access to a unique set of assets, although patterns of ownership and accessibility may vary within a given context. The interaction of assets with limits and opportunities afforded by particular sets of policies, institutions and practices is expressed as livelihoods strategies and, in turn, lead to livelihood outcomes. Carney (1998:7) suggests that the framework as a tool that can serve the following purposes: (a) to identify the scope of and provide analytical basis for livelihoods analysis by identifying the main factors affecting livelihoods and relationships between them, (b) to help those concerned with supporting livelihoods of the poor to understand and manage their complexity, and (c) to provide a basis for identifying appropriate objectives and interventions to support livelihoods.

### **2.6.1 Definitions**

Livelihood is simply defined as a ‘means of living’ (DFID, 2002). However, a more elaborate definition that is commonly used in development discourse is the one by Chambers and Conway (1992:8):

*‘A livelihood comprises the capabilities, assets (stores, resources, claims and access) and activities required for a means of living: a livelihood is sustainable which can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, provide sustainable livelihood opportunities for the next generation; and which contributes net benefits to other livelihoods at the local and global levels in the long and short term.*

The above definition forms the foundations of the many other conceptualisations of livelihoods. It is applied as a guide in the context of this study, as it contains three livelihood concepts: (1) equity, (2) capability, and (3) sustainability. These concepts are the fundamental means and ends of sustainable livelihoods.

Equity is the fair distribution of assets, access and provision of adequate and decent livelihoods for all (Chambers and Conway, 1992). The subject of equity, which has become a household term in light of the mining operation on the Lihir Islands, is discussed in Chapter 5. Capability refers to what people can or cannot do and can or cannot be. The various living conditions people can or cannot achieve are their 'functioning' and their ability to achieve them, are their 'capabilities'. This includes being able to cope with stress and shocks, and being able to find and make use of livelihood opportunities. The focus is on what people are able to do, rather than on what they could buy with their income (Sen, 1985). Sen (1997) argues that there is a relationship between human capital in the generic sense and human capability. This relationship is expounded in Chapter 6.

Ellis (2000:10), in his version of the definition of capability, emphasises access to assets and livelihood strategies that are influenced by social relations and institutions, rather than on capabilities and sustainability. The author of this study argues that a clear understanding of the people's 'functioning' and 'capabilities' in any livelihood system could define an entry point of intervention towards enhancing their livelihoods. For example, the failure of many business entities initiated and established by Lihirians during the construction phase of the mine is an indication of lack of business management skills. From the outset, this could have been an important entry point of intervention before the commencement of the mining operation to equip individuals aspiring to run businesses. In another angle, it is interesting to note that the mining operation has contributed to stratification of households on the Lihir Islands. Chapter 6 documents the author's argument that stratification in the Lihir context is a direct result of their ability to achieve their 'functioning'. Figure 6.4 in Chapter 6 explains the endowment of livelihood assets being transformed to livelihood capabilities and functionings, which eventually produce livelihood outcomes.

With regards to sustainability, Chambers and Conway (1992:8) argue that it is an important concept of livelihood because it should provide opportunities for the next generation and net benefit for others. DFID/FAO (2002) advances the argument by suggesting that in

development the concept has many dimensions, all of which are important to the sustainable livelihoods approach. These dimensions are resilient in the face of external shocks and stresses, not dependent upon external support (or if they are, this support itself should be economically and institutionally sustainable), maintain the long-term productivity of natural resources; and do not undermine the livelihoods of, or compromise the livelihood options open to others. Sustainability in the context of this study is considered in five different perspectives: (1) maintenance of the physical infrastructure; (2) financially, without the mining operation; (3) institutionally, through the integration of the introduced institutions either in part or in whole with the existing ones; (4) socially, to minimise loss of cultural values; and (5) environmentally, to ensure sustainable use of natural resources. These perceptions are touched on in Chapters 3 to 6, with emphasis in Chapter 7.

### **2.6.2 Application of the Sustainable Livelihoods Approach**

Development practitioners and researchers have applied the framework as an approach in research, program and project formulation, monitoring and evaluation, policy analysis, and as a theoretical concept on which inquiry and analysis can be based (Scoones, 1998; DFID/FAO, 2002; Ashley and Carney, 1999; Ellis, 2000; Ashley and Hussein, 2000). According to DFID/FAO (2002), objectives of sustainable livelihood would normally focus on generating more income, increasing the wellbeing, reducing vulnerability to risks, improving food security, and sustaining the natural resources. The livelihoods approach constitutes core principles, which explain why they make such an important contribution to the overall value of the approach (Farrington et al., 1999). Apart from being driven as people-centric, the approach is potentially participatory, in that it can fully involve people, not only in the analysis of their situation, but in their determination to control their future livelihoods. It is by starting with priorities of the poor and enabling them to gain the livelihoods they want and need, that both they and sustainable development can be best served (Chambers, 1987; Chambers and Conway, 1992; Ashley and Carney, 1999). The approach is also holistic, which means it has the potential to holistically perceive livelihoods through cross-sectoral synergies (Tonner and Franks, 2006). Furthermore, the approach is seen by many development practitioners as dynamic. This is based on the assumption that the poor move in and out of poverty as they respond to the opportunities, shocks and stresses – social, economic and environmental – which they experience (Chambers, 1995). As such, the poor behave as strategic managers in negotiating their livelihoods outcomes, by selecting from a range of

options available within particular dynamic localities and context (Carney, 1998; DFID, 2002; Ellis, 2000).

With regards to this study, the core principles of the approach are congruent with the qualitative and phenomenological nature of the study. To that end, the approach was chosen as a research lens to (a) guide and give purpose to this study, (b) focus and define the boundaries of the study, (c) be used as a checklist for issues in pursuit of answers to the research questions, and (d) act as a conceptual map for linking important issues. For example, it identified that apart from the wages earned by the employees of the mining operation, *buai* (betel nut, which was a subsistence crop) has become a major source of income (Chapter 6) for most families in villages outside the mining area on the Lihir Islands. However, it is important to note that in the long term, the sustainability of the *buai* industry depends on the mining operation, as most of the customers are wage earners. In addition, *buai* is a seasonal crop that could cause a major shortfall in the income of the families, which largely depend on it for their income. This links with the need for diversification of sources of income into non-mining activities (Chapter 6). Another example discussed in Chapter 3 is that the availability of cash deriving from the mining operation has escalated the magnitude of feasting, therefore enhancing social capital. According to Cahn (2006: 243), the sustainable livelihood framework works well for the analysis of existing livelihoods, but sometimes it is difficult to use the framework to address opportunities for the future. However, since this study is conducted in a non-renewable resource extraction context, it is quite obvious to see into at least some aspects of the future, as the people's livelihoods are largely dependent on the mining operation. Thus, planning (Chapter 7) towards sustaining and enhancing livelihoods on Lihir becomes paramount before the mine ceases operation. Overall, the traditional livelihood system (Chapter 3) has been transformed into a cash-based system, where the mining operation is dramatically altering rural livelihood resources (Chapters 5 and 6). This is particularly compelling in all villages in proximity to the mine site and Londolovit Town, as transformation of livelihoods in these villages has been accelerated by mining royalties and allowances. However, the ripple effects of the mining operation are also evident in other villages that are located quite far from the mine site and Londolovit Town (Chapter 6).

At large, the sustainable livelihood approach focuses on environmental, social, economical and political sustainability and the wellbeing of people within their livelihood systems. In this regard, wellbeing has to be perceived as more than just economic wellbeing. Issues such as

health, freedom from oppression, equity and empowerment all have to be considered. These are discussed in Chapter 7. Cahn (2006) has identified culture as a key component of a livelihood system, as it contributes to the people's overall wellbeing. Culture and livelihoods in the Lihir context is discussed in Chapter 3. Spirituality and religious values in relation to wellbeing are an important part of the livelihood system on Lihir; this is mentioned in Chapter 4.

## **2.7 Sustainable Development**

The concept of sustainable development was given prominence in *Our Common Future*, commonly known as the Brundtland Report (WCED, 1987b). It is defined in page 43 of the report as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” The World Commission on Environment and Development believes that people can build a future that is more prosperous, more just, and more secure. Their report is not a prediction of ever increasing environmental decay, poverty and hardship in an ever more polluted world among ever decreasing resources. The report sees instead the possibility for a new era of economic growth, one that is based on sound policies that would sustain and expand the environmental resource base. The report believes such growth to be absolutely essential to lessen the great poverty that is deepening in much of the developing world (WCED, 1987b). In the case of mining, one of the greatest challenges is integrating economic activity with environmental integrity, social concerns, and effective governance. The goal of that integration can be seen as sustainable development. Therefore, the aim is to maximise the contribution to the well-being of the current generation in a way that ensures an equitable distribution of costs and benefits, without reducing the potential for future generations to meet their own needs (IIED and WBCSD, 2002).

Overall, the framework of what the concept of sustainable development means and how to put it into practice still has some murky areas, but it is becoming increasingly rational. According to IIED and WBCSD (2000:51), although the above definition has received broad support, it has multiple layers of meaning and some profound implications. On the other hand, it allows flexibility and can be applied to development of many activities. There is no single goal or path for getting there; sustainable development presents more a framework for change than a list of prescriptions to achieve it. In this sense, it is as hard to define as other ideas that guide society, such as democracy, justice or freedom of speech. The above definition can easily be

broken down into four conditions for sustainable development: (a) material needs for a better quality of life have to be fulfilled for the current generation; (b) as equitably as possible; (c) respecting the natural environment; and (d) building the basis on which future generations can meet their own needs.

A core principle of sustainable development is to improve human wellbeing and to sustain those improvements over time. The goal is for children to have as good a life as their parents did, or better. This requires passing the means of survival on to future generations unimpaired and building, or at least not diminishing, the total stock of capital assets. It also requires the integration of social, economic, environmental, good governance goals, and decision-making at both the micro and macro level. In essence, these are pressing sustainable issues in the context of this study.

## **2.8 Systems Thinking as a Complementary Theory**

Systems thinking have been described as a trans-disciplinary approach which emerged out of necessity to investigate and find solutions to management problems, especially in areas where human interactions are diverse and cluttered. The emergence of the approach led to the first publication on soft systems thinking by Peter Checkland in 1981. He is known as the creator of soft systems methodology, and developed the theory from some earlier thinking on the theory of systems as alternative to reductionism. Checkland's contribution was to expand the thinking beyond economics, biology and ecology to include the so called 'soft' or 'social' human perspectives, and thus make systems thinking more relevant to human and management issues in society. Therefore, Checkland (1981) makes sense of systems thinking from the viewpoint of countering the reductionism of natural sciences. It describes early experiences of trying to apply systems engineering outside the area for which it was developed. The rethinking of systems thinking, which early experience made necessary, sets out the first developed form of soft systems methodology as a seven-stage process of inquiry (outlined in page 163 of the book). The seven-stage process has now evolved into what is now known as the four-activity model. In reflecting on the learning and evolution of soft systems methodology, Checkland (2000) identified four key thoughts which dictated the overall shape of the development of the soft systems methodology and the direction it took.



Firstly, system thinkers and practitioners are moving away from thinking, in terms of real-world systems of improvement, to focusing on the fact that every action research undertaken is a human situation in which people are attempting to take purposeful action which is meaningful to them. This led to the idea of modelling purposeful human activity systems as sets of linked activities, which together could show the emergent property of purposefulness.

The second thought is that system thinkers could only model *purposeful activity* in relation to declared world views. In the process of exploring human activities there is bound to be multiple interpretations of purposeful models of activities. As a result, Checkland asserts that there could be a large number of human activity models which one could build to depict the declared world views. The selection of the most relevant and insightful ones will depend on the viewpoint from which the model is built, the world view upon which it is based.

The third thought is that there is a shift away from working with the idea of an obvious problem that required solution to developing models as a way to tackling problem situations. The models are used as devices to structure debate about real-life situations. This process derives new knowledge and insights concerning the problem situations, and leads to further ideas for relevant models. In principle, the learning process about real-life situations is an ongoing enquiry or learning process. What would bring it to an end, and lead to action being taken, was the development of an accommodation among people in the situation that a certain course of action was both desirable in terms of the analysis, and feasible for these people with particular history, relationships, culture and aspirations. The fourth thought is that the activity models are sets of activities which link together to show the purpose of a whole system.

Checkland argues that the seven-stage version, though still often used for initial teaching purposes, has a rather mechanistic flavour and can give the false impression that soft systems methodology is a prescriptive process which has to be followed systematically; hence its fall from favour. Nevertheless, the theory of perceiving situations in wholeness and as systems with connected and interrelated subsystems cannot be discarded. Systems are 'wholes' because their parts are connected in such ways that give rise to a sense of wholeness. Further, the underpinning ontological and epistemological belief in applying systems theory lies within the constructivist interpretative paradigm. As suggested by Patton (2002:41):

*The whole phenomenon under study is understood as a complex system that is more than the sum of its parts; focus on complex interdependencies and systems dynamics*

*that cannot meaningfully be reduced to a few discrete variables and linear, cause-effect relationships.*

These ideas give rise to perceiving livelihoods on Lihir from a systems perspective where the actors have different perspectives, and operate in dynamic and varied, but interconnected subsystems. This gives rise to the dynamics and complexity between the subsystems of the whole livelihood systems. Although the application of soft systems methodology has been largely on modeling ‘purposeful human activity’, underpinned by the action research paradigm, it is possible to apply the theory in other social science fields and traditions in which it could be considered legitimate and appropriate. To that end, the focus is not upon ‘action’, but upon understanding and learning, and contribution to knowledge. Often, that learning will be represented as theory generation, or theory testing (Rose, 1997). Therefore, from the systems perspective, the concern of this study is on enquiry – learning about the interaction and relationships between the various subsystems of the livelihood system on Lihir rather than action debate-change. Accordingly, Rose argues that the underlying assumption is the construction of relevant human systems, which in itself interprets meanings of human activity systems. In this regard, a relevant system is constructed based on the empirical data to show the livelihood system on Lihir prior to the mine operation (see Figure 3.10).

## **2.9 Dialectic, Reflexivity and Hermeneutics in Phenomenology**

The knowledge gathering process of this study began by reviewing relevant secondary data on Lihir and theoretical knowledge on the sustainable livelihoods framework and the inquiry framework. These relevant existing knowledge claims in the literature are treated as interpretations of phenomena that are subsequently being re-interpreted. This interpretive process is described as the double hermeneutic, which also underpins the unstructured and semi-structured interview techniques used in the collection of the primary data. During the course of interviews, an ongoing dialectic was established between the author and the interviewees on Lihir. This was necessary, in order to construct subjective meanings of their actions and experiences, and of the social structures and institutions which conditioned and enabled such meanings to be placed in their context. Thus, it was necessary to incorporate a sense of reflexivity into this dialectic process during the qualitative researching process and analysis of data. These processes are essential in phenomenological studies (Diesing, 1991;

Patton, 2002). Reflexivity is the process of reflecting upon lived experiences between the researcher and their subject. It entails the need to question research habits, modes of thinking, and prejudices. The researcher and their subject are inseparable. The influence of Diesing's concept of social science is situated within the heuristic approach that imposes a sense of reflexivity on the researcher. These factors are considered part of the research process, as they are products of previous inquiries and should be examined and bracketed (Lincoln and Guba, 1985; Hatch, 2002).

To a large extent, in phenomenological studies, the researcher's subjectivity comes into play, and therefore has to be acknowledged. In this regard, it must be appreciated that the researcher's awareness of the social issues and theoretical perspectives need to be examined. Diesing (1991:178-9) sums up the significance of a social researcher's social location and past experiences at each stage of the research process:

*Social scientists always locate themselves somewhere in society, and use their direct or vicarious experience in that location to guide their research. The experience, idealized as vision, suggests the social concerns, the phenomena and problems that should be studied, and the goals appropriate to those phenomena.*

To effectively implement this study, the researcher had to recognise the need to be reflexive and to detach himself from the ideas and experiences which have influenced the design of the research project. This is necessary to ensure that unexpected empirical data pointing towards explanations and theories are to be disregarded. Application of the theoretical frameworks (sustainable livelihood approach, grounded theory, and systems thinking) contributed to guiding the collection of primary data; especially the continuous reflections on the collected data ensured the data points towards answering the research questions.

In phenomenological studies, the hermeneutic theory argues that one can only interpret the meaning of real-life experiences as already present and waiting to be grasped from the viewpoint of the perspectives of the actors within the studied phenomena. When it is grasped and interpreted, it becomes a product of the dialectic process between the researcher and the subject. Through the dialectic, reflexive and hermeneutic processes the researcher's foreknowledge is revised, and their existing knowledge of the studied phenomena is integrated with new knowledge. In essence, this results in re-interpretation and re-integration of new knowledge to the researcher's foreknowledge. This process is known as the

hermeneutic circle. This helps researchers towards producing knowledge. Thus, researchers form an expectation about the unknown using what is already known (Diesing, 1991).

## **2.10 Research Ethics**

The collection of the empirical data on Lihir was conducted in accordance with ethical framework stipulated by the Lincoln University Human Ethics Committee. However, it must be noted from the outset that it was impossible to religiously abide by the Human Ethics Committee established procedures. For example, respondents became suspicious when asked to sign consent forms. In this regard, blanket consents were sought from their Ward Councillors. Even educated respondents who were approached on one-to-one basis to be interviewed queried why they had to sign consent forms when they were more than willing to be interviewed. One of them said it was insulting for them to sign the forms, and advised that it would be highly likely for illiterate villages to become suspicious being asked to sign the forms prior to interviews. Nevertheless, full anonymity to respondents was assured, with special care taken to present responses in a way that would not result in the interviewees becoming identifiable. However, a few clan leaders and senior villagers queried why their names should not appear in the thesis; they in fact would like to be identified in the thesis to show their future generation that they have participated in the study.

## **2.11 Conclusion**

This chapter has spelt out the research framework that underpinned this study. Through a critical engagement with the aims and objectives, the ontological, epistemological and methodological issues relating to the research process have been presented. The methodological issues specifically highlighted the case study as a research strategy underpinned by qualitative research paradigm. Primarily, the unstructured, semi-structured and observations qualitative data collection methods were effectively utilised in the study to collect empirical data from purposively sampled respondents in their natural settings on the Lihir Islands. The units of samples were not people as such, but their real-life experiences in terms of events, incidents, activities, roles and responsibilities. The theories of sustainable livelihoods and systems thinking applied as research lens in the study not only assist in

drawing a boundary around the research, but also provided purpose and meaning to the data collected. Further, the theories to a certain element can be regarded as expression of this author's personal worldview brought into this study. Analysis of the data was done continuously throughout the primary data collection through a process of reflection and theoretical sampling. This was followed initially by tentative coding and categorisation of data into core categories, which evolved into the thesis structure. According to the social constructionist ontology and epistemology embodied in this study, the social world is said to be multi-faceted and abstract. Therefore, empirical data derived from this study is not intended to falsify theories or a theory, but to produce new knowledge and build onto existing theories.

## Chapter 3: The Lihir Traditional Livelihood System

### 3.1 Introduction

Chapter 3 discusses the Lihir traditional livelihood system. The chapter begins with discussing the generic meaning of culture and tradition, and situates the meaning with the Lihir culture. This is followed by a discussion of the Lihir matrilineal clan system through which major decisions are made in the construction of household livelihoods. Existence of the matrilineal clan system is symbolised by men's houses (Figure 3.1) in the the Lihir villages. Gardening; the principal livelihood strategy of the Lihir traditional livelihood system is presented in Section 3.5. The cultural significance of pigs, yams (*Discorea alata*) and *mami* (*Discorea esculenta*), lesser type of yam, and *mis* (Lihir traditional currency) in the people's livelihoods is then discussed. The mortuary feasts and rituals perceived as livelihood strategies in the context of this thesis are discussed. Further, culture as a livelihood capital sustained through practicing the mortuary feasts and other rituals are the discussed, followed by social capital.

### 3.2 Culture and Tradition

#### 3.2.1 Culture

Lindstorm and White (1994:3) suggest that people should derive their own definitions of the term *culture* from within their local contexts, as it is often confused with the term *tradition*. In that regard, this section begins with a short discussion on the meaning of culture and tradition to position their meanings and application in the context of this study. According to Kavaliku (2000:23), culture comprises a wide range of spiritual, intellectual and emotional features that are characteristics for a societal group. On the other hand, Dodd (1998: 43), in his definition, places emphasis on the people's social identity, roles, relationships, cultural beliefs, values and norms of recognition. Crocombe (1972:21) uses the term *broad culture* as a *total way of life*, including ways of thinking, and the ways people behave and relate to each other. He also uses the term *narrow culture* to describe the ways in which people express themselves through dress, lifestyle, song, performance, visual art and language. Maiava (2001) argues

that these expressions contribute to people's worldviews, which define who and what they are, and signify how their culture differs from other cultures. Consequently, the expression of culture has a profound significance on how people feel about their culture, and also for the definitive meanings it gives to their lives.

### 3.2.2 Tradition

In defining tradition, Lindstorm and White (1994: 5) refer to it as the continuation of cultural aspects, or its history and the way it has operated over time. They suggest that traditions are handed down through generations. In that regard, the term *tradition* is applied in this study as the Lihirian beliefs and values that have existed for a long time and are passed down to the younger generation. This is what Archer (1988: 45) calls the process of enculturation, which he defines as: 'the process through which the older generation induces and compels the younger generation to reproduce the established lifestyle'. In Lihir, and also elsewhere throughout Melanesia, enculturation is done through story telling, observation and participation. It is also evident on Lihir that enculturation is done through a series of mortuary feasts and other rituals (see Section 3.6).

### 3.2.3 Lihir Culture and Tradition

Culture is an integral part of the Lihir traditional livelihood systems. Their cultural practices include songs, dance and performance, land tenure transfer, rituals, ceremonies, and inter- and intra-household relationships. The most significant strategy through which the people express these practices is through the various ceremonial mortuary feasts and rituals (see Section 3.6). Typically, the feasts are marked by dancing and festivities, where men, women and children participate in one way or another. This involvement of the community demonstrates the social importance of the ceremonial events, which are underpinned by ceremonial exchanges. As uttered by a clan leader, *prior to the arrival of the white man, our traditional lifestyle was based on gardening, raising pigs, and feasting. These activities are associated with our dead relatives. We have many different types of feasts to honour our dead people.* The mortuary feasts and other rituals are discussed below. Two common expressions are encountered on the Lihir Islands that identify Lihirians with their culture. The expressions, which emerged since the commencement of the mining operation, have evolved into a common discourse and rhetoric. They are expressed here in *Tok Pisin*. The first one is *pasin bilong Lihir* (the way Lihirians do things). Most people whom the author consulted revealed that this expression

signifies good forms of behaviour and ways of living that entail a peaceful lifestyle, communal sharing, giving and receiving, helping and respecting one another. Similarly, Bainton (2006) also suggests that the term *pasin* carries immediate connotations of appropriate Lihirian behaviour that includes activities associated with traditional ways of living. The second expression is *kastom em Lihir ia*, which means Lihirians are very much entrenched in their cultural and traditional ways of living. This expression is closely associated with the hosting of extravagant mortuary feasts. These feasts could cost thousands of kina (Section 3.6) to satge. The cultural value of these feasts is also magnified through a norm which has developed amongst most employed Lihirians who normally would take extended leave from their wage employment with the mining operation to fully participate in them.

### **3.3 Clan Lineage System**

The traditional social groups on Lihir are based on the matrilineal system where clan is the cultural ethnic entity consisting of individual kinships. This means that clan membership, or descent, is traced through the mother's side. Land rights and other property rights are primarily held within matrilineal descent groups (clans, sub clans) lineages. Therefore, inheritance, access and endowment of land and other properties is matriarchal.

A clan leader indicated that clans on Lihir are generally grouped under two moieties traditionally known in Tok Pisin as *bikpisin* and *smolpisin* ('big bird' and 'small bird'). 'Big bird' is identified with the eagle, while 'small bird' is identified with the fish hawk. These moieties are also commonly used in New Ireland Province and in the Tolai society in East New Britain Province. An interviewee pointed out that marriage within the moieties is taboo, but the author's experience in the Tolai society (in East New Britain), coupled with field data on Lihir, indicate that the taboo is no longer adhered to. Nevertheless, moieties are not the means by which land is accessed or whereby valuables or property are endowed; by and large, this is the role of the clan.

Most Lihirians, like in many Melanesian societies, insist that marriage within the clans and subclans remains relatively taboo. The existing major clans are *Tengawom*, *Unawos*, *Tinietalgo*, *Tinalian*, *Nielik* and *Nissal*. Each clan consists of several subclans. The existence



of clans in all the villages on Lihir is marked by their matrilineal men's houses (see Section 3.4). Although the clan lineage on Lihir is matrilineal, the clan leaders are always males. The clan leaders are responsible for identifying landmarks, sacred objects and sites linking the clan to land and reefs. They are selected for qualities such as ability to host feasts and to possess and distribute wealth (pigs, *mis*, and land and fruit trees). Clan leaders are tasked with instigating mass action, but only by establishing extensive and renowned special relations of compulsion or reciprocity with other clans. Further, clan leaders are knowledgeable in legends and traditional ways of life, and exhibit responsibility for the well being of their clan. They have true command ability within their clan, and they usually get what they want by haranguing their clan members (Sahlins, 2000).

Interviews with several clan leaders suggested that their influence in their community is enhanced through their ability to possess and distribute wealth, which inevitably establishes a wider network for them and their clan within and outside of their communities. As one of them stated; *In our culture one has to give in order to receive. A leader who extends his hand in giving establishes a wider network. Consequently he is respected and regarded in his clan and the community on the whole, within and outside of Lihir. The more wealth you give the more you receive and more people will come to know you and respect you and your clan. In the event that you want to stage a big feast, you will get a lot of people helping you.*

### **3.4 The Men's House**

The Lihir's men's house (see Figure 3.1) is the centre-piece of the Lihirian social, economic and political life. It is an affirmation of clan lineage and kinship (Bainton, 2006). It is a site of the Lihir culture, and where the majority of feasting and exchanges take place (Foster, 1992). Similarly, most clan leaders and ordinary Lihirians the author talked with regard their clan's men's houses as mini parliaments or classrooms. It is where major clan decisions are made, where men identify themselves with other men, and where young male adults are empowered and nurtured socially and culturally in their *kastom* and *pasin bilong* Lihir. These processes are done not only to enhance the immediate livelihoods of families and households of the men being nurtured, but also to strengthen inter- and intra-clan networks. Consequently, the existence of their clan on the whole is upheld. All males and females are linked to their clan's men's house through a system of matrilineal descent. Upon birth, males are immediately

received as members of their mother's men's house, maintained by her brothers (the children's maternal uncles). When their uncle dies the children inherits custodian of the clan's men's houses.

There are two categories of men's houses. Secondly, the clan's men's house is where major feasts and other *kastom* functions sanctioned by the clan are held. The custodian of a clan's men's house is normally the clan leader.



Figure 3. 1: Lihir's Men's House Kunaie 2 Village

The Lihirian men's house is easily identified by the stone wall that is built around the house and the distinctive large 'Y' shaped stile that people must step over in order to enter its perimeters. All maintenance of the clan's men's house is marked by holding a feast (*Usnie arihiri*). An interviewee stated that married men sleeping and dwelling in the men's house tend to better space the birth of their children. This is regarded as a cultural contraceptive method of family planning. He indicated that most families would normally wait 2-3 years before they have another child. Hemer (2001) also reported that, in the past, birth spacing was maintained by the practice of husbands sleeping in the men's house. Secondly, a lot of households the author visited tend to have what Lihirians call the family's men's house, which is treated as a rest house and a place for entertaining family visitors. Many family men's houses do not have the 'Y' shaped stile as seen in the clan's men's houses; however, they have stone walls around them.

### 3.5 Gardening the Principal Livelihood Strategy

On Lihir, gardening is the principal livelihood strategy through which people produce most of their food for consumption, festivities and gifting. Most of the people interviewed in the case study villages own gardens. Despite their island habitat, Lihirians regard themselves as gardeners. Similarly, Foster (1995:113) in his anthropological study of the nearby Tanga Island indicates that gardening constitutes the ideal typical activity for both men and women – *Every married couple make gardens, and gardening makes a man and woman a married couple*. Foster suggests that the capacity to garden, and hence feed oneself and others, demonstrates both personal autonomy and social viability.

According to a clan leader, the practice on Lihir is that garden areas are owned communally. The traditional custom is that communal gardens are planned and organised by clan leaders. The clan leader selects the site, subdivides and allocates the total garden area amongst married couples and unmarried young adults within his clan. The practice allows matrilineal households and individuals to have their garden areas in the same location. The practice contributes to controlling the use of land and also serves as a security strategy against enemies, especially during the pre-history and cannibalism period. An interviewee said: *Long ago when our people were still killing and eating each other, it would be foolish for a family or an individual to have separate garden areas. They would be easy prey for their enemies. Today, garden areas are no longer allocated by our clan leaders; the tendency is that people are moving onto area on their own will to making gardens.*

Preparation of a garden normally would involve initial clearing of a block land which is communally owned through their matrilineal clan system. After three to four weeks, the dry debris is burned. Unburned debris is removed before holes are dug for planting yams and *mami*. Traditionally, labour in gardening was distinctively shared between men and women. The men cut the forest, remove the logs and branches, dig up the soil, cut and erect stakes, and build fences, while women plant and carry out the general husbandry tasks. Both men and women harvest when the crops are ready. However, women interviewees indicated that since the exploration phase of the mining operation during the 1980s most of their time is taken up in gardening and doing some of the tasks traditionally done by men. This is especially expressed by women from households where male members of their households are employed

in the mining operation. In one occasion, the author observed a group of women building a fence around a garden. Fencing is a task normally executed by men in a Melanesian culture.

There are two main types of gardens on the Lihir Islands, these are discussed below.

### **3.5.1 Home Consumption and Feast Gardens**

According to a key informant, allocation for gardening is normally divided into feast and home consumption gardens. Land regarded as fertile is allocated for the growing of yams and *mami* intended for feasts, although small-sized yams and *mami* harvested from these gardens are used for household consumption and feed for pigs. Planning, preparation of the site, planting and staking of yams, maintenance and harvesting of feast gardens are done communally. The communal work is done either by clans or close relatives within cluster of households. In contrast, land regarded as less fertile is set aside for food crops intended for home consumption. The crops include stands of yams and *mami*, mixed with sweet potato, cassava and vegetables.

### **3.5.2 Traditional Bush Fallow**

The traditional bush fallow system of gardening, which worked for many years under low population densities, appears to no longer sustainable. As expressed by an interviewee from the Kunayie village. *Every individual household tends to have separate gardens in separate areas. This is causing land shortage.* Another interviewee said: *We used to rest our garden sites for 3-5 years, now it is about 6 months to 1 year. Some people from Putput and Londolovit villages who have lost their gardening areas under the mining operation are also gardening in our village. People from Malie Island are also gardening in our gardening land.* These concerns are consistent with a study by Baput (2003) on the farming system on Malie Island that indicates extreme pressure on land for gardening. The study indicates that yields on Malie had dropped seriously within the previous five years. Even in the absence of scientific evidence, people are observing declining yields from their gardens. The following comment from an interviewee further depicts the declining soil fertility stemming from short fallows: *Our yams and mami harvests are no longer plentiful. We used to get 10 or more from one planting stand, now we are only getting 2-3 per stand. Our gardens areas are over used.* If the declination of employed Lihirians in gardening and the declining yield of yams from the gardens are any indication, production of yams and other food crops might be at risk. As a result, overall food security will also be at risk.



Figure 3.2: A Yam garden on Lihir Islands

### 3.6 Role of *Mis*, Pigs and Yams as Produced Capital in Livelihoods

Most interviewees expressed the importance of *mis*, pigs, yams and *mami* in the traditional mode of exchange in the Lihir culture. These are principal items, as they express authority, prestige and solidarity. An Interviewee suggested that major ceremonies such as the *rarhum*, *tutunkanut* and the *ikinetz* feasts (see Section 3.7) cannot be held without these items. He emphasised that in order to inherit clan land and other material wealth such as fruit trees, canoes, houses, betelnut and coconut trees, clan members must fulfil *kastom* obligations, including provision of feasts in honour of dead clan members by contributing pigs, *mis* and yams. Further, a clan leader indicated that groups and clan members can demonstrate their capacity to acquire land use rights from their deceased clansmen by presenting pigs, yams and *mis* in an appropriate mortuary feast. He emphasised that most importantly the pigs must be lined up in front of their clan's men's house in order to publically show transfer of land rights. To this end, Lihirians draw on this produced capital to acquire and confirm access rights to other capital or wealth. Similarly, Filer and Jackson (1989:66) suggest that the use of these items facilitates the reconfirmation and sometimes the redefinition of clan membership and ownership of properties.

These items are now considered separately, commencing with *mis*, the traditional mode of exchange on the Islands. The *mis* (see Figure 3.3) is used to buy pigs, settle disputes, as bride price, and in feasting. *Mis* is sold on the Island for cash, and it is a booming source of income. As expressed by a man from Malie Island: *Selling mis is an important source of cash income for us. We have limited opportunities to earn cash from our land, and the quickest way is to buy the shells from New Ireland and process them into mis and sell them for cash.* This is to meet increasing demand as a result of the increasing frequency of cultural feasting on the Island. As observed during the *karat* on Malie Island, a lot of *mis* were used to pay for pigs brought into the feast arena (see Figure 3.3). Further, the author observed an engagement ceremony at Lipuko village where *mis* to the value of K200 (NZ\$100) was given to the father of a young woman by a man to publicly announce the engagement of his nephew to the woman. The *mis*, as announced by the bridegroom's uncle, were to be shared equally between the parents and the uncles of the bride.



Figure 3.3: Sorting out *mis* to pay for pigs during a *Karat* feast on Malie Island

Pigs (see Figure 3.4) have social significance in the Lihir culture, and are a principal element in gifting and reciprocal exchange. The demand and use of yams and *mis* in feasting is also driven by pigs. Participation by Lihirians in cultural ceremonies is valued greatly by contributing pigs. As expressed by an interviewee: *A feast without a pig[s] is not a feast; pigs value more than cash in Lihirian feasts. Feasts mean it's time to eat pork. Children are taught by their parents on how to look after pigs from early age so that they can start valuing pigs.*

They signify tremendous symbolic power by the feast givers. A respected clan leader stated that an important aspect of feasting was to publicly announce the value of pigs in terms of *mis* during feasts. This was observed during the *Karat* on Malie Island where 170 pigs were lined up in front of the clan's men's house, which hosted the feast where the owners of the pigs took turns to announce the value of their pigs in terms of *mis* to the feast attendants. During this occasion, transfer of land and other properties is publically announced, and witnessed by the people in attendance. More importantly, the transfer of wealth is transparent, as expressed by a Lihirian.

Pigs brought into a feasting arena are slaughtered and distributed as reciprocal gifts in various sizes to the people who have attended. An interviewee explained that two factors determined the precise portions of uncooked pork and the size of whole pigs distributed to those in attendance at feasts. The first is the recipient's relationship to those hosting the feast. The second is the recipient's contribution in terms of the size of pigs, size and quantity of yams and *mami*, towards the feast. For example, a couple from the Kinami village was given a big live pig at the *karat* held on Malie Island because they are closely related to the hosts of the feast and also as a reciprocate of a live pig they gave to the hosts at a *karat* held at the Kinami village in 2004. Recipients take their uncooked portions of pork and pigs home and redistribute them within their households, families and village. In the process, they create wealth by indebting others to reciprocate in future feasts. As expressed by Lincoln (1989:67), 'this is the process of discharging old obligations and creating new ones. As pigs in Melanesia represent and result from a line of social 'connectedness' that stretches into the past, while also creating obligations that carry connectedness into the future'.

Traditionally, the daily tasks in pig husbandry in the Lihir culture are the women's responsibility. These are tasks that they take a lot of pride in executing. However, Lincoln (1989) notes that in Melanesia the women's labour is taken over by men at the time of ceremonial feasting, a tradition where domestic labour is transformed into items of specific cultural meaning in a realm of prestige, which men control and women do not. Normally, all the domesticated pigs on the Islands are given names, often with association with known things (e.g. rivers, mountains, rocks, reefs, places, etc.), and people often develop close bonds with their pigs. Many people express remorse when their pigs are slaughtered, and some remove themselves from the scene when the animal is trussed before being killed.

Although raising pigs is traditionally a woman's task, an emerging trend on the Islands is that men are taking over the responsibility because of the increase in the cash value of pigs. The trend stems from the high demand for pigs for feasting. A clan leader claimed that a big pig on the Island could easily fetch K700-K1000 (NZ\$350-500).

Conversation with a pig owner who had his pig slaughtered at the *Karat* on Malie Island indicates that presenting and slaughtering one's own pig in a feast that one has raised has more social value, *as the pig is a symbol of your hard work; the fruit and symbol of your success. It also shows that you are capable of demanding wealth. The pig is part of our family and we feel sad when it is slaughtered. The feeling is not the same towards pigs which we have bought from other people.*

Qualitative data from interviews indicate that the majority of pigs butchered during the *karat* held on Malie Island were bought and shipped from Tanga and Tabar islands, Namatanai, and East New Britain Province. Lihirians have also travelled as far as Chimbu in the Highlands region and Daru in the Southern region and West New Britain to buy pigs for their feasts. According to an interviewee, the neighbouring islands of Tabar, Tanga and the main island of New Ireland are seizing upon the regular frequency of feasts in Lihir and are raising pigs for their income. Similarly, a young lady from Namatanai who is employed on Lihir indicated that her family have made it their business to specifically raise pigs for Lihirians to buy for their feasts. In 2005, her parents sold two big pigs at K1000 each. While Lihirians prefer locally-raised pigs for their feasts, on the other hand, the availability of cash is empowering people to endure much trouble in buying pigs from outside of Lihir. In addition, an interviewee indicated that prestige seems to be associated with money as employed Lihirians venture out of Lihir to buy the biggest pig they can find for feasting. The bigger the pig, the more recognition and accolade one receives. This indicates that the availability of cash spent on cultural ceremonies has been enhanced by the cash earning opportunities deriving from the mining operation. Wealthy big men use the opportunity to display their affluence and indebt others in ways that are difficult to match, as reciprocation requires an equivalent sized pig with similar expenditure.





Figure 3.4: A man sitting on a pig at a *Karat* feast, Malie Island

Yams (see Figure 3.5) are a staple food on the island, beside pigs and *mis* they are an important capital item in gifting and reciprocal exchange. According to the elderly interviewees, distribution of yams during feasts indicates that hosts of the feast and their clan members are hard working; hence, they are able to produce abundantly from their land. It also shows that they are not landless. A clan leader stated that it also indicates the capacity of the clan members to coordinate and subordinate themselves to their clan leader; a sign of coerciveness between clan members. Likewise, Bainton (2006) indicates that Lihrians believe that the act of distributing yams extends the daily efforts of women who nurture and sustain matrilineal lineage in bearing children.

A trend being experienced in Lihir is that some local people, who are employed in the mining operation, are buying yams from the villagers for feasting purposes, as they do not have yam gardens. Most village interviewees consider this as a contradiction to the Lihirian *kastom*, as for a man to gain respect and regard he must sacrifice his time and effort to own and cultivate yam gardens and raise pigs for ceremonial feasting. Conversely, women interviewees indicated that the trend has created an opportunity for many of them to earn cash from selling their yams.



Figure 3.5: Yams, a principal item in feasting and reciprocal exchange

Bainton (2006) suggests that the use of cash to buy items meant for cultural activities is a way of expressing the prestige of clan members having access to money. On that point, most people the author talked with suggested that money is empowering young men to exercise authority in feasting on the Islands. As expressed by a clan leader: *Young people short cut in their efforts to be recognised, because they have cash to buy pigs and yams, but mentally they are not mature to lead their clans in staging kastom ceremonies.*

### 3.7 Mortuary Feasts and Other Rituals as Livelihood Strategies

Ethnographic studies on New Ireland have focused on mortuary feasts from different perspectives. Probably the most common is the study of the *malanggan* ritual in the form of its production and display in ceremonies. *Malanggan* are wooden funerary carvings which are customarily displayed during mortuary feasts. They are regarded as counterparts of dead individuals (Powdermaker, 1966; Sykes, 2007). Ceremonies associated with *malanggan* are large scale and famous amongst the many events that take place within the New Ireland *kastom*. They are not restricted to mortuary rituals, but are also used in initiation rites of young men to manhood (Billings, 2007). Although Lihirians do not practise the *malanggan* rituals, the people indicate that their relatives on the neighbouring Tabar Island have the rights to the *malanggan kastom*. Likewise, Powdermaker (1966: 92) claims that myths about *malanggan* originated from Tabar Island. Its production and display instils authority and

recognition of male power, and initiation of boys into manhood (Lincoln, 1989:200). Elsewhere on New Ireland, attention has been paid to the role of memory and forgetting in mortuary feasts (Eves, 1996), the context of leadership succession and economic activity (Foster, 1995), Specific ethnographic studies on the Lihir mortuary feasts have perceived them as having three parts: the deceased, the hosts of rituals, and the guests (Hemer, 2001). Further, Bainton (2006) had referred to the Lihir mortuary feasts as collective events that not only honour deceased relatives, but also express community and clan lineage, and male authority to sustain *kastom*.

The kinship and clan coerciveness was evident in the *karat* feast the author attended on Malie Island (see below), in the way that guests were entertained and the manner in which the dancing groups and the presentation of pigs into the feast arena were done by kinship clan groups.

Based on interviews with elderly Lihirians, mortuary feasts and other rituals are held when the participating clans have enough pigs, shell-money, *mis*, yams and *mami*. The people prefer to have feasts during the yam harvesting season so that they have enough food for feasting, gifting and reciprocity. The feasts start when the person is still in his/her mother's womb and ends many years after his/her death. These include the women's puberty or initiation ritual (*Tolup*), the exchanges involved with marriage (*minakuetz* and *rapar*), the first pregnancy feast (*Tektipsasie*), the hair cutting ceremony (*Kiptiekoh*), the feast to honour elderly people (*rarhum*), and a cluster of mortuary-type feasts (*Mbiektip*, *Pkepke* and *Tutunkanut*) known as the *Karat*. The series of mortuary feasts begins with the burial of the corpse and terminates years later with exchanges of *mis*, pigs, yams and *mami*.

A clan leader indicated that the live pigs given in a few of these rituals are usually females, as the intention is to encourage the woman (and later the child) to rear and breed numerous pigs. The giving of pigs and *mis* exchanges is seen as providing the means to accumulate wealth and participate in all feasts for their respective lineage. However, a few of these rituals are not being practised today, as other village commitments are taking precedence over them. The rituals are complex, and a brief description of each is given below.

### 3.7.1 Main Rituals

#### a) *Karat*

The term *karat* refers to a combined mortuary feasts to honour deceased lineages. It normally consists of the *katakato*, *tutunkanut*, *rarhrum* and *Ikinietz*. The main reason for combining these feasts is the cost involved; as one big man said: *It is becoming very expensive to host a single feast for a single deceased kinship.*

The *karat* is on a much bigger scale than any of the other feasts on Lihir. It is spectacular, dramatic and highlighted with songs and dance performances. They demand months, and sometimes years, of planning and preparation. Large feast gardens (Section 3.5) are cultivated to produce vast amount of yams and *mami*. Besides these two items, a vast amount of *mis* and cash are needed to stage a *karat*. An elderly interviewee said the *karat* is the most startling display of clan strength, magical powers, wealth and prestige, and can be held over several days or even weeks. Macintyre (1989:22) states that a *karat* is geared towards ‘finishing’ deceased clan members, meaning that it is the final stage of a mortuary cycle in the Lihir *kastom*.

During the course of his field trip, the author attended the last day of a *karat* feast, which had gone on for three weeks on Malie Island. It was held to honour more than six dead people and more than ten aging people. There were about 700-1000 attendants on the last day. Some people came from the neighboring islands of Tanga and Tabar to participate in exchange relationships and support their kinships. A total of 15 dancing groups performed various traditional songs and dances on the last day.

During the entire period of the feast, more than 300 pigs were slaughtered and distributed, along with yams, *mami* and *mis*. The number of pigs slaughtered on the last day was 170. The live pigs were tied onto bamboo stretchers, decorated with colourful plant leaves, and carried by men into the feast arena in colourful processions and lined up at the front of a men’s house.

In one instance, 12 men were involved in carrying a big pig with two young boys sitting on it. The boys were decorated with red soil on their faces. The author was told that the red soil was to repel magical powers or influencing spirits that anyone might place on them. The arrangement added glamour and amusement to the procession. They entered the feast arena

singing and waving colourful plant leaves and branches, exhibiting a kind of clamour and songs to indicate their arrival with their pigs



Figure 3.6: A dance performance by Kunaie Villagers at the *Karat* feast, Malie Island

As stated by an owner of a pig being carried onot the feast arena: *The songs and clamour can be about the pig, owners or donors of the pig, or generally it can be a song to celebrate the fruit (pig) of their effort.* The processions are normally led by the owner[s] or donor[s] of the pig decorated with *mis*, lime and red soil on their faces. Upon their arrival at the feast arena they are met by a greeting group of the hosts, also decorated and carrying their *mis*. The two groups leap to meet each other by planting their right or left foot well forward and rock back and forth displaying their *mis* and at the same time pronouncing special terms such as (a) *Palik* or *Aberpelkan*, *Nomelam*, *Sawet* (relax, we've come to settle our debt), if the pig presented at the feast arena is to reciprocate a pig that had been given at an earlier feast, or (b) *Berturan* (work together), if the pig is a gift to create a new obligation and to be reciprocated at future feasts. The people carrying the pigs and their companion are normally relatives of the pig owners. The procession is a public exhibition of cohesion and support amongst kinships, clans, families, households and individuals. Similarly, Macintyre (1989) indicates that the ritual is a demonstration of the wealth of the feast giver, specifically their capacity to transact *mis* for pigs.



Figure 3.7: Hosts of the feast meet the donors a pig at a *Karat* feast on Malie Island

***b) Rarhum***

Rarhum is the first of three in a series of ceremonies celebrated in feasting to honour the older generation, especially people who are losing their teeth. Loss of tooth is a sign of aging and bodily decline, and that one day the old people would die. The author was told that the tooth is either buried in a specific location or deposited near a reef in the ocean. Such places are then regarded sacred or taboo. Although *rarhum* is regularly held, according to informants on the island, it is increasingly being combined with other mortuary ceremonies (*Karat*). It is a belief that not performing a *rarhum* was considered risky, as the aggrieved spirits of dead ancestors might kill members of the lineage, pigs or destroy crops. As such, *rarhum* is regarded as a preventive measure from attacks by the aggrieved spirits. In addition, as explained by a clan leader, *rarhum* is a strategy used by many Lihirians to accumulate wealth for their clans. This is done by way of contributing pigs, yams and *mis* to be consumed during the feast. The elderly persons whom the feast is held in their honour would normally transfer their ownership of fruits trees, a block of land, a canoe or other valuable physical assets to people who have contributed pigs, *mis* and yams to be consumed during the *rarhum*. As such,

*rahrum* is livelihood strategy through which Lihirans could increase their physical assets and elevate therefore elevate their standing in their community.

**c) *Tamatiapuios***

*Tamatiapuios* is the initial burial feast, which entails gifts of pigs from relatives of the deceased. If no *rahrum* has been made in respect of the deceased person, then it is performed after *tamatiapuios*. However, the common practice is that the *rahrum* is held in conjunction with the other mortuary feasts.

**d) *Mbiektip***

According to the elderly interviewees, this feast is held to end the mourning period. In the Lihir language, *Mbie* means ‘mourning’, and *ktip* means ‘cut’. Indeed, in this context, ‘cut’ means to end one’s relationship with the deceased. *Mbiektip* is normally held 1-2 weeks after the burial. The author was told that the mourners would normally stay at the house of the deceased until a *mbiektip* is held to cut (*ktip*) their relationship with the dead person, hence allowing them to resume their daily activities. The mourners are normally relatives of the deceased. However, it can also include close friends of the deceased. Interviewees also explained that *mbiektip* is normally a one-day feast, although preparation could take many weeks. Normally, an even number of pigs are slaughtered and cooked with yams in ground ovens. These are evenly distributed amongst those who attend the feast. This is ensured by the principal mourners to prevent any spell placed on them by the spirit of the deceased.

Although the *mbiektip* is theoretically meant for mourners, the whole village is involved. In the Lihir culture, it is disrespectful not to turn up for a *mbiektip* feast. Normally the mourners return to their respective homes after a *mbiektip*. However, Hemer (2001: 294) noted that female mourners stayed on in the house for another 10 days after a *mbiektip* feast. Their extended stay was to show their respect for the deceased and to acknowledge that it requires a lot of work and resources to adequately honour a deceased, and to indicate to the extended family that they are capable of adhering to *kastom*.

**e) *Tutulkanut***

The author was told that *tutulkanut* is the last of the mortuary feasts held to farewell deceased relatives. Normally, it warrants a large-scale feast and exchanges of wealth that collectively ‘finish’ one or more of the host lineage’s deceased members. ‘Finish’ in this context implies

an act of remembrance undertaken in order to forget debts that have been incurred by the deceased (Hemer, 2001). The author was also told that, in the past, skulls of the dead were brought to the men's house during *Tutunkanut*. The skulls would be decorated and displayed during the feast and then stored away in a sacred place. The hosting of *tutunkanut* can be quite competitive, as the feast-giver is thus staking claims to the land and other properties of the deceased; the number of pigs given by the host can be as high as 10. Being regarded as a large scale feast it would normally take many years of preparation, especially in the raising of pigs as they take time to grow into big feasting size pigs.

### 3.7.2 Other Rituals

#### a) *Tolup*

According to an old female interviewee the *Tolup* is the female puberty ritual. It involves secluding the girl for months in a specially constructed house with no light – *tolup* (a dark place). A *tolup* feast is prepared by the lineage of the girl, with all the clan members attending to give *mis* to the girl in exchange for portions of pork. The feast is held at the end of the secluding period. Some bring female live piglets. The *mis* and live piglets form the foundation of future exchanges for the girl during her marriage life. Similarly, Macintyre (1989) indicated that the live piglets marks the beginning of a long relationship between pigs and the girl, as raising pigs is the women's responsibility in the Lihir *kastom*.

The *tolup* feast usually provides the girl with the first inkling of her future husband's identity. Following the *tolup* feast, the girl would spend most of her time with her mother and aunties. This is an essential process as the girl is ushered into motherhood by learning the skills of motherhood before marriage. During this internship period, the proposed husband's parents and relatives make it their task to find out how the woman is handling her initiation into motherhood. The task could also involve spying on the girl when she is working in the gardens with her experienced mother or aunties. Marriage is delayed if it is found that the girl is not up to handling the chores of motherhood.

An interviewee from a Kuniaie village stated that he witnessed a few *tolups* after World War II. The interviewee said the Catholic Mission convinced the people to abolish the *tolup* when they found out the girls were kept in very unhygienic conditions, as they were not allowed to wash or wear clean clothes during the entire seclusion. An old woman recalled that the latest



*tolup* held on Lihir was on Malie Island in the late 1970s for a young woman who had completed secondary school.

**b) *Minakuetz***

*Minakuetz* is a marriage feast which inevitably follows the *tolup*. On this occasion, the bridegroom's family and his clan deliver the bride price to symbolise and affirm the marriage.

**c) *Kitiksasie and kale kiak daldal***

*Kitiksasie* is held to celebrate the women's first pregnancy. It is normally held in the men's house of the woman's clan, and attended by members of both her and her husband's clans. Fruits such as watermelon, breadfruit and ripe bananas are normally consumed to celebrate the woman's fertility. Often, the big men in the village would give *mis* as a noble gesture. The *mis* become her personal possession and a means of purchasing live pigs to be raised for future exchanges. Upon the birth of a child, a feast called the *kale kiak daldal* is held to symbolically wash the mother's blood off the newborn child.

**d) *Kitipkop***

*Kitipkop* is the name given to a ceremonial feast to honour the cutting of hair of a first-born child. Although small, the feast is an avenue for the child to accumulate *mis* at an early age. Both sides of the family contribute food and at least one or two pigs. The child is decorated with *mis*, and the face and head painted with red paint. Each family member is given the opportunity to cut a piece of the child's hair and contributes *mis* as gift to the child. The gift giver receives a piece of uncooked pork in return, normally given by the opposite lineage (i.e. people from the father's clan are given pork by the mother's clan, and vice versa). On this occasion, the child enters his/her clan's men's house for the first time, therefore confirming and establishing his/her matrilineal clan lineage. The feast establishes the foundation for all exchange relationships involving the woman and her eldest child throughout their lives and after their deaths. For this reason the feast is considered the starting point and origin of all future exchanges. Interviewees indicated that a decline in performing this ritual might be because of the mining operation.

**e) *Ikinietz***

This feast is held purposely for children to thank or appreciate their parents for their love and efforts in bringing them up. As far as Lihirian children are concerned, they consider the love

and care of their parents as debts which they have to repay. Anthropologists call these debts *of nurturance*. According to Bainton, (2006) debts of nurturance usually incurred at the household level. Primarily, these exist between a man and his children and his sister's children, and between a woman and her children Bainton noted that while, Lihirians incur numerous debts through the exchange of pigs, *mis* and yams during their various forms of feasting, they also incur debts of nurturance. In this study, the author was told that children can host an *ikinietz* for their parents while they are still alive. It is an opportunity for the children to honour and acknowledge their parent's love and effort in raising them. Children can also settle these debts during attendance at any of their clan member's *rarhum* or *karat*. As expressed by an individual at the *karat* the author attended on the Island: *The pig and mis I brought here today will be given to my mother. This is to thank her for her love and hard work in raising me.* According to the interviewee, this is also another path through which ownership of land and other resources can be transferred, especially from the father to his children. The *ikinietz* feasts, according to an interviewee, are no longer held separately, but are combined with other feasts such as the *karat*. An elderly person indicated that the piece of land on which he and his siblings have settled was inherited from their father's clan through an *ikinietz* feast held in honour of their father in 1979 when he was still alive.

### **3.8 Culture As a Livelihood Capital Asset**

The development and conceiving of the sustainable livelihoods framework and approaches in the early 1980s placed a lot of prominence on environmental sustainability. This became central to the Brundtland report in 1987 (WCED, 1987), and evolved into a central policy on Environment and Development in Rio in 1992 (Scoones, 2009). This is articulated in the early definitions of sustainable livelihoods, which emphasised natural resources. Consequently, much of the discourse and practice in development continue to consider livelihoods within a framework of agriculture and natural resources (Scoones, 2009). However, sustainable livelihood approaches have subsequently evolved, with emphasis on the sustainability of other capital assets or resources, in particular, financial and social capitals (Bebbington, 1999:2022; Overten et al, 1999:265). Based on the fundamental perspective that livelihood is a human system, the sustainable livelihood approach is therefore characterised as being people-centred, holistic, participatory and flexible in nature (DFID, 2002). In addition, culture as a capital should be given special attention in any sustainable livelihood frameworks, as cultural

practices are inputs to and outputs of livelihood strategies (Bebbington, 1999). Therefore, culture is articulated differently by different organisations, depending on the viewpoints they place on it in their sustainable livelihood approaches. For example, in the DFID and Oxfam frameworks, culture is placed within the vulnerability context and in the transforming structures and processes. The CARE framework specifically places culture under the cultural environment. Ellis (2000) deals with it under rule, customs and land tenure, categorised under institutions that can modify access to assets. According to Bebbington, inclusion of culture as a livelihood asset is an attempt to look at livelihoods from the local perspectives that enhances people's capability (Sen, 1981). On the other hand, Cahn (2006) argues that culture is interwoven into almost all aspects of livelihoods in the South Pacific. From this perspective, culture as a livelihood capital is an integral component of the livelihood system of Lihir Islands. This is best illustrated through the series of mortuary feasts and other rituals indicated in Section 3.5. Underpinned by reciprocal gifting and exchanges of produced capital, which include *mis*, yams, pork and dance and performance, the process adds value and meaning to what it means to be a Lihiran, as shown in the assets framework (see Figure 3.8).

The Lihir context is consistent with Bebbington's findings in the Andes, where meaningfulness is associated with cultural practices. In addition, Kleymeyer (1993) suggests that beyond being simply meaningful, cultural practices are enabling and empowering, which raises the notion that people's assets are not only a source of substance and meaning, but also a source of power.

It is obvious in Section 3.7 that Lihirians are empowered to endow material wealth through their active participation in mortuary feasts and other rituals. Indeed, a clan leader said: *A clan must fulfil all kastom obligations, including staging of feasts in honour of the dead clan members. The feasts involve contribution of mis, yams and pigs which are distributed and consumed during the feasts. By doing this the clans protect their land from being taken over by other relatives.* To that end, Bebbington (1999:2034) concludes that enhancing and sustaining cultural assets enhances the people's capabilities, which ensures the relationships of people with their environment and other people within their culture are sustained.

The building and utilisation of cultural capital depends on social capital. In the same token, social capital thrives through the expression of cultural capital shown by the blue arrows in the white box. The natural capital shows that the traditional livelihood system on Lihir is a natural resource based. Capital assets such as *mis*, yams, and pigs depend on the natural capital

for their production by human capital. This is expressed through the reciprocal exchanges on the Lihir mortuary feasts through which tangible and intangible wealth are produced. Clans and households use their tangible and intangible wealth and their capability to sustain and enhance their livelihoods. Furthermore, the use of cultural capital together with other capital assets in this livelihood system also enhances the capability of people in the building of their livelihoods.

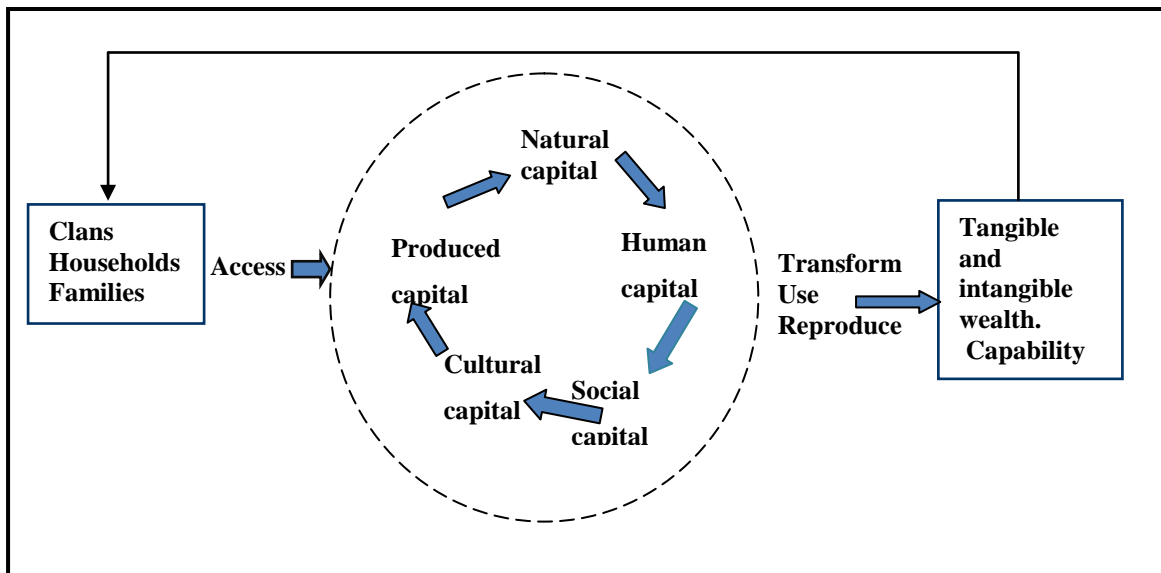


Figure 3.8: Framework of Capital assets: Traditional livelihood systems of Lihir. (Based on: Bebbington, 1999:2029).

### 3.9 Social Capital

The notion of social capital has captured considerable attention in development debates, especially in the sustainable livelihoods context. Its value in livelihoods was identified by Jacobs (1961). Later, it was given a clear theoretical framework by Coleman (1988, 1990), who claimed that none of these studies specifically identified and categorised culture and tradition as a livelihood systems. Putnam (1993, 1995) also claims none of these studies identified culture and tradition as the structure of relations between the actors in livelihood systems. Given this gap in the literature, the limited intent in this chapter is to identify and categorise the Lihir culture and traditions as a livelihood system.

In defining sustainable livelihoods, Ellis (2000), places more emphasis on access to assets and activities that are influenced by social relations and institutions. Woolcock (2001), argues that

a significant virtue of discourse of social capital is that it helps to bridge orthodox divides among scholars, practitioners and policy makers. Pretty and Ward (2001), argue that the term captures the idea that social bonds and norms are an important part of the basis for sustainable livelihoods. They suggest that aspects of social structure and organisation act as resources for individuals to gain material wealth and realise their personal interests. Personal interest may include spiritual well-being, a sense of identity and belonging, the pleasure of relationship, social statuses, honour and prestige. Based on Bebbington (2002), social relationships are an asset, which can have significant impact on the people's ability to access other assets and transform them into well-being. On the other hand, it can exclude others from such access.

Social capital is not foreign to Lihir, as the island has always been endowed with a diverse stock of it. Indeed it is an integral part of the people's cultural and traditional livelihood system. The gifting and reciprocal exchanges manifested in the series of mortuary feasts and other rituals (discussed in Section 3.3) and the social network between the clans, households and families demonstrate the strength of social capital on the Islands.

Western scholars recognised the significance of gift exchanges in their first encounters of such culture in economic anthropology by Bronislaw Malinowski (1922), Raymond Firth (1929, 1939) and others. Similarly, Curry (2005:237) states, "Gift exchanges are very much embedded in the Melanesian social and economic relations'. In the PNG context, Yamauch et al. (2001) suggest that gifts and reciprocal exchanges are a social act concerned with the sustainability of social relationships between individuals, groups, tribes and clans. Gift exchange is about forming identities and interpersonal and group relationships, and defining group boundaries. Likewise at the heart of the Lihir culture are the distribution, sharing and consumption of food – a process that objectifies the value of nurturance and reciprocity. Therefore, underlying social capital is the notion that an actor's social relationships are an asset, and that this asset has significant impact on their access to other assets, their capability to turn those assets into well-being.

The community as a whole help each other to sustain the cohesiveness of their community. This was evident on Malie Island during the *karat* feast (see Section 3.4) where gifting, exchange and distribution of pork, *mis* and yams objectifies the act of reciprocity. As expressed by Sahlins (2000: 345), 'Gifts and reciprocal exchange is embedded in the Melanesian social system. It is practised in their economic terms that lie partly outside the

market economy. It also expresses commonality between the giver and the recipient'. In that regard, it enhances and adds meaning to the actor's social capital. On the other hand, social liability is created if recipients fail to honour their debts; thus, in such cases, people are vulnerable to being ridiculed and shame. However, a clan leader on Lihir noted that such cases rarely happen because of the strong ties between kinships, families and households. He said: *We do not do things as individuals, but in groups as clans, families and households.*

### 3.10 A Holistic View of the Traditional Livelihood System

The Lihir cultural and traditional livelihood system is diagrammatically represented in Figure 3.9. The arrows indicate the links and interactions between the subsystems. The diagram portrays a complex portfolio of activities to sustain their livelihoods. It would seem that their livelihood systems, prior to the major interventions, were self-sustaining.

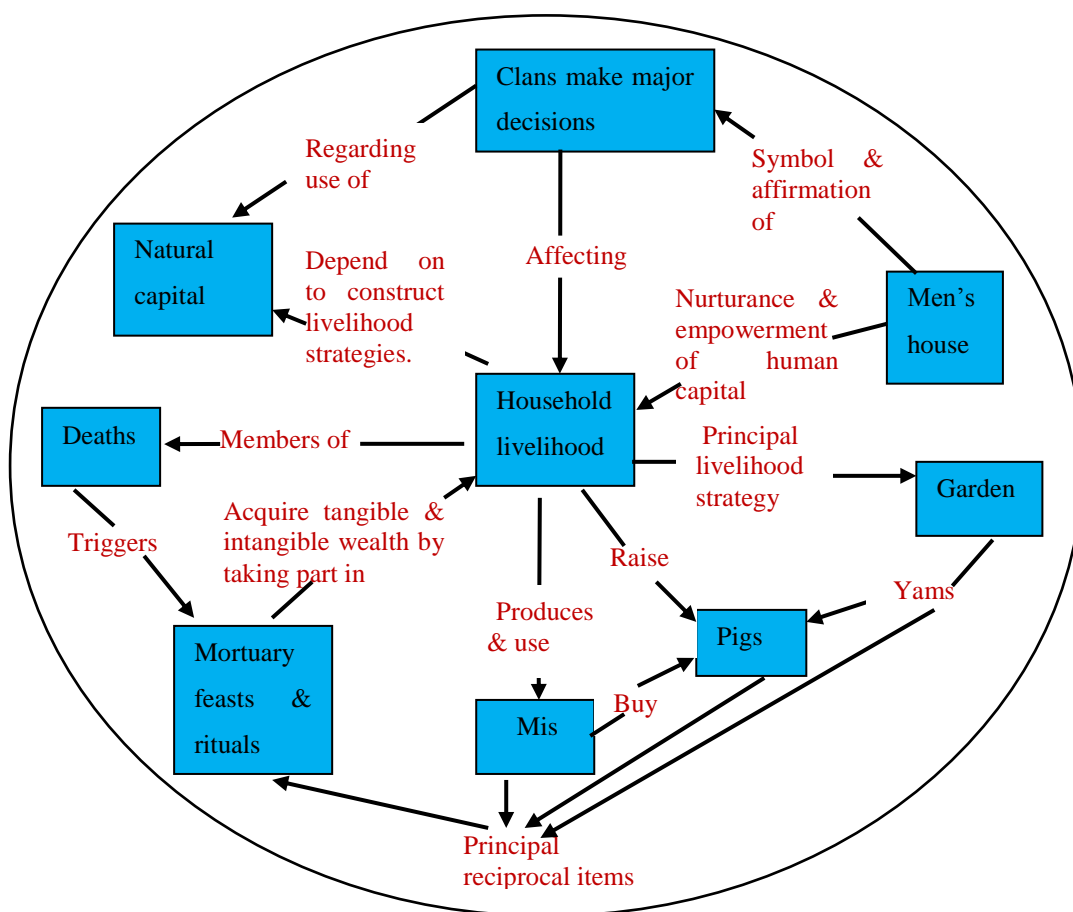


Figure: 3.9: Diagrammatic Representation of the Traditional Livelihood System on Lihir

### 3.11 Conclusion

This chapter presented the cultural and traditional livelihood systems in the Lihir context. The analyses and general argument emerging from the analysis is that culture is seen as a capital, which is an important livelihood asset. As seen in the Lihir context, people use their cultural practices to sustain and enhance their traditional livelihood system. This is demonstrated through their myriad of mortuary feasts and rituals. Through participating in these rituals people are enchained in interrelated sequences of life cycle exchanges with the recipients and their lineages. Pigs, yams and *mis* are important reciprocal items in the Lihir context. These are produced capital, which empowers people to command both tangible and intangible wealth. Furthermore, the use of cultural capital together with other capital assets in this livelihood system also enhances the capability of people in the building of their livelihoods.

In this livelihood system, gardening is the primary livelihood strategy, as most families relied on it for production of food for home consumption, feeding pigs and feasting. An important institution within the Lihir cultural and traditional livelihood system is the clan's men's house. Every clan on the Islands owns a men's house to symbolise their existence and authority. It is a site where the majority of feasts and exchanges are held, and where the older men nurture and empower the younger men. The Lihir society is based around the matrilineal clan system. Clan members support each other in cultural activities, such as feasting, to express solidarity and to uphold the Lihir *kastom*.

## Chapter 4: Early Interventions on the Lihir

### 4.1 Introduction

This chapter presents a history of the interventions in the livelihood system on the Lihir Islands, prior to the mining operation. It discusses the processes and events that contributed to the cultural and traditional livelihood system discussed in Chapter 3. Section 4.2 presents the plantation labour recruits on Lihir. Section 4.3 covers the period under the German Imperial Rule. Section 4.4 covers the intervention by the churches. Section 4.5 presents the Australian colonial era. Section 4.6 presents the ‘cargo cult’. Section 4.7 looks at some of the modern economic livelihood strategies Lihirans were eager to introduce into their cultural and traditional livelihood system. Section 4.8 covers the early institutions. Table 4.1 presents a timeline of the major events on Lihir which have contributed to the socio economic changes to the livelihood system.

### 4.2 Intervention by Plantation Labour Recruits

Billings (2002: 29) wrote that Europeans sighted New Ireland from time to time during the seventeenth century; however it was not until 1865 that Lt. Philip Carteret R.N. commanding HMS Sloop Swallow landed on the south coast and established that it was a separate island. The landing led to the establishment of both the German and English trading posts on the island in the 1870s. According to Griffin, Nelson and Firth (1979), the Imperial German Government annexed and named the island New Mecklenburg in 1884. This happened ten days after the proclamation of the British Protectorate over the south coast of New Guinea. It can be argued that these events marked the beginning of foreign intervention of livelihoods on New Ireland. Following these events, Corris (1968: 85) reported that the Islands were exposed to a labour recruitment drive in 1883. It was during this time that the Fijian recruiter, the *Lord of the Isles*, collaborated with the German trader Eduard Hensheim to recruit men from the northern part of New Ireland for sugar plantations in Samoa. The recruitment drive resulted in the recruiting of 528 labourers from Lihir and the neighbouring islands of Anir and Tanga.



Similarly, Firth (1982), indicates that during the same year demand for coloured labour from the islands increased as a direct result of expansion in the Queensland sugarcane industry. Subsequently, some 649 men from Lihir were recruited to work in sugar plantations in Queensland, Australia. According to Bainton (2006), this marked the beginning of exposure and entrance to the global capital system by Lihirians. To this end, it can be suggested that the recruitment of labour from Lihir marked the beginning of interventions into the Lihirian cultural and traditional livelihood system. This suggestion is evidenced by labour recruits, upon completing their terms as plantation workers, returning with modern goods including steel tools such as axes and bush knives (Waiko, 2003). Observation indicates that steel tools have revolutionized the people's technology, and eased their burden of work. They are regarded essential tools in rural livelihoods in PNG.

An interviewee recalled a story told on Masahet Island, which has been passed down over generations about the first steel axe demonstration. Amazed by the new introduction into their village the chief of the village instructed some young men to spread the news to the entire island showing some of the grain from the tree that had been chopped with the axe. Corris, (1968: 95), suggested that the people's quest for steel tools and other modern goods came to a stop when the recruiting of labour for the Queensland sugar plantations ceased in May 1884. This happened when some 800 plantation labourers died from malaria, including 85 from New Ireland and New Britain.

Another notable outcome was that PNG men who had worked for the white men in plantations were able to increase their status to become "big men", as they were able to dispense modern goods through payments of bride price and services. However, this new wealth undermined the status of the traditional "big men" and seriously disrupted some traditional and cultural practices (Waiko, 2003).

In Bainton's (2006) opinion the high number of men recruited from Lihir in 1883 was an indication that Lihirians were more willing recruits in the labour trade than men from the neighbouring islands of Tanga, Tabar, and Feni. He also claims that Lihirians appeared to be headed on a prosperous economic trajectory through the recruitment of labour. Bainton's claim was based on the understanding that a higher number of men being introduced to wage labour and new consumer goods had possibly generated a greater desire to trade labour for money and commodities. However, initial enthusiasm for labour participation never translated into organised and sustained economic activity for Lihirians. The fate of the Lihirian cultural

and traditional livelihood system came to rest in the hands of German Imperial rule and the Australian Administration (Bainton, 2009).

### 4.3 Intervention by German Imperial Rule

According to Griffin et al (1979:36), Germany first acquired Melanesian territory in 1885. Officially known as ‘The Protectorate of the New Guinea Company’, this area stretched from the northeast mainland of New Guinea to the northern and eastern islands, covering the Bismarck Archipelago, New Britain, New Ireland, Lavongai (New Hanover), and Manus. The German Government granted the company a charter to administer the colony and to occupy what they regarded as ‘ownerless land’. The primary reasons for their presence were to make money by developing a plantation economy and to impose a foreign system of administration upon the inhabitants.

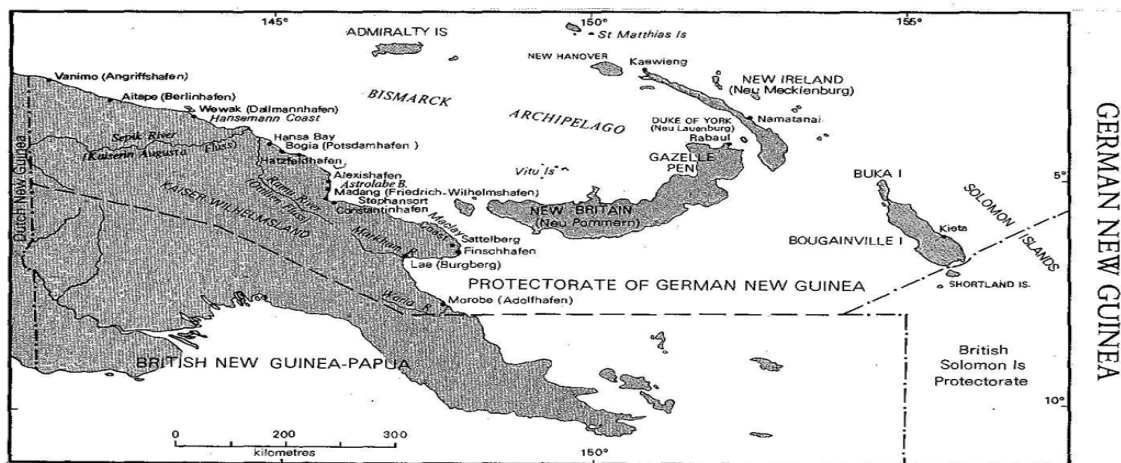


Figure 4. 1: PNG under German & British Rule (Source: Griffin et al, 1979)

Griffin et al (1979), indicated that initially the Germans concentrated their settlement on the mainland of New Guinea around the Astrolabe Bay district where traditionally village life had hardly been touched by foreign influences. The people used stone axes, wore bark clothing, and had travelled no further for trading than southern New Britain. This is in contrast to the situation in the islands where the people had been exposed to modern goods, including steel tools through their exposure as plantation labourers in Queensland and Fiji. Therefore, the Germans in their attempt to develop a plantation economy had to recruit labour they needed from New Britain and New Ireland. However, their drive and commitment to develop the plantation economy did not go down too well with the islanders.

Griffin et al (1979), suggest that the German establishment in the New Guinea mainland was gaining a reputation in the New Guinea Islands of being the place where there was “no kaikai [food], no Sunday, plenty fight, plenty die”. Further, they indicated that the islanders’ reluctance to engage in wage labour stemmed from the dreadful working conditions and a more general realisation that the existence of ‘successful’ workers was not necessarily better than village life. They said such sentiments were captured in the words of one Lihirian who in 1900 reportedly asked the Governor Rudolf von Benningsen ‘why villagers should go to the plantations when they had plenty to eat at home’. Hence, many islanders were reluctant to leave their villages to work in the German plantations on the New Guinea mainland.

Nevertheless, by 1905 the Germans were drawing more of the Namatanai District into their “sphere of control”. This resulted in the establishment of administrative units on Lihir, Tanga, and Anir Islands. The Germans appointed local chiefs whom they called – *luluais* and *tultuls* to head the administrative units (Sack and Clark 1978:257). Following the introduction of forced labour in 1903 and the imposition of head tax, *luluais* soon became important government agents. They were responsible for maintenance of roads and bridges, village sanitation, law and order, collection of head tax and facilitators in the process of recruitment of physically fit adult male for forced labour by the German Company (Waiko, 2003). Qualitative data suggest that the appointment of the *luluais* and the *tultuls* to head their villages was the first formal political structure introduced into the cultural and traditional livelihood system on Lihir. They were the contact point for the colonial administration and operated over and above the social clan system that has existed in Lihir for many generations. Sack and Clark (1978) state that the *luluais* and *tultuls* were instructed to be unquestionably obedient to the German officials in order to implement their colonial authority.

#### **4.4 Intervention by Churches**

Apart from the primary role in converting people to Christianity, the churches have also played an important role in providing education, health and welfare services in areas where government agencies were slow to bring development. The churches assisted the local people to establish selfhelp social and economic projects - plantations, village cooperatives, and small business, and assisted in building infrastructure. Some churches taught reading and

writing in the local vernacular so that people could read the Bible in their own languages. They played a major role in introducing and encouraging people to participate in sports as a means to end tribal warfare. These are some of the activities the Churches focused on when they entered Lihir, beginning with the Catholic Mission, and followed by the Methodist Missionary Society (now known as the United Church of PNG).

The Catholic Mission entered New Ireland in 1901 and established itself in the central and northern parts of the Island (Billings, 2002). In 1933, the Catholic Mission established a modern station on Lihir at Pali (see Figure 1.2, Chapter 1), where it became a gateway to the world. Pali had a trade store, a copra buying depot, a health centre and a vocational school. Besides the vocational school, the church established five primary schools (Macintyre, 1989). According to a long serving member of the Catholic Church, most Lihirians were educated at the church run schools. The church also operated a shipping service between the Lihir Islands and Namatanai for the marketing of copra, but ceased operation towards the end of the construction phase of the mine in 1997.

Women interviewees indicated that the Catholic Church through Pali vocational centre assisted female graduates to establish village based enterprises. The church appointed an expatriate instructor to oversee the establishment of the village enterprises. Twelve such projects were established at one time or another in the 1970s. The enterprises seem to have lasted only as long as the expatriate instructor was available to oversee their operation. Interviewees claimed that there was some confusion as to whether the projects were owned by the clans or the Pali Vocational Centre graduates, as a result the projects failed.

The other church which established itself on the Lihir was the Methodist Missionary Society. It was also established all over the New Ireland province, when the Australians occupied Kavieng on 17 October 1914. It then entered the island during the first decade of the twentieth century, but gained converts in only four of the twenty villages (Billings, 2002). Interviewees indicated that the Church first established its headquarters at Kunaie village, but relocated to Samo where the majority of the members are from, and where more land was available. Following the relocation the church established Samo primary school. Other churches were to follow, including the Seventh Day Adventists and the Pentecostals.

## 4.5 The Australian Colonial Era

The Australians commenced occupation of German New Guinea in 1914 after the First World War. They took over a territory that was largely controlled by the Europeans. However, the European control was largely limited to the coastal fringes and places that were accessible. They regarded New Guineans as ‘boys’, legally forbidden to own businesses; Australians became the new ‘masters’, secure in their economic dominance. After nearly thirty years of ‘control’, thousands of New Guinea men had entered the international labour trade or signed on as plantation labourers throughout the protectorate (Griffin et al, 1979: 74). The cessation of German rule and the commencement of Australian occupation had led some New Guinea men to believe that they would be free to flee their German employers, break their contracts, and escape back to their villages. However that was not to be the case, as the hierarchical order remained the same: whites were vested with power to direct the lives of Melanesians. It was a case of the new colonial power who became the settler and the native became the subordinates (Denoon, 2005).

By 1940 about two-thirds of the Territory was governed by Australians through ‘patrol’. Villages close to administrative centres or which had good anchorages might be visited twice a year, while the more distant villages might see a patrol once every two years. However some people were rarely visited (Griffin et al, 1979: 89). The country’s rugged terrain and terrestrial and marine ecosystem could have posed some difficulties preventing the Australian administration from developing a sustainable transport infrastructure. Instead they concentrated their efforts in areas that had been opened up by German and British administrations (Gibson and Rozelle, 2003). Based on this argument, the remoteness of Lihir may have made it difficult for the Australian administration to visit the island regularly. As claimed by a former councillor; *the patrol officers, who were mainly Australians, visited the Islands probably twice a year in the 1960s. They hardly stay with us, they sleep on the government boats, they conduct roll calls in every village they visited and made people to build their rest houses. Lihir was unknown, it was remote for government officers, sometimes bad weather prevented them from coming to Lihir.* A former government officer indicated that because of the remoteness of the Islands, the colonial administration decided to bring its services to the islands by building a government station in the late 1960s and staffed it with a Patrol Officer, an agricultural officer, a commerce officer, a policeman, and a casual correctional officer. The station also had a rural lock-up for trouble makers. However, Lihir

simply did not have the necessary resources for economic development, such as a road, vehicle transport, sea ports and regular sea transport, making access to markets increasingly difficult for the people. Bainton (2009) claims that Lihirians therefore considered themselves deprived, economically disadvantaged and remained marginal under both the German and Australian administration, owing to geographic isolation and lack of government attention.

## **4.6 The Cargo Cult, and Its Intervention on Livelihoods**

### **4.6.1 The beginning of Cargo Cult on New Ireland**

In anthropological perspectives the concept ‘cargo’ (in Tok Pisin *Kago*) refers to spiritual expectation of an abundant supply of Western cargo (Otto, 1998:229). According to Billing (2002), the emergence of the cargo cult phenomenon in the 1940s and 1960s in Melanesia stemmed from a local reaction to economic and social transformation and inequalities. It represents the locals’ desire and dreams for new social models that would ensure local sovereignty and withdrawal of colonial rule. Further, Billing argues that cargo believers tend to always expect a sudden, miraculous transformation of their lives.

Interviewees who were once followers of the cult movement claim that the cargo cult movement in the New Ireland province began in 1960 on Lavongai, sometimes also as New Hanover Island, located North West of the main island of New Ireland. Normally it has been thought that the dead ancestors are the source of cargo. According to Otto, (1998), rooted in this phenomenon is the belief that dead ancestors would one day return to deliver Western cargo to make the followers rich. Many interviewees claim that that belief was entrenched by the people’s encounter with a group of American gold explorers on New Hanover. The Americans traded some of their modern goods, mainly tinned food, rice, and tobacco with the locals for fruits, such as pineapples, pawpaw and *kulau* (soft green coconut). Further, the Americans occasionally would offer free goods to the locals, particularly to their immediate helpers in their exploration. The interviewees claimed that the local people became so engrossed in the encounter that every trip a helicopter made to New Hanover from Rabaul or Kavieng the locals knew more goods were on board for them. Consequently, the people’s acquaintance with the white Americans led them to think that their cargo cult belief was now coming to pass. That belief resulted in a significant event in 1964, when during the elections, the chief of the Island mobilised his people to stage a petition at the Methodist Mission

Station on the Island to elect Lyndon B. Johnson of America to be their regional representative in the House of Assembly in Port Moresby. Billings (2002), one of the very few anthropologists to have worked in New Hanover, claims that on the dawn of Election Day, the election officials noticed that a blackboard had been erected outside the missionary's house with a simple message written on it: 'We want to vote for Lyndon B. Johnson of America. That is all'. Despite all appeals to the people to vote for a bona fide local candidate, instead they wanted to vote for Lyndon B. Johnson to be their representative. This protest had lasting effects, as for years, large numbers of voters continued to express their allegiance to Lyndon B. Johnson and their dream for American intervention and co-operation in place of the Australian colonial administration. The name (*Johnson's cult*) associated with the New Hanover cargo cult movement originated from this episode (Billings, 2002, 1969).

#### **4.6.2 Evolvement of Johnson's Cargo Cult into Investment Livelihood Activities**

In contrast to the cargo cult phenomenon in the sense of waiting for the arrival of cargo from some dead ancestors, the Johnson's cult was practical. As claimed by an interviewee the intention of the cult emanating from New Hanover was towards improving the people's livelihoods. This was evident by the evolvement of the cult into an investment activity, which the people name *Tutukal Isaku* Association (TIA). TIA means '*stand up together to plant*' in the Northern New Ireland Language. The interviewee also indicated that the Catholic Priest based on New Hanover assisted the people in formalising TIA into a cooperative society. However, a former patrol officer, who served on New Ireland during the heights of the cult movement, indicated that many people who were opposed to the cult movement refused to become members of the cooperative. As a result the association evolved into another association known as *Tuk Kuvul Aisok* (TKA), which translated '*stand together and work*' in the local language. TKA operated as a farmers' cooperative; separately from the stigma of *Johnson's cult* associated with TIA.

#### **4.6.3 The Johnson's on Cult on Lihir**

A village elder from Matakues village indicated that the *Johnson's cult* as TKA was introduced to Niolam Island, Lihir, by a man from the same village in 1969. He was then working in Kavieng as Catholic catechist and a native *dokta boi* (medical assistant) and had become a member of TKA. This man became the leader of TKA on Lihir. Empowered by the message from New Hanover and his experience with the cult followers in Kavieng, he attracted a following of over 2000 people on Lihir. A former patrol officer who was posted to

Lihir in 1979 claims that lack of government services and subsequent lack of economic development on Lihir was the main reason for the people's receptiveness to the cargo cult movement introduced from New Hanover. Moreover, a former councillor stated that; *Lihir was forgotten by the colonial government, and again by the PNG government after independence. No one knew us, now it seems the whole world knows us because of our gold.*

In addition, the Matakues village elder and other interviewees claim that his message was very convincing, as he was able to connect it with a well known Lihirian prophecy told on Lihir in the 17<sup>th</sup> century: *that Lihir has wealth under the ground, which one day will make the people rich, and that white men will become their slaves.* He declared that their ancestors would return in the form of American businessmen who would bring money and transform Lihir into a city. It would become a place where there would be roads, electricity and that all Lihirians would live in European style houses and buy their food from stores. People would have money, either from their own production or given by their wealthy ancestors. To that end, the presence of white men during the exploration of gold on the islands (See Chapter 5) in the 1980s entrenched the Johnson's cult belief, and led to intensifying the activities of the cult. Followers of TKA interviewed during the field work claimed that this prophecy has become a reality as they see a lot of white people being employed by Lihirian companies contracted by the mining operation.

A former patrol officer who served on Lihir during the 1970s indicated that the leader of TKA instructed his followers to establish prayer sites in their villages with a wooden cross erected at the centre of the site. They were instructed to congregate at their prayer sites twice a day to pray. An interviewee who was then a member of TKA stated that in all their prayers they would petition God to send their dead ancestors back to life to deliver Western style goods in order for them to become wealthy. Moreover, the TKA leader convinced his followers to believe that for their dead ancestors to return they had to campaign for Jesus Christ to be their candidate in the 1982 national elections. Accordingly, on the Election Day they staged a procession displaying a single ballot paper with the words "*1982 National Elections Votim Jesus Christ, King Bilong Olgeta*" (Vote for Jesus Christ, King for all). The ballot paper was presented to the presiding officer by the cult leader. Without the people's knowledge he secretly buried the ballot paper at Potzlaka (see Figure 1.2, Chapter 1), a site where the Local Level Government headquarters is now located.



There were regular altercations between the followers of TKA and non-followers. The TKA followers refused to pay the council head tax, instead opting to pay their tax to the leader of the cult movement. The then clerk of the cult group who headed the collection of tax claims a total of PNGK6, 000.00 (NZ\$3000.00) was collected and remitted to New Hanover Island, where the Johnson's cult originated. Most interviewees claim the money is invested in a bank in the United States of America and are anticipating a windfall in the future.

Stemming from the colonial administration's failure to quell the cult group the non-followers also refused to pay their council head tax. Consequently the government officials submitted a special report to the administration to exempt Lihirians from paying head tax. A former patrol officer who was largely responsible for the report indicated that the other argument in the submission was the limited economic opportunities faced by the people to earn regular income in order to pay their tax. This brings the discussion to the rationale underlying the emergence of cargo cult.

#### **4.6.4 Evolvement Johnson's Cult into Economic Livelihood Activities on Lihir**

Motivated by their economically enterprising and proactive motto; *let's stand together and work*, the TKA leaders mobilised their members to plant more coconuts, betel nuts, mustard and coconut plantations on their customary. Certain villages seriously took heed of the association's move and went into mass plantings of these crops. An example is Matakues village, which is particularly known for its bountiful supply of these crops, especially betel nuts (See Chapter 6). The crop has become an important source of income for the people of Matakues. As stated by a former executive of TKA; *We encouraged our people to plant betel nuts, coconuts, and mustard. Despite the fact that there was no initial market for them, but as a result of the mining operation the people are making lots of money from them. Everyone on the island knows that Matakues Village is the main supplier of these crops.* On the other hand, not all Lihirians were convinced that TKA was capable of delivering the cargo. Disagreements over which strategies would lead to realising the members' dreams started to emerge within the core of the association's leadership. Capitalising on these disagreements an interviewee from Matakues village stated that he tactfully negotiated with the leader of TKA in 1973 to form another association, which they called *Tutrome Farmers Association (TFA)*. The informant assisted by a Catholic Priest stationed at Pali (See Figure 1.2 Chapter 1) attempted to transform TFA into a business group. The move attracted the attention of the colonial administration as a genuine move towards creating economic activities for its

members. The association reinforced the village coconut plantation concept conceived under TKA. However, a key informant claims that, in the absence of a marketing outlet for their copra as an association, the people had no choice, but to sell their copra to the Catholic Church. Moreover, the people resented the low price of copra offered by the Catholic Church, and as a result they resorted to reviving their cargo cult activities. Subsequently, they protested against the council, which they claimed was not doing anything to develop proper marketing infrastructure for their copra. Stemming from this political and economic situation and coupled with news that exploration for gold would soon commence, TFA consolidated its leadership and became quite vocal in the negotiation leading to the signing of mining agreement. To this end, the Association extended the prophesy by the cult leader mentioned above and broadly declared that all the resources on and under the ground, in and under the ocean, including stones, steam from hot springs, wind, rainbow, lightning, sun, moon light shining on Lihir, stars, cloud, and the people's culture and beliefs about all their resources, and money earned from these resources belongs to the people of Lihir and the company which will come in to mine, use, or transform these resources. Furthermore, TFA declared that all compensation and mining royalties be paid through TFA and that the association becomes the sole distributor of cash to the people of Lihir, but the declarations failed to materialise. An interviewee states that TFA did not have the capacity and mandate to handle royalties and compensation. Furthermore, the declarations indicate a drastic departure from the earlier intention towards encouraging economic strategies, guided by their motto; *Let us stand together and work*. In so doing the association shifted away from their cargo cult mentality abandoning its links with New Hanover and devoted their attention to increasing copra production, which they had no choice, but to sell their copra at the Catholic Mission stationed at Pali.

#### **4.7 Early Modern Economic Livelihood Strategies**

This section covers the early modern economic livelihood strategies which have been attempted at some stage on the islands prior to the mining operation mentioned in Chapter 5. These strategies derived from the need for cash to pay for services and government head tax during the colonial era. The production of copra, cocoa, chillies, poultry, home sewing and baking has been, at one time or another, economic livelihood strategies. On a bigger scale coconut plantations have also existed on the island.

### 4.7.1 Copra

Coconut, from which copra is made for commercial purposes, is a common tree crop in the coastal areas of Papua New Guinea. Lihir is no exception. The tree has always been part of the people's livelihoods. The mature nut contains an oily flesh, which is widely used as a food condiment. Similarly, it can be solely consumed as green coconut. It is also widely used as pig feed, which is common on Lihir. Interviewees indicate that copra was the principal source of income on the islands prior to the mining operation. However, in some villages the chiefs were the main producers as they had ultimate access to the coconut trees growing on their customary land. For example interviewee data from Matakues village indicate that four chiefs were involved in producing copra, and as such were tagged as businessmen by their own people. These chiefs occasionally would employ men and women, who were desperate for some cash, to cut their copra to pay for services. Thus, copra production on the islands was largely driven by the need for cash for special occasions such as feasts, Christmas, Easter, and the payment for services (school fees) and the council head tax. An informant recalled that her parents had to work hard to produce copra to pay for her school fees. On the other hand most people did not see the need for money. Hence the urge to make copra was nonexistent for them. According to an interviewee from Samo village, often people would sell their copra for goods such as rice, clothes, lamps, soap and steel tools. Notwithstanding the above situation, proponents of the TFA encouraged the local people to work on their coconut plantations. Reminders of these plantations are still evident in some villages. Similarly, archives of the Patrol Officer's reports on the Islands during the 1950s also show that more than 60,000 coconut plants were growing on customary land. A production figure of about 170 tons was estimated from the trees by the colonial administration, but they were producing only 60 to 70 tons, although the records did not indicate the number of people producing copra at the village level, nor the quantity. The bulk of the production figure could have been based on the amount of copra sold to the Catholic Church (see Section 4.4). The figure could have been based on production from the privately owned plantations mentioned in Section 4.7.2. Villages located within the periphery of these plantations were then selling their copra to these plantations. In a related development, a man from Masahait Island (see Figure 1.2, Chapter 1) convinced his clan to establish a coconut plantation on their customary land located between Kunaie and Zuen Villages. Qualitative data indicate that he was hoping to compete with the other plantations by providing an alternative market for the villages

producing copra. Moreover, the price of copra was quite high, and he thought he would make a fortune from the plantation. However, that was not to be, as by the time the coconuts commenced production in mid 1970s, the price of copra had dropped miserably, and despite the price subsidies instituted by the colonial administration to support the growers, he decided to abandon the plantation. On the other hand some people continued to produce copra in small cooperatives under TFA.

#### **4.7.2 Plantations**

Apart from the coconut trees planted by villages on their customary land, Macintyre (2003) indicates that by the 1950s the Lihirian copra industry began to advance, as both the Hunia and Lakakot Bay plantations were established. In addition the Londolovit Plantation was established by an Australian family in 1960. These plantations although established on customary land that had been alienated, were not major employers of Lihirians. Most employees were brought in from the Sepiks, New Ireland and Bougainville as contract workers. These people became the first non-Lihirians who were brought in as plantation contract workers (Macintyre, 2003). However, qualitative data indicate that men from Kunaie, Lambuar and Samo villages were occasionally employed by these plantations. For example, during the later part of 1980 most workers at Lakakot plantation were men from Lambuar Village. These people abandoned their employer in 1995 and joined the work force needed in the construction phase of the mining facilities. As expressed by an interviewee; *the mining company was offering more money than the plantation, so we left. That is why the plantation had to close.*

#### **4.7.3 Cocoa**

According to an interviewee cocoa was introduced to Lihir in the early 1950s by Lihirians who had returned home from wage employment on New Britain Island. The crop did not become a cash crop in a big way. However, the interviewee claims that there were about 50-70 cocoa growers and 7 licensed cocoa processing facilities (fermenteries) on Niolam Island between the 1970s and 1980s.

During the 1960s and 1970s all the processed cocoa beans were sold in Namatanai Town where an export agent, Bali Merchants, was located. However, a former Patrol Officer indicated that it had to close down as a result of the low volume of produce from the local

producers. He claimed that the closure of the export agency caused a lot of growers to neglect their cocoa trees, which led to the closure of four fermenteries. Most of the cocoa produced during the 1980s were then shipped to Rabaul, East New Britain Province. An interviewee from Komat Village said his father-in-law was a major cocoa grower and a licensed cocoa dealer. He was then buying wet cocoa beans from the villages and processing them into export beans. Cocoa was also grown at Pali, Lataul, and Lesel villages. However, most interviewees made particular reference to a local man who was viewed by many as a successful cocoa dealer and the first businessman on the Islands. Apart from cocoa, he was also buying copra from the villages and operating a trade store. Another individual cocoa dealer that was quite well known was located at Samo village, although his business had a short life of two years (1993-1994). The highest number of export cocoa bags sold by the owner was 72, earning a total of PNGK2, 700.00 (NZ\$1, 350.00). According to the owner he abandoned the business in 1995 to join the other men from his village to work for wages during the construction phase of the mining operation. The money he was earning from being employed was more than what he was earning from his cocoa business. Similarly, most people consulted in the case study villages indicate that the copra and cocoa production collapsed when the mine opened in 1995 as a result of the high income from the royalties and wages from the mine. To this end, all the cocoa growers naturally lost interest in their cocoa trees.

#### **4.7.4 Chilli**

Chilli was introduced to the Islands by the agricultural officers in the mid 1970s and became popular, especially on Masahait Island. According to a woman interviewee, chilli was an easy crop for women to work with, as it does not require heavy work. Similarly, the crop was noted by Filer and Jackson (1989:42) as a minor cash crop. However, lack of marketing infrastructure made it impossible for the people to market their dried chillies.

#### **4.7.5 Poultry**

Qualitative data show that poultry, especially meat birds, was introduced to Lihir in the early 1980s. About ten projects existed at Samo village between 1990 and 1997. According to interviewees at Samo village the poultry projects were doing well during this period as a lot of people were then employed during the construction phase of the mine. Subsequently, there were a lot of customers who had cash to buy their birds. Each bird was fetching about K30.00

(NZ\$15.00). On the other hand, some people were obtaining birds on credits, but not honouring their obligations to pay. For example, a women interviewee noted that a few of her relatives have yet to pay for birds obtained on credit from her in 1996. Another male interviewee stated that he raised two batches in 1995, but could not continue as he was recruited to work in the mine. Moreover, he noted the transport difficulties in getting day old birds and commercial feed to the Islands discouraged the poultry growers.

## **4.8 Early Institutions**

This section covers attempts by Lihirians to form produce cooperatives, a business group, and the political incorporation of Lihir with the Namatanai Local Level Government. These institutions were introduced into Lihir by both the Colonial administration in 1950s and 1960s. At independence in 1975 the PNG Government continued with the concept of produce cooperatives and business groups, but without success. According to a former patrol officer, the main reason for their failure was lack management skills by the locals.

### **4.8.1 Lihirian Cooperative Societies**

Waiko (2003: 91) wrote that part of the colonial administration strategy towards engaging Papua New Guineans to participate in the country's economy was through the establishment of production and marketing cooperatives in the 1950s and 1960s. The concept was designed to encourage the locals to grow cash crops on their customary land and sell their produce to their own cooperatives. An interviewee indicated that during the 1960s a *luluai* from Lesel village, acting on advice from a government patrol officer, formed a committee comprised of a number of 'big men' to focus on increasing coconut plantings for produce cooperatives. The initiative coincided with the formation of small production units within the clans which they called *wok tesin bilong sasaiti* in *Tok Pisin*; translated as 'plantation work activities for the societies'. The production units evolved into small cooperative societies, which required people to pay membership fees to become members. The people, operating within their cooperative societies, assisted each other in making copra. The production cooperatives were revived during the TKA period, which resulted in the establishment of plantations in some villages. A former patrol officer claims that despite infrastructural constraints, these activities represent some level of economic progress towards producing copra not as individuals but as cooperatives. Similarly, elderly interviewees at Matakues and Komat villages indicated that

copra production increased, evidenced by the number of big men involved in producing copra. This spurred the member for New Ireland in the first House of Assembly for PNG to visit the Islands, purposely to gauge the people's views about a locally owned copra cargo boat. However, the cargo boat never arrived, consequently, the initiative failed to gain greater heights. Similarly, Waiko (2003) claims that marketing cooperatives set up by the Australian administration in the 1950s failed due to lack of capital and mismanagement.

In 1980 a business group was incorporated as the Maniel Business Group, which was known to be the first on the Islands. The major shareholder was the United Church and certain individuals on the Islands. The group operated a cargo boat (MV Maniel), which was shipping copra between Lihir and Namatanai. The cargo boat was funded from a major loan secured from the then Agriculture Bank (now the Rural Development Bank). A key informant states that operating a cargo boat at that time was a risky business as most times it was making trips to Namatanai with low volumes of copra. However, the business group managed to fully repay the loan, although the bulk of the loan instalments were from the Church financial contributions. Ultimately the boat had to stop operating in 1986.

#### **4.8.2 Political Incorporation**

Qualitative interviews with key informants indicate that Lihir was officially incorporated into the Namatanai Local Government Council in 1967. Some *luluais* appointed during the German Imperial rule remained on as councillors, while many of them were happy to relinquish their positions to younger Lihirians. In total, eleven councillors were elected to represent Lihir, which meant that Lihir was well represented. The councillors used their numerical strength and successfully lobbied for one of them to be elected as the Vice-President, a position which he held for ten years. According to him, the councillors discharged their responsibilities enthusiastically, initiating projects that would benefit the people. For example, the councillors initiated moves to purchase a work boat to assist the people in shipping their copra to Namatanai. However, he claims their effort was thwarted by the colonial administration, concluding that the project would be uneconomical and that there would be colossal logistical problems associated with the ownership and management of the boat. In the area of health, the councillors pushed for the establishment of two rural aid posts and a primary school. Conversely, a former councillor claims that for over 15 years they had to govern the Islands under a hostile environment stemming from the cargo cult activities,

mentioned above. The local government council system evolved into what is now known as the Local Level Government (LLG) under the government reforms in 1995. Lihir formed the Nimamar Rural Local Level Government (NRLLG), which politically and administratively reports to the Namatanai District. In total there are 14 Wards on Lihir, each represented by a duly elected representative, commonly designated Ward Member. Ward Members serve for a term of five years. Generally, a Ward in PNG can consist of one village or number of villages, depending on the population.

The NRLLG is headed by a President who is elected by the Ward Members for a term of five years. Qualitative interviews reveal that each Ward has both a Ward Planning Committee and a Ward Development Committee. The primary responsibility of the Ward Planning Committee is to initiate and devise Ward projects which are presented to the Ward Development Committee for further deliberation. The projects are prioritised at this level before they are presented by the Ward Member in the NRLLG budget meeting for funding.

Table 4.1: Timeline of Major Events (Source: LGL, 2009)

<b>Year</b>	<b>Major Events</b>
1616	First recorded sightings of Lihir by Dutch Explores: Le Marie and Schauten
1643	Abel Janzoon Tasman navigated through New Guinea onboard the Heemskerck. A companion Isaac Gileman sketched the first image of Lihir. Abel names the Islands Gerrit de Niz Eylandt.
1883	649 Lihirians sign on for work in Queensland sugar cane industry. Some men were recruited against their will and taken abroad.
1884	German occupied North East New Guinea in a bid to establish a plantation economy.
1905	Germans entered New Ireland. Settled at Namatanai, sub-district. Appointment of <i>Luluais</i> in villages
1907	Otto Scchlaginhauffen with the Deutsche Marine-expedition lands at Pali, Lihir, Recorded songs and documented aspects of the Lihir culture.
1918	Australian administration assumed control of German New Guinea after WW I
1933	Catholic Mission established a station at Pali, Lihir Islands. Physical development in terms of Schools and health facilities were established.
1939	WWII, Lihirian men recruited as carriers
1960	A copra plantation established at Londolovit by an Australian couple.



	Airstrip established.
1967	Namatanai Local Level Government established. Lihir Islands represented by 11 councillors. Vice – President was a Lihrian. Villages were encouraged to produce copra, but sporadic
1969	Cargo cult introduced to Lihir as TIA Followers refuse to pay council head tax. People were encouraged to plant coconuts on customary land.
1973	TIA became TFA
1975	Papua New Guinea became an independent Nation
1982	Exploration on Lihir for minerals by Kennecott Exploration Australia Lihirians, for the first time employed as wage earners
1984	TFA changed its name to Nimamar
1988	Nimamar Community Government formed
1994	Community Government system done away with. Nimamar Development Authority formed
1995	Organic law on government reforms introduced. Nimamar Rural Local Government formed Mining lease is granted. The first Integrated Benefit Package is signed. Mining construction begins. More than 2000 people employed. Changes to the livelihood system on Lihir begin in a big way. Greater access to cash, and consumables. Changes to physical infrastructure, relocation of villages Establishment of institutions and businesses (see chapters 5 & 6)
1997	Mining operation begins. (see chapters 5 & 6)

## 4. 9 Conclusion

The discovery of the New Ireland in the 18<sup>th</sup> century by Europeans and the consequent establishment of trading posts exposed Lihir to the outside world. This exposure resulted in the introduction of modern goods, especially steel tools, which have become essential livelihood resources not only on the Lihir Islands, but also throughout the rural areas in PNG. The intervention by the German Imperial rule in the 19<sup>th</sup> century established the first ever

Western political system by appointing *luluais* and *tutuls* mainly to assist in recruitment of labour for their plantation economy. Although the Germans established a trading post on Lihir in 1905, the Islands did not advance in terms of economic, social and physical infrastructural development. However, intervention by the Catholic mission in the 1920s was probably the beginning of some tangible intervention on the Lihir cultural and traditional livelihood system. As its settlement on Lihir stimulated economic activities in terms of copra production, social services, and shipping service, which linked the Islands with the emerging civilisation on New Ireland and New Britain. Besides, it also built a modern station, which had copra buying depot and a trade store. Fourthly, despite the tangible development spurred by the Catholic Mission the Australian colonial administration upon inheriting New Guinea from the Germans in 1914 regarded Lihir as isolated and economically peripheral to the main Island of New Ireland. Therefore, the social and economic activities initiated by the Australians were largely limited to accessible areas.

The introduction of the Local Level Government Council system in 1967 empowered the Lihir councillors to establish a school and rural health facilities on the Islands. Although the councillors did have some control in their attempt to economically develop Lihir the colonial administration was grossly unsupportive, labelling their plans as uneconomical due mainly to the isolation of the Lihir. The local government council system evolved into what is now known as the Local Level Government (LLG) under the government reforms in 1995. Consequently, Lihir formed the Nimamar Rural Local Level Government (NRLLG).

The isolation, and lack of attention on Lihir by the colonial administration, resulted in the people's receptiveness to a cargo cult intervention, originating from New Hanover in 1969. The councillors instead of governing the Islands shift their focus on attempting to suppress the new intervention. The cargo cult evolved into economic and political associations, firstly as TKA, and than TFA. Central to the evolvement of the associations was the establishment of economic livelihood strategies in terms of planting more coconuts on their customary land. Copra production cooperatives were formed along clan lines, but failed, as 'big men' seized the opportunity to own them in order to increase their control and fame within a circumscribed social environment. In the midst of these interventions Lihirians have attempted various economic enterprises. Overall, the Lihirian and cultural traditional livelihood system is keenly shaped as Lihirians are steadily drawn into the interactions in the labour trade, the German plantation economy, mission activities, the colonial administration, the cult activities, the local copra industry and now the Coming the Mine – Chapter 5.

## **Chapter 5: The Gold Mine as an Intervention**

### **5.1 Introduction**

This chapter describes how the gold mine operation became a major intervention in the people's livelihood on the Lehar Islands. This intervention has been transforming the island from what was always regarded as economically backward to a fast changing modern island. First, the mining industry in PNG and its contribution to the PNG economy is presented. The effects of the mine on the various institutions and organisations, their roles, how they function, and how they inter-relate are analysed. The chapter then discusses the embracement of wage employment as a livelihood strategy for Lihirians. Mining operations inevitably create conducive environments for businesses. The engagement of Lihirians in spin-off businesses is presented. Three categories of businesses are identified: big businesses, small businesses, and local businesses. Reference is drawn to the non-market-centric and market-centric desires and perspectives in operating these businesses. The chapter ends with infrastructural development stemming from the mining operation.

### **5.2 Mining in Papua New Guinea**

This section presents an overview of the early wave of the mining industry, the current mining operation and its importance to the PNG economy. Papua New Guinea is endowed with natural resources, including major gold and copper deposits, large oil and natural gas reserves, vast expanses of agricultural land, and extensive forests and maritime fisheries. These rich natural resources provide the foundation for a markedly dualistic economy in which a dynamic, capital-intensive enclave minerals sector is dominating. The Australian colonial administration laid the groundwork for the production of commodities for export and promoted the use of natural resources to finance economic development. After independence in 1975, PNG rapidly became a mining frontier (Baxter, 2001).

According to Banks (2001), the first wave of the PNG mining industry dates back to 1888, when gold was discovered on the Sudest Island in Milne Bay by North Queensland prospectors (see Figure 5.1) The discovery sparked a thirty year progression of alluvial

mining throughout the islands of Milne Bay, spreading to the mainland of what was then known as Papua, under the British and subsequently the Australian administration. Imbun (2000) noted that the discovery brought miners from Australian goldfields, which led to more extensive contact between the white men and the locals. The number of miners varied from 700 to 1000 located at various mining points. This wave of mining, according to Banks (2001), was a very small operation with low capital requirements and technology, and a short life. In this context, Banks states that the economic contribution from the operation was insignificant. On the other hand, Imbun (2000) noted that a significant lasting legacy of that operation was the uptake of new technology and skills in small-scale mining by the locals after the Europeans had left. The uptake led to a number of small scale alluvial mines, especially in the Milne Bay, Morobe and Sepik Provinces.

The second wave of mining commenced in 1926, with the discovery of gold at the Edie Creek, and subsequent identification and development of the Bulolo Valley alluvial gold resource. This discovery marked a significant milestone in the history of mining in PNG. Placer Development Ltd, a Canadian based company was responsible for developing the Bulolo gold field, through a publically listed Bulolo Gold Dredging Ltd. Consequently, interest in large-scale mining emerged, which led to hard rock mining operations at the Edie Creek deposits. These operations were serviced by aircraft, as no roads existed at that time. During 1930-31, PNG moved more airfreight than the rest of the world combined. Hard rock mining operations were also started during the 1920s and 1930s on Misima gold, and Laloki north of Port Moresby (Healy 1967). According to Imbun (2000), the Bulolo Gold Dredging was characterised by capital, technology and labour. In order to fund the operation, initial capital was raised largely in Canada and Australia in public floats. As a result, a substantial proportion of the value of gold was remitted offshore. In 1938, for example, profits accounted for 73 percent of the value of Bulolo production, and in total, during the period 1932-1962, C\$33 million was paid out to largely Australian and Canadian investors. Despite these offshore remittances, it was estimated that between 1931 and 1940, mining royalties and import duties on mining machinery accounted for 23 percent of the then Territory of New Guinea's revenues. However, it was noted that at the community level, the impact was limited by low wages paid to the local recruits, of whom the bulk were indentured labour from other parts of the then territory. The community focus was on consumption of consumable goods, rather than on investments. At the macro level, wealth derived from gold was invested in natural resource businesses, which saw the first plywood industry established at Bulolo,

which continues today. Effectively, this phase of mining ended with the Japanese invasion of PNG during the Second World War. Bulolo Town including the mining infrastructure was destroyed (Imbun, 2000; Banks, 2001).

The third wave of mining, according to Banks (2001) is pegged to the discovery of the large copper deposits on Bougainville by Conzinc Riotinto Australia geologists in 1963. This was followed soon after by the discovery of the Ok Tedi copper and gold deposits in 1967 by Kennecott Copper, and the subsequent identification of large ore quantities at Frieda River. This was then followed by the confirmation of economically viable gold deposits at Pogera, Misima and Lihir between 1981 and 1985. The Bougainville copper mine closed in 1989, following the civil war, while Misima ceased operating in 2001. Ok Tedi, Pogera, Lihir and the Ramu nickel cobalt deposit in Madang Province, and Nautilus Seabed mining between New Britain and New Ireland now form the core of the current PNG mines. The latter is the world's first seafloor mining operation. In addition, medium size level mining operations including the Sinivit-Wild Dog gold mine in East New Britain, Semberi in New Ireland Province, the Tolukuma gold mine near Port Moresby, and the Hidden Valley gold mine in Morobe Province, have all commenced operation. Meanwhile, according to Papua New Guinea Chamber of Mining PNGCMP (2009), drilling is ongoing in a number of advanced project sites, including Yandara, Friedra, Wafi-Galupu, Woodlark, Kainatu and Tabar. Further, PNGCMP reported that in 2006, a total of 132 new Exploration Licence applications were lodged with the Department of Mining.

The contribution of the mining industry to the economy is significant and multi-faceted. The government receives significant taxation, royalty and dividend revenues from the industry. In 2007, the mineral export receipts amounted to K7.9 billion and accounted for 57 percent of merchandise exports in that year. In contrast, agriculture exports were K2.3 billion, forestry K0.63 billion, marine exports K0.32 billion, and petroleum exports of K3 billion (PNGCMP, 2009).

Mining is the means through which dormant mineral wealth in the ground can be translated into public goods such as schools and hospitals and productive assets such as roads, bridges and ports. In PNG, the mining sector is responsible for more than 70 per cent of the value of merchandise exports. Further, the sector produces enhanced human capital in the form of new skills that in turn can facilitate economic development in other sectors of the economy.

Therefore mineral development is crucial to the development of a country like PNG. Mineral resources are part of the nation's realisable capital and the revenues from them can and are being used in the improvement of other types of capital, including physical, human, knowledge and institutional forms. So, according to the traditional view, mining, like other economic activities, plays an important role in the development process and can convert a mineral resource in the ground into sustainable improvements in people's livelihoods (Togolo 1999: 597).

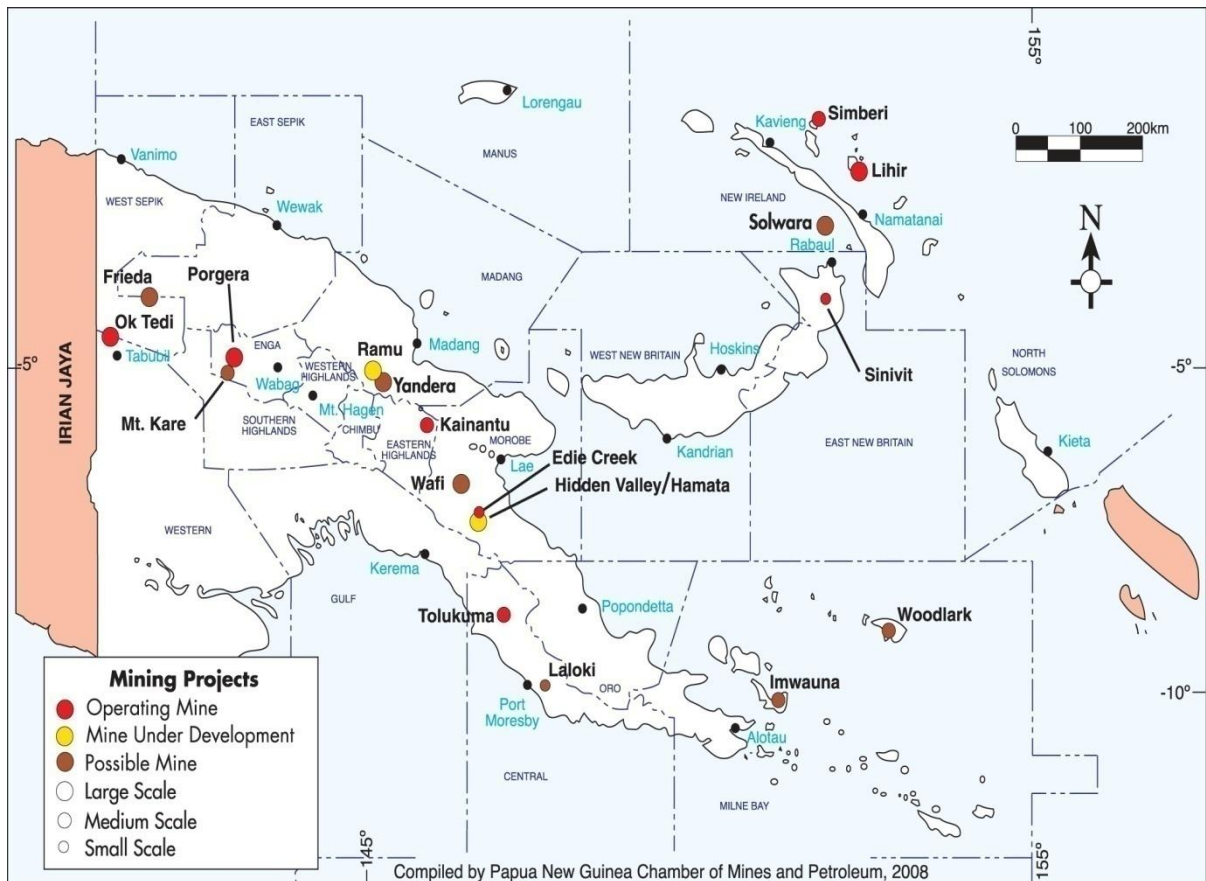


Figure 5. 1: Mining areas in PNG

Employment is generated both directly and indirectly through service providers. The non-mining areas also benefit from the spin-off business activities. Mining has had a direct impact on the local subsistence natural livelihood systems in some of the remotest parts of the country where these mines are located. The industry is increasingly being recognised as a significant contributor to livelihoods across at least 10 provinces. The transformation of the physical environment, including the construction of the mines and their associated infrastructure, and the social changes which accompanied the transformation has impacted on livelihoods in the mine areas (Banks, 2001). Being hosts to the projects alone has given most

of these previously isolated communities new experiences of wage labour, in handling of cash, in employment and business opportunities, and a link to the larger economy and society. Therefore, rural communities, which depend heavily on their natural capital to sustain their livelihoods, have to change in order to flow with the socioeconomic changes brought about by the mining operations (Baxter, 2001). The people of PNG readily welcome mining operations in their areas because they view it as a way to fulfil their dreams of development and modernity, and also to gain from the ensuing wealth that is rapidly associated with such natural resource extractive industries (Filer and Macintyre, 2006).

### **5.3 The Gold Mine on Lihir**

On Lihir, the mining operation is the most prominent intervention on the Lihirian livelihood system since the 1883, when Lihirians were first exposed to the global economy through the labour trade (see Table 4.1). The discovery and consequent mining of gold on the island is transforming the island from what has always been regarded as peculiarly backward to a fast changing modern island.

Most elderly people perceived the discovery of gold on the Island in the 1980s as the fulfilment of prophecies made in the context of the cult discussed in Chapter 4. For this reason, when Kennecott Exploration Australia Ltd and Niu Gini Mining Ltd first arrived by ship in 1982 to begin exploration for gold, many adherents of the cult linked their arrival with prophecies about cargo ships. This was confirmed when companies distributed food stuffs, toys and basic trade store items in the villages on the islands. The exercise no doubt led some to believe that the company personnel were Lihirian ancestors who had arrived with their Western style goods. Further, the modernisation of Lihir brought about by the mining operation was perceived as compelling fulfilment of these prophecies. However, these fantasies disappeared as modern educated Lihirians readily embraced the mining operation as a pathway to gain modern wealth. As expressed by a prominent Lihirian; *our aim is to create wealth, to convert gold bars into millionaires.*

The gold mine is situated in the Kapit Landolam area of Niolam Island (Figure 1.2, Chapter 1). The Lihir project is operated by Lihir Gold Limited, which is owned by a consortium, with Rio Tinto (17.5 percent) and Vengold (18.5 percent) being the largest shareholders, the people of Lihir hold 6.76 percent, while the balance is held by the public (LGL, 2003).

Gold traces were initially discovered during a geological survey of PNG conducted by the Bureau of Mineral Resources between 1969 and 1974. The results fuelled great expectations for substantial gold reserves, which averaged 1.7 grams of gold per tonne on Niolam. The report identified hydrothermal alteration and thermal activity on Niolam, suggesting the possibility of favourable epithermal gold mineralisation. Prompted by these promising projections, in 1982 Kennecott Exploration Australia and its joint venture Niugini Mining Limited conducted initial sampling work on the islands. Subsequent extensive drilling was carried out between 1982 and 1983 (LGL, 2000).

In 1988, Rio Tinto acquired Kennecott from BP Minerals America and took over as the joint venture partner with Niugini Mining Limited. The Joint Venture conducted several years of extensive drilling, as well as detailed metallurgical test work, and geotechnical, geothermal, groundwater, environmental and engineering studies, which culminated in the Feasibility Report for the Lihir Project. Following community consultation and the submission of the Feasibility Report to the PNG Government, the Joint Venture was granted a Special Mining Lease (SML) on 17th March 1995, valid for the forty year term of the company's Mining Development Contract. In June 1995 Lihir Gold Limited (LGL) was incorporated in PNG for the purpose of acquiring the Lihir Joint Venture Project. Four months later, on 9 October 1995, the initial public offering of shares was made (Anderson and Moramoro, 2001).

According to a former Patrol Officer, who served on Lihir during the Australian colonial era, extensive negotiations between the PNG government, the mining company and Lihirians resulted in the formulation and the signing of the initial mining agreement known as the Integrated Benefit Package (IBP), discussed below. The subsequent agreement paved the way for construction of the mine in 1996, and production started in 1997. LGL, (2008) estimated that the mining operation will end in 2043.

## **5.4 The Integrated Benefit Package**

According to a senior administrator of NRLLG, in June 1995 the major stakeholders of the mining operation, which included the Lihirians, the PNG Government, the New Ireland Provincial Government and LGL, signed the Integrated Benefits Package (IBP). The package



became a contract that outlined the specific range of agreements and memoranda that cover different aspects of mine related development. These included various compensation packages such as the: Mining Pit Agreement, relocation of the villages of Putput 1 & 2, and the Kapit Agreement, the Londolovet River Agreement, the Kunaie Airport Agreement, the Land Use Agreement (land used for light houses, power lines, towers, and transmitters), and the inconvenience or dust allowances agreement. The IBP also covered the preferential spin-off businesses and employment, the establishment of Londolovit Town, commitments relating to environmental monitoring and development of infrastructure on Lihir by the PNG government, LGL and NIPG, and a K1 million per annum funding for a village development scheme for the construction of modern houses and reticulated water and power supplies in the Lihir villages. A local leader stated that LMALA negotiated with the state and the mining company and successfully secured an agreement that bestowed Lihirians half of the 2 percent mining royalty rate and 30 percent of the national Special Mining Support Grant. The balance was paid to the NRLLG and the NIPG. Under the PNG mining guidelines, these proportions of royalties should be paid to provinces hosting mining operations. In this case, the royalties are paid to the NIPG. According to Banks, (1998:62) and Filer et al, (2000:53-58), this agreement became “the new benchmark within PNG for such an arrangement”. In essence, the IBP forms the basis of interaction between LGL, and the various institutions on Lihir, including the NIPG and the PNG government.

The IBP was reviewed after 5 years. The first review started in 2000 and completed in 2005. According to a senior NRLLG administrator, following the review the revised IBP is now known as the Lihir Sustainable Development Plan (LSDP). The plan is a concept which encompasses all the implementing institutions under the IBP, presented below. According to a senior local politician, LSDP is a unique concept, which establishes the ‘Lihir Destiny’, the future development of Lihir. LSDP is based on the principles of financial independence and self-reliance. The LSDP translates the vision of the ‘Lihir Destiny’ into short, medium and long term strategies and plans for infrastructure development, financial development, and personal development. LSDP is administered by a committee comprising representatives from LMALA, NRLLG, TWA, LGL, MRL and the churches. The committee meet fortnightly to plan and review the progress of the projects outlined in the plan. The LSDP office is located in the Tinetalgo Office Complex in Londolovit town.

Under the IBP, LGL allocates K1.67 million every month to the LSDP growth account, which equates to about K100 million over a 5 year period. The amount is divided amongst NIPG (30 percent), Namatanai District (20 percent), LMALA (30 percent), and the NRLLG (20 percent). LSDP receives an additional one-off investment of K7 million in an income generating business on behalf of the landowners. In addition, the Nimamar Special Purpose Authority receives an annual allocation of K200, 000 for operational cost, plus one allocation of K 500,000 to seal the ring road on Niolam Island in 2008, and K200, 000 annually towards its maintenance. Lihir hospital receives an annual grant of K150, 000. Lihir Secondary School received K1.48 million, as a one-off allocation to complete stage three of its infrastructural development in 2008.

There is a strong sense, especially amongst the educated Lihirians, of the need to shift from reliance on the mine as the provider, to self-reliance and financial independence. The shift, according to many interviewees is imminent. To this end, many respondents saw the formation of LSDP as a reflection of the desire for Lihir to become financially independent. Likewise, LGL (2003) indicated that the hallmark of the plan is that it will create an opportunity for the local community to have greater responsibility and accountability in spending the financial proceeds delivered under the plan. In addition, an officer from LMALA indicated that LSDP is the foundation for future economic independence, and by developing the people's skills in economic activities, Lihirians will be able to enhance their capabilities to realise the economic benefits. Another interviewee claims that LSDP lays a foundation for future economic self-sufficiency for Lihir when the mine eventually ends. It sets the basis for a good working relationship between LGL and Lihirians. A senior local politician indicated that for the purpose of long term economic sustainability, LSDP has to be driven by the Lihirians themselves; after all, as he claims, the plan is a Lihirian concept. Overall, over the next 20 years, LSDP aims to shift the community from a hand out mentality to one of shared responsibility and interest in the future. However, many interviewees in the villages claim that LSDP is not doing anything constructive. As one of them states: *There is nothing on the ground to sustain our lives in the future. The people in the LSDP have the brains, but they are pen pushers and not implementers. They might have good plans, but until such plans are implemented and produce results, plans are just plans.* A local leader from Kapit village claims that the revised LSDP does not cater for some of their outstanding claims, which include four bars of gold and a K10 million one-off payment promised in 1995.

## 5.5 Lihir Equity in the Mining Operation

Lihirians, represented by Mineral Resources Lihir (MRL), have 77,169,431 shares (6.76 percent). The purchase of shares by MRL in Lihir Gold was through a special low interest loan through the European Investment Bank, which was organised by the PNG Government. The loan was fully repaid in 2008 at 2 percent interest rate per annum. The Lihirian equity enabled Lihirians to have a Director on the LGL Board (LGL, 2002). Shareholders were paid in November 2009 at US\$0.015 (the National, 30/10/2009).

MRL was managed by the PNG Mineral Resource Development Company until September 2008, when it was handed over to the people of Lihir as a separate entity. It is now managed by a Lihirian company A'Gorlam Ltd. Included in the hand over was a financial portfolio of K500 million.

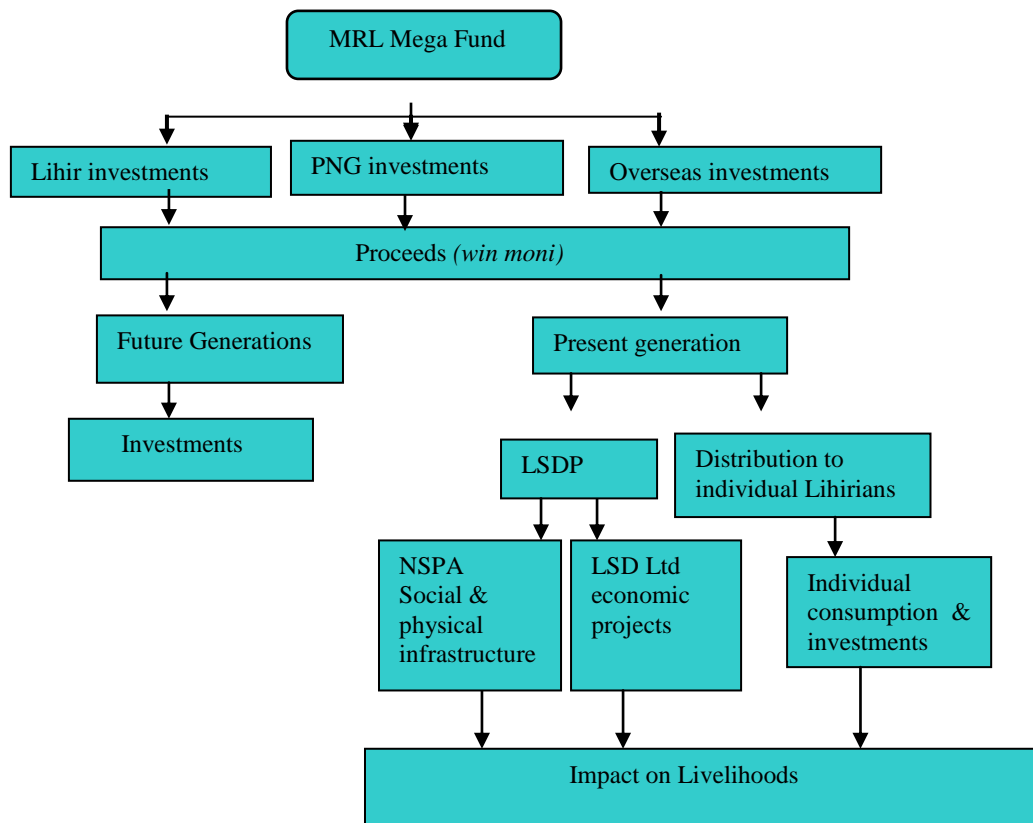


Figure 5.2: Distributions and Management of Dividends by MRL

According to a senior officer from MLR, distribution of *win moni* (interests or proceeds) from investments by MRL to the community is guided by the terms and conditions of the Lihirian Equity Trust, which specifies that where a dividend is declared some of the money will flow directly to individual Lihirians, while some will be invested in community development

projects under the (LSDP) (see Figure 5.2). The Lihirian Equity Trust is managed by a Board of Trustees that includes representatives from the Lihirian community, the government and Mineral Resources Development Corporation. The NSPA is responsible for the development and maintenance of infrastructure development, while the LSD Ltd is responsible for economic projects. During the second leg of the field trip in this study in 2008, community awareness sessions were conducted by the staff of the planning and monitoring unit of LSDP in all the Wards on the Islands about the first payment of *win moni* (K10 million) from MRL to be paid to every individual Lihirian over 18 years. This caused widespread frustration amongst the local politicians who claimed that the distribution should be channelled through the LLG.

According to Banks (2003:231), landowner equity in large-scale mining projects in PNG translates to an important symbolic role for communities, providing them with a sense of project ownership and control, albeit in a limited way. Banks argues that while the symbolic importance of an equity share was a central part of the community's negotiating position prior to the start of the mine, the equity became less important once the project started and the community experienced massive revenue flows from other revenue sources, such the compensations, royalties, wages, and special allowances. A senior local Lihirian politician states that the, *Lihirians' equity in LGL empowers them to be part of the decision making at the LGL board meetings through their representative on the board of directors*. On the flip side, many interviewees fear that revenue flowing from the equity might not be equitably distributed or used to improve the people's livelihoods.

## **5.6 Institutions and Organisations**

Large-scale natural resource developments inevitably establish institutions and organisations which serve the interest of communities in which they are mandated to operate. In the case of Lihir, Bainton (2006:27-28), noted that Lihirians are represented through a number institutions, aimed at providing overall direction on community life. This is to ensure the social, economical, natural and physical transformations in the context of the gold mine operation are dealt with appropriately. The main institutions are the Lihir Area Landowner Association (LMALA), the Tutome Women's Association (TWA), the Nimamar Rural Local Level Government (NRLLG), and the churches. Moreover, Bainton observed that on the whole these institutions were established to serve the community. However, in reality they function

in such way as to ensure most Lihirians are not well informed about the policies, and institutional process taking place on their island.

### **5.6.1 Concepts of Institutions and Organisations**

The arrival of the gold mine operation on Lihir has led to the emergence of a number of institutions and has also contributed to the expansion of existing ones. The latter include the NRLLG, the government divisions, and the churches, while the former include the Lihir Mining Area Landowners Association (LMALA), the Businesses Development Office (BDO), the Nimamar Special Purpose Authority (NSPA), Nimamar Investment Ltd, the Tutrome Women's Association, the Lihir Business Development Advisory Group (LBDAG), Lihir Small Business Association (LSBA), Lihir Grower's Association (LGA), and the LSDP. The governance environment created by these institutions is associated with a complex range of issues. These include participation, power, authority, policies, public service delivery, social relations, the matrilineal clan system, land ownership and access, strengths and weaknesses of the institutions. All these issues put together exert different degrees of influence on the construction of livelihood strategies within the changing livelihood system deriving from the mining operation.

The functions of the organisations are governed largely by the Integrated Benefit Package mentioned above. Therefore, the purpose of this section is to analyse the Policies Institutions and Processes (PIP) box (see Figure 2.2, Chapter 2), in order to situate the epistemological questions of *what* and *how* in relation to this section of the thesis. The analysis includes illustration of the demand and supply sides of these organisations (see Figure 5.4) based on Horbley (2001), and a messy matrix analysis (Table 5. 2) of their relationships and linkages with various categories of members of the Lihirian community based on Cousins (1997).

Development practitioners and scholars tend to use the terms 'institutions' and organisations' interchangeably, depending on the context in which the terms are applied. To this end, this section situates institutions in relation to this study. North (1995) in his writings on new institutional economics distinguished the terms by defining institutions as the rules of the game in society, and organisations as players, or groups of people bound together by some common purpose to achieve objectives. In this regard, North argues that institutions are humanly devised formal and informal constraints that structure human interactions. Formal

constraints include laws of the country (statutes and common law), while informal constraints are norms of behaviour, and self-imposed modes of conduct and processes. By contrast, North argues that organisations are players who are continually contesting and adapting the ‘rules of the game of the society’. Similarly, Giddens (1997: 23), taking a sociological and anthropological perspective, defines institutions as ‘regularised practice (or patterns of behaviour) structured by rules and norms of society, which have persistent and widespread use’. Accordingly, institutions are also dynamic, continually being shaped and reshaped over time. They are thus part of a process of social negotiation, rather than fixed ‘objects’ or ‘bounded social systems’. They do not exist independently of people and relations between them (Scoones, 1998:12).

Based on these concepts, the DFID (2000:7) indicates that organisations operate both within the public and private sectors, which are referred to as structures, as depicted in the diagrammatic sustainable livelihood framework (Figure 2.2. Chapter 2) as a box, referred to in the sustainable livelihoods literature as the PIP box. PIP matters when development practitioners are devising ways to promote people’s sustainable livelihoods. PIP creates the institutional and organisational governance under which livelihoods are constructed. Scoones (1998:13) argues that unless we understand the social structures and processes through which sustainable livelihoods are achieved, a description of the relationships between variables and outcomes is somewhat limiting. For this reason, particular emphasis is placed here to analyse the institutions in the context of this study. First, the core institutions are examined, commencing with the mining operation, which is operated by Lihir Gold Limited.

### **5.6.2 Lihir Gold Mine**

Lihir Gold interacts with a broad range of institutions through the course of its regular activities at four levels: macro, upper meso, lower meso and micro. At the macro-level, the National Government of PNG is the custodian of natural resources on behalf of the nation. Therefore, at this level LGL interacts with the PNG Government’s regulatory authorities and industry bodies such as the Department of Mining and Petroleum, the Department of Environment and Conservation and the Mineral Resource Authority. Besides government agencies, it also interacts with the PNG Chamber of Mining and Petroleum. The Chamber looks after interests of all mining and petroleum companies in PNG. Interaction at the macro level is important to support the mining operation in complying with all relevant legislation and regulations.

At the upper meso level, LGL links with the New Ireland Provincial Government (NIPG), which has the administrative and political responsibility for the Lihir Group of Islands. As noted by a senior public servant, *it is important to maintain a conducive environment for the mine's operation for mutual benefit. Under the IBP, the NIPG is a signatory to the various agreements between the State, the company and the people.*

The core institutions at the lower meso level are the NRLLG and LMALA. Interaction and linkages with these two institutions is particularly important for the implementation of the LSDP. LGL recognises that it is fundamentally reliant on the goodwill and support of the community for its success. Therefore, it is accountable for the social, economic and environmental impacts of the mining operation, and ensures that it is fulfilling its responsibilities in each of these areas. In that regard LGL works with the Lihirian community through its community relations and community development divisions. These divisions are part of LGL's overall management. According to LGL (2009: 7-8) community relations have two primary roles: (1). working externally with NRLLG and LMALA to resolve a wide range of community issues and grievances while building and maintaining relationships and: (2). working internally with LGL staff to enrich their perception and participation in the organisation's management of its impacts on the Lihir community. Concurrently, the community development division works collaboratively with other LGL departments, LMALA, NRLLG, NSPA and programs under the LSDP.

Two fundamentally important stakeholders at this level are the suppliers and the workforce. The former are concerned with the reliable supply of goods and services, and LGL expects them to be commercially and socially responsible in their dealings. The latter expects LGL to be accountable, and a responsible employer, especially in terms of safety, and opportunities to advance skills. On the other hand, LGL needs their professional skills, expertise, and expects them to be committed and responsible.

At the micro level, LGL interacts with the community through its community relations department, which again is guided by the IBP. Qualitative data suggest that Lihirians have a lot of expectations from LGL, and naturally most of them expect tangible projects and services to be provided by the company. For example, a prominent leader from Kapit village indicated that after more than 10 years of mining LGL is yet to properly relocate over 40

percent of the families from Kapit village to their relocated villages. Unless enough land is allocated for each family to cater for housing, gardens, cash crops, and pigs the families will not move (See Chapter 6). These expectations and demands are consistent with Ballard's and Banks's (2003) claim that PNG mining communities have become smart and astute negotiators with mining companies in their demands for spin-off projects and benefits. On the other hand, mining companies have massive economic influence in mining communities as a productive force to enhance their entrepreneurial success. In the PNG context, mining companies cannot operate without establishing and maintaining a good relationship with the community. Also communities need mining companies for the provisions of economic and physical infrastructure (Imbun (2006)).

### **5.6.3 Lihir Mining Area Landowner Association**

The Lihir Mining Area Landowner Association (LMALA) was initially formed during the negotiation phase of the mine to represent only those people within the affected area, who are the land owners of the mining lease land. However, it is now represents all Lihirians in negotiations relating to the mining operation. LMALA is a link between Lihirians, the national government and the mining company. Through this link, LMALA has become a powerful and influential institution. LMALA has its own office building located in Londolovit Town, a fleet of vehicles, a hierarchy of staff, including overseas expatriates as technical advisors, and a body of executive members. The association enjoys considerable administrative and financial assistance from LGL and the NRLLG, as indicated in section 5.5. According to LGL (2007), between 2005 and 2007 LMALA received a direct financial grant of K28 million from LGL. In addition, it receives an annual grant of K200, 000 from NRLLG. In relation to the financial assistance from LGL, Ward Councillors claim that because LMALA is heavily funded by LGL it is highly likely that it will be partial to it in negotiations relating to the mine operation.

Chaired by a Lihirian, the association played a leading role in the negotiations which resulted in both the initial IBP and its review. The chair is also a director of LGL representing Lihirians. He also serves as a director on Mineral Resource Lihir, and three major Lihirian companies operating on Lihir.

### **5.6.4 Governance and Livelihoods on Lhir**

Governance refers to the processes and institutions through which people and groups articulate their interests, authority, and influence, together with enactment of policies and



decision making concerning public life, economic development, and social development. Governance includes the conventional responsibilities of government, but also concerns interactions between formal agencies, institutions and civil society (Goldman, 20001, UNDP, 1998). Governance and livelihoods are interrelated because peace, security and the opportunity to participate in decision-making are important issues and part of people's livelihood (Wairiu, 2006:409).

#### **5.6.4.1 The process of Planning in Governance on Lihir**

Qualitative data from interviews indicate that the NRLLG is consultative, as the process of planning and decision making is based on what an interviewee calls 'assembly committees'. In total there are 11 assembly committees, which are chaired by 11 elected Ward members who are appointed by the President. The committees are: 1) Finance and Planning, 2) Executive, 3) Education, 4) Law and order, 5) Business development, 6) Agriculture and Livestock, 7) Health, 8) Fisheries and Marine Resources, 9) Culture, Tradition and Tourism, 10) LSDP, 11) Women and Youth. Heads of government divisions stationed on Lihir automatically become members of these committees to provide technical advice and execute the committees' decisions. Although people whom I spoke with were unsure of exactly how the committees operate, one interviewee indicated that governing Lihir by committees gives every Ward Member equal opportunity to participate in the governance of Lihir. In this way, the members are responsible for the implementations of decisions they make. Thus the Ward Members interviewed on this matter indicate that the government annual budget should complement the decisions of these committees. On other hand a Ward Councillor claimed that the clan system is influencing local politics on the islands. This is evidenced by the ascendancy of debate and decisions by councillors who are members of two major clans, which own most of the mining lease land. The trend, according to the Ward Councillor, is causing division in the local assembly. As major owners of the land under the mining lease, from which the NRLLG receives 20 percent of the mining royalty, these leaders feel that they should have a greater say on how the government spends the money.

At the Local Level Government the process of governance is the most important to people's livelihoods, as they are accorded the opportunity to participate in decision making, which directly impacts on their livelihoods. To this end, decision making, planning and budgeting is in the context of encouraging bottom-up planning. According to a Ward Member, the Organic Law on Provincial and Local Level Government allows for the establishment of Ward

Development Committees. The WDC, which consists of five members elected by the residents of the Ward, is chaired by the Ward Member. The common composition of most WDC on Lihir includes representatives of women, youth, churches, and the chairperson of a school board of governors within the Ward. On the Lihir islands, the NRLLG went a step further and established a Village Planning Committees for each village within a Ward. The chairperson of the VPC and the members are elected by the village people, of which, the chairperson automatically becomes a member of the WDC. With these structures established at the basic unit of governance, the people are given the opportunity to participate in the decision making process, hence putting the concept of bottom-up planning into motion. At the village level, the basic function of the VPC is to identify projects and submit a list with a brief description of each project in order of priority to their WDC. The WDC deliberates on the list of projects from each village and submits a Ward list to NRLLG with the anticipation that their projects will be included in the annual budget for eventual funding and implementation. A VPC chairperson indicates that identification of projects at the village level is done by gathering requests from various sectors of the village such as the youth, churches, women or individuals. Most of these requests are spelled out during village meetings which are held every Monday; this day is called government day on Lihir (See Chapter 6).

Most chairpersons of VPCs pointed out that the planning framework, although it looks impressive on paper, makes the practicality of planning and getting the projects approved to be cumbersome. The process is made more difficult by lack of actual planning at the Ward and Village level. As a Ward Member stated, *we are empowered by the organic law relating to the establishment of local level government to make decisions at the village and Ward levels, but most of us lack the know how to do our jobs properly. We do not have long term plans. The identification of our projects is done by observation and listening to what our people are saying.*

The planning system in facilitating sustainable livelihood projects is critical in that it can provide access for people to resources, or it can be simply be a vehicle for power plays between different stakeholders. There needs to be on the one hand a strategic view of opportunities and threats, and on the other hand a possibility of local input about priorities and needs. In this way, micro and macro aspects can be linked. The micro aspects of planning involve the Village Development Committee in each Ward, which is has the responsibility to identify projects at the village. While the macro aspects of planning involves planning and

budgeting at the Local Level Government. Table 5.1 summarises the link between the sustainable livelihood principles and planning at the Ward and Village levels on Lihir.

#### **5.6.4.2 Government Bureaucracy on Lihir**

Governments enact laws and create policy. It is the bureaucracy that implements these laws and policies. According to Goldman (2000) the main functions of the bureaucracy are: carrying out administration, offering policy advice, articulating and aggregating interests and maintaining political stability. Qualitative data from this study shows that there are two bureaucratic structures on Lihir. Firstly, the public service structure headed by a sub-district administrator. This structure accounts for the various government divisions: Primary Industry, Commerce, Education, Lands, Health, Labour, Treasury and Environment. The public service bureaucracy is responsible for providing technical advice to the Ward Members in their respective portfolios, and for implementing decisions passed by the Local Level Government Assembly.

Secondly, the NRLLG has an established management structure, which is headed by a Manager. Included in that structure are: an accountant, a project officer, two economists, an accounts clerk and three administrative assistants. These people are housed at the NRLLG head quarters. The same building also accommodates the office of the president, the assembly clerk and the assembly meeting room. Financially, NRLLG is the richest in PNG, with an annual budget of K40m. Every council ward receives a budget allocation of K100, 000 for special projects in their Wards; similarly this makes the Lihir Wards the richest in PNG. Ideally these institutions work together to serve Lihirians by facilitating direction over community life in order to maximise benefits deriving from the mining operation. However, many local leaders indicate that in reality their functions are not clearly understood by Lihirians. Similarly, responsibilities of these institutions are not clearly demarcated. As a result most Lihirians are not well informed about the processes and decisions affecting their livelihoods on their island.

#### **5.6.5 Nimamar Special Purpose Authority**

According to an interviewee, the establishment of the Nimamar Special Purpose Authority (NSPA) in 2001 was derived from delays in implementing funded projects by NRLLG. The NSPA's core function is to implement and maintain community infrastructural projects throughout the Lihir islands. It ensures community development priorities established by

NRLLG are implemented. LGL (2003) indicate that NSPA does not actually build projects, but tenders projects for Lihirian contractors to execute. Prior to the establishment of the NSPA, community infrastructural projects were carried out by various organisations including the youth, church and women's groups and Lihir Gold. This sometimes resulted in inefficient coordination resulting in incomplete projects.

### **5.6.6 Lihir Sustainable Development Company**

The company was established to plan and implement economic projects on Lihir. It also has the liberty to engage other entities outside Lihir to design or manage the projects. For example, the company is embarking on a livestock integrated project which will commercially raise pigs and poultry. It is envisaged that the project will supply the mining camps on Lihir.

### **5.6.7 Nimamar Investment Limited**

According to the local politicians, the Nimamar Investment Ltd is the business arm of NRLLG, which was established as a requirement under the IBP. Its core function is to make investments on behalf of NRLLG for the people of Lihir. The company also provides advice to individual Lihirians, clans, Council Wards and Lihirian companies about investment opportunities. For example, through Nimamar Investment Ltd, each of the Council Wards on the islands secured 30,000 shares each in PNG Airlines in 2008. On Lihir, Nimamar Investment Ltd is a shareholder (7.5 percent) in LAKAKA, which owns Lihir Hard Ware and Best Buy. The latter is the biggest supermarket in Londolovit Town. Dividends earned from investments are paid to NRLLG.

### **5.6.8 Business Development Office**

Established by LGL within its community relations department, the core function of the Business Development Office is to support Lihirian business men and women establish spin-off businesses. The office offers free managerial advice, accounting, logistics assistance and secretarial support, as well as general commercial training. The BDO also assists local businesses to identify appropriate business structures, prepare business and financial plans and, where required, make representation to banks and other financial institutions. Since the commencement of the operation in 1997, the BDO has assisted more than 33 companies, 6 business groups, and 3 individual or family businesses. According to an interviewee, in 2007

alone, the office provided assistance to 38 percent of the local business ventures. The single biggest issue for the office is creating a sustainable environment that does not impinge on the operation of the Lihir project. In addition, the BDO administers an interest-free loan scheme to help small Lihirians start their businesses. Borrowers are required to put up 50 percent of the capital before a loan is approved. These loans are required to be paid back within five years and are limited to K5, 000 per application. In 2005, the office approved loans to the amount of K700, 000 to a range of businesses. These businesses include twelve buses, one each for the twelve wards on Niolam Island, and thirteen outboard motors for the outer islands of Mahur, Malie and Masahet. The boats were contracted by LGL to transport workers from these islands on a daily basis. Since the inception of the scheme in 1995, LGL has loaned over K10 million to local businesses. BDO's key aim is to develop realistic commercial opportunities and ensure that businesses are sustainable once the mine eventually closes. On the other hand, LGL relies heavily on these businesses for the smooth operation of the mine. Although the BDO is mandated to provide advice and assistance to Lihirians in the management of their businesses, it is not mandatory for them to seek assistance from the office (LGL, 2006).

#### **5.6.9 Lihir Business Advisory Group**

With members drawn from the BDO, Division of Commerce, LMALA and the community, the LBAG's major terms of reference is to consider and approve or disapprove applications from people who wish to conduct businesses on Lihir. LBAG is guided by the preferential treatment given to Lihirians to go into businesses on Lihir. Where a non Lihirian intends to conduct or establish a business on Lihir, according to an interviewee, the rule is that he or she has to enter into a joint venture arrangement with a Lihirian or Lihirians. In this regard, Lihirians must hold at least 50 percent equity in the business.

#### **5.6.10 Tutrome Lihir Women's Association**

In this matrilineal society, women's economic contributions are substantial, but their political status is not. Consequently, their participation in decision-making about the mine has been restricted, mainly because they are culturally excluded by men. Qualitative data from this study indicate that Lihirian women often believe that men will represent their interests, a perception that is not unusual in a paternalistic society like PNG. Recognising this inequality in political power, LGL established a women's section within its Community Affairs

Department aimed at facilitating the development of women's issues. This led to the formation of the 'Petztrome' Women's Association in 1995 (*Petztrome* in the Lihir dialect means working together). In 2007, the association was reformed and renamed Tutrome Lihir Women's Association. 'Tutrome' in the Lihir dialect means 'stand together'. The association was reformed following widespread concern that the earlier association 'Petztrome' had failed to deliver its mandate. Petztrome, although meant to represent all the women on Lihir, in actual fact had only 80 financial members. In contrast 'Tutrome', has over 500 members, and according to a senior local politician, the aim is to get all Lihirian women who are over 18 years old, and are residing on the Islands, to become members. Demographic records held by the NRLLG and LGL's Community Affairs Department, shows that there about 3000 adult women on the Lihir Islands.

The association was generally embraced as a good idea because women saw it as a means to ensure they have an institutional base for participating in decisions about the social and economic changes affecting them. Therefore, the association had empowered women to stand up and be counted alongside men (Macintyre, 2003). However, according to women interviewees, many men were either baffled or affronted by women having to form an association, which would represent them in decision making processes relating to the social and economic issues affecting their livelihoods. Some clan leaders were bewildered and questioned why a foreign organisation was supporting their women to form an association, especially in a society where culturally they were supposed to subordinate themselves to man's leadership. However, women often think otherwise, as put by one of them, *our men have to realise that they have no choice, but to support us, it is us the women who are mostly affected by decisions or policies made by them, for example we now have to catch buses to attend to our food gardens, because we were not consulted on the land size we were going to be reallocated to; alluding to lack of land for family food gardens in the relocated sites (See Chapter 6). Nevertheless, as indicated by an executive of the association; until such time that men accept women as equal partners in development, any women's group formed to represent women in PNG will always face a big challenge working with men.*

According to an executive of the association, with financial assistance from NRLLG, the association was able to establish three income earning projects. These were the Lihir local market, a can crushing machine and a seed distribution garden. The seed distribution garden ceased operation in 2006. Female interviewees who had previously benefited from the seed

garden claimed that the division of primary industry, which was responsible for managing the project, lacked the technical knowledge to sustainably manage it. Generally, women perceive their association as a mechanism to upgrade their skills and assist them initiate income earning projects in their villages. On the other hand, the association expects women in their respective villages to initiate fund raising activities to raise money for their association. This is a concept which many women embrace, as many of them indicated that if they were to engage themselves in income earning projects they would be more committed to the projects, in contrast to merely receiving mining royalties or allowances. A women interviewee indicated that self help projects, although they would require a lot of effort to start and sustain, would on the other hand make them work hard to ensure they are profitable. However, in their effort to organise income raising activities, they noted that their association is no different to the established church women's organisations. Indeed, the women's church organisations are village based, and the same women are expected to raise money for their village church congregations. For example, the United Church Women's fellowship group uses a concept called a four square programme, and one of the activities in that program is fund raising. Likewise, Macintyre (2003) found that the Catholic Church parish-based structure used by the women's association made it difficult for women to work out just how the association's fund raising activities were different, as the membership are exactly the same. This situation seems to have exerted more pressure on women, by doubling their activities.

Despite the challenges faced by women in their effort to raise money for their association, the association had organised and staged many activities on the islands. These included events to mark days such as Women's Day and the Universal Children's Day. Women's Day was a colourful event with songs and dances, and speeches by women on HIV and AIDS, on respect from men, and calls for tougher measures by the authorities against alcohol and drugs. They also facilitate women's involvement in business and Women in Mining conferences and participated in the review of the IBP.

In 2004, the women in the Londolovit Township, including spouses of overseas staff working on the mine had a day out and joined the local women in their gardens learning how to harvest yams and cooked their own harvest in 'mumu' pits (ground ovens) and over open fires. They all agreed it was a time of learning and great fun. They also learned to sing and dance with their local compatriots. For local women, who are more used to earth ovens for cooking and using running streams for washing, standing behind an electric stove was a thrill, although a tap of gushing water had its limitations compared to their open streams (LGL, 2004). Overall,

with administrative and financial assistance from NRLLG, the women's association provides an important voice for Lihirian women who seek recognition of their status as landowners in a matrilineal society.

### **5.6.11 Churches**

In addition to their pastoral duties, church leaders have been drawn into the political sphere of mining negotiations and development. They are often expected to disseminate information to the community and work with other bodies to help alleviate social problems. At least 80 percent of the population nominally subscribes to Catholicism, while the remainder is divided between the United Church and an array of charismatic and revival style denominations.

The Catholic Church is a key provider of health and education services on Lihir. It established its base at Palie in the 1930s and is responsible for the Palie Health Centre, the Palie Vocational School, and the Palie Primary School (Macintyre, 2003). The Church forms a very central part of Lihirian society.

In most representative groups Lihirians will seek to have a Church Representative. According to a long serving catechist on Lihir, the Catholic Church was responsible for educating the many Lihirians who are now employed in the mining operation and elsewhere in PNG. Further, LGL (2009) indicated that many Lihirians had used education to gain valuable experience in other parts of the country.



Table 5.1: Sustainable Livelihood issues and their relationship to planning

Sustainable Livelihood related issues	Sustainable Livelihood implication for planning	Situation on Lihir	Additional Comments
Starts with village people as the focus	Is planning community-based or at least based on detailed information on rural people's situation?	Village & Ward level information used, but collection not very systematic. Absence of planning leading to ad hoc decision making.	<i>We do not have plans, long term or short term, but we listen to what our people are saying:</i> Chairman of VPC
Recognises holistic nature of people's lives	Is planning integrated? This is easier at lower levels, example village.	Provincial & District plans produced but need more integration at sub-district level. No evidence of liaison between government divisions on Lihir and Namatanai District. Lihir is seen to be operating on its own.	Integrated, all sectors of community represented in WDC & VPC on paper. In practice a need for participatory approach in planning is required.
Mainstreaming environment	Is environment integrated into planning?	Separate programme, relies on data from LGL, but not integrated with Wards & village planning.	People seem to have little concern about the environment. More concern placed accumulating material wealth.
Builds on positives/ strengths Recognises differences within villages	Is it based on a SWOT, for the area and preferably also for different groups?	Strategic plans at Provincial & district level. No evidence of produced strategic plans which build on strengths at LLG & Ward level.	No sophisticated analysis to identify SWOT, but according to a senior politician, Lihir has, money, electricity, ocean, is an island, friendly, culture, need more educated & skilled people, biggest threat is corruption.
Importance of institutional structures and processes	Planning is a key process as it is a point where decisions are taken about access to resources	Structured process, but sectoral and local planning process missing at Ward & village level.	Some structures developed. Weak links to communities and departments
Partnership approach	Are other stakeholders included in planning?	Integrated Agriculture Training Program & Personal Viability present on Lihir. But they are not included in planning. No NGOs, except churches. Churches are represented in WDC & VPC	In principle included, but many not be concrete.
Bottom-up micro (Ward & village) work linked to top-down macro (District and sub-district) strategies.	Is village level planning happening to be linked to strategic planning at district and higher levels?	No evidence of planning micro level to link, district & provincial plans.	Not linked, no plans. There is a big need for strategic planning at all levels.

### 5.6.12 Variations between the Institutions

There is marked variance in terms of human capability, availability and access to physical assets, access to financial asset, and linkages within and outside of Lihir between the various institutions on Lihir. For example, a local politician said; *Staff of the government divisions are employed by the government to serve the people of Lihir, but they do not have any plans for our people, nil goals and objectives, they lack capacity and direction.* As a result, many interviewees claimed that many projects initiated by the government divisions and funded by NRLLG have failed. Examples include vanilla, a piggery, poultry and coffee enterprises. In this regard, senior administrative staffs of the NRLLG claim that DPI staff lack the skills in project planning, appraisal, monitoring and evaluation. However, contrary to the negative perceptions held by many politicians and ordinary Lihirians, a senior public servant says that; *the government has money to pay our salaries, but does not provide ongoing funding to efficiently operate and maintain physical operations. We lack some of the basic office resources, we have no funds to repair run down machines such as desk top computers, no transport to do extension work. Yet we are stationed in the richest LLG in PNG, with an annual budget of K40 million.* Similarly, a local politician suggests that the whole building which houses the public servants requires complete refurbishing. On the other hand, observation indicates that some offices within the building are well resourced with physical assets but others are not.

Qualitative data also indicate that some public servants, although responsible for providing advice and technical support to the local Ward Members, are rarely utilised. The general perception indicated by most interviewees is that the public service lacks the capacity to provide expert advice. As a result, most Ward Members seek advice from the NRLLG staff. The biggest strength public servants have is that their salaries are paid by the government. Regardless of whether they lack capacity in terms of technical skills as perceived by many interviewees, most of them have secured positions and are therefore employable elsewhere in the public service.

On the other hand, LMALA, which is the best resourced institution, and linked closely with the Lihirian villages, is viewed with envy by most public servants and local politicians. Generally, there is lack of liaison between the public service, NRLLG and LMALA. LMALA is a threat to NRLLG, with a general perception held by a lot of young educated Lihirians

being that NRLLG will one day cease to exist on Lihir. According to a senior local politician, and many interviewees in the villages, these institutions have been established to serve the Lihirians, and it is up to the people within these institutions to make them work.

There is compelling evidence that the mining company is not only interested in extracting gold from Lihir, but is also concerned about good governance in ensuring that the management of the enormous financial benefits flowing from the mine benefit Lihirians now and in the future. Accordingly, the LGL Community Affairs Section is assisting with a capacity-building program to enhance human capacity within NRLLG and the SPA. This program is empowering local authorities to be more self-sufficient and capable of fulfilling Lihirians needs and desires for future development. The importance of such training programs parallels the discourse on the mismanagement of resource rents from natural resources, particularly from forest and minerals in PNG (Banks, 2003). Similarly, Sach and Warner (2001) argue that resource booms tend to undermine the capacity for governance that economists and ordinary people frequently declare is needed for proper management of resource rents in the first place.

### **5.6.13 Messy Matrix of Analysis of Institutions**

Institutions mediating development or seen as change agents are normally located within a complex institutional 'matrix', which exists in a wider political and social economic context. The use of a messy matrix analysis could reveal the differences in authority, power play, resource use, and other less obvious characteristics of institutions. The notion of messy matrices of institutions helps to understand the difficult choices inherent in policy making and implementation (Cousins 1997:61). Table 5.2 is a messy matrix of seven institutions on Lihir, their operational resources, human capacity, their influence on the institutional environment, their resilience and sustainability, and the public's perceptions about them, relating to the provision of services towards sustaining livelihoods on Lihir.

Table 5.2: Messy matrix analysis of the core institutions Relating Provisions of on Lihir

<b>Institutions</b>	<b>Operational Resources</b>	<b>Human Capacity</b>	<b>Influence on the Institutional Environment</b>	<b>Resilience and sustainability</b>	<b>Public's perceptions about the institution.</b>
<b>NRLLG Administration</b>	Well resourced, allocation of funds comes under its mandate, 20 percent of royalties (K40 million) per year.	Qualified & experienced, manager, economist and an accountant. Well served by administrative staff. Staff well paid.	Very influential, control over funding.  Provision of advice to the LLG President and Ward Members. Can redirect funds	Is likely to be dissolved when the mine ceases operation. Largely depends on the mine for its existence.	Is another administrative and bureaucratic structure besides the government agencies  Minimum or no regular dialogue with government divisions
<b>Nimamar Investment</b>	Well resourced, housed in a building on its own.	Well staffed, executive manager and an economist. Well served by administrative staff.	Can be influential, not easily accessed by ordinary Lihirians for advice on investments. Well linked with LGL, NRLLG and the Ward Members.	Potential to be sustainable and resilient. But subject to political interference.  Retains portions of returns from investments for operation.	Could become a successful company. Accounts & books must be subject to government audits, as the company is investing public money on behalf of Lihirians.
<b>Government Divisions</b>	Very poorly resourced, Poor work environment  No administrative support staff.	Low staff morale. Staff need in-house training on management and planning. Need for specialist officers. Example: project officer.	Can be influential, but poor dialogue with other institutions such as LMALA & NRLLG administration	Highly Resilient in terms of job security, being government divisions.	Superfluous, as the generally held view is that some of the officers are not performing.  Work ethics have to change to work in a dynamic and developing situation such as Lihir.

Institutions	Operational Resources	Human Capacity	Influence on the Institutional Environment	Resilience and sustainability	Public's perceptions about the institution.
<b>LMALA</b>	Well resourced, housed in a modern building. Easy access to funding.	Well staffed by Lihirians, plus overseas expatriates as advisors  Well supported by administrative staff	Highly influential. Links well with the community. Involved in community projects. Highly regarded by the community. Well linked with LGL and the National government. Is an independent organisation.  Signatory to IBP on behalf of the people.  A threat to NRLLG.	Highly dependent on mining royalties for funding its operation.  Its role and mandate in representing the people is likely to cease when the mine ceases operation	Seen as another bureaucratic organisation that absorbs portion of mining royalties. Envious feeling towards it by some local politicians as it has become powerful. Seen as another government body on Lihir by some leaders.
<b>Business Development Office</b>	Very well resourced as funding comes form LGL	Staffed with qualified and experienced staff	Well linked with other institutions; LGL LMALA, Division of Commerce, and Lihir Business Advisory Board.  However, not easily accessed by owners of small businesses	Unless it starts charging its clients for management fees, it might not be sustainable in the long term. Its use could diminish, in the short term. It has about 19 clients, which equates to 9.5 percent of the local businesses	Not particularly well linked within the community. Lihirian business men and women tend not to ask for help.

<b>Institutions</b>	<b>Operational Resources</b>	<b>Human Capacity</b>	<b>Influence on the Institutional Environment</b>	<b>Resilience and sustainability</b>	<b>Public's perceptions about the institution.</b>
<b>Special Purpose Authority</b>	Well resourced.	Well staffed with technical staff.	Very influential. Good link with LMALA, NRLLG, and Ward Members & Contractors.  Monitoring and evaluation of community projects is needed.	A service organisation, which depends entirely on the NRLLG developmental budget. Could cease in the long term when royalties or dividends from investments run low.	A very important organisation. Vital for overseeing implantation of village projects. Subject to corruption and influence by politicians and community leaders.
<b>Turtrome Women's Association</b>	Does not have a permanent office space to operate from. The administrative officer is being moved between LGL Community Affairs Department and LAMLA	Administered by an executive officer.	Its presence as an association is insignificant in the villages, but vocal on major issues affecting women.	Politically supported by the NRLLG. Has the potential to sustain itself financially with income from established projects. Must invest for long term sustainability. Subject to corruption.	Certain sectors of the community do not have regard for it, as culturally women do not have political authority, but now they are being empowered.

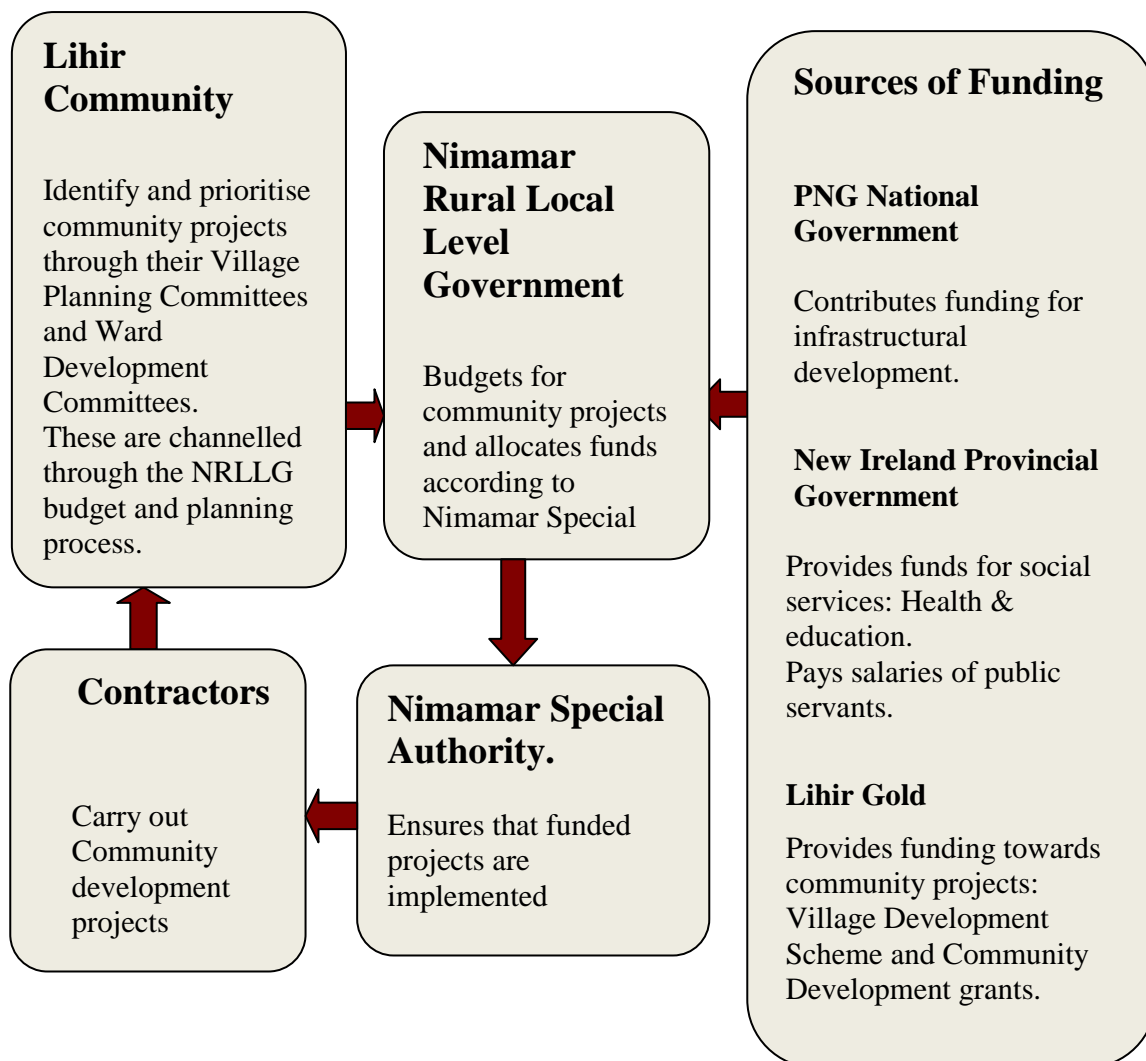


Figure 5.3: Roles and Responsibilities of the core institutions on Lihir

#### 5.6.14 Supply and Demand Side of Institutions

In analysing policies institutions and processes (PIP) entailed in a livelihood system, Goldman (2000) and Hussein (2000) noted that all institutions in a given context can be on either the supply side or the demand side. Their positions in the governance environment can easily be switched between these two halves. Generally, institutions at the macro level are concerned with strategic planning, while institutions at the meso and micro levels are concerned with implementing policies. The demand side is concerned with the support of clients and target groups or beneficiaries, and their expectations of what the supply side is expected to deliver. Put simply, the supply analysis looks at what is provided, while the demand side analysis covers

what is needed. Slater, et. al (2006) used the concept in their appraisal of the productivity of the safety net programme and institutional linkages in Ethiopia.



Figure 5.4: Links between the supply side and demand side of institutions

In the context of this study, Figure 5.3 illustrates the supply and demand side of the policies institutions and processes of organisation. The arrows indicate the links between the supply side and the demands of the institutions on Lihir. The more arrows linking an institution to other institutions the more influential that institution has on the governance environment of livelihoods on Lihir. It is apparent from the diagram that the most influential institution is LGL, followed by LMALA and NLLG. These institutions have the most arrows linking them to other institutions on both the supply and demand sides. Take for example, LMALA. On the supply side, the people of Lihir expect it to responsibly represent them in all



negotiations with LGL on matters relating to their economic and social development, while, on the demand side LMALA expects LGL to liaise with it in all matters relating to the mining operation. The following are some of the perceived expectations of people whom the author talked with from the demand side. That is they expect these things to be provided by the demand side of institutions.

- a) Lihirians through LMALA & NRLLG expect that mining operations will be an engine for sustained economic growth.
- b) Lihir local communities expect that LGL will provide employment, infrastructure, and other benefits that counter the risks and impacts they experience and will leave them better off than when the project started.
- c) LGL employees expect safer and healthier working conditions, a better community life, and better pay and privileges, and consideration when their employment ends.
- d) Lihirians through LMALA & NRLLG expect LGL to respect and support their basic rights, culture and social aspects of their lives.
- e) Groups, clans & individuals expect LMALA to fairly represent them in all negotiations relating to the mine issues.
- f) NRLLG expects LGL to continue to pay its share of the mining Levi as stipulated in the IBP.
- g) Land owners expect LGL to continue to honour its commitment to pay them mining allowances and royalties.

## **5.7 Mining and Employment**

Any large-scale mining operation has the potential to create significant economic livelihood opportunities for the people in areas where they are located. Indeed the mining operation has provided substantial additional employment opportunities for Lihirians, with higher income-generation potential than most, if not all, other employment in the area. In this respect, numerous studies have focused on diverse groups of people whose entry into the modern wage-earning labour workforce has derived from the establishment of mining operations in their areas. For example, Perrings (1979) investigated the transformation of African tribesmen into skilled mine workers. Lahiri - Dutt and Mahy (2007) studied access to job opportunities by women and youth in mining in Indonesia. In the PNG context, Benedict Imbum has been a

prominent author on the subject of employment of the mining workforce, especially along the lines of human resource development and industrial issues and challenges (Imbun, 2006; 2000; 1998; 1997). On the other hand, Polier (1996) provided an insightful account of how modernisation resulting from the Ok Tedi mine led to increasing marginalisation and identity crises of men of Faiwolmin, as they were unable to find fulfilment from traditional roles or as modern mine workers. Similarly, many commentators have discussed employment opportunities within the general heading of social impacts of mining. In the context of this thesis, Lihirians embraced mining as an inevitable imposition of making a living, which they view as a requirement to render their labour for a wage. Besides they were somewhat empowered by the policy of “Lihir First” in employment stipulated in the IBP mentioned earlier on. The focus of this section is to address the transformation of Lihirians from a subsistence based livelihood system where employment is non-existent (Chapter 3) into a modern wage-earning livelihood strategy where wage employment in the mining operation is viewed by some as the only income earning livelihood strategy.

The exploration phase of the mine from 1982-1993 marked the beginning of this transformation, when more than 300 Lihirians (5 percent of the population of 6000 at that time) sporadically entered the formal employment market presented to them by the exploration company. Qualitative data also indicate that for the vast majority; it was a new experience, not only for them, but, also for their families. As noted by a man from Londolovit Village, *My wife had to tend our gardens most of the times I was out working. When I got paid for the first time, it was the first time in my life to see and handle a lot of money. For my wife and children it was their first time to touch money.*

A man from Kapit Village who was one of the first people to be employed during the exploration phase said his family called him ‘*wok man*’ (a man employed on wages), a name derived from seeing him going off to work 7 days a week during the period of his shifts. Imbun (2000) noted a similar transformation of subsistence tribesmen in the Pogera gold mine, Enga Province.

According to LGL (2005), the recruitment and employment of personnel are largely driven by preferential employment policy given to Lihirians. The commitment is an integral part of LGL’s community policy, aimed at an overall net benefit to the community in the long-term as a result of Lihir Gold’s operations in the area.

The signing of the initial IBP in 1995 paved the way for the construction of the mining facilities, which resulted in mass employment of Lihirians. A mine worker said; *whether the people realised it or not, they were actually participating in the construction of and witnessing one of the biggest gold mines in the world.* The preferential employment policy became a significant milestone in the lives of many Lihirians, as it empowered most able subsistence village men and women to be employed during the construction phase. An interviewee estimated that there were about 1500 local Lihirians employees, which is about 25 percent of the Lihir population. Many interviewees indicated that only the very old people who were not able to do physical work were not employed.

Most people who were employed then described the scenario during the construction phase as *intensive, hectic, and fast mode*, as the normally relaxed and laidback subsistence villagers had to suddenly adjust their mindsets in order to cope with the modern fixed schedule wage-earning scenario. Further, the construction phase triggered the beginning of a transformation trajectory to cash-based livelihood systems.

In retrospect, most interviewees noted that the wages they were earning during the construction phase were higher than what the workers are now earning from the normal operation. A local businessman stated that; *for most Lihirians it was like moving from one end of the scale with no cash to the other end with lots of cash.* He used the phrase: *people were crazy about money.* He estimated that K20 million could have flowed into the pockets of Lihirians during the construction phase; between 1995 and 1996. That amount equates to K3,333 per Lihirian. He claimed that; *money was a new item in people's pockets and that most of them did not know how to handle it.* He also claimed that most people spent their money on beer, cars and on shopping sprees in Kokopo, ENBP. Every individual would like to own a car; there were more cars in Putput 1 & 2, Kapit and Londolovit villages than ever seen in the history of islands. He said the scenario was like a competitive sport, as it seemed people were competing to accumulate capital wealth. *Most of the cars broke down; and their wrecks are rotting away in people's back yards*, he lamented.

The construction phase ended in 1996, and normal mining operation commenced in 1997. Recruitment of the mine workforce became quite stringent, although maintaining the preferential employment policy. Some Lihirians who did not have the capacity to develop new skills and be deployed in the normal operation had to be made redundant. On the other

hand, more than 100 Lihirians who were employed elsewhere in the country capitalised on the preferential employment policy and returned to Lihir to be absorbed into the workforce. Imbun (2007) noted that when the mine commenced operation in 1997, it employed 2000 workers, of whom 40 percent were local Lhirians. An interviewee from the community affairs department of LGL indicated that as of December 2007, LGL employed approximately 1,914 people, of which 37 percent were Lihirians, of which 5 percent were women. Notably, females are employed by the support and administrative departments and only a few by the technical departments. Two senior company staff and professional level positions were filled by female employees from the New Ireland Province. Other Papua New Guineans accounted for approximately 56 percent of which 4 percent were women, while 7 percent were expatriates from other countries. During 2007, the total workforce (including business partners) totalled 3,962 people. In terms of wages and salaries paid to Lihirians, in 2007 LGL paid K20, 662, 807.

Qualitative data from interviewees and observations from the study indicate that the mining operation inevitably created economic and social desires as reasons for seeking employment with the mining operation. Generally, Lihirians regard themselves as owners of the LGL, a perception derived largely from the 6.76 percent equity they have in the mining operation. Therefore, they regard the mine and its associated activities as entities in which they could easily find comfort in seeking wage-employment. They emphasised the importance of earning money to live in a livelihood system that is fast changing into cash based livelihood systems, and to satisfy desires to own permanent houses, to possess a wide range of consumer goods and appliances, and to have their children educated. Employable children are encouraged to seek wage-employment. Parents see higher education as procrastinating their children's opportunity to enter wage employment. Therefore, grade 10 school leavers who could not make the grades to proceed to secondary schools are sent to vocational schools to learn a trade in the shortest time possible to make them employable.

LGL made a social economic decision to employ Lihirians rather than recruit from outside the province. Economically, LGL saves money on recruitment expenses and on fly-in fly-out arrangements. Socially, Lihirians do not want to be influenced by non-Lihirians who would be likely to introduce social problems that would be detrimental to their culture. Similarly, Lihirians feel that LGL is obliged to look after them first, as the mining operation is located on their island and LGL in doing so enhances its cooperative links with the Lihirians.

In a similar study of the Pogoran tribesmen who own the land on which the Pogera Joint Venture Gold (PJV) mine is located, Imbun (2000) indicated that the Pogoran tribesmen were transformed from largely subsistence to wage labour in just over a decade. Their transformation also stemmed from what Imbun calls a pro-Pogoran employment and training policy. Imbun identified three groups of workers in the mine workforce, each of which identified itself differently in relation to their employment and their village economies. These groups were 'grassroots' (rural villager), 'bisnisan' (Businessman) and 'saveman' (Knowledge man, educated man), with 'grassroots' being the least and 'saveman' being the most removed from the traditional village socio-economies. Although the same categories of workers could be applied in the Lihir context, by contrast employed Lihirians are expected to actively participate in cultural or *kastom* activities to a large extent by way of cash contribution. Through their participation, Lihirians are actively involved in their village economies. Generally, the study indicates that earnings from wage employment are largely translated into capital goods, permanent houses, entrepreneurial activities, and elevation of social standings as members of their clans and villages. The study also indicates that Lihirian perceptions and desires about wage employment in the mining operation can be categorised into four categories, which are presented below.

## **5.8 Employment Motivation**

This section presents the four important reasons which motivated Lihirians to seek employment with the mining operation. Large scale development projects create employment opportunities in areas where they are allowed to operate. Mining operations are no exception, as such, for the local areas where mines are allowed to operate; the opportunity is made easier with the preferential employment opportunity given to them. Observation and qualitative data from this study shows that Lihirians are motivated by a number of reasons to seek for employment in the mining operation.

### **5.8.1 Wage Employment and Children's Education.**

Despite the fact that education on the Islands is subsidised by the NRLLG, many interviewees indicated that one of the basic reasons they are employed is to save money for their children's education. An interviewee from Samo Village, who was then employed during the

construction phase, recalled that his main aim at that time was to save enough money to pay for his children's education. That is now achieved, as his daughter and two sons, after completing their vocational training, are now employed. A young father with three young children from Komat Village is hoping that one day one of his children will attend a university. He said; *I have an investment account with the Bank of South Pacific, in which I am depositing money every fortnight. The account is to pay for my children's school fees in the future. Probably by the time they reach tertiary education I would have retired.* Similarly, a young family from Kunaie 2 Village is helping their extended family members in another province to pay for their education. The family indicated that they are also saving money for the future of their children's education. On the other hand, an educationist highlighted a common trend being observed amongst many working parents is that they are sponsoring their children who have completed grade 10 and 12 to undertake vocational training for a year or two in order for them to land a job with the mining operation. They see the mine as an opportunity for their children to easily gain employment, which many of them do. He concludes that these parents are not prepared to face the agony of sponsoring their children to undertake higher educational qualification, but opt to *short cut* their children's education. He claims the preferential employment policy mentioned above, is an inducement to the trend.

The drive for wage-employment is also affecting students, especially adult students who are attempting to advance their tertiary education. Interviews with some students who are attending the University of Papua New Guinea Open College on Lihir revealed that many students who are attending the campuses do not continue onto advancing their higher certificates in other universities, but, choose to be employed in the mining operation. An interviewee claimed that it is a daunting task associating with people of the same age who are employed and earning money, while you are stuck being a student. *What is the motivation?* he asked, he left school and landed a job with a contracting company. In a contrasting scenario, an interviewee claimed that many parents send their children to schools located in other provinces with the anticipation that their children will receive better education, and also to get them away from the economic pressure exerted by the wage-earning employment on Lihir. For example, a mother stated that she had two children who were undertaking an internationally recognised curriculum in an international school in Lae, Morebe Province. She affirmed the priority given to her children for a better education by pointing to a semi-permanent family house and lamented; *my husband has been working for 7 years, but, we are still living in this shoddy house, because we want our children to receive a good education.*

She also claimed that many parents send their children to other schools in ENBP and NIP for a better education.

A young man from Komat Village, who completed one year training as a heavy machinery mechanic at a vocational school on the main island of New Ireland in 2006, acknowledged his success to his aunty who paid his fees. He stated that the encouragement given to him by his aunty was to gain a trade qualification in the shortest time possible, in order to gain employment and earn money. Further, he asserted that; *the opportunity to get a job and start earning some money is here, so I grab it*. Overall, many parents who were interviewed regard their children's education as investments for their future, as they expect their children to take care of them when they are old, and in order for them to do that effectively they must have money.

### **5.8.2 Wage employment towards Establishing Businesses.**

According to the interviewees on the subject of small businesses, Lihirians are given preference to establish spin-off businesses by a policy similar to the employment policy. Consequently, all spin-off businesses, including companies, are either wholly or partly owned by Lihirians. In the former, qualitative data indicate that all the owners were once employed during the exploration and construction stages of the mine or at some stage during the normal operation. They all went into business using part of their wages as starting capital. For example: a business woman who was previously employed with the WestPac Bank stated that she was among the many Lihirians who resigned their jobs in 1994 and went back to Lihir to capitalise on the employment and spin-off business opportunities reserved for them. She stated that her desire was to establish a small business when she left the bank, however she did not have enough money to start one. According to her, *the most obvious thing was to get a job*. She landed a job with the mining company as an assistant business development officer. She resigned in 1996 to set up a retailing business, selling working clothes to the mine workers. She has since expanded her business into selling other general goods.

A married couple who run a small business dealing in painting static structures at the mining site indicated that they started their business from the wages they earned when they were employed during the construction phase of the mine. According to the husband, his desire to be a businessman was prompted during the awareness campaign by the government officials

prior to the signing of the mining agreement in 1994. They were told that only Lihirians would be allowed to own spin-off businesses from the mine. He is illiterate, and claims to be a simple village man, as he says in *Tok Pisin; mi man nating tasol long ples mi no save long rid na raite*. (I am just a village man, I do not know how to read and write.) However, his wife is literate, and according to him, he managed to convince her to help him start their own business. When the construction ended in 1997, they decided not to seek further employment, but instead ventured into painting structures erected in the mining areas. The wife keeps the records, while the husband manages the day to day field activities. Like most small businesses, they operate from their house in their village.

### **5.8.3 Wage employment and Cultural Obligations**

Wage-employment is viewed by many Lihirians as a strategy to access other wealth, which would empower them to participate in the cultural obligations. This is evidenced by interviewees who readily allude to how wage-employment has empowered them in dispensing wealth such as pigs, yams and *mis* in cultural activities (see Chapter 3). In so doing, they impact on their social status amongst their clans and villages. For some, wage employment has elevated their cultural positions into leadership roles. A clan leader's wife says, in 2007, her husband spent about K10,000 on a mortuary feast staged by his clan, *this is money he earned from his wages; we have two accounts, one for the family use and the other for cultural obligations*. Many villagers who are not employed in the mining operation call upon their employed relatives to assist with cash so that they could meet their cultural obligations. Similarly, Imbum (2000) found that the 'big men' in Pogera are committed to their jobs and wages in the Pogera mine; it has become a strategy to accumulate modern wealth, go into trade store business, marry more wives, and increase their social status.

### **5.8.4 Wage employment and Accumulation of Capital Goods**

On the whole, employment with the mining operation is viewed as the single most important strategy that has opened up social and economic opportunities Lihirians have never dreamed of or experienced. Desire for modern consumer goods and capital goods has become entrenched in their livelihoods. An interviewee noted, and likened his village to a small town, especially in the nights when homes with electricity lit up. He says; *as you can see in this village, most people who are employed own permanent houses. Most of these houses are built*



*from their wages*. He also claims that most homes in his village own television sets, DVD players, mobile phones, and radios.

In contrast, Bedford and Mamak (1976) found that many illiterate Bougainvillians, who were employed by the Panguan mine, considered wage–employment not important, in comparison with cash cropping in their villages, which was of primary importance in their livelihoods. The difference between Bougainvillians and Lihirians is that Lihirians have few other income earning strategies, and would be more willing to seek wage employment with the mining operation where wages are high. In addition, the mining operation is conveniently located on their island, which enables them to move between their jobs and the village lifestyle.

## **5.9 Mining and Modern Business on Lihir**

The intervention of mining on the Lihir Islands created an economic environment for establishing businesses. An interviewee described the economic opportunity as *opening a flood gate of businesses*, as grassroots subsistence villagers, clan leaders and educated Lihirians seized the opportunity to become business men and women. Since the commencement of the mining operation in 1995, the Commerce Division on the islands has registered over 200 business entities. However, 30 percent of the registered business ventures never started upon registration, and a further 35 percent failed to continue after they started to operate. According to a business woman, although many grassroots Lihirians were empowered by the preferential policy to set up business, they lacked business management skills, and she attributed this as the main cause of their downfall. Similarly, an owner of a business venture which lasted for about eight months after it had started claimed that the government and the mining company did not adequately prepare the Lihirian grassroots to take full advantage of the policy. As such LGL (2004) noted that over 100 Lihirian businesses were listed for deregistration in 2004 by the Government for non-compliance with statutory requirements. Nevertheless, every year new business ventures continue to emerge.

Records held by the Division of Commerce show that between 2004 and 2005, there were 60 companies, 20 business groups (formed and owned by clans and families) and 40 business names (registered under a particular trading name to represent individuals or groups, the name

identifies the particular business activity). Likewise, LGL (2005) reported that there were 120 local business ventures operating in 2005.

LGL (2005) stated that approximately 95 percent of the business entities were directly associated with the mining operation in some capacity to provide goods and services ranging from construction and transportation companies to clothing and catering. Public motor vehicles, trade stores, and sea transport (small outboard motors) occupied 2 percent of the business market, while the balance of 3 percent was occupied by informal activity.

No evidence was found of formal businesses that were producing fresh agricultural, livestock and fisheries produce, despite the demand for fresh produce to feed the more than 3000 mine workers. Interviewees indicated that all the produce consumed by the mine workers are imported to the island, with the bulk coming from Lae (Morobe Province) and Australia. In this regard, an interviewee stated that he started a fresh vegetable buying business in 2005 to supply the catering department of the mining camps, but low volume, inconsistent supply, and lack of variety of vegetables were major impediments to its continuity. He claimed that on many occasions he was *foolishly driving around the main island (Niolam) with an empty truck*. In a similar vein, qualitative data shows that people from the Letlet plateau on the main Island of New Ireland were selling vegetables to National Catering Services, which provides catering services in the mining camps. However, the supply has been very irregular. In the absence of a marketing arrangement, the logistics of getting to Lihir from the immediate could be very cumbersome.

Businesses on Lihir can be broadly categorised into big business contracts and local businesses, each of which identifies differently with the mining operation. Regardless of which category the businesses are identified with, they are wholly or partly owned by Lihirians. Essentially, these businesses depend on the mining operation either directly or indirectly to conduct business. The business contract category can be further categorised into big business contracts and small business contracts. These categories are dealt with separately below.

### **5.9.1 Big Business Contracts**

Big business contracts include companies which carry out major essential contracting jobs worth millions of Kina. For example, LGL (2007) reported that in 2007, Lihirian own business contracts earned K65.8m. LAKAKA Ltd, which is an umbrella land owner company earned over K58 million from major contract works since 1995. In addition, in 2007, Lihirian joint venture business contracts earned K46.6 million. Examples of other Lihirian big companies are the Nationwide Catering Services, and Niolam Security Services. Common shareholders of these companies are individual Lihirians, Lihir clans and the NRLLG. Because LGL relies heavily on these big business contracts for the supply of goods and services, it is imperative they are market-oriented. Essentially, they have to make a profit in order to pay dividends to the shareholders. These businesses employ expatriates in key management positions, mainly from New Zealand and Australia, and pay competitive salaries.

### **5.9.2 Small Business Contract**

Small business contracts characteristically lack the capacity to carry out jobs worth millions of Kina; instead they are sub-contracted by big business companies to carry out certain aspects of their contracts with LGL. In other words, they rely on the big business contracts to go into business. A manager of big business contracts stated that the value of most sub-contract jobs ranges from K10,000 to K20,000. For example, a manager of a small business contract indicated that his biggest job since he started his business in 1999 was K12,000. Most people interviewed claimed that owners of small business contracts tend to have a common habit in delaying paying their employee's wages. For example, it was noted during the second phase of the field trip in 2007, that three small business contracts did not pay their employees for two months. According to a key informant on this subject, there have been a number of court cases between certain small business contractors and their employees stemming from either non payment or underpayment of wages. Such management issues clearly indicate lack of prudent management of business.

In another business arrangement, clan business groups, individuals and Council Wards on Lihir enter into joint venture contractual agreements with big business companies to supply goods and services. In this arrangement, the big business companies manage the small businesses by providing management advice. For example, a clan and NCS jointly own and

manage two canteens, which are located within the mining camps. The clan provided the starting capital to establish the canteens and appointed a manager and four workers, while NCS provides management advice and keeps the accounts of the joint venture. According to the manager of the canteens, profits made from the canteen are paid to the clan through their bank account. So far the clan has expanded their asset base by purchasing a bus from the profits. The bus is hired by LGL to transport workers from their villages to the mine site.

Similarly, a number of business groups, individuals and Council Wards have entered into contractual agreements with LGL to provide buses for the purpose of transporting workers to from their villages. An interviewee indicated these buses become part of LGL's transport fleet, which are either managed by LGL or a local management company. For example, Ward 11, through their Ward member bought two 25-seater buses, which are contracted to LGL to service its workforce under a three year contractual agreement. According to an interviewee, the owners receive K2,500 to K3,000 (NZ\$1,150 to NZ\$1 500) per month depending on the mileage covered by the buses.

### **5.9.3 Local Businesses Resulting from Local Multiplier Effects**

The operations of local businesses are not directly identified with the mining operation. Rather, they depend on trade generated by the mining operation, in terms of wages, royalties, allowances and compensation, as inputs into the local economy. Examples of businesses under this category include trade stores, public motor vehicles, lawn mower services, builders, chain saw operators, outboard motor operators, intranet specialists, liquor outlets, guest houses, and homes for rents. Owners of these businesses conduct their businesses either in Londolovit Town or in their villages. In the case of public motor vehicles, they operate between the town and villages. Likewise, the outboard motors operate between the outer islands and Niolam Island, and Namatanai Town on the main Island of New Ireland. These businesses have either replaced or become part of the people's subsistence livelihood strategies. In any case, they have become important livelihood income earning strategies. Business owners noted that their engagement in their businesses on a daily basis has separated them from their gardening activities. Although some of them still have yam gardens, they are spending less time in them. However, all the business owners interviewed indicate that participation in *kastom* activities take precedence over other activities. To this end, the discussion now focuses on non market centric businesses (without a market focus) and their purpose.

#### **5.9.4 Local Businesses not Market Centric.**

Non profit businesses such as trade stores, small family contractors, petrol and kerosene sellers, outboard motor owners and lawn mower operators are largely income livelihood strategies to enhance the broader scope of cultural, social and economic status of the business owners and their clans. Most times they operate outside formal market forces which are not of concern to their operation. This perception according to Curry (1999) is consistent with the view of economic geography, which situates the social, political and cultural practices within formal economics. Drawing on the work of Polanyi (1957) there is a need to recognise the embeddedness of economic behaviour in terms of capitalist and traditional concepts within the PNG context. Polanyi's key insight was the notion of always-embedded economy, which is derived from the perception that resources such as land labour and money must always remain embedded in society. Polanyi's view of the always-embedded economy means that how an economy is structured depends on the way it is embedded in society. Polanyi argues that different forms of social embeddedness will lead to different types of economies. Thus, a variety of market societies is expected, and the notion of market economies becomes unfashionable. Polanyi also demonstrated that the embeddedness of economic action suggests that employers or employees are motivated by a range of logics. Stemming from Polanyi's views, Thrift (1990) and Leyshon (1997) argued that exchange transactions are embedded in social relationships, and such relationships in turn influence and enhance social networks and generate trust in economic relationships. In another study Yang (2000) investigated the notion of social embeddedness of economies in the province of Wenzhou, China. Yang's study revealed that market economy and the introduction of capitalism released the forces of a ritual economy. Yang indicates that although households show what they are capable of producing in order to maximise their household business incomes, this is not entirely for commercial purposes, but also to participate in their ritual economy. In the PNG context, Curry (2003) indicates that there is a growing body of work that resonates with the notion of social embeddedness of economies and the consequent emergence of a range of alternative modernities. Curry (2005) argues that the establishment of modern businesses by indigenous people is about social relationships, group identity and status. In other words, the market view of doing business should not be detached from the cultural and traditional context, but is embedded within it through non-market livelihood strategies. In that sense, Yang (2000) claims that the modern business activities are viewed as symbols of modernity for the owners. In an important contribution to this debate, Banks (2001) in a study of Porgeran engagement

with modern economic opportunities presented to them by the Pogera Joint Venture gold mine reveals that the people's culture articulates with modern business discourse and practices. Banks argues that there is a need to acknowledge more openly the socially and politically embedded nature of the economy and understand the role it plays in enhancing the social institutions in Pogera. Clearly, as noted by Banks, the Pogeran get into business to primarily enhance their non-market activities. Therefore, from this perspective, local businesses are less adaptive to market forces compared to western-style economic systems.

Generally, in the PNG context, business owners feel obligated to submit to demands of relatives for assistance in cash and kind. The embeddedness of businesses in social and kinship networks influences all facets of the operations of these businesses (Curry, 2005). To this end, as Lihirians enter the cash economy through their business ventures, qualitative data indicate that non-market livelihood strategies are enhanced. Drawing from Curry (1999; 2003; 2005), and literature on the sustainable livelihoods theory, the practice can be perceived as economic transactions which are firmly grounded in the enhancement of social capital. In turn, these are related to the economic success of business ventures. The non-market and non-profit desire and world views are illustrated in the following local businesses on Lihir.

A businessman who owns a company states; *I have to contribute pigs and yams to assist in mortuary ceremonies, money to support the youth activities and our local church. My participation in these activities enhances my relationship with members of my clan and the village on the whole. I do this to gain the respect. If I don't do it people will dislike me and probably my business will not run properly.* He claims that since 2004, he has spent more than K50, 000 on feasting, youth and church activities.

A business woman indicated that; *owning and operating a business in a paternal society such as Lihir is very challenging for women. There is no other woman on Lihir who owns a business. Although many have tried to set up their businesses, they have all failed, because they could not compete with men, they are not prepared to say to men: if you can do it, I can do it too.* She claimed that members of her clan at large perceive themselves to be also owners of her business and on numerous occasions request that she should support them financially to stage *kastom* activities, or give them cash. The most important challenge for her is mixing modern business with *kastom* obligations and whether she likes it or not she must account for *kastom* obligation in the operation of her business.

A man who is viewed by Lihirians as a leading businessman said; *running a business on Lihir is challenging because it is like living in two worlds, one side is the business world and the other is the chores of village life*. According to him, for a business man to be successful in the Lihir context one has to blend the two worlds together. He claims that it is impossible for him to separate himself from village life and solely concentrate on his business.

A village man, who resigned from his job as water pump attendant in 2005, ventured into selling kerosene and petrol in his village. He buys kerosene and petrol from Londolovit Town and sells them from a small shed near his clan's men's house. He does not own a house, but dwells in his clan's men's house. In 2006, he spent K2000 on a mortuary feast hosted by his clan. Although the amount seems a lot, according to him he is obliged by *kastom* to spend such an amount on it.

He highlighted that, without his small business he would not have had to contribute that amount of money on *kastom*. According to him, although that expenditure adversely affected his business, he was able to recover from it. The recovery strategy as he explains was focusing on selling kerosene, which is highly demanded by households that are not connected to electricity supplied by LGL. Income earned from the sale of kerosene enabled him to resume selling petrol. He claims that petrol is in high demand when feasts are held, as people are required to travel to other islands to buy pigs.

A village man, who was previously employed, but now operates a trade store and a lawn mowing business, claimed that, since he started his business in 2003, he has spent a lot of cash earned from his business on pigs and yams for *kastom* activities. In 2006, he bought a pig worth K1000 from Namatanai, New Ireland for a feast. Further, he contributes cash to assist the village youth group and church activities.

A family which owns two business entities admitted that conducting business on Lihir is not easy, especially in a culturally and socially circumscribed environment. Cash, according to the head of the family (father), has created an environment where people are *competing for status and glory*. He said, although he is educated, he is not directly involved in the day to day operation of the family business. They employ a fulltime manager and their daughter as an administrative clerk, says the wife. The business has an advisory board, which consists of

them (husband & wife) and two independent members. The board meets four times a year and each member receives a sitting allowance of K50 per sitting. The wife said, although they do not directly manage their businesses, they are signatories to their business account, apart from their daughter. They admitted that there have been disagreements between them, especially about expenses not related to their business, but they have been able to contain them. The disagreement stems from their daughter's perception about running a profit making business. The wife disclosed that they have an annual budget of K3,500 (NZ\$1,500) for financial assistance towards community activities including churches, schools and village sports, which they try not to overspend on.

In addition to the husband's role as a chair of the board of his family business he also serves as a member of the Town Planning Committee and a member of his Ward's Planning Committee. He is a regarded and respected leader on the Islands. The wife claims that although they are viewed as business people on Lihir, they still live a normal villager life, attending to their yam gardens and pigs, which according to her take up a lot of their time. Their daughter, who was interviewed separately, revealed that because of the reputation of her father in the community, she ensures that their businesses are well managed. She said it would be shameful for her father and for the family if their businesses ceased operating, alluding to a lot of businesses which have become insolvent.

The underling meaning of these stories is consistent with Curry's (2005) argument that many businesses in PNG are established primarily for the facilitation of gift exchange and enhancing social status of the proprietors and investors, with the profit motive subordinated to these objectives. The important role of village enterprises in meeting indigenous objectives means that they are rarely profitable.

Further, the above testimonies illustrate that business owners feel obligated to acquiesce to demands of relatives for assistance in cash and kind. This argument is consistent with Curry's (2005) theory that in PNG local businesses are embedded in social and kinship networks that influence all facets of the operations of these businesses. The reality is that these businesses can not be understood independently of their social embeddedness of businesses enterprises in rural villages, and identify the characteristics that make some businesses more sustainable than the others. At large, their operations are driven by indigenous non-market livelihood imperatives.



### 5.9.5 Perspective of Market Centric Business Proprietors

Most managers of small businesses who were interviewed claim that owners of local businesses spend a lot of their operational money on non-market livelihood activities. They perceive it as bad practice, in terms of the market centric economic and sustainable context of businesses. Accordingly, the practice is considered by many interviewees to be a major cause of breakdown of a lot of small businesses. The other reason alluded to by many interviewees was lack of business management skills by many Lihirians, especially the villagers. As put simply by an interviewee, many village men and women seized the opportunity created by the mining operation to venture into businesses, but lack basic management skills. A female interviewee points out that the mining company, although it provided seed money through the revolving credit scheme to assist Lihirians start their businesses, did not train them on how to manage their businesses. She says; *the company through the business development office was giving out interest free loans to us, but it did not do any good to a lot of people as their businesses failed.* She also claims that BDO did not have the human capacity to cope with the business boom during the construction phase of mining, and as a result many small businesses subsequently ceased.

In addition, she claimed that no study was conducted to identify the most feasible business entities for Lihirians to venture into. She also claimed that the business development office has been conducting business management courses for managers and owners of small businesses over the years, but there has been no study to identify gaps in business skills and knowledge amongst Lihirian business men and women. Further, there has been no evaluation of the uptake of skills and knowledge taught.

Schaper (2002) argues that economic benefits from the PNG mining industry have not been utilized wisely to generate a strong business sector. The problem stems from what Schaper calls lack of empowerment of Papua New Guineans in entrepreneurial proficiency. The process of empowerment is made more difficult as most people in the country are self-employed in the informal sector. In this regard, Schaper argues that it is difficult for an entrepreneurial class to emerge and prosper, and it is even more difficult for administrators to provide the support mechanisms needed to foster the growth and sustainability of businesses. To this end, Schaper indicated that the dependence on mining projects has created a source of

wage employment for many people. However, this study has identified that the economic benefits have not been effectively utilized to generate a strong small business sector.

## **5.10 Conclusion**

This chapter demonstrates that the mining operation as an intervention is significantly affecting the people's livelihoods on Lihir. The intervention has resulted in new introductions into livelihoods on the islands. In particular, the establishment of institutions has been underpinned by the LSDP. The chapter has unpacked these institutions by presenting their functions, strengths, weaknesses, resilience and sustainability using a messy matrix analysis. Further, analysis of their influence using a tool known as the demand and supply side of institutions revealed that LGL, LMALA and NRLLG are having more influence than other institutions on livelihoods. Hence the power to 'represent Lihirans is concentrated in the hands of a few in a way that contradicts the traditional context. The chapter also revealed that two administrative structures exist on Lihir, first the public service, and second the NRLLG administrative structure. These structures serve the same governing body and the same people. In comparison between the two, the public service structure is weak in terms of resources and human capacity. In this regard certain government divisions are liabilities to the overall governance environment on Lihir. The planning system is encouraged through the bottom up process at the Village and Ward level. However, personnel at this level lack capacity in planning.

The mining operation has also provided substantial employment opportunities, with higher income-generation potential than most, if not all, other employment in the area. Empowered by the preferential employment policy, subsistence villagers have readily embraced wage employment, which has become a major income livelihood strategy.

Generally, many Lihirians now view wage employment in the mining operation as the only income earning livelihood strategy rather than as one of many ways of earning an income. Similarly, Lihirians have been empowered by the preferential business development policy to become essential providers of goods and services required by the mining operation. These businesses are categorised into three categories, each having distinct characteristics. These are big contract businesses, small contract businesses and local businesses. Each category views

business differently. Generally, big contract businesses are operated with the aim of achieving market centric objectives, while local businesses tend to operate along non-market centric perspectives. Small businesses are switching between these two world views. Given these changes to the people's livelihood system at a broader level, Chapter 6 will focus on the changes in livelihoods at the village level.

# **Chapter 6: Village Livelihoods in Transition**

## **6.1 Introduction**

This chapter examines the transition that is occurring in livelihoods in the villages on Lihir. It answers the question of how the village people are responding to the changes in their livelihood system in response to the changes deriving from the gold mine operation. The changes to the financial, human, social and physical assets are discussed. The section on human capital is expounded to cover the relationship between human capital and human capabilities in the context of this thesis. The chapter also covers the stratification and typology of households which has occurred as a direct response to the mining operation.

## **6.2 Financial Assets**

Financial capital can be held in several forms: cash, bank deposits or liquid assets. Financial resources can also be obtained through credit-providing institutions; in which case, liabilities are attached (DFID, 2000). Communities can receive substantial flows of revenue when a large mine is established in their areas. For areas previously peripheral to the cash economy, these monetary flows can transform the economic and social basis of communities. In other areas, they can act as an important catalyst for change and growth (Banks, 2001).

In Chapter 5 Section 5.5, financial assets were mentioned; however, the discussion was focused on upper and the lower meso levels, where the NIP and NRLLG receive mining royalties, and how these assets are channeled through various institutions to implement the LSDP. In contrast, this current section presents financial capital at the micro level of the village and family or household level.

### **6.2.1 Financial Institutions**

In all the case study villages, there is compelling evidence that the mining operation has contributed immensely to both the stock and flows of cash into the villages, individuals and

households. For example, all the heads of households and individuals interviewed indicate that they have bank accounts with either the Bank of South Pacific or Micro-finance Bank. The third financial institution, the Niu Ireland Savings and Loans Society has a total of 12,000 members. This figure includes public servants and other workers. Using their savings as collateral, members are able to borrow money from the society to either buy capital goods or pursue other livelihood strategies.

### 6.2.3 Income from Wages

Several sources of income emerged from both the secondary and qualitative data. The most significant is the income from Lihirians who are employed in the mining operation. According to LGL (2007a), from a population of 14,833, 708 Lihirians were employed by the gold mine operation. This represents five percent of the Island's population at that time. The total amount of wages paid to them was US\$8.8 million (K26.4 million). It is not clear whether this amount was after or before income tax. Nevertheless, it indicates the magnitude of income deriving from wage employment and circulating on the islands. Table 6.1 shows the level of cash from wages flowing into five villages in 2008. The average population used in column (a) is taken from the 2009-2013 Lihir community health plan (LSDP, undated).

Table 6.1: Estimated cash flow into five villages from wages, 2008

Village	Village population, Ward Av. (a)	Number of people employed (b)	Number of wage earners interviewed (c)	Average income per fortnight (PNGK) (d)	Annual estimated total income flow per village (PNGK) <i>bxdx26 fortnight</i> (f)	Estimated income per capita (PNGK) $f \div a$
Kunaie 1 & 2	1129	65	15	431	728,390	645
Londolovit	671	75	9	347	676,650	1008
Samo	590	33	4	333	285,714	484
Komat	520	23	8	346	206,908	398
Matakues	657	12	4	375	117,000	178

It is quite obvious from the table that income per capita per village is high compared to the K60 per capita for the whole island prior to the mining operation. On the other hand it must

be noted that this figure is not cumulative as it is based only on income from wages in five villages. Nevertheless, the table gives an impression of the level of income flowing from wages into these villages as a result of the mining operation. This has to happen as Lihirians are readily employable by the gold mine operation, enhanced by the preferential employment given to them under the mining agreement.

#### **6.2.4 Income from the Sale of Betel Nuts**

Based on observations and qualitative interviews, betel nut is a major source of income for a lot of village households. It is the easiest cash income strategy for many families, as it is readily available. Men, women and children are involved in selling it at the open market in Londolovit Town, on roadside markets, from homes, and village trade stores. A head count over a 6 day period (Monday to Saturday) at the Londolovit market indicated that out of 1604 sellers, a daily average of 71 sold betel nuts. The figure equates to a total of 426 betel nut sellers for the 6 day period. It was not possible to elicit the income from betel nut sellers from a public market with many people around. A female interviewee stated that; *betel nut was here before the mine came. It has always been part of us. We never sold it for cash, but now people are selling it everywhere, on the roadsides markets and from their homes.* Another woman interviewee indicated that; *betel nut is readily available in our villages, and because the gold mine brought a lot people onto Lihir, many of them are buying betel nuts from us. This started before the market in town was opened.* Similarly, Anderson (2008) indicates that betel nut was one of the products that attracted the highest returns for women roadside sellers in the Madang Province.

In the villages of Kunaie 1 & 2, Putput 1 & 2, Kapit and Samo, a total of 23 interviewees indicated that they sell betel nut almost every day, but the sales were not continuous throughout the day. The maximum daily income from these sellers was K340, with a minimum of K33 and an average of K113. Based on the average, the fortnightly income an individual could have earned was K1582.

Interviews with five non-Lihirians who are living in a squatter settlement between Kunaie Village and Londolovit Town indicated that they sell betel nut every day, between 6.30 am and 6.00 pm. Their daily average income was K116, ranging from K84 to K152, giving an average individual weekly earnings of K812.

It is common knowledge on the islands that Matakues Village has a bountiful supply of betel nuts. All 15 interviewees at Matakues Village indicated selling betel nut is their main source of income. Their daily sale was from K67 to K220, with an average of K113. Based on this anecdotal evidence, one could assume that an average betel nut seller at Matakues who is selling every day earns an estimated K791 per week, or K1582 per fortnight.



Figure 6.1: A customer buying Betel nuts from betel nut sellers at a road side market on Lihir

### 6.2.5 Income from Mining Royalties and Allowances

According to LGL (2008:39), in 2008, the PNG Government was paid K84 million in taxes and levies, the NIP was paid K21 million, and NRLLG was paid K12 million. At the village level, mining royalties are paid monthly to the clans that own the estimated 30 hectares of land under the special mining lease area. The six major clans (*Lamatlik, Nayal, Nissal, Tengawom, Tinetalgo* and *Unawos*) and more than 40 sub-clans (mentioned in Chapter 3) own portions of the land under the special mining lease. However, the *Tinetalgo* and *Unawos*

clans are the major owners. Together they own 70 percent of the land under the special mining lease. These two clans plus their sub clans receive 60 percent of the mining royalties. Overall, LGL (2008:39) claims that the land owners received K8 million in royalties in 2008. This amount of money flowed directly into Lihirians. Anecdotal evidence from 11 interviewees indicated that they received K700 to K7000, an average of K2,236 per month. Based on this evidence each clan could have received an average of K26,832 per month in 2008. Overall, LGL (2008:39) claims that the land owners received K8 million in royalties in 2008.

Inconvenience allowance, also commonly known as dust allowance, is paid to the villagers of Londolovit, Kapit and Putput 1 & 2. As the name implies, it is an allowance for inconveniences caused by noise and dust from the mining operation, which are affecting the normal life of these people. As shown in Figure 1.2 (Chapter 1), these villages are within proximity of the mining operation. According to a village population survey conducted by LLG in 2000, the total population for these three villages was 1541. Each individual over the age of 18 in these villages received K300 per month, of which 10 percent is withheld by LMALA, to be paid into a special trust fund as savings for each individual. The estimated amount received in a month for the three villages is K416,070. According to all the interviewees in these villages, the mining allowance was their major source of income, paid into their bank accounts, and therefore, easily accessible by each individual. This is in contrast to the distribution of mining royalties, which are distributed to individuals in cash.

Essentially, royalties are collected by clan leaders who are also responsible for making decisions for their disposal. As stated by an interviewee, this makes clan leaders very powerful and influential. For example, a clan leader indicates that he receives three cheques every month, of which he keeps one, and passes the other two to two elders within his clan. The verbal agreement was for the elders to cash the cheques and distribute it amongst their members. However, the leader claims that the elders instead buy food from the grocery shops in town and distribute it amongst the members. A women interviewee stated that; *sometimes the clan leaders do not distribute the mining royalties evenly. Some people miss out on receiving royalties altogether.* Similarly, an interviewee from Putput 2 village claimed that he is not on his clan's distribution list, as his clan leader sees him as a wealthy man because he owns a trade store, a perception he disagrees with. Bainton (2006) noted mining uneven distribution of mining royalties has created problems between the landowners and non land



owners on Lihir. According to Golup (2006) land owners in the context of mining on Lihir are those people who claim ownership of the matrilineal clan groups who own land alienated for the purpose of mining. Moreover, at the broader level, many interviewees claimed that only the people of Londolovit, Kapit and Putput 1 & 2 villages are benefiting from the mining royalties and allowances. People in other villages are missing out. This means that of the 14,833 Lihirians, 3137 (i.e. population of Londolovit, Kapit and Putput 1 & 2 villages) or 21 percent are direct beneficiaries of the mining royalties and allowances. The disparity according to many interviewees is common knowledge on Lihir. However, according to an interviewee from Lambuar village, the local leaders are not addressing the issue; *they are not seeing the many people on Lihir who can be categorised as marginalised*, he lamented. An interviewee from Komat village indicated that there are people in his village who are poor (that is, they do not have regular sources of income); as a result, they depend on their relatives for most of their needs. He suggested that two percent of the royalties paid to Londolovit, Kapit and the Puput villages could be distributed to the villages that are not receiving the mining royalties. This would result in fair distribution of royalties and also to assist those who really needed money.

### **6.2.6 Housing Rentals**

Many Lihirians rent their houses to non-Lihirians who are employed by the mining operation. From a sample of 12 interviewees, their fortnightly rentals range between K330 and K600, an average of K462. Many of the houses rented out are owned by elderly people, who possessed them through the Village Development Scheme. A common problem, according to many interviewees, is that no provision is made in the modern homes for a fireplace to keep the elderly people warm in the nights. In addition, most of these houses are raised buildings built on high posts. This makes it difficult for elderly people to walk up and down the steps. Many have resorted to living in their bush material houses where it is cool during the day, and in which they can have a fireplace to keep warm in the nights. An interviewee said; *Because I am not living in my permanent home, I am on the other hand earning an income by renting it out.*

### **6.2.7. Sale of Culturally Significant Items: Yams, Pigs and *Mis***

Women interviewees in the case study villages indicated that yams, *mis* and pigs, which were traditionally reserved for ceremonial feasts and exchanges, and for family and household

consumption, are being traded for cash. For example, a women interviewee at Kunaie 2 village claimed that her family sell their yams and other garden produce, as they have no other means of generating cash. She stated; *our village has changed; We have to have money to buy store goods. My husband does not work for money. That is why we have to sell yams, pigs, betel nuts and other garden produce for money.* She claimed that in 2006 they sold 10 piglets, earning them K1000. In one occasion, she sold K150 worth of yams to a feast giver. She remarked, *the best time to sell yams is when cultural mortuary feasts are held.* Another woman stated, *I sell yams and sweet potatoes at the entrance to our house, which many men and women come to buy. Most of these men and women work in the mine and they do not have the time to plant their own food. During the times that kastom activities are conducted, I sell more yams and sweet potato. This is the way I get money for my family. Sometimes I earn K100, K150. On one occasion I earned K200.*

With regards to the sale of pigs as an income livelihood strategy, qualitative data shows that more men are taking over the role of rearing pigs, which is a role traditionally performed by women. The basic rationale for the shift is the economic value of pigs on the islands. A male interviewee at Kinami village said, *Pigs which are normally used in cultural feasts in our culture are being sold for cash. People sell their pigs for K1000 or more. The demand is high because of the many cultural feasts held here on the Islands'. In our culture it is the women's role to look after pigs. However men are becoming more involved because they see a lot of money in pigs.* Although most pig sellers prefer to be paid in cash, many Lihirians still accept *mis* if it was offered to them.

The other item of cultural significance which is being traded for cash is the traditional currency (*mis*) mentioned in Chapter 3. Many Lihirians, especially the residents of the outer islands of Malie, Maur and Masahet, are trading *mis* for cash. As indicated by a man from Malie Island, *'We on Malie Island, selling mis have become our number one strategy to earn money. We buy the shells from Kavieng and produce mis to earn an income. Our land is not suitable for growing food crops to sell for money. That is why we are producing mis to earn money'*. Likewise, Macintyre (1989:22) indicates that *mis* production is a booming business on Masahet Island. People are using income from their wages to purchase the blank shells from New Ireland. The blank shells are grounded, polished and strung. Women interviewees at Kunaie Village indicated that a fathom of *mis* at about arms length is worth K50. According to a local politician, the value of *mis* in terms of cash is estimated at K10 million, circulating

on the Lihir. His estimation is based on the extensive use of *mis* in the mortuary feasting, which have escalated as a direct response to the improved economy of Lihir. Further, qualitative data indicate that there are differing views and opinions about the real value of *mis*, especially amongst the local leaders. One opinion is that it is a currency for the main function of ceremonial transactions. Another is the desirability of establishing a local bank to facilitate the circulation of *mis* to enhance its value and usage within the changing Lihir economy.

### **6.2.8 Roadside Market Sellers**

Anderson (2008) suggests that roadside markets have become a successful economic phenomenon in PNG, especially in areas where people have access to fertile customary land and proximity to good road systems. In fact, roadside markets have become a common feature on major roads in PNG, and barriers to participation are low. Anderson indicated that the average weekly income from a roadside market in the Madang Province was K286.00. This is considerably higher than the PNG rural minimum wage of K37.20 per week established in 2006 by the Government of PNG.

On the Lihir Islands, roadside markets have become a common feature of the ring road on the biggest island of Niolam. Villagers have capitalised on the improved road system to sell cooked food, fresh vegetables, and betel nuts. Observations in most villages indicate that roadside vendors are mostly women and children. The women congregate and socialise by the markets, while their children conduct the sales. A mother stated that it is a good way of keeping children out of trouble and instilling responsibility in them. An elderly male interviewee at Matakues village said that the children who are involved in roadside markets would likely develop an economic focus in their lives when they grow up. This is because they are participating in economic activities, especially handling money from roadside market sales. *They will be different from their parents*, he added. *They will grow up to think money most of the time*. On the other hand, many women interviewees indicated that Lihirian women are timid in selling their produce in public places, and therefore tend to use their children instead. Similarly, Anderson (2008) indicates that the roadside vendors in the Madang Province are populated overwhelmingly by women.

The number of sellers in the roadside markets ranges between 1 and 15. In many cases, the markets are owned by families or households whose homes are built near the main road. The main item sold in these markets is betel nuts. This is especially evident in the villages of Matakues, Kinami, Wurtol, and Putput 1 & 2. The vendors prefer to sell their betel nuts in the mornings between 6 and 9 am and in the afternoons between 3 and 6 pm. At other times of the day, they attend to village or family commitments. At Matakues Village, the author noted that three interviewees immediately started selling their betel nuts at roadside markets after their interviews.

In one of the roadside markets, five 25-seat buses made brief stops for passengers, who are mostly mine workers returning from work, to buy betel nuts, mustard, *brus* (local tobacco), Kulau (green soft coconut), galip nuts, fruits (oranges and pawpaws), loose cigarettes, *spear* and *mutrus* (PNG, Tobacco products), ice-blocks, homemade scones and flour balls.

Two particular roadside markets near Londolovit Town are known for selling fresh vegetables. Observations indicated that the majority of the vendors in one of these markets are non-Lihirians who have migrated to Lihir. These two roadside markets operate only between 3.00 and 6.00 pm every day. Many vendors claimed that during this time they make a lot of money from commuters returning from work. In-depth interviews suggested that vendors at these two roadside markets tend to spend the early part of the day preparing their produce for sale. For example, some of the produce such as pumpkin tips and bush ferns are forest products, which the sellers have to scavenge from the forest.

Although the income figures shown in the above cases may not be proportional to the number of income earners in each of the case study villages, the figures however indicate the magnitude of cash flowing into households, families and individuals. This is a contrasting situation to the period prior to the mine operation when few people were employed as plantation labourers, school teachers, and health workers, and when copra was the only source of cash, albeit sporadically.

The island's per capita income has grown from K65 (LGL, 2002) to K2,500 per head over a 10-year period of operation (LGL, 2005). Physically, the islands have developed from almost nil modern infrastructures to a much improved road system, sea transport, air transport, education and health facilities, housing and communication system. In addition, the

establishment of Londolovit Township includes banking and shopping facilities, and service utilities, which contributed to the modernisation of the Lihir Islands. In contrast, prior to the commencement of the mining operation in 1995, the annual government expenditure on many services was approximately K60 per head (Filer and Jackson, 1998:107). At the household level, greater access to financial and physical assets is contributing to changes in people's livelihoods.

### **6.3 Human Capital**

Human capital is a category of livelihood asset. It represents the skills, knowledge, and capacity to work. It also includes good health, which, together with education, empowers people to pursue different livelihood strategies and achieve their livelihood outcomes. Human capital requires physical capital, social capital, natural capital, and financial capital to achieve positive livelihood outcomes (DFID, 2000). At a household level, human capital is a factor of the amount and quality of labour available. This varies according to household size, skill levels, leadership potential, health status and age (Ellis, 2000).

In the context of this study, the mining operations created an opportunity for Lihirians to attain technical and business skills. LGL invested significantly in up-skilling many Lihirians to empower them to be employable within the mining operation. Previously, most of these people were subsistence villagers who had never experienced what it was like to be employed. In addition, many Lihirians living in other parts of PNG returned to Lihir for employment at the mine or to take advantage of the mine's community development programs. These people introduced new skills into their respective villages. Many of them were able to directly impact the economy of their villages through their employment with the mining operation and participation in village activities.

Lihirian leaders have also been able to develop negotiations skills at the corporate level with LGL, and at government levels leading to the agreed IBP mentioned in Chapter 5. A local leader, who was part of the negotiation team, indicated that the local Lihirians who were members of the joint negotiation committee learnt a great deal in terms of negotiation skills and being exposed to the country's mining policies, as they had to deal with educated LGL and government personnel.

LGL (2007) reported that education is one of the keys to Lihirian wealth and economic growth. It is regarded as the principal means through which future Lihirians will secure their economic independence. According to LGL (2008), the company, through NRLLG, spent more than K5 million on educational facilities throughout the islands between 2004 and 2008. In addition, Lihirians have access to the Lihir Education Assistance Program, from which funds are made available for parents who have difficulties in paying their children's school fees. Since 2004, the program has assisted Lihirian students in the lower, intermediate and higher institutions. Each year the 26 elementary schools, seven community schools, and the Pali Vocational Centre are allocated financial grants. For example, in 2006, a total of 325 student fees were subsidised by the program, representing a contribution of K51,665. Grants of K16,500 were also made directly to schools. Every year, an awareness program led by Lihirian role models encourages young Lihirians on the value of education. According to a key informant on the subject of education, investment in education has translated to 65 percent of the population being literate in 2008. She claims that this is in contrast to less than 40 percent prior to the gold mine operation.

LGL acknowledges that a strong apprenticeship and training program for itself and other major contractors makes good business sense. To this end, it has established a training centre to train Lihirians. Since 2004, more than 440 Lihirians have been trained through LGL's apprenticeship program. The figure includes women who have undertaken secretarial courses, which are conducted every two years. For example, in 2004, nine graduated as trainee secretaries and landed permanent jobs with LGL and other contracting companies on the project. In future, it is intended that six grade 10 leavers will join the program every year (LGL, 2008). According to Sen (1997:2), the rationale for education is making a person more efficient in production. It can add value of production in the economy and also to the person who has been educated. For example, a person may benefit from education in the form of reading, communicating, arguing, in being able to make decisions in a more informed way, and in being taken more seriously by others. In this sense the benefits of education exceed its role as human capital in commodity production in an economy. In fact it enhances human capability.

While the mine provides jobs for the locals, in enhancing their skills in a new and uncommon working culture, the villagers' traditional roles in teaching their children and the youth in subsistence methods of sustaining their lives are being eroded. This may lead to un-

sustainability in their abilities to make a living from their newly acquired skills, when the mines cease operation (LGL, 2002).

In any livelihood system, the quality of its human capital can be determined by its overall health standards; that is, the availability and sustainability of its health infrastructure and the general health of its population. In that regard, the LSDP has embarked on a community health plan (2009-2013) that incorporates all aspects of community health on the islands. The plan is part of the development plan for a healthy Lihirian population. It promotes community responsibility for health, and targets existing and potential disease burdens on Lihir Islands.

In the meantime, the plan outlines that the leading causes of morbidity and mortality on Lihir Islands are common infectious diseases (especially malaria, pneumonia, diarrhoea and tuberculosis) and neonatal health problems related to maternal morbidities. According to LGL (2001:25), between 1998 and 2001 the incidence of malaria on the islands reduced from 67 percent to about the World Health Organisation standard of 10 percent. This is a direct response to the provision of better and improved health facilities by the mining company. On the whole, it is anticipated that the improved health facilities would lead to a healthy Lihir human capital.

According to LSDP (2007), the incidence of sexually transmitted diseases, HIV and AIDS is underestimated and undercounted, but is likely to become an increasingly significant problem. Simple and cost-effective interventions can be applied to all these health issues. However, according to an interviewee, *health facilities, staff houses, and medical equipment are in need of maintenance. Management of drugs is poor, with few locally initiated in-service training activities in recent years.*

Lifestyle diseases are a new phenomenon on Lihir Islands, and can be linked to the population adopting unhealthy diets and undertaking inadequate physical activities. With greater cash income, Lihirians are increasingly consuming processed foods high in sugar and fat. Obesity rates are increasing, resulting in an increase in diabetes, hypertension, heart disease and other related diseases (LSDP, 2007). A health officer indicated that there is a need to address lifestyle diseases by programs that centred on public education and awareness, as well as management, of those who have already developed lifestyle diseases.

## 6.4 The Relationship between Human Capital and Human Capabilities

### 6.4.1 Conceptual relationships

In analysing Champers's and Conway's (1992:8) definition of the term 'livelihoods' in Chapter 2, Section 2.6.3, it is apparent that the concept of capabilities is one of the fundamental means and ends of the sustainable livelihoods approach or framework. Therefore, having discussed the generic nature of human capital above, in this section the relationship between human capital and human capability is explained. But first, an overview of the capability approach is presented.

The capability approach, according to Sen (1992), is perceived as a framework of thought, a mode of thinking. The approach can be applied to address diverse problems in different ways. For example, it can be applied in the evaluation and assessment of individual well-being and social arrangements, and in the design of policy and social change in society. It provides a framework to analyse a variety of social issues, such as well-being and poverty, liberty and freedom, development, gender bias and inequalities, justice and social ethics.

The capability approach has received substantial attention by philosophers, economists and other social scientists. However, the nature of this attention has been mixed. For example, Atkinson (1999) embraced the capability approach as a substantial contribution to economics, ethics and development studies. The capability approach has also been judged as superior to other theories or approaches in a number of more specific discussions. For example, Bebbington (1999:2031) argues that "egalitarians should seek equality for all in the space of capabilities", while Davis (2002) perceives it as a way to redefine economics from a discipline centrally concerned with preferences, choice and exchange, to a discipline that focuses on the needs of related individuals who are embedded in their environment. However, others have expressed scepticism in general about the approach. For example, Rawls (1999:13), while acknowledging that the idea of basic capabilities is important, calls it "an unworkable idea" for a liberal conception of justice, while Roemer (1996:191-193) criticises the capability approach for not being sufficiently specified. Robeyns (2005) argues that the capability approach is not a theory that can explain poverty, inequality or well-being; instead, it rather provides a tool and a framework within which to conceptualise and evaluate these phenomena.



Essentially, as Sen (1999:76) indicates, the capability approach involves “concentration on freedoms to achieve in general and the capabilities to function in particular”. The major constituents of the capability approach are functionings and capabilities.

Functionings are the ‘beings and doings’ of a person, whereas a person’s capability is “the various combinations of functionings that a person can achieve. Capability is thus, a set of vectors of functionings; reflecting the person’s freedom to lead one type of life or another” (Sen, 1997:1959). According to Sen, a person’s functionings and capabilities are closely related, but distinct. “A functioning is an achievement, whereas a capability is the ability to achieve. Functionings are, in a sense, more directly related to living conditions, as there are different aspects of living conditions, while capabilities are notions of freedom, reflecting the real opportunities people have regarding the life they may lead” (Sen 1999:76).

Therefore, the core characteristic of the capability approach is its focus on what people are effectively able to do and to be; that is, on their capabilities. This contrasts with philosophical approaches that concentrate on people’s happiness or desire-fulfilment, or on income, expenditures, or consumption. In other words, the capability approach is concerned with what people are able to do, rather than their income and expenses (Sen, 1999:76).

A person has the ability to do (or be) certain things that he/she has reason to value. The reason for valuation may be direct, and that the functioning involved may directly enrich his or her life, such as being well nourished or healthy, or being wealthy in terms of capital good and financial assets. Alternatively, the valuation may be indirect, in which case the function involved may contribute to further production, or command a price in the market. For example, on Lihir, most people who are serving on the Ward Development Committees and Village Planning Committees are educated. In that regard, they are expanding their commodity as educated Lihirians to serve their people.

In understanding the process of economic and social development, Sen (1997:1959) contrasted and connected ‘human capital’ and ‘human capability’. Human capital, according to Sen, is concerned with the agency of human beings, which represents the skill, knowledge and effort they possess and apply to expand production possibilities. In contrast, Lanzi (2007: 425) points out that human capital in economic development can be termed as the ‘productive

approach', which situates the educational institutions and their outcomes in Sen's capability approach. These include the educational facilities, students and teachers, school curriculums, learning environments, good parenting and other facets of education in a generic sense. Although this study did not focus on the school curricula and the intricacies concerning students, teachers and parents, data presented above suggest that NRLLG is investing in education. At large, Lihirians have access to education. Therefore, human capital viewed as human development in the generic sense is well accounted for in the context of livelihoods on Lihir. This is what Sen (1997) suggested as 'human capital accumulation', which generically affects human well-being in two distinct ways. On the one hand, Sen indicates that it increases human qualities and skills for economic production and reproduction and market exchange. On the other hand, it indirectly enlarges individual opportunity sets by giving people new possibilities to enrich their lives. In the context of this study, empirical data indicates that the villagers' opportunity sets largely depend on the mining operation to provide the possibilities in provisioning their livelihoods. For example, as discussed in Chapter 5, educated Lihirians see the mining operation as a major source of employment through which their social and economic enrichment could be attained.

According to Sen (1997:1960), it is important to see human beings in a broader perspective than that of human capital, referring to the instrumental role of capability expansion in bringing about social and economic change. Therefore, Sen argues that human capability focuses on the ability of human beings to lead lives they have reason to value and to enhance the substantive choices they have (Sen, 1997:1959). Accordingly, Sen argues that capability serves as the means not only to economic production (to which the perspective of 'human capital' usually points), but also to the social development. An example in this study is the opportunity given to Lihirian women to enter wage employment with the mining operation. The opportunity does not only contribute to reducing gender inequality, but also enhances the status of women within the household. Further, it gives the opportunity to women to earn money, so that they can contribute to enhancing the financial capital of their households.

Figure 6.4 shows the relationship between human capital which concerns skills, knowledge, educational system and infrastructure, and the general health of individuals and the population (functionings). This empowers people or gives them the capability to achieve what they want to achieve, which leads to the people's functioning. Consequently, this leads to production of livelihood outcomes: well-being, increased income, better health, better social networks, food

security, and so forth. Conceptually, the process is mediated and constrained within an institutional and vulnerability context. Therefore, the functionings and livelihood outcomes of the people in their given livelihood system are affected.

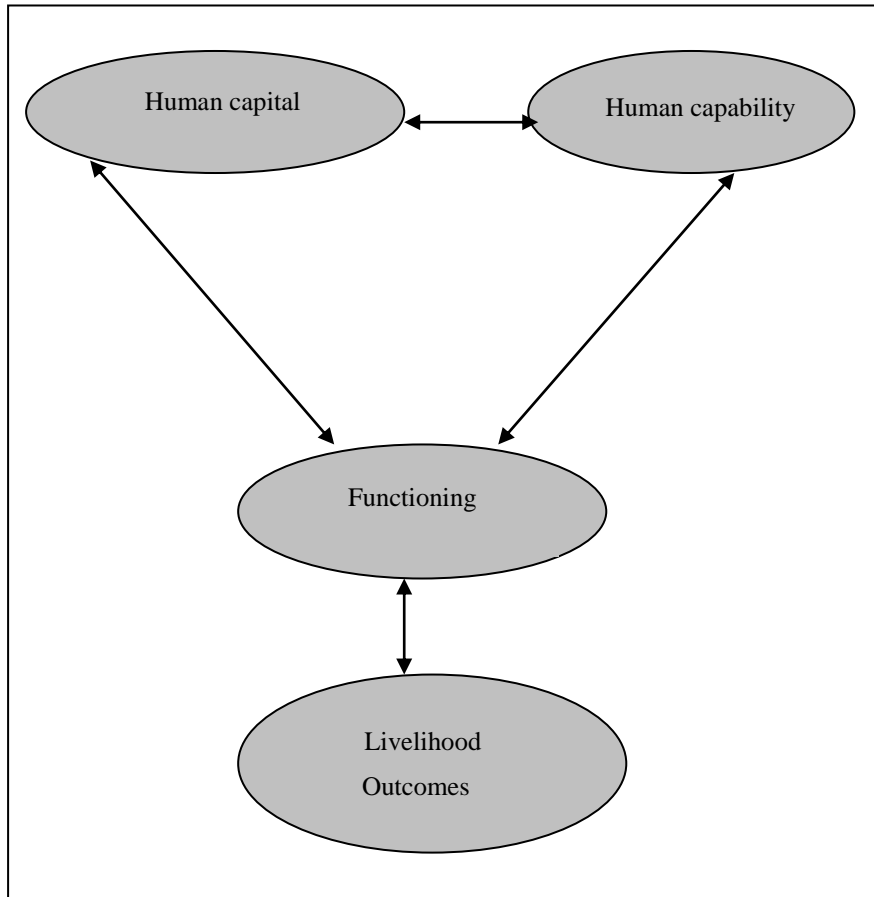


Figure 6. 2: The relationship between human capital and human capability (Based on Sen, 1997)

Sen (1997) claims that given one's personal characteristics, social background, economic situation, and educational background, a person has the ability to do (or be) certain things that he or she has reasons to value. In other words, the functionings and capabilities of a person are determined by these factors. In order to understand the connections between human capital accumulation, and human capability alluded to by Sen, reference is made to Nussbaum's (2000) version of the capability approach, which emphasises concrete skills and knowledge as capabilities. Without these abilities, individuals face shortfalls in opportunities for functioning, defined independently as what legal rights, policies or external and social conditions allow them to achieve what they want to be or can do.

In Figure 6.4, functioning (the middle circle) in the context of this study is perceived as legal rights as land owners (recipients) of mining royalties, compensations, allowances and dividends from their equity on the mining operation. In terms of the mining policy, Lihirians are given preference in employment and business activities as stated in Chapter 5. This allows them the freedom and opportunity (which, in Sen's language, is part of their capabilities) to achieve what they want to do and to be; or their functionings. Lihirians had to attain the appropriate skills and knowledge in order to effectively participate in the opportunities given to them. Thus, individual opportunities to attain well-being as a livelihood outcome are not simply determined by individual skills or abilities. However, policies and institutions, economic and social entitlements, and informal household rules also contribute to shaping real livelihood opportunities. According to Nussbaum (2000), these factors are external capabilities that can constrain individual skills capabilities, and consequently the individual functionings are affected, which in turn could affect their livelihood outcomes. The public servants on Lihir Islands provide one example, as mentioned in Chapter 5. Although they are well-skilled in their professions, they are achieving low job satisfaction because they are not well-resourced in terms of physical and financial assets. This is despite the fact that they are paid five percent more than their counterparts in other locations in the province, and provided with free housing and electricity. These conditions of employment were placed to make their employment comparable with the mine workers. Institutional factors constrained the people's freedom and opportunities (capabilities) to achieve their functioning; in this example, ineffective and inefficient service provision partly contributes to undesirable livelihood outcomes.

## **6.5 Mining and Households**

As a result of the mining operation on Lihir, there are emerging strata and ongoing stratification, as well as differing household livelihood strategies at play which indicate how households are navigating the changing economic situation on the islands. Therefore, presented in this section is an examination of how households on Lihir are utilising their resources in their livelihood activities in response to the mining operation. First, an overview of what is meant by household is presented.

### 6.5.1 Household Livelihood Concepts

Households are regarded as the integrating socio-economic structures that constitute the functioning and dynamics of livelihoods (Oughton and Wheelock, 2003). However, in PNG, little research has specifically examined how the impacts of mining activities might be understood at the level of the household or across a broad spectrum of resources that households draw upon in the production of their livelihoods. Major resource extraction projects that play a major role in contributing to the transformation of livelihood systems tend to focus more on the physical and social changes, and quantification of financial contributions into the affected communities. Specific literature on mining on Lihir is deficient in explaining household livelihoods, although Lihirians and elsewhere in rural PNG, people live in households.

Households consist of men, women, children, spouses, relatives or non-relatives who frequently carry with them groups or communal rights and responsibilities (Chen and Dun, 1996; Sen, 1999; Oughton and Wheelock, 2003). Such categories of individuals are defined by law, social and biological relations or expectations, which govern individual access to and use of resources much or more than membership *per se* in households (Chen and Dunn, 1996). For that reason, Wheelock and Oughton (1996:144) argue that the term ‘individual’ can be misleading as it could conjure up the concept of isolation from the household socio-economic setup. Nor does it distinguish men and women, and one could argue that young adults, youths and children are also ignored. As argued by Sen (1992), targeting households is the greatest need, and targeting them is likely to enable them to acquire functionings that would enable a household to move out of poverty. The term ‘household’ can also be applied simply to co-residence, a task-oriented unit, or the site of shared activities. This may involve close family, wider kin networks, and can include unrelated co-residents such as lodgers (Martin and Beittel, 1987:217).

Examining the social and economic characteristics of households allows understanding of their links with the formal and informal economy. Where links are non-existent, these could be established so that households could use the links to sustain their livelihoods (Goody, 1996). In an effort to recognise poverty processes, including its reproduction and multidimensionality, analysis of household livelihoods within communities should take centre stage (Chambers, 1995).

Literature on households suggests that three major developments have occurred in household discourse in the last two decades. The first, and most notable, has been a move away from models of household which emphasise sharing, altruism and cooperation, to models which include the possibility of negotiation, bargaining and conflict. The second major development has been a shift from viewing the household as a bounded unit towards stressing its embeddedness in wider societal structures. Anthropologists have been largely responsible in influencing this shift, perceiving households as social units that determine production decisions, particularly through the wider lens of family, marriage, and kinship with a primary focus on relationships between family and the household. A third major development has been the recognition of the enormous variability in household consumption between and within societies as well as over time (Folbre 1986; Goody 1996; Oughton and Wheelock, 2003).

Further, economists tend to analyse households from the perspective of the consumer and the firm, and as producers. In this context, the family is neglected, while the primary concern has been on defining the household in relation to production and consumption. This view of households stems from neo-classical economics, treating households as units of analysis (Goody, 1996:4). This is often the case; for example, in urban household surveys, where ‘the household’ is used to assess how the aggregate public accumulates, spends, or uses and experiences housing, infrastructure and urban services (Beal and Kanji, 1993:2).

According to Chen and Dun (1996: 28), there are variations in the composition of household portfolio and structure. However, in any given area at any given time, typologies of households can be developed. Such typologies can be used to identify and map patterns of change in each type of household. If adequately specified and analysed, a typology of households could provide a very useful analytic framework for understanding the impact of services in specific settings. This then leads to the discussion on the typology of households in the context of this study.

### **6.5.2 Typology of Households on Lihir**

Oughton and Wheelock (2003:7) indicate that as most people live in households, analysis of their household livelihoods would be the most appropriate starting point. Based on levels of income, the common typology of households is: the poorest at one end of the continuum, the richest on the other end, and the middle level income households in the middle (Chen and

Dun 1996). Based on this study, the typology of household livelihood are (a) semi subsistence households, (b) business households, (c) households on mining allowances and royalties, and (d) households with employed members.

#### **6.5.2.1        *Semi subsistence households***

Prior to the mining operation in Lihir, the majority of households dwelled in the context of a subsistence and livelihood system presented in Chapter 3. As a result of the mining operation, over 80 percent of subsistence households have been transformed into semi-subsistence households. Household livelihoods in this category are based primarily on natural capital, especially land and forest, to derive their livelihood strategies. They also depend on social capital, through inter- and intra-household relationships and networks, which at large influence their livelihood decisions. By contrast with other types of households, none of the members of these households are wage earners in the mining operation. Most of them have low educational levels. Thus, gardening is a primary livelihood strategy as mentioned in Chapter 3. This characterises this type of household as a significant food producer. Food production depends entirely on land that is not owned by the household, but communally by the clan through the customary land tenure system.

Portions of their garden produce are sporadically sold for income, and decisions have to be made on how much produce will be sold. Selling too much could mean not enough remained to feed the household or its livestock (pigs). The common food garden items sold are sweet potato, yams and vegetables. In the case of vegetables, pumpkin tips and bush ferns are common, which are largely scavenged from the forest. In addition, because betel nut is readily available in all the villages most households sell it for an income. Thereby, most households use income from the sale of betel nut to venture into other income strategies.

A single mother with three teenage children started selling a portion of their garden produce for cash. The woman used the income from her first sale to diversify her income source by baking bread and scones. She had learnt how to bake bread at Pali Vocational School in 1975. According to her, her baking skill improved as their need for cash arose. However, she claimed that the main source of her income is from selling betel nuts. Another household invested their income from the sale of betel to venture into selling kerosene. In 2007, they diversified and established a village chicken project.

Members of these households are sometimes hired by employed relatives to do domestic work and work in food gardens. For example, an interviewee at the Komat village indicated that she and her adult daughter are sometimes hired at K10 per head per day to do domestic work for her sister, who is employed with LGL. She also mentioned that in many instances she had to request her sister to hire them, because they needed the cash. In another example, an employed man hired three boys to cut bamboos to stake his yams. They were paid both in cash and store goods.

In the case study villages, particularly at Kunaie 1 & 2, Londolovit and Putput 1 & 2 villages, qualitative data indicate that elderly people who are members of this type of household depend largely on income derived from renting out their permanent homes built under VDS, mentioned in Section 6.4.6. Also, although electricity is supplied to these villages, most households cannot afford it. However, they do have access to the communal piped water system.

On the whole, households in this category have a low endowment of financial assets, therefore limiting their capabilities to venture into other livelihood strategies. This could mean that they are less vulnerable to market forces. However, they are affected by the high cost of living, especially in the mining area where wages are relatively high. They feel that life was more difficult due to higher living costs; as explained by a couple, *'We all go to the same supermarkets in town, including the business men and employed people. We pay the same price, but they buy more and different types of goods, we buy less and mainly what we really need'*.

According to Sen (1999:19), low income can be a major reason for illiteracy, ill health, hunger and undernourishment. In the context of this thesis, Sen's claim is consistent with illiteracy (writing and speaking) amongst the elderly people. This could have been the result of fewer opportunities for higher education because of lack of economic development prior to the mine operation.

The households' inter- and intra-household networks are high, reflecting a high endowment of social capital. This is evidenced by voluntary, but reciprocal, transfer of goods and services between households. For example, it is quite common for households to combine their labour to execute laborious garden activities such as digging planting points for yams, fencing and



staking. Therefore, social capital is an important characteristic of this household type as a safety net mechanism in enhancing livelihoods, as mentioned in Chapter 3. From observation in five villages (Komat, Samo, Matakues, Kunaie 1, and Kunaie 2), it is obvious that members of this type of household actively participate in village activities, which include village meetings, clearing roadsides, feasting, and church and school activities.

#### **6.5.2.2 Business households**

Business activities are major spin-offs in all areas where large mining operations exist, and Lihir is no exception. Macintyre (2003:120) reported that when the gold mine operation commenced on Lihir in 1995, Lihirians aspired to be business people. As mentioned in Chapter 5, Lihirian leaders ensured that provisions are made in the mining agreement for them to be given preference in operating spin-off businesses. Subsequently, many Lihirians became business owners, which saw households transformed from subsistence to business households. Evidence from interviews with the business advisers on the islands indicate that most people who are managing their own businesses were once ordinary village people.

Relative to other types of households, livelihoods of most business households are quite distinct, with high endowment of financial, physical, human and social assets. This is reflected by the high endowment of physical assets in terms of the physical setup of their businesses, cars and trucks, permanent homesteads, and their overall influence in their immediate community. These endowments make them prominent on Lihir. Further evidence is revealed by their sending their children to the international primary school on Lihir, as they can afford the fees. This characteristic and behaviour is consistent with Sen's claim in correlating high income with better education and health (Sen, 1999:19). These characteristics and behaviour make them the most affluent household type on Lihir.

Although most households indicate a declining access to natural resources, especially land for the cultivation of food crops, this is more than offset by their access to land to establish their business, either in Londolovit Town or in their villages. Most business owners who were interviewed indicated that they do not have time to physically work the land and plant food crops. A businessman said that a few years ago he had a yam garden, but had to hire other people to do most of the work. In most cases, the workers are given cooked food and beer as payment for their labour; this seems to be the normal tradition on the islands. However, qualitative data indicate that some workers would prefer to be paid in cash. Another source of

labour for non-economic activities (often used by business households) is the youth, women and sporting groups. These groups are available for hire for a fixed amount to carry out specific activities. A youth leader claimed that this has become a common fund raising strategy for these social groups. Such non-economic activities provide an avenue for further circulation of the financial assets in other typologies of households. Another significant insight is that such livelihood strategies provide an interface between the formal and informal economy. Under these circumstances and context, literature suggests that business households are high risk takers. This is consistent with a study of micro-business households in England by Oughton and Wheelock (2003:9), which suggests that micro-business households with high levels of financial, human and social endowments are more able to take risks without ultimately threatening the ability of the household to sustain itself. Similarly, a study of typology of household risk taking in Russia by Wegren (2008:390) indicates that peasant households with higher total income are more likely to take risks.

#### **6.5.2.3        *Households on mining allowances and royalties***

As mentioned in Sections 6.4.4 and 6.4.5, most of the households in this category are from the Kapit, Londolovit and Putput 1 & 2 villages. They are the closest to the mine pits, the processing facilities, and Londolovit Township. Therefore, the households have experienced substantial alterations in their access and endowment to financial or economic, natural, human and social resources. Positively, this is illustrated by the monthly inconvenience allowance and mining royalties, permanent homes built for each household under the mining agreement, all weather road system, water supply, electricity and street lights. In terms of financial savings, each member of the households has a bank account with the Micro Finance Bank, located in Londolovit Town. This is a requirement governing the monthly inconvenience allowances, which must be paid into individual bank accounts.

Qualitative data indicate that women members of this household type are also engaged in the array of income earning strategies, including selling betel nuts, cigarettes, *brus* (local tobacco) and ice blocks. However, these households are experiencing greater decline in access to natural resources. Their gardening land, including the forest, has been lost to the mining operation under a special mining lease. Notably, this is affecting household supply of garden food. Observations over two weeks of interviews at the Puput 2 village indicate that meals are a mixture of garden produce and store food. In-depth interviews revealed that most household gardens are located between Londolovit Town and the Kunaie 1 & 2 villages, but the garden

areas are actually quite small, compared to the period prior to the mine operation. Backyard gardens with patches of leafy vegetables and beans were observed in some household homesteads, a sign of land intensification, as a result of lack of land for gardening.

The change in the people's diet in this typology of household is further illustrated by many ordinary villagers pushing shopping trolleys in the grocery shops in Londolovit Town. On one occasion during the second phase of the field trip in 2008, Best Buy, which is one of the grocery shops in town, had to close for half a day to re-stock. Notably, this happened at the end of the month, when the mining allowances and royalties were paid. Similarly, a trade store owner at the Putput village claimed that the people's diet has changed since the mine operation. Consumption of store food is on the rise. He added, '*I buy cargo for my store every fortnight. People like to eat rice, tinned meat, tinned fish, drink tea and coffee. I sell 10 bales of rice every fortnight*'. (A bale of rice contains 40 x 1 kg packets of rice.)

Interviews with chairpersons of the Village Planning Committee for the Kapit and Puput 2 villages reveal that, as a result of the high inflow of cash into their villages, the people's community financial obligations are also on the rise. This is illustrated by the many financial requests from churches and social groups, which members are expected to contribute towards. A VPC chair person calls these commitments a '*community tax*'.

Household inter- and intra-decision-making is becoming quite complex, especially where members have to make economic and non-economic decisions towards sustaining their livelihoods. A woman interviewee said that children know that they have trust bank accounts into which their allowances are paid, and so demand that goods be bought for them. Many are luxury items such as toy cars and bicycles. During the interviews, children were seen driving big dummy cars and using mobile phones. According to an interviewee, one of those cars cost K600, and a bicycle costs around K450. Because of the high cashflow into these households, their consumption and accumulation of wealth is relatively high, compared to the semi-subsistence households and households with wage earners. In-depth interviews in other villages show that there is a certain level of envy against these households.

#### **6.5.2.4 Households with Wage Earners**

Characteristics of these households are similar to the semi-subsistence households. However, the major difference is that members of this typology of household are employed. Most of

these wage earners had received some education and gained some skills and experience in the specific jobs they are employed in. For example, a man who was employed during the exploration phase stated that because of his command of both English and Tok *Pisin*, he was easily appointed as team leader to a group of Kapit villagers who were employed at the same time. He added, *'The three white men who were leading the exploration could only speak English, and they relied heavily on me to translate their instructions for the boys to understand'*.

In this type of household, it is common to find that the male head of the households or the young adult members are employed. The not so common scenario is where only the wife is employed. The rest of the household largely depends on the wage earner(s) for medical, transport, educational expenses, *kastom* and other community financial obligations. In addition, these earners buy store food and contribute to the household food stock.

In many cases, the wage earners would provide the starting financial capital for the household informal income strategies. These include sale of cigarettes, kerosene, ice blocks, petrol and lubricants for outboard motors. In two cases of respondents, the households are selling rice and biscuits from their homes. In another case, a household was showing DVDs every Friday night and charging K1 per adult customer. Because of the financial assets the employed members bring into the household, they have enormous influence on the affairs of the household. For example, a young adult, who is the only employed member of her household, is consulted in every decision regarding the household financial assets. The household consists of her elderly parents, two adult brothers, a younger sister, and two adult relatives. In another example, a household consists of husband and wife, who are subsistence gardeners, their son and daughter, who are both employed, and two adult relatives. The parents informed that their son controls his own wages, although he contributes store food for the household, while their daughter consults them regarding her savings account and on what things she needs to buy for the household. In a more conservative example, all the spouses with employed male heads of the households claimed that their husbands decide on the distribution and disposal of their wages.

In a particular case at the Matakues Village, a young employed man with a wife and two young children belongs to a very large household with six other members. Included in the other members is a 69-year old man (a former government worker), who is the leader of one

the biggest clans on Lihir. The clan owns a big portion of the land under the mining lease. The elderly man is physically unfit to work in the household garden, but attends monthly meetings at the LMALA office in town. He earns sitting allowances from these meetings. Other members include a young woman who helps out with domestic work and sells phone cards, a young boy who attends Lihir High School, another boy who attends Pali Vocational School, an adult male who sometimes drives the village truck, and a young village man. The young village man spends a reasonable amount of time doing gardening, with the help of the mother of the two young children and the young women. The young employed man works in the garden when he is not working in his employed work. The same goes for the driver and the two students. The men and young boys sleep in the men's house. Sometimes the mother sells betel nut in the roadside market. The employed man dips heavily into his income to cater for the livelihood of the household. However, he stated that the welfare of his wife and their two young children is priority.

In terms of access to the livelihood assets, this household would be rated as high, as they have access to public goods and services such as a good road system, piped water supply system, communication facilities for mobile phones, education and health facilities. At the household level, they have two permanent houses and the men's house, which is semi-permanent. This family also have a generator that supplies electricity to their homes, although according to the elderly man, sometimes they go without it and resort to using their torches. This indicates a constraint on their financial resources relating to a physical asset, which is more of a luxury. On the other hand, savings from not running the generator could be used to acquire other essential goods and services.

Overall, households in this category have experienced substantial alterations in their access to financial, human, natural and social resources. These changes contribute to livelihood transformations in household livelihoods.

## **6.6 Application of the Capability Approach to Household Livelihoods**

This section draws on Oughton and Wheelock's (2003) household framework model of household behaviour, which they constructed based on Sen's (1999) capability's approach. Sen (1999:76) sees livelihood assets that are available to individuals as 'endowments'. As

such, Oughton and Wheelock (2003:9) suggest that household endowments consist of the total productive resources of all household members. According to them, the way individuals use these endowments is governed by entitlements mediated by legal and social rights. In this way, endowments are converted to individual capabilities through the formal and informal regulatory institutions governing the operations of households. As discussed above (section 6.6.1), Sen (1999:75) argues that capability is the freedom to achieve alternative functioning combinations, or freedom to achieve various lifestyles. In other words, according to Sen, the capability set is a set of real possibilities available to the households. It represents an opportunity for choices, which may or may not be realised. In the event that the choices are realised, the actual achievement '*reflects the various things a person may value doing or being*'. Sen calls this actual achievement the 'chosen functioning vector'. In short, capabilities provide opportunities for valuable functionings (ibid: 76).

Conversely, the framework developed by Oughton and Wheelock (2003) does not focus on conversion from endowments to entitlements, as in Sen's capability's approach. This is because their framework tends to incorporate the process of establishing entitlements within the institutional environment, as shown in Figure 6.5, Level 1. They focussed their analysis on the institutions that frame the entitlements, such as markets and networks. Their model identifies two points of transformation: from endowments to livelihood capabilities level (2) and from functionings level (3). In Oughton's and Wheelock's framework, the transformation from capabilities to functionings involves an active choice. However, this choice is constrained. The ability of members of households to organise and apply their joint endowments will be affected by power, norms, values and entitlements.

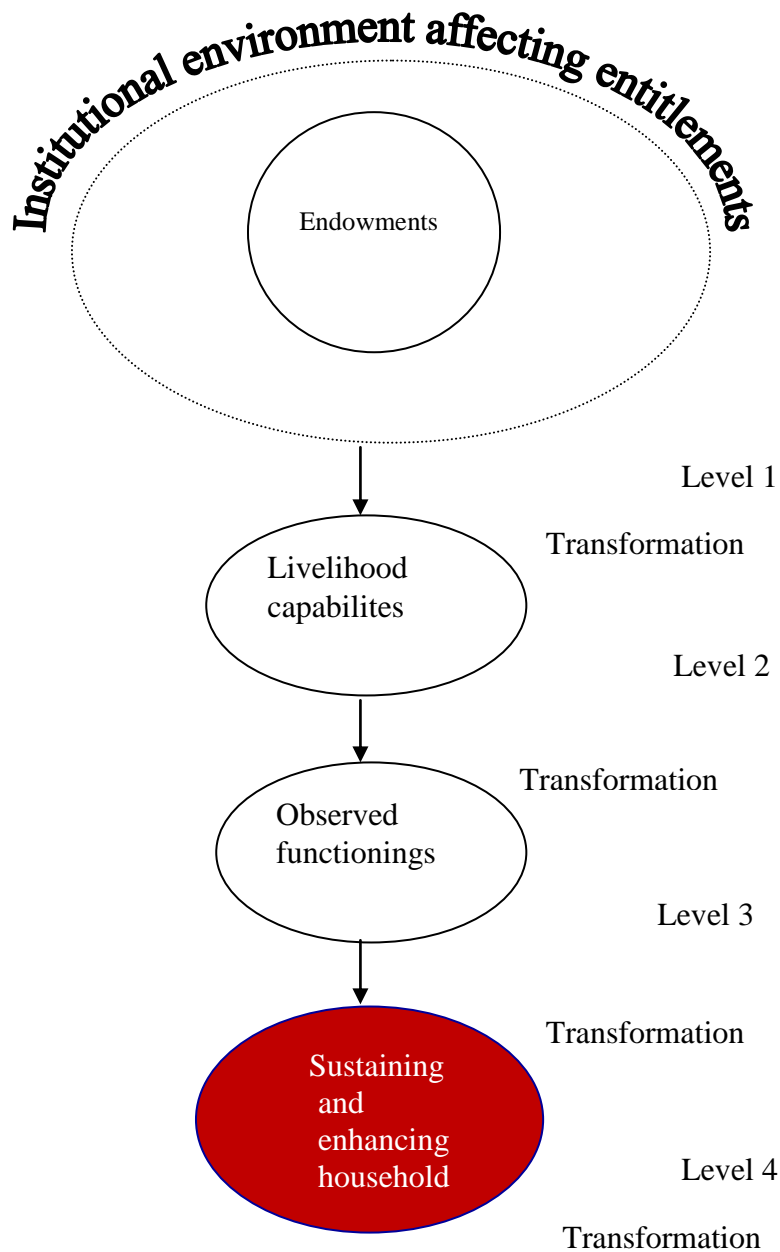


Figure 6. 3: Framework of household livelihoods (Source: Oughton and Wheelock, 2003:10)

In Oughton and Wheelock’s framework, the term ‘household endowment’ refers to not just the stock of assets of the household, but the potential of each individual to contribute to the household provisioning capability. In the Lihir context, this applies to the physical land, forest, houses, financial asset (wealth and income), human asset (skills, education, training), and social groups (clans, families, friends, youth and women’s group, church groups). All these household endowments put together contribute to enhancing the household livelihoods. For instance, employed members of the household use their educational qualification, skills and experience to earn an income in order to contribute to the household financial

endowment. Conversely, members of the semi-subsistence households lack the required education, skills and experience to be employed. However, their endowments of gardening skills enable them to produce food items, which they can then convert to cash, thus enabling them to contribute to their household livelihoods financial asset. As for the elderly man mentioned above in the example from the Matakues village, even though he is constrained by his age from being employed, he is able to use his reputation and network as a clan leader and a former government worker to participate in meetings, earn an income, and contribute towards enhancing his household livelihoods. In the households receiving monthly mining allowances and royalties, their main endowment is financial assets. This endowment empowers them to acquire other endowments (such as household physical assets) and enhance their social capital through financial contributions towards various community activities. The same applies to households with employed members. Their level of financial endowment may be lower, but they are able to apply this endowment to acquire other endowments.

The transformation of endowments in Level 1 (shown in Figure 6.5) expands the livelihood capability set at Level 2, because the household can combine the endowments in different ways. According to Oughton and Wheelock (2003), benefits in the use or exploitation of endowments may also arise through sharing rights of ownership or use. Transformation to the household capability set also depends on the institutional context as well as the level of endowments. Ought and Wheelock claim that household members can transpose the set of livelihood capabilities at Level 2 available to them by choosing functionings (Level 3). Functionings, according Sen (1999:79), are expressions of values of the household within their socio-economic environment. The choices of these expressions of values are constrained by the socio-economic environment. These in turn contribute to the types of households mentioned above. The characteristics of the household types are underpinned by the collective decisions they make in order to sustain their livelihoods. To this end, the author argues that another dimension can be added to Oughton and Wheelock's framework, and – that is, the enhancement of household livelihoods (Level 4). The argument is that the observed functionings (Level 3) cannot be just as they are, but should be transformed into enhancing and sustaining household livelihoods.



## 6.7 Natural Capital

Natural capital is a category of livelihood assets. It is the term used for the natural resource stocks (for example, trees, land, clean air, coastal resources) on which people depend upon. The benefits of these stocks are both direct and indirect. For example, land and trees provide direct benefits by contributing to income and people's sense of well-being. The indirect benefits include nutrient cycling and protection from erosion and storms. In informal economies, in particular, the natural environment is critical to the household's abilities to generate income and satisfy household needs through the supply of biomass fuel, building materials, medicinal plants, traditional costume, water and marine life for food. Furthermore, Lihir, being an island, has some of the best natural and tranquil untouched spots. These include lime stone mountains, beaches, reefs, caves, bush tracks and a waterfall. Although the general view is that the mining operation will leave behind huge mine pits, these could become a tourism product.

Anecdotal evidence from the field data shows that land available for food production is already under pressure in some villages, as discussed in Chapter 3. In addition, the sea and its marine life, which are important assets on the islands, are also perceived to be under threat. For example, anecdotal evidence from the interviews in all the case study villages shows that, relative to the period prior to the mine operation, Lihirians are spending longer time fishing, but with very low catches. In most cases, they have to venture further into the ocean. The National newspaper of 14 January 2010 reported that people on the outer islands (Masahet, Maur and Malie) have drastically cut down on the consumption of marine products after discovering dead fish and octopuses on their reef.

Mining transforms the natural assets and often renders an area useless for some types of local economic activities that had formally existed. For example, mountains become holes in the ground, rivers and reefs fill with sediment, often large areas of bush have to be cleared; plantation and gardening land is lost; and occasionally whole villages have to be relocated. To a certain degree, that description depicts the situation on Lihir. From observations, Lihirians in general do not demand stricter controls over their natural assets and the effects on them. Rather, they ask for more money, modern goods and other accoutrements of modernisation.

As Foale (2001) indicated, Melanesians who are desperate for economic development will tolerate environmental destruction on a large scale.

## **6.8 Challenges**

### **6.8.1 The Relocation Agreement**

One of the most significant developments since the mining operation on Lihir was the relocation of four villages: Londolovit, Putput 1 and Putput 2 and Kapit. The exercise was necessary to make way for the mining operation. These villages were uprooted and shifted to new areas. Part of the relocation design was to ensure that the Lihirians were relocated to their customary land as well as maintaining the social cohesiveness of the villages. While Londolovit and Putput 1 and Putput 2 villagers are satisfied with their relocation, Kapit villagers are yet to be satisfied. They were relocated in 1997 because of land disputes and demands from the villagers for better housing and other service utilities. As a result, LGL had to relocate the people to a new site, and a new relocation package had to be drawn up to accommodate the people's demands. The agreement allocates 1.7 ha of land for each family to build permanent homes, a permanent stand-alone kitchen, a garden area for vegetables and root crops, an area for pigs, an area for poultry, and an area for backyard cash crops of coffee, vanilla, hybrid coconuts, fruit and nuts, betel nuts and mustards.

The relocation poses challenges in the people's livelihoods. These may entail reconstruction of livelihood strategies, adjustments to attitudes and perceptions, and acquiring new skills needed to sustainably manage their assets in their relocated areas. These challenges are discussed below.

The relocation measures implemented by LGL and LMALA have serious consequences for the households as close-knit social units. New housing arrangements for resettled communities have also disrupted long established family networks in the area. Notably, in the new Kapit relocation, family homes are quite far apart from each other. Put simply by a village elder, *'Our homes are no longer situated side by side like in our previous village. We are no longer going to live together as a village, but as one family village'*. In this setup, households and families will likely put a lot of pressure in maintaining the village social cohesion. The most vulnerable in this exercise will be the old village folk, especially men who

socialise in the men's house in a village setup. That opportunity, according to the elder, has been taken away, as each household or family have their own men's houses in the relocated areas

### **6.8.2 Need for Maintenance of Permanent Homes**

From observations, when traditional homes are replaced with permanent material houses, villagers may not have the skills required to maintain them, and companies may be reluctant to be involved. This situation is being experienced both in the relocated villages and in houses built under VDS. The owners are confused and do not know who is responsible for maintaining their permanent homes. For most people, they have to learn how to live in a modern home, which is considerably different from the bush material homes. Observations indicate that many permanent homes in the villages require maintenance work to be done.

### **6.8.3 Increasing Household Sizes**

Increasing household sizes are placing pressure on the relocated housing. Young people are demanding equivalent dwellings upon their marriage. This is evident in a number of relocated households at Puptput and Londolovit Villages. Similarly, the situation is experienced at the Kapit village relocation areas. However, it is highly unlikely that the young married couples will be allocated permanent homes, and will continue to live with their parents. From the outset, more land and funding will be needed for further relocations. In an associated thread, a clan leader suggested that it is an opportune time to start collecting land rentals from customary land used for relocation purposes. These developments will exacerbate pressure on land and the socio-economic cohesiveness of the people's livelihoods.

### **6.8.4 Need for New Skills**

In order to settle in their relocated areas, which in most cases will entail relatively different livelihood strategies, the villagers will have to be equipped with new skills. This requirement becomes more apparent as coffee, vanilla and specific areas for food crops will require new skills to manage them. For example, a specific area for cultivation of food crops will require soil fertility management practices. The shifting cultivation and bush fallow system the people are used to will no longer be an option, as households will be confined and restricted to their allocated 1.7 ha of land.

### **6.8.5 Dependency on the Mining Company**

Generally, there is a lack of motivation to venture into other long-term livelihood strategies, as the people are content with their monthly allowances and royalties. These people have evolved from a traditional lifestyle to a dependent one; a handout mentality. On the other hand, this handout mentality is somewhat exacerbated by LGL through the continuous provision of services under the resettlement agreement. For example, LGL employed caretakers to develop the relocation areas before the people are allowed to move in. Some of the activities, such as establishing fruit and coconut trees, could easily be done by the people themselves.

In-depth interviews with Kapit villagers indicate that some of them will not move until their relocation land is fully established with housing, water supply, electricity, sealed roads and cash crops. In an associated dependency mentality, some school children either have left school or are not interested in attending because they do not see the value in education. According to a clan leader, they are *'blinded by free money in their pockets'*. He lamented that these children will grow up to become a burden not only for their families, but also for the whole community.

### **6.8.6 Mothers and Children: What is Their Future?**

Lihir, being a matrilineal society (mentioned in Chapter 3), women have more power over resources. However, mining development has weakened the traditional matrilineal society. It is apparent that relocation schemes on Lihir appear to have benefited men more than women in the relocation areas, as permanent homes are built on the husband's clan land. Therefore, relocated families effectively follow the husband and father. The question many are asking is where they are going to move to when or if their fathers/husbands pass away. Clearly, as a women leader lamented, women have been left out in discussions preceding relocations. In the long term, they are being stripped of their identity and assets, and have become increasingly dependent on their fathers and husbands. It seems that the relocation has benefited men more than women and, at the same time, placed a greater burden on women than men. Hence, female interviewees suggested that families should be relocated to their matrilineal land rather than their husband's land.



Figure 6.4: A modern family home in a relocation area

## 6.9 Physical Infrastructure

The intervention of the mining operation on Lihir has led to the development of a number of physical infrastructural facilities. The development and maintenance of these infrastructures and the existence of services on the islands, in reality, represent essential services that are required by the operation of the mine. These include the growth of a township, housing and road infrastructure, communication, electricity, health and educational facilities. Many Lihirians claim that these infrastructures exceed standards of almost anywhere else in PNG. According to LGL (2006), since 1995, over K40 million of funding has been contributed to the establishment of these infrastructure projects, which makes Lihir one of the well-serviced islands in PNG. This is consistent with Banks' (2006) argument that the introduction of mining in rural areas results in transformation of the physical environment, including the construction of the mines and their associated infrastructure, and that the social changes that accompanied the transformation have impacted on livelihoods in the mine areas (ibid:15-20). There is no doubt the mine operation on Lihir has contributed to the transformation of physical assets in terms of better health service, schools, communication infrastructure, and better road, air and sea infrastructure. Prior to the operation, there was no proper road, no communication system, no high school, and only one health centre. In essence, this has placed the company in a position of extreme power over the development of Lihir. The core of these physical infrastructures is presented below.

### **6.9.1 Physical Capital a Livelihood Asset**

Physical capital is a category of livelihood assets. It comprises the basic infrastructure and physical goods that support livelihoods. Infrastructure development consists of changes to the physical environment that help people to meet their basic needs and to be more productive. Key components of infrastructure include: affordable transport systems, water supply and sanitation (of adequate quantity and quality), energy (that is both clean and affordable), good communications and access to information, and shelter that is of adequate quality and durability. Other components of physical capital include productive capital that enhances income (for example, bicycles, sewing machines, and agricultural equipment), household goods and utensils, and personal consumption items such as radios and refrigerators.

### **6.9.2 Londolovit Town**

The township was built as part of the agreement in the initial IBP. It is now a booming town, which LMALA would like to develop into a bigger modern town. According to many leaders interviewed, the vision is for the town to become a shopping hub not only for Lihirians, but also for the nearby islands of Tabar, Feni and Tanga, and the people of Namatani on the main island. The existing main physical facilities include three financial institutions, two supermarkets, a police station, a post office, an open market, a car dealer, a hardware shop, a gas station, sporting fields, a hospital, a training centre, a liquor outlet shop, and a jetty. Mining camps and residential areas for public servants and senior mining personnel are located within the town precincts.

### **6.9.3 Housing**

Under the IBP, all the villages on Lihir will be provided with permanent houses through a VDS (Village Development Scheme). This program has seen the construction of more than 600 houses throughout the villages on Lihir, making a very significant improvement to the quality of life of Lihirians. The scheme has specially made significant impact in the relocated villages of Kapit and Puput 1 & 2, where families have been provided with permanent houses. According to LGL (2005), in 2006, a budget of K3.5 million was approved for the construction of culturally sensitive houses under the VDS. Qualitative data indicate that generally people are happy to be provided with modern homes. However, many interviewees claimed that low quality material was used in building their homes, alluding to some homes

requiring general maintenance. In addition, many educated Lihirians are also dissatisfied with what they claim to be ‘low cost houses’, which have been provided under VDS, in contrast to the high standard of houses provided by the company for the expatriate employees. As stated by an interviewee, *‘The houses provided by LGL through VDS are built with cheap material of low quality. We deserve good houses in return for our land being destroyed by the mine operation. We cannot understand why the white workers are provided with better housing than the ones built for us’*. In another argument, many interviewees claimed that because living in modern homes is a new phenomenon for Lihirians (although many of them will, over time, get used to their modern homes); they have to go through a transitional phase. Qualitative data indicate that more than ten homes built for families in the case study villages are rented out to non-Lihirians who are employed by the mining operation. This means that the owners have resorted to living in their bush material homes, but in return receive an income stream.

#### **6.9.4 Road**

On Niolam Island, where the mine operation is located, Lihirians have the luxury of travelling on an all-weather road, known as the ring road. The road links all the villages on Niolam Island with Londolovit Town and the mine site. An interviewee commented that *‘we now have a good road around the Island; prior to the mine operation we only had bush tracks’*. In capitalising on the established ring road, all the Council Wards have ventured into providing transport services for their villages. Each ward on Niolam Island is serviced either by a bus or truck between their ward and Londolovit Town. Maintenance of the ring road is the responsibility of both the national and local governments. Between 2003 and 2006, NRLLG spent more than K275,851 on maintaining the road.



Figure 6.5: Part of an improved road system on Lihir

### **6.9.5 Sea Transport**

On Lihir, sea transport is an essential mode in transporting bulk cargo and passengers from other centres. Most of the business houses ‘piggyback’ on LGL’s shipping arrangement to transport their bulk cargo from the main centres such as Port Moresby, Lae and Rabaul. Local travel between Niolam Island and the islands of Malie, Mahsait and Maur is done mainly by outboard motors owned by Lihirians. Qualitative data reveal that sea traffic on this route is busy because of the concentration of the social and commercial services, and the mining operation on Niolam Island. More than 10 small boat owners on these islands are contracted by LGL to transport workers every day to and from the islands.

Travel between Namatanai Town on the main island of New Ireland and the Lihir group of islands is mainly by outboard motors operated by individuals. In addition, LGL is operating a four-hour daily ferry between Namatani and Lihir. The outboard motors take about three hours. Many travel from Kokopo in ENBP to Lihir via the west coast of Namantani on outboard motors. They then travel by passenger trucks to the east coast where they connect with outboard motors to Lihir. Many women travel on this route to sell their garden produce at the local market in Lihir



Many interviewees describe the route between Namatani town and Lihir as a 'highway on sea'. According to LGL (2005), on average, there are five outboard motors per village and 30 boats berthed on a daily basis at the water front in Londolovit Town.



Figure 6.6: An outboard motor boat travelling between Namatanai and Lihir

### **6.9.6 Air Transport**

NRLLG built an airport facility that is capable of accommodating light aircrafts that service the domestic routes and jets that service the international route between Lihir and Cairns in Australia. The facility is extensively used by LGL with daily flights.

### **6.9.7 Water Supply**

Kunaie 1 & 2, Putput 1 & 2, Londolovit, and Kapit are connected to the LGL reticulated water system. Interviewees indicated that they do not like the taste of the water because of the chlorine in it. Most women agreed that having water readily available in their villages saves them time and energy walking to the natural creeks. However, on the other hand, it has eroded socialisation amongst women folk who would normally meet with each other at the creeks. A women interviewee commented that many in her village are missing the normally relaxing walk through the bush tracks to the creeks.

Many complained about the continuous low pressure at some of the water points, and the general lack of maintenance of leaking water taps in the case study villages. Observations indicate that out of 23 villages on Niolam Island, only five villages are connected to the reticulated water supply, while two villages have their own stand-alone supplies, and three villages have uncompleted stand-alone water projects. According to a VPC chairperson, the uncompleted water projects resulted from either underfunding or funding cuts by NRLLG. On the other hand, LGL plans are underway to build a dam on the western side of the island, to provide the water both for the villages and to cater for the planned increase in gold processing. When this gets underway, it will prompt the provision of electricity to the area, as this will be needed to pump water from the dam.

### **6.9.8 Health and Educational Facilities**

All health and educational facilities have received immense improvements in terms of physical infrastructure.

In the health sector, these include seven aid posts administered by the government and the Pali Health Centre, run by the Catholic Church. The most significant development in this area is the establishment of a modern 16-bed hospital on Lihir. Built by LGL to serve its workforce, the hospital is open to by all Lihirians. In appreciating the facility, a woman interviewee said, *'We have a good hospital which is similar to the ones you find in big towns. The services provided at hospital are of high standard'*. The hospital has a full-time dental therapist and dental nurse. Visits by a general surgeon, gynaecologist, obstetrician, ophthalmologist and optometrist mean that patients can now be treated locally and do not need to be referred elsewhere in PNG.

In the education sector, all ten primary schools, 25 village elementary schools, Pali Vocational School, and the Lihir High School have had their facilities upgraded. Overall, these facilities represent, or are components of, physical assets being established in the Lihir villages.



Figure 6. 7: Pali Health Centre on the left and Puput Aid post on the right

### 6.9.9 Electricity

According to LGL (2007), the company is the first in PNG to be granted the right to accumulate and trade carbon credits, following the development of its environmentally friendly geothermal power generation facility, which is driven by naturally occurring underground steam reserves. The 56 MW geothermal power project was registered under the clean development mechanism of the Kyoto Protocol in May 2006. This means that the project has been formally certified as a facility that will lead to reductions in greenhouse gas emissions, enabling the company to start generating carbon credits which can be sold in the global markets. At current world prices, the carbon credits are worth approximately \$US3 million per year in additional revenues for LGL. Carbon credits, or Certified Emission Reductions (CER), are accumulated in proportion to reductions in carbon dioxide; one tonne of carbon dioxide is equivalent to one CER. In 2008, one CER is worth in excess of \$US10. The geothermal power generation facility is envisaged to reduce carbon dioxide emissions by approximately 280,000 tonnes per annum. Although LGL will earn additional income from carbon trade, electricity from the project is anticipated to contribute towards enhancing livelihoods on Lihir. The villages of Putput, Kunaie 1 & 2, Lipuko, Zuen and Londolovit are accessing electricity from the geothermal project. A senior politician indicated that the overall plan by NRLLG is to ensure that all the villages on Niolam Island are connected to the power supply. Observations indicate that homes that are supplied with electricity have physical assets such as fridges, television, DVD players, and CD players. Home users pay for the power they use, while schools, the hospital, community halls, and church buildings are supplied free of charge.

## **6.10 Other Social and Economic Threads**

This section covers, in the Lihir context, the other common social and economic threads that emerge as a result of large-scale natural resource extraction projects.

### **6.10.1 High Cost of Living**

The cost of living in Lihir is high compared to other places in the Province or PNG. All the interviewees agree that this is the case. The contributing factors for the high cost of living are: (a) the mine operation, particularly the high wages earned by the workers; and (b) that most of the goods sold on Lihir have to be shipped from the major towns as such, the transport cost is added to the retail prices of goods. The store goods are even more expensive in the villages outside of Londolovit Township.

Locally fresh food produce is also expensive. Two factors contribute to this situation:

(a) The bulk of fresh food, especially staples such as taro, sweet potato and bananas, are imported from either the main island of New Ireland or ENBP. (b) The low supply of locally produced fresh food.

Many interviewees claimed that the cost of goods (especially in the villages receiving mining royalties) follows the buying power of the people. Everyone knows when royalties are being paid, and trade store owners and market vendors follow suit by increasing their prices. Many women interviewees commented that they have benefited from this marketing behaviour.

The majority (80 percent) of the Lihirian population affected by the ripple effects of the mine operation have to initiate strategies in order to sustain their previous livelihoods. This proportion of the population are without material capital and business skills, and are unemployed, do not receive royalties and allowances, but must still cope with the higher cost of living.

The rest of the population includes those who receive royalties (14 percent), those employed by the mining operation (5 percent), and the business owners and employees of business entities (1 percent). Income and consumption behaviour of this proportion of the population contribute to the magnitude of the high cost of living.

## 6.10.2 Changes in Culture and Traditional Practices

### a) Water Melon

Qualitative data from interviews indicates that many people on the island are concerned that aspects of their culture and tradition are either being lost or evolving into another form. For example, an adult female interviewee said: *In the past we used to recognise and celebrate watermelon seasons. The practice involves the whole village to plant watermelon with the harvesting season in about September every year. We would get together as a village and share our watermelons. Half the harvest is taken to the men's house for men to consume, while the other half is consumed by the women. This kastom was strong in the past, but we no longer practised today as a village, although some families still practise it within their families.* According to another female interviewee, the tradition started to disappear in the late 1990s, which corresponds with the construction phase of the mining operation. The author had the opportunity to participate in a watermelon consumption tradition during the second leg of his field trip. The host family invited some of their relatives to participate. A clan leader who attended the occasion said that the tradition symbolises the abundant fruits of a family's labour and multiplies the fruits of their land. The multiplication is done through people preserving the watermelon seeds for succeeding crops.

### b) Sharing of Food

Another tradition that is fast disappearing is the sharing of food between households and families. Many families instead are selling their surplus garden produce for cash. A young mother expressed that when she was growing up it was normal to food being exchanged between relatives every evening. However, she noted that the practice seemed to be disappearing, as families and households are becoming more individualistic in nature

From observation during a mortuary feast held in one of the case study villages, it is obvious that Lihirians have great concern for their culture. After eating pork and yams, the village big men seized the opportunity to deliver speeches about issues regarding their culture, especially the difficulties people have to go through in hosting the mortuary feasts. One of the leaders suggested that the local government should consider buying a ship to assist them in transporting pigs from long distant places for feasting purposes. His suggestion pointed to two

main issues: firstly, there is a shortage of pigs on the islands to meet the local feasting demand. Secondly, the neighbouring islands of Tanga and Tabar, from where most Lihirians buy their pigs for feasting, are not coping with the demand. To this end, a clan leader said: *The feasting cycle on the islands of Tanga and Tabar are disrupted. On the other hand the people on these islands are experiencing a high cash flow into their villages.* Another big man stood up and argued that the opportunity to earn cash stemming from the mine operation is empowering Lihirians to organise and stage feasts whenever they wish. He emphasised that, *In our Lihir culture only the clan leaders decide and take the lead in organising feasts. The preparation and planning take years; pigs are raised which take a number of years, and yam gardens are planted to prepare for feasts. The increasing frequency of feasts is causing us to risk our lives to travel to the other islands and distant places such as New Britain Island to buy pigs. If we do it the Lihir way, may-be we will not run short of pigs.* Evidence from interviews also suggests that the frequency of feasting has increased in the last 10 years, as a result of easy access to improved transport infrastructure and more cash income opportunities created by the mining operation. People whom the author talked with during the *karat feast* held on Malie Island mentioned in Chapter 3 feast claimed that cash earned from the mining operations has largely contributed to lavish mortuary feasts and other rituals. For example, conversation with a group of elderly men during the *Karat* feast held on Malie Island estimated the cost of the feast at half a million kina (NZ\$250,000). This includes transport, pigs, store goods, value of yams, *mami*, betel nuts, tobacco and the cash value of *mis*.

According to an elderly person, young men who are aspiring to become leaders use feasts to induce their influence on their clan and the community. They do this by contributing their resources (pigs, yams, *mami*, *mis* and cash). The other underlying reason for their contribution is accumulation of material wealth and recognition which, over time, would translate to transfer of lineage leadership.

### **c) Men's House**

The men's house culture is under threat as Lihirian men seem to be spending less time in the men's house. This may be due to the many changes brought about by the mine operation (see Chapter 5). Most of the elderly male folk and clan leaders expressed their concern that the culture of the men's house is no longer getting the respect and honour it was accorded during the period prior to the arrival of the mining operation. For example, many young men are no longer dwelling in their clan's men's houses, as most of them are employed in the mining

operation, and do not seem to have the time to dwell in the men's house to be nurtured by their clan leaders and the elderly folk. In contrast, many young male interviewees shifted the blame onto some clan leaders and village male elders who are not committed to the men's house culture. In their opinion, some clan leaders are compromising their position by indulging in prostitution, alcohol abuse, and misusing their clan's mining royalties. The behaviour is causing some young men to neglect the men's house.

## **6.11 Mining and Women**

This section concentrates on the perceptions of women towards the mining operation, what it means to them, the positive and negative aspects of the mine seen from women's perspectives, and how women are responding or managing these changes to sustain their livelihoods.

The majority of the women interviewed indicated some of the negative and positive effects of the mine (environmental and social). The negative impacts are often specific to a particular person or group. Some of the general ones include the increase in the cost of living, the lack of direct employment opportunities in the mine for women and their resulting dependency on male relatives, environmental impacts, loss of agricultural land and resources and the failure of compensation to ensure sustainable alternative livelihoods, and women's lack of decision-making power at the community level. For example, a women leader lamented that no Lihirian women collect the mining royalties on behalf of their clans, although the land is owned and inherited through the matrilineal system on the Lihir islands.

Many indicated that they had to request labour from other households to assist in their gardening activities. In addition, some women indicated that they had to undertake some of the activities normally done by the husbands. For example, women interviewees at Matakues and Komat villages claimed that they had to build fences and erect yam stakes in their gardens, in the absence of their employed husbands. In one occasion, the author observed a group of women building a fence around a garden. As a result, the women's workload increases. In another contrasting example, women interviewees indicated that the men's tasks are done by their husbands when they are off work (mine workers work on shift basis). According to interviewees, some people who are employed by the mining operation do not have the time to tend their own gardens. Similarly, Macintyre (1989) observed that many who

depend on income from the Lihir mine regard gardening as 'backward'. Consequently, traditional knowledge of gardening could be in danger of being lost.

A common negative impact mentioned by women is prostitution and marital problems, which many claimed were never a problem on their islands prior to the mining operation. The common view on Lihir is that these problems are on the rise. Women lamented about unwanted pregnancies, and also marital problems amongst those who had left their families. With men spending large amounts of time away from home, the social fabric is disrupted. Increased domestic violence incidences and marital breakups can result from the greater stress on family life. In some cases, the changed circumstances have forced women to turn to prostitution to earn a living, and this too can lead to an increase in the incidence of sexually transmitted diseases. Cases of sexual abuse of indigenous women and girls linked to mining operations are common, though often not discussed or highlighted. Interviewees gave examples of married men and women who had lived in mining camps and become vulnerable to promiscuity.

The economic changes inevitably require changes in attitude and ideology in gender roles at the household level in order to participate in the cash economy. For example, many female interviewees indicated that selling items for cash was never practised until the gold mine operation arrived, alluding to the fact that many women are now selling garden produce, cooked food and betel nuts.

The direct involvement of women in formal employment is generally limited to support activities such as management, clerical, security, catering and cleaning-related jobs. However, the number of women in direct employment is comparatively few. Formal employment of women was non-existent on Lihir prior to the arrival of mining operations.

PNG women are essentially bound to subsistence production within their households, and very rarely do they venture outside their immediate households. According to Macintyre (2006:131), many Australian managers carry the perception and attitude that employment in the mining sector belongs to men, where they tend to reinforce the prevailing ideas among the Papua New Guineans. Macintyre claims that mining employers were generally reluctant to change the conditions of employment to accommodate the specific needs of women. On another contrasting note, men are devoting more of their time to rearing pigs, a task primarily



done by women in the Lihir culture, reflecting that men are taking over women's roles, which are likely to yield economic returns.

Most women interviewed felt positive about the mining because of their improved economic situation. Most felt very thankful for the role that mining has played in their lives, in providing jobs and business opportunities for their families and households. Most women could see the benefits of better educational facilities and opportunities, better health facilities, improved road system and sea transport, which are providing general economic well-being. Women and their families also benefit from improved nutrition and access to medical services. For example, the provision water and electricity in villages ultimately reduces the time spent on chores.

## **6.12 Mining and the Youth**

Qualitative data suggest that most young people in the case study villages depend on their households for their general well-being. Financially, they are associated with the relative prosperity or the decline in incomes of the members of their households, as indicated in section 6.7.1.3. Under the dynamic economic changes, most of the youth (who were observed and interviewed) lack economic opportunities. One of them lamented, *'We are the forgotten group; our leaders and policy makers are selfish'*. A policeman commented that lack of economic opportunities locked them in the middle of riches and cash-flow all around; the resultant frustration often driving them to drugs and illegal activities.

Young people who were born just before and after the commencement of the mine are growing up with better access to education and health facilities, and other modern facilities such as modern forms of communication. They are experiencing an expansion of the cash-based livelihood system with their parents and peers. The cash-based and consumerism behaviour on Lihir has raised their expectations of the mining company and the local level government. A youth leader claimed that insecurity and lack of financial security undermine their capabilities. He added, *'The gap between expectations and the opportunities leads to risk-taking propensities and antisocial behaviour trends. It is of crucial importance to keep them engaged and involved, and enable them to get the benefits in an environment of uncertainty and distrust'*. Therefore, he claimed, all youth on Lihir should belong to either a church youth group or a sports group. In addition, villages have the liberty to form other

groups, which from the outset should encourage the youth to be involved in some form of worthwhile activities. Qualitative data indicate that both the churches and NRLLG encourage the youth to organise themselves into social groups. For example, the Kunaie 2 village has a youth fishing group that owns a fibreglass boat and a 40-horse power engine provided by the local level government. The group leader said that these resources are not utilised for the intended purpose, and most of the time they lay idle. Many youths interviewed often referred to acquiring jobs with the mining operation. However, a youth leader stated that they need ‘training’ rather than education. Overall, qualitative data indicate that NRLLG lacks the management structure and capacity to adequately cater for the affairs of the youth.

### **6.13 Land Disputes**

Land disputes have become common since the mining operation started in the early 1980s. As a result, according to a senior public servant, cases presented to land mediation court have become very common. During the combined phases of the research trip in 2007 and 2008, there were five courts cases dealing with land disputes. In one case, a clan leader claimed that it took him seven years to win a court battle over a block of land at the special mining lease land. He is now receiving mining royalties from the block of land. He also claimed that LGL owes him half a million Kina as back payment over the years that the block of land was under dispute. Certain leaders on the island claim that the clan system has only recently become very obvious as a result of land disputes. Some of the sub-clans claiming to be owners of certain portions of land have, in recent times, come to light; otherwise, they were never heard of.

### **6.14 Squatter Settlements**

One of the most significant impacts of mining activity is the migration of people into a mine area, particularly in remote parts of developing countries where the mine represents the single most important economic activity. For example, the population of the squatter settlements around Porgera in PNG, which opened in 1990, has grown from 4000 to over 18,000. This influx of newcomers can have a profound impact on the original inhabitants, and disputes may arise over land and the way benefits have been shared. Sudden increases in population can also lead to pressures on land, water, and other resources, as well as problems of sanitation and waste disposal. It can also create difficulties in determining the level of facilities and services required. From a social perspective, such an influx can lead to the build-up of a large

mass of people with weak links into society as a whole, and a disruptive influence on local social control, leadership and lifestyles. From the corporate and state perspective, these migrants may be seen as representing an increased security risk, and effectively dilute the value of benefits provided to the host communities (Banks, 1999; Bonnell, 1999).

A squatter is a person who settles on land without authorisation (Bonnell, 1999:68). However, this definition does not apply on Lihir. In-depth interviews revealed that outsiders, who have become what the locals refer to as squatters, were initially authorised by land owners to settle on their land for commercial reasons, and that the outsider was expected to pay rent. However, that was not to be the case. As is the common norm in PNG, if one invites an outsider to settle on one's land, even for a temporary period, it is highly likely that the extended family of the outsider will turn up. For example, in one particular case, a person from the highland region was authorised to settle on a block of land between Kunaie 1 and Londolovit Town in 2000. He has now established himself with a semi-permanent home and two cars (one for his personal use and another for hire). After building his home, he organised for his wife and children to join him. There are five other people from the same extended family who have joined them recently.

Many non-Lihirians living in squatter settlements have different reasons for coming to Lihir. Many have come to the island in pursuit of quality of life factors: employment opportunities, access to education and health facilities, to reside in a peaceful place, to visit their 'wantoks' (a person from the same province, region or language group) who have settled on the island. The biggest loss to the land owners is shortage of land for gardening. Migrants are also easily blamed for other social upheavals that arise. Indeed, the term 'squatters' is associated with crime in most urban areas in PNG, and the common public perception is that they are trouble-makers.



Figure 6.8: Aerial view of squatter settlement on Lihir (source: LGL, 2009:8)

Social capital was discussed in Chapter 3, Section 3.10, and is an important asset for the squatters. If this asset is well established, then it is often possible for other assets (finance, natural and physical) to fall into place. In-depth interviews with squatters suggest that building and enhancing good relationship with Lihirians is paramount. Without it they will not be able to properly establish themselves. According to a prominent squatter, for him to be accepted by the Lihirians he had to participate in their *kastom* activities. To this end, he has on numerous occasions contributed pigs, store goods and cash towards *kastom* activities put up by Lihirians who have allowed him to settle on their land.

The squatters' main sources of income are selling betel nuts, mustard, ice blocks, loose cigarettes, kerosene, bush ferns, fresh food and a range of store items. Their points of sale are their houses, roadsides and the open market located in Londolovit Town. They are referred to by the management of the open market as permanent vendors. They pay K200 per head per month for a permanent spot at the market to conduct their sales.

Squatters, in the same way as Lihirians and the mine workers, access the medical services, educational facilities and the free transport service provided by LGL and NRLLG. Some of them are members of the Lihir Club, an entertainment centre established on the islands for the permanent local workers and the expatriate personnel.

Qualitative data also indicate that apart from the permanent squatters discussed above, outsiders also come to Lihir on a temporary basis. Most of these people are either related to Lihirians or come to the islands for special commercial reasons. In the latter, outsiders come to sell hand crafts, garden produce and betel nuts. Betel nut vendors are either from Tanga or Tabar Islands. These islands have a long history of traditional exchange system with Lihirians, and most of these people use that traditional network to access the services provided on Lihir.

The other group non-Lihirians are opportunists, whom Lihirians negotiate with to make business. An example is given in Section 6.4 where two men had travelled from the Highlands Region to Lihir to do business. Their Lihirian hosts collect a commission as part of the business deal.

## **6.15 Conclusions**

This chapter presented additional changes to livelihoods on Lihir, stemming from the mining operation. It began by signifying the changes to the livelihood assets. In terms of financial assets, the chapter demonstrated that the mining operation is contributing significantly to the villagers' assets, as indicated by the cashflows into the villages. The cashflow is more than what Lihirians would have been earning from their traditional subsistence sources (Chapters 3 and 4). Cashflow into the villages is either from direct or consequential flows. Direct cashflows include the mining royalties, allowances and income from wage employment. The consequential inflow includes income from the sale of betel nuts, pigs and garden produce and other items. As an asset, finance received as royalties and allowance are not produced capital in contrast to the income strategies. Rather, its access and endowment in this regard is governed by the IBP. In other words, mining royalties and allowances, and wages from employment are not direct responses to the mining operation, but part of it. On the other hand, disparity in the distribution of royalties exists, causing envy between the recipients and non-recipients.

Roadside markets have become significant phenomena, where women and children are conducting their sales. Economically, it creates an opportunity for women and children to contribute to their household's financial assets. Socially, it has become a point of socialisation

for women, their children, and the buyers. On the other hand, conducting sales is an addition to the women's household activities.

Also, some of the permanent homes built under the VDS for people to live in are being rented out, and have become ready-made sources of income. Lihirians are using the income derived directly or indirectly from the mining operation to build their financial assets.

The chapter also discussed how the mine has influenced human capital in a generic sense, linking it with Sen's (1981) capability approach. The major constituents of the capability approach are functionings (what people want to do and to be) and capabilities (choices, opportunities, freedom). The link between the generic sense of human capital, capabilities, functionings and livelihood outcomes was shown in Figure 6.3. Generically, Lihirians have access to better educational and health facilities, which from the outset should lead to a more literate and healthy Lihirian population.

Based on analysis of qualitative and quantitative data, several types of households were identified. These include subsistence households, business households, households with employed members, and households that depend on mining royalties and allowances. Each of these household types entails different livelihood strategies in order to sustain their livelihoods. This demonstrates that there is ongoing stratification of households on Lihir as a direct response to the socio-economic changes deriving from the mine operation. The categorisation of households is recognition that people's livelihoods are complex, and in any context there will be different types of people who will have different types of livelihood strategies.

Oughton and Wheelock's (2003) framework of the capability's approach was adapted to explain household endowments towards enhancement of livelihoods. In this process, endowments, which are constrained and regulated under an institutional environment, are converted to livelihood capabilities, which become observed functionings towards sustaining and enhancing livelihoods.

A significant development on Lihir stemming from the mining operation is the relocation of villages. A number of challenges confront the people in the reconstruction of their livelihoods in their relocation areas. In terms of physical assets, these people are well endowed with

housing, roads, electricity and water supply, while in terms of land; they will have to manage their relocated areas in order to ensure it is sustainable in the long term. This will entail skills in land management practices which people have to acquire. In addition, the modern homes will take some time for the people to see the value of maintenance to sustain their quality. Socially, the normal daily experience of village cohesiveness will diminish as homesteads are located on separate blocks of land. Furthermore, the relocation areas pose insecurity in terms of inheritance of physical assets. In a way, mothers and their children are constrained by their own matrilineal system as they cannot inherit any assets established on their father's and husband's land under the matrilineal system (explained in Section 3.7, Chapter 3). The mining operation has also stimulated investments in basic public infrastructure, goods and services such as housing, water supplies, electricity, roads, and sea, and air transport facilities. Educational and health physical structures have also seen marked improvements.

In the final section of the chapter, the other social and economic threads of the mining operation have been presented. These include the high cost of living, which is impacting on Lihirian livelihoods. The impact on the youth and women are also presented, particularly their views and perceptions, and how the mine is impacting on their livelihoods. Although women think positively about the mine, on the other hand they are heavily dependent on their employed husbands. Land disputes, population increases and squatter settlements are other important issues.

# **Chapter 7: Sustaining and Enhancing Livelihoods on Lihir**

## **7.1 Introduction**

This chapter presents how livelihoods on Lihir can be sustained and enhanced. As demonstrated particularly in Chapters 5 and 6, livelihoods on Lihir largely depend on the gold mine operation. However, mining is expected to cease in 2020, and the processing of stock piles will continue until 2043. Solutions to countering the economic and associated livelihood impacts of mine closure are therefore the central theme of this chapter. The chapter begins with a literature review in Section 7.2 of two competing views about societal impacts of mining and natural resource extraction. The ‘resource curse’ articulated through the ‘Dutch disease’ is presented in Section 7.3. Section 7.4 covers how to avoid the resource curse, again reviewing literature and relating it to the context of this study. The focus in this section is on community-based tourism and fisheries as further interventions to the livelihood system on Lihir to avoid the resource curse. Whereas the historical and early interventions presented in Chapter 4 and the mining operation presented in Chapter 5 are seen as external interventions, the two interventions suggested in this chapter would be community driven. Section 7.5 presents the importance of governance going forward in enhancing livelihoods after the cessation of the mine. Section 7.6 concludes the chapter.

## **7.2 Two dominant Views about Mineral Extraction Operations**

Two common world views about the impacts of large scale mineral extraction are confronted in the discourse stemming from what become known as the ‘the resource curse’ or the ‘Dutch disease’ (Corden, 1984:359). The first perspective is that development of mineral resources adds value to an economy. These resources provide revenue to a host government through taxation and other financial transactions, and they provide an environment conducive to the emergence of service providers and spin-off businesses. Further, they contribute to the development of physical infrastructure and improvement of social services. Overall, they heavily influence economic growth of host countries and specific locations within those countries where they have been allowed to operate (Bury, 2002; Davis and Tilton, 2002). As indicated by Davis and Tilton, (2002: 6-7) mineral wealth in the form of deposits is part of the



a country's stock of natural capital and 'mining of minerals plays an important role in the development process by converting these physical resources into a form of capital that contributes to a nation's output'. In order for their potential to be realised, mineral deposits have to be extracted. To this end, the PNG economy has always been buoyed at the macro level by the mineral sector, and one could easily claim that mining as an industry is very important to its economy as described in Chapter 5. At the micro level, and especially in the context of this study, the gold mine on Lihir is directly or indirectly transforming the people's livelihoods from a subsistence livelihood system discussed in Chapter 3 to a cash-based livelihood system (see Chapters 5 and 6). Overall, the gold mine operation is transforming the environmental, social, political and economic contexts for livelihoods in the Lihir Islands. The mine is clearly the engine for growth for the economy of the islands, and it can be safely argued that livelihoods on Lihir can be termed as mineral based.

The second view is that mining negatively impacts on the economies of countries where mining generates at least 10 percent of their GDP and at least 40 percent of their foreign exchange earnings from mineral exports (Davis, 1995:1769). Those who subscribe to this second view maintain that resource extraction has not contributed to sustainable socio-economic development in these mineral economies. At the extreme end, the common argument is that mining operations in poor countries inevitably lead to poor outcomes and growth (Sachs and Warner, 1999). This has been largely caused by mismanagement of revenue from the mining industry (Davis, 1995)

Studies conducted in a number of mineral economies showed little or no economic growth over extended periods. For some of these countries, growth was even negative (Davis and Tilton, 2002:8). Gilb (1988: 126) noted that six mineral producing countries (Nigeria, Trinidad & Tobago, Venezuela, Algeria, Ecuador and Indonesia) from 1982-84 had an aggregated average annual GDP growth of -8.1 percent. Auty (2009:4), concluded, based on per capita GDP for 106 countries for the period 1970-93, that mineral economies had weak economic performances. Pegg (2006:376) reported that, from 1990 to 1999, countries where mining contributed 6-15 percent of their export earnings had an annual GDP per capita growth rate of -0.7 percent, and that countries where mining contributed 15-51 percent of exports had an annual GDP per capita growth rate of -1 percent. He concluded that the overall growth performance of countries with substantial incomes generated from mining was lower than for countries with less income from mining. Gylfason and Zoega (2002) reported that

evidence in 85 countries from 1965 to 1998 suggests that natural capital typically crowds out physical and human capital, thereby inhibiting economic growth. Their results also suggest that, across countries, heavy dependence on natural resources hurt savings and investment indirectly by slowing down the development of the financial system. In a similar vein, Cox (2009), in his analysis of the Nauru's phosphate mining policy concluded that the country's economic woes are a direct result of its own mishandling of its mineral wealth through poor investment decisions. Similarly, in the case of PNG, Koyama (2005) claims that much of the revenue generated from oil and gas in the Southern Highlands Province has not translated to physical and economic development, because of mismanagement of the revenues.

A related issue that has contributed to the emergence of this view is that large scale mining or resource extractions operations can cause violence and civil wars within countries. In some cases these problems lead to foreign intervention in internal affairs to protect multinational interests. The Bougainville crisis in PNG, which stemmed from disagreements between the land owners and the mining company, is an example of social disintegration within communities. The crisis, which began in 1989, lasted for 10 years.

According to Papayraksi and Gerlagh (2007), countries that base their economies on natural resources tend to be examples of development failures. In contrast, countries such as Japan, Hong-Kong, Korea, Singapore and Switzerland, that only had limited access to natural resources, experienced remarkably high economic growth rates (Papyraksi and Gerlagh, 2007).

However, there are some examples of countries that either have benefited or still benefit from their extensive natural wealth. Norway, for instance, converts much of its rich oil reserves to foreign securities, and thus protects its economy from abrupt income increases. Diamond-rich Botswana experienced high income-growth during the last three decades supported by good institutions of private ownership, constraints on political elites, an efficient bureaucracy and sensible investment of resource rents in infrastructure, health, and education (Gylfason, 2001)

### **7.3 The 'Resource Curse'**

Research has indicated that the resource curse results from large revenue inflows that facilitate rent-seeking and wasteful expenditure. The resource curse occurs during a resource boom, causing wages to rise as the economy competes for scarce skilled labour (Auty, 1993).

In the case of mining, it draws skilled labour and other resources away from other sectors (Sachs and Warner, 2001). In addition, an increase in mineral exports causes the local currency to appreciate. Consequently, it creates difficulties for agricultural exports, the manufacturing sector and other tradeable goods and services to compete internationally. When the mineral boom is over, the country's traditional sources of exports could well have been destroyed, unable to be sustained in a high exchange rate environment. This leads to an economic structure that is dominated by enclave economies associated with resource extraction (Auty, 2009; Gilb, 1988; Mikesell, 1997). Accordingly, the concentration of mining in one sector of the economy brings with it vulnerabilities associated with export dependence. Vulnerability arises from mineral price volatility, and dependence is reinforced by the controlled processing and marketing of final products derived from the minerals in question (Bebbington et al, 2008:269).

Mining typically links with few local suppliers, even to the point where many mining companies bring in food from the main towns and cities or overseas through contracts with international catering companies (Szablowski, 2002: 263). This is clearly observed on Lihir, where all the food (fresh and processed) is imported either from other centres in PNG or from New Zealand and Australia. To this end, Pegg, (2006: 376) argues that, as a consequence, the multiplier effects in the local and regional economies are weak. Closely related to these observations on growth is the claim that mining has a dismal track record to date in poverty reduction. Pegg also argues that the availability of mineral wealth discourages investment to increase labour productivity in non-mineral sectors, leading to under-investment in education, although Stijns (2006) argues that mineral wealth should be associated with greater investment in education.

In the PNG context the resource curse view is that resource extraction (mineral, oil and gas) creates a handout mentality among a few wealthy rent-seeking landowners, who might have no idea about sustainability, creating expectations that are well beyond the reach of ordinary villagers. Rent-seeking behaviour encourages 'unearned' income to be wasted on consumption rather than investment and can become an excuse for poor governance (Togolo, 2006:277). An example of rent-seeking behaviour, including corruption, is presented by Koyama (2005) on the oil producing Province, the Southern Highlands, mentioned above. According to Koyama, the province received K741 million as royalties and compensation from 1992 -2001. However, there is no physical evidence to show how the money has

contributed to enhancing the people's livelihoods. Koyama concluded that wide spread corruption and maladministration by the provincial government officers and politicians are major setbacks inhibiting appropriate use of revenue from the oil. As a result, the province is regarded as rich in oil, but poor. Another example stems from the Misima Gold mine, which operated between 1989 and 2001, mentioned in Chapter 5. According to an interviewee of this study who is a former Misima employee and who comes from Misisma, when the mine ceased in 2001 the people's livelihoods were badly affected. He said: *We had millions of cash circulating in the local economy deriving from wages and mining royalties. After the mine left, infrastructure deteriorated, people who were once employed on wages went back to their normal village life, mining royalties stopped flowing, and people become very poor.* The interviewee claims that mining royalties were misappropriated by people in leadership positions, and generally wage earners did not invest to cater for their future.

Similarly, many interviewees on Lihir who visited Misima as part of their orientation into a mining community claimed that they saw poverty which they had never seen in their lives. Children were visibly malnourished, modern homes were in disrepair, the road had become a bush track, and young girls were into prostitution. An interviewee claims that he had to donate a few of his clothes to a family upon witnessing the struggle they are going through. According to Jackson (2000), the Misima gold mine in 2000 employed 780 Papua New Guineans, of which 82 percent were locals from Misima Island. In preparation for the mine closure, the number of the local employees was reduced by 50 percent. This had a deleterious impact on the employees as many found it difficult to adjust back to village life. Adjustment was made more difficult by the fact that, whilst mining was still proceeding, government services supporting non-mining activities were receding.

#### **7.4 Avoiding the Resource Curse on Lihir**

Cessation of mining, which is scheduled for around 2043, will see a massive reduction in income for Lihirians. Lihirians know that the mining operation on their island will one day cease its operation. To counter the impact of its cessation the NRLLG through LSDP (see Chapter 5 & 6) is making some attempt to foster a sustainable livelihood system for Lihirians. According to a senior staff of the NRLLG, the vision of the local level government is: *to foster a vibrant social, economic and investment climate that is conducive to sustaining all*

*facets of development for the benefit and livelihood of all Lihirian people during and after the mine.* Secondary data on Lihir also indicate that LGL is concerned about sustainability. Overall their operation is guided by an overarching development policy aimed at fostering ‘growth and performance, providing independence and self reliance for our people and communities, both present and future’ (LGL 2007:2). Presented below are some suggestions towards avoiding the resource curse.

#### **7.4.1 Savings and Investments**

Writing about why some countries are so rich and some are so poor, Landes (1999: 172-173) pointed out that from the age of discovery to the 18th century, Spain, probably at that time the wealthiest country in all of Christendom, used its money from its newly discovered territories on luxury and war and did not invest for the future. In other words, it became poor because it spent all its money on non-productive ventures as the result of bad decisions. This was also the case in Nauru, as Hugh (2004) indicates; a series of bad investments led to the people of Nauru not benefiting from the wealth generated by their phosphate. This also occurred on Misima Island and in the Southern Highlands Province of PNG mentioned above. Gilb and Associates (1988) point out the resource curse results from inadequate savings and unsustainable patterns of consumption and investment. Papyrakis and Gerlagh (2007) also indicate that most mineral producing countries fail to maintain incentives for savings and investment after positive resource shocks.

On Lihir, the NRLLG has established what is called the Nimamar Investment to assist the council wards, business entities and Lihirians in their investments, as mentioned in Chapter 5. However, at the household and individual levels, people have yet to realise the value of such an institution. Observational data from the thesis fieldwork suggest people know of the need to invest, but for a range of pragmatic reasons, including lack of information and mechanism, do not do so. On the other hand, observations indicate that Lihirians are investing in permanent homes, businesses, vehicles, and household capital items. However, unless the owners start investing in long term non-mining activities, the long term sustainability of these physical assets is not guaranteed. Investment also will ensure that the wealth generated from the exploitation of their gold generates more wealth; this requires advice to ensure the investments are sound. Further, investment breaks the cycle of dependency on the mine operation. In this thesis it is argued that one of the principles of sustaining and enhancing livelihoods on Lihir is appropriation of a portion of income into savings and investments. To

this end, LMALA, may have to investigate the possibility of devising a policy towards compulsory deductions from Lihirians who are employed into an established financial institutions.

Savings contribute to financial stock to meet everyday basic needs and in countering regular shocks (illness, deaths in the family, mortuary feasts). The latter contributes to building the financial stock, which can be used as collaterals to expand and or diversify the household asset base. This then could lead to sustainable livelihood systems. The opposite could happen if income from mining is spent on meeting basic needs and nothing is put aside as saved or invested (see Figure 7.1). As presented above in Section 7.2, literature indicates that the resource curse can be avoided if resource abundant countries invest in infrastructure and education. Infrastructure stimulates economic growth, while education empowers the human asset of a country (Payrakis and Gerlagh 2007). Investment in education also empowers people to migrate to other areas where their education and skills could be a value. This has become important in small island countries in the Pacific with scarce natural resources (Adger et al, 2002; Nowak and Sahli, 2007). In the context of this thesis, investment in education and other non-mining areas such as tourism and fisheries is presented below.

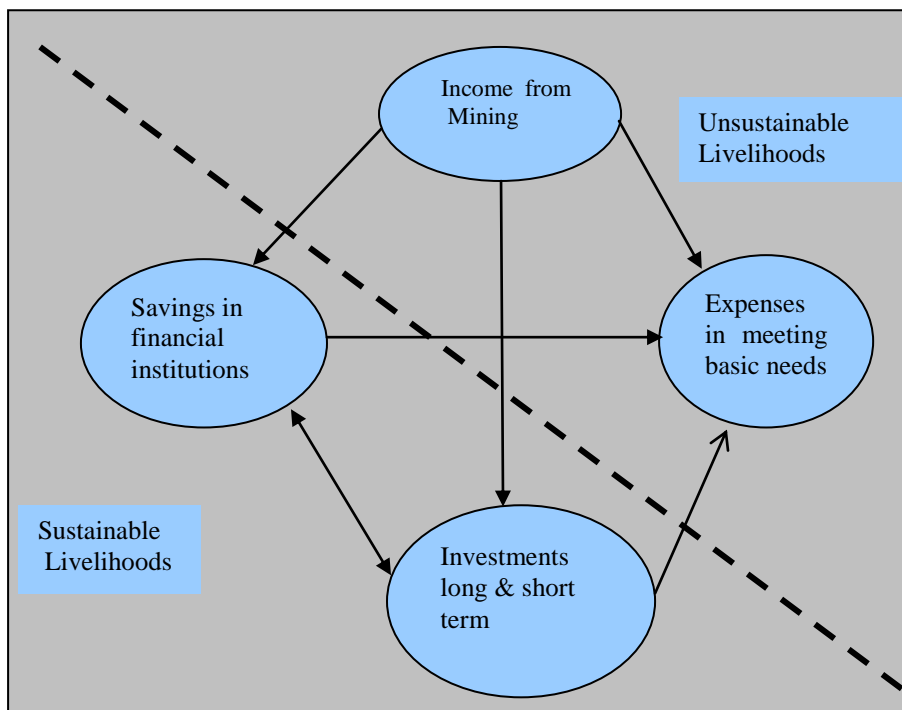


Figure 7.1: The importance of Savings & Investments in Lihir

#### 7.4.2. Other non-mining interventions

The mining sector should be considered a bonus to facilitate opportunities for diversification of the economy. Diversification, which should be in the non-mining area, would be funded by the financial capital generated from mining. At large, this must be done on Lihir in order to break the dependency on the wealth generated by the mining operation and ultimately the resource curse. More importantly, these interventions have to come into play in the people's livelihoods years before the mining operation ceases its operation on the island. According to LGL (2007), mining will cease in 2021, and the processing of the stockpile will continue until 2043 when the mining operation comes to cessation.

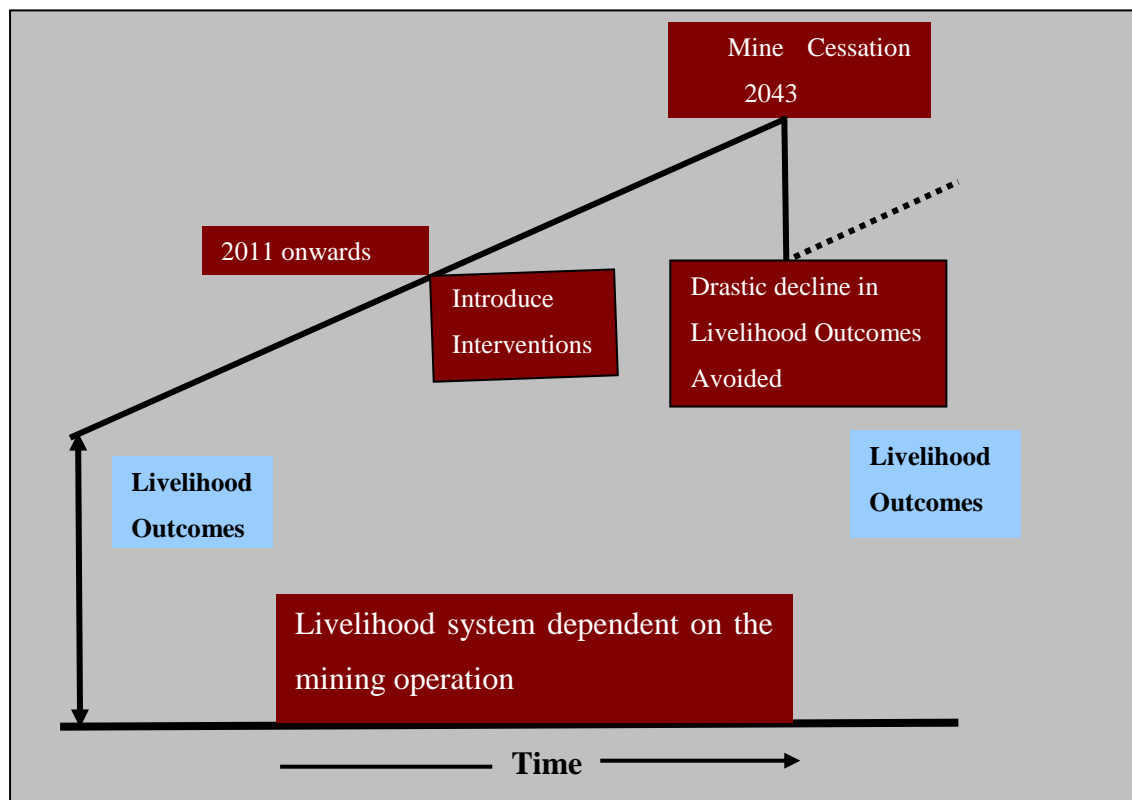


Figure 7.2: Avoiding a drastic decline in Livelihood Outcomes on Lihir

The mine closure plan provides a framework to guide the New Ireland Provincial Government and the NRLLG in making sustainable investment decisions on the use of their remaining benefit streams in the lead up to the mine closure. Good management is required to minimise the negative impact of the mine closure so that the detrimental effects are minimised. Community consultation will be essential in this process to allow all stakeholders to participate in formulating an integrated plan to accommodate the mine closure. Community based eco-tourism, community based fisheries industry and vanilla growing are suggested interventions that could minimise the negative impact of the mine closure.

Therefore, a suggestion would be to introduce these interventions in year 2011. When introduced, these interventions would run parallel to the mining operation (Figure 7.2). By the time the mine ceases operation these interventions would have been impacting on livelihoods on Lihir. If managed effectively their positive impacts should contribute to avoiding the resource curse impacting on Lihir. The theory is that the negative impact of the closure of the mine on livelihood outcomes will be minimised, and the positive impact will be sustained and enhanced.

Undertaking these interventions is a challenge that requires a broad range of skills and capabilities. Lihirians will need to appreciate this challenge and recognise that they may not possess the skills needed to implement these interventions. These interventions will need proper planning, which would entail participatory approaches to determine how they would best fit in the people's livelihoods. These interventions include tourism, fisheries and vanilla. Nevertheless, a SWOT (strength, weakness, opportunities, and threats) analysis is presented in Table 7.1 to justify why they have been selected.

Besides having the potential in fisheries and tourism there is a need to revive vanilla production as a backyard household commercial crop. Data from the study show that Lihirians are growing vanilla, but market information is lacking. More attention in the area of sourcing relevant overseas market information and assisting the growers towards meeting the demand would lead to growth of the vanilla as a commercial crop.

#### **a) Sustainable Livelihoods for Community based Tourism on Lihir**

Tourism has been increasingly used in developing countries for rural poverty reduction due to its perceived development advantages, and has been regarded by some as a panacea for rural development (Shen et. al. 2008:1). Adapting the definition of sustainable livelihoods by Chambers and Conway (1992) and Ellis (2000), Shen et al (2008) propose that a tourism-livelihood analysis need to be broadened to include core community assets (natural, human, economic, social and institutional capital), activities related to tourism, and the access to these which provide a means of living. However, they argue that sustainable tourism can only exist within a sustainable destination. In the case of small islands states, tourism is a promising source of economic and human development. For most of them, such as Samoa and Fiji it has become the main economic activity in terms of income generation, employment creation and



foreign exchange earnings (Nowak and Sahli, 2007). While Lihir is not a state *per se*, it has a lot to offer in terms of tourism. The industry, if developed could become an important income earning industry. Its introduction will require proper planning to ensure that it does not create pressure on the natural resources on Lihir. As argued by Nowak and Sahli (2007), tourism development on small islands is characterised by a process of reallocation of land from traditional activities such as agriculture and fishing. In the case of Lihir, the islands have a huge potential for ecotourism. The islands have sandy beaches, pristine ocean and coral reefs for snorkelling and diving, a rich culture, sacred sites, and limestone mountains. The mining pits which reach a depth of more than 200m below sea level could become potential tourism product. Lihir, being isolated from the main urban centres is relatively free from major law and order problems that would normally be a major inhibiting consideration for tourists. On the whole, Lihir is socially conducive to tourism. However, Lihirians will need the essential skills in hospitality and tourism. Part of the tourism project would be training people in this vital area.

#### **b) Sustainable Livelihoods for Community based Fish Cannery**

A local politician on Lihir indicated that establishing a fishing company to be owned by Lihirians is being talked about at the political level. However, nothing has been done to turn the idea into reality. This politician's dream is for a fish cannery to be established either on the Lihir islands or on the main island of New Ireland. According to a fisheries expert, the two important physical assets needed for a fish cannery are water and electricity, and Lihir has both, together with the country's 200 nautical miles of fishing zone. The thinking of the local government is to establish a fish cannery that would have the capacity to employ Lihirians so that income into the households would continue to flow, even after cessation of the mining operation. The suggestion in this thesis would be to call the fisheries venture: 'community-based fisheries'. The notion of community ensures that it is people driven and owned. Even if Lihirians decide to invite a fishing company or an NGO for a joint venture, the entity has to be driven by Lihirians for Lihirians. In this regard, participatory approaches would be employed in negotiations leading to the establishment of a community-based fish cannery. The focus should be to create wealth, which will continue to positively impact on the livelihood assets aimed at enhancing livelihoods on Lihir.

#### **c) Vanilla Production as a Backyard Cash Crop**

Qualitative data from interviews indicate that over 200 people were growing vanilla when the price was high in the late 1990s and early 2000s. There is potential to revive the crop as it does not require sophisticated market infrastructure. The crop is easy to handle from the harvesting to

processing and marketing stages. On the other hand is a labour intensive crop, as it has to be hand pollinated. It is also crop that does not require a lot land, which makes it high suitable for the Lihir Islands where land shortage is becoming an issue.

#### **7.4.3 Impact of community-based tourism and fisheries on livelihood assets on Lihir**

Besides the direct costs and benefits, such as profits and job generated from these interventions, the impacts of tourism and fisheries on the livelihood assets on Lihir are analysed (see Table 7.1).

Table 7. 1: Impact of tourism, fisheries and vanilla as interventions on people’s assets on Lihir

<b>Livelihood Assets</b>	<b>Negatives</b>	<b>Positives</b>
Financial	Unless people invest revenue from these investments in order to create other wealth, it is likely that their livelihoods will not be sustainable in a long run. Corruption could become a inhibiting factor as leaders/policiticans could easily misuse revenue from these interventions	Income from mining to be invested on fisheries and tourism. Financial assets become a long term equity
Physical	High rate of depreciation of assets could lead to high maintainence cost of physical assets.	Earnings invested in sustaining and enhancing physical capital funded by income from the mine.  Invested in new physical assets as the need arises
Human	Draw human assets from other livelihood strategies.  Increase in household responsibilities.	Training, skills development in management of tourism and fisheries products  Enhance communal effort.
Natural	Lost access to exclusive tourism areas Increased competition for resources Over fishing	Enhance communal management and care of natural resources  Value for natural resources
Social	Conflict with neighbours over rights and access to resources.	Enhance social organisations for tourism and fisheries management Enhanced networks with external organisations.

#### **7.4.4 Invest in Education – Human asset.**

More and better education can stimulate economic growth and improve people's livelihoods in many aspects. It empowers people; the human capital, to make well informed decisions concerning their livelihoods. It opens up livelihood opportunities for people within and

outside of their context. However, Gylfason (2001), in writing about natural resources, education and economic development, argues that most countries that regard their natural resource as the most important asset unconsciously neglect the development of their human capital. They do this by devoting inadequate attention and expenditure to education. For example, Gylfason's study shows that natural resource countries such as Indonesia, Myanmar, Nigeria and Sudan spent as little as 1 percent of their GNP on education in 1990. For the period 1980 to 1997, the study suggests that an increase in investment in natural assets by 5 percent occurred at the same time as a 10 percent decrease in secondary school enrolment in natural resource abundant countries. In contrast, Gylfason indicates that countries such as Botswana and Norway converted their wealth earned from their natural resources into education. Botswana's expenditure on education relative to income continues to be the highest in the world, while the Norwegians show no signs of neglecting education as people attending colleges and universities in Norway rose from 26 percent in 1980 to 62 percent in 1997.

Natural resources bring risks. One is that too many people become locked in low-skill intensive natural-resource-based industries and thus fail through no fault of their own to advance their own or their children's education and earning power. Another risk is that the authorities and other inhabitants of resource-rich countries become over confident and therefore tend to under-rate or overlook the need for good education to enhance their human capital. In other words, nations that believe that natural capital is their most important asset may develop a false sense of security and become negligent about the accumulation of human capital. On the other hand, nations without natural resources tend to invest more of their wealth in education (Gylfason 2001:858). Studies about the impact of phosphate mining in Nauru also indicate that the Nauru government did not invest in human capital through education and training (Cox, 2009). In the case of Lihir, education is an important component of the NRLLG annual budget. As discussed in Chapter 6, Lihir is well catered for in terms of the number of schools and facilities. In 2008, the NRLLG spent K1 million of its budget of K20 million on education. Lihir High School received a special grant of K1.48 million to complete phase three of its development. However, as discussed in Chapter 5, many parents are encouraging their children to gain vocational skills upon completing their high school certificates, so that they can be employed as soon as possible with the mining operation to earn an income. Based on Gylfason (2001) and Sachs and Warner, (2001; 1999) it can be argued that many parents on Lihir are blinded by wealth deriving from the mining operation and are not prepared to invest to advance their education in higher tertiary schools. This was

discussed in Chapter 5, section 5.8.2. To this end, there is a need to educate parents on Lihir to see the value in replacing non-renewable capital in long term investment in human capital. On the other hand, many Lihirians are learning trade skills required by the opportunity presented to them by the mining operation. These skills should be transferable to other areas either on Lihir or elsewhere in PNG. In addition, Lihirians need to be trained in order to manage the suggested interventions.

In another vein of thinking, the economy of Lihir after cessation of the mining operation in 2043 will not have the capacity to absorb educated and employable Lihirians. Many educated Lihirians will have no choice but to migrate to other areas in PNG or overseas to seek employment. These people will be expected to remit money to Lihir. In this regard, Lihir will be like Manus Island, where as reported by Hanson et al (2001), cash remittances from Manus people working in other parts of PNG are more than the total income the island earned from the agricultural commodities. This is because Manus invested in human capital by placing education and health as its development priorities. To this end, out-migration of educated Lihirians can become an important livelihood strategy. Adger et al, (2002:359) point out that migration is a livelihood strategy to raise income, spread risks, provide capital for investment and minimise constraints on land in 'sending' areas. Further, it also results in remittance income, which can sustain livelihoods, if invested in economic activities, and on human or physical capital to enhance household production in the receiving areas.

#### **7.4.5 SWOT analysis of the interventions**

SWOT is an acronym for Strength, Weakness, Opportunities and Threats. It is a general planning tool designed to be used in preliminary stages of decision-making and a precursor to strategic planning in various kinds of applications (Johnson et al., 1989). When correctly applied, it is possible for an organisation to get an overall picture of its present situation. Further, a SWOT analysis applied as a planning tool looks at future concerns, both positives and negatives, of projects or programmes (Houben, et al., 1999). In this thesis it is used to explore the possibilities for initiating the new interventions mentioned above towards enhancing livelihoods on Lihir. It communicates the internal strengths and weaknesses, and the possible opportunities and threats. Literature indicates that the application of SWOT as a planning tool only accounts for strengths, weaknesses, opportunities and threats. In this thesis the author has included two more dimensions to the tool. These are minimising threats, and

maximising opportunities. The argument is to help planners to plan towards countering the threats and maximising the opportunities.

Table 7.2: SWOT analysis of suggested interventions towards enhancing livelihoods on Lihir

<b>Interventions</b>	<b>Strengths</b>	<b>Weakness</b>	<b>Opportunities</b>	<b>Threats</b>	<b>Minimising threats</b>	<b>Maximising opportunities</b>
<b>Commercial Community Fishing</b>	<p>Access and endowment of financial capital from mining royalties and special grants.</p> <p>Access to a vast ocean; a natural source of fish</p> <p>Water and electricity available for processing</p> <p>Airport and seaport are available to aid marketing</p>	<p>People lack skills in modern fishing techniques.</p> <p>Lack of skills in processing and marketing fish.</p> <p>Remoteness of Lihir could incur high freight costs</p> <p>Dispute over land and seas rights could inhibit investments.</p>	<p>Available markets for fish products both locally and overseas.</p> <p>(Example: tuna for the Japanese market).</p> <p>Fish fillets for mining camps and other institutions.</p> <p>By products can be processed into livestock feed.</p>	<p>Competition from other fishing companies.</p> <p>Low demand could be expected in some markets.</p> <p>Low prices in market.</p>	<p>Enter into a joint venture with an overseas or local company, which has experience in the fishing industry.</p> <p>Process fish into marketable products.</p> <p>Research to identify lucrative markets for fish.</p>	<p>Ensure continuous supply of fish products to meet market demand.</p> <p>Embark on researching fish populations and market information.</p> <p>Participate in overseas trade shows</p> <p>Organise overseas markets through PNG overseas missions.</p>
<b>Community Based Tourism</b>	<p>Access and endowment of financial capital from mining to be invested in tourism.</p> <p>Lihir group of islands is a potential tourist destination.</p> <p>Lihir culture is a potential tourism</p>	<p>People are not tourism sensitised.</p> <p>Lack skills in tourism and hospitality.</p>	<p>Liaison with international tourist organisation.</p> <p>Increase social capital through linkages with outside organisations</p>	<p>Display of negative behaviour and attitude could inhibit the industry.</p>	<p>Provision of training in tourism and hospitality</p> <p>Community effort and processes used in thwarting negative attitude towards tourists.</p>	<p>Establish a Lihir tourism board/committee.</p> <p>Establish linkages with tourism organisations in PNG and abroad.</p> <p>Strengthen community management of natural resources –</p>

<p><b>Vanilla as a backyard cash crop.</b></p>	<p>product</p> <p>Sacred sites are potential tourism product</p> <p>International airport, with direct flights from Cairns, Australia</p> <p>A modern hospital</p> <p>Ideal tropical climate growing vanilla.</p> <p>A suitable crop in areas where land is scarce.</p> <p>Can be easily transported to the market, as the crop does not require sophisticated market logistics.</p>	<p>Lack of skills in vanilla husbandry and processing for commercial markets.</p>	<p>High for vanilla in markets in Europe and the United States.</p>	<p>High prices could cause production of low quality vanilla.</p>	<p>Establish a regulatory body to regulate the vanilla industry</p>	<p>tourist products.</p> <p>Strengthen and preserve the Lihir culture</p> <p>Establish Lihir vanilla growers' association.</p> <p>Train growers in husbandry and processing of vanilla for commercial markets.</p>
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## 7.5 Importance of Good Governance

In the resource curse discourse many writers agree that sound development policies and good governance are vital in mining countries to avoid the resource curse, and hence maximise benefits from mining on livelihoods. It is not a question of whether mining is good or bad for the economy, the question is how wealth generated from mining is managed to sustain and enhance livelihoods. According to Papyrakis and Gerbagh, (2007), natural resource countries suffer from the resource curse as a result of rent seeking and corruption. They spoil their wealth instead of managing it efficiently. Sachs and Warner, (2001), argue that resource curse can be avoided, and for this to happen, the capacity and efficiency of governance in mining areas must become paramount. Therefore, one can argue that mining can bring about changes both good and bad to livelihood assets (human, physical, financial, natural and social), but without good governance the bad effects cannot be minimised and the good effects cannot be sustained. Lihrians and the LGL believe that the institutional arrangements created under LSDP discussed in Chapter 5 will steer Lihir to long term sustenance of livelihoods after cessation of the mine. However, observational data collected in this thesis suggests that some local leaders are selfish and are not concerned about the real needs of the people. For example, many people are concerned that the NRLLG is not concerned about the unequal distribution of mining royalties amongst clan members, and the unwise and lavish spending on consumer goods at household level. Many people are concerned about the absence of policy at the village level to govern the distribution and use of royalties. Besides, certain local politicians who are members of the clans receiving mining royalties and allowances have become very influential in the decision making processes at the political level.

On the issue of the mine closure, an interviewee from Kunaie village suggests that LSDP should start communicating the mine closure plan to the people at the village to gauge their views and inputs. He stated, *we are the ones who will be affected most when the mine closes, and it is important for us to know what LSDP is planning*. Indeed, the new interventions being suggested above will require wider community consultation through participatory processes in order for them to be accepted by the Lihir leaders and the people. A suggestion would be to incorporate the intervention with LSDP and work along with the Lihir Sustainable Development Ltd to implement the interventions. This would mean that the interventions will



be implemented along with private enterprise concepts, but with a community development focus.

## 7.6 Conclusions

This chapter has demonstrated how countries rich in natural resources are vulnerable to the resource curse. There are two contrasting perspectives as to the societal and community benefits of natural resources. Some people believe that natural resource extraction industries such as mining contribute to the economic development of underdeveloped countries. In the context of this thesis, this view is clearly evident on Lihir as mentioned in Chapters 5 and 6. The other view is that mining is bad, because it contributes to the resource curse. However, according to the literature, the resource curse will affect a naturally resource abundant country if the wealth generated from extraction of their natural wealth is not managed effectively. Based on that theory, one would argue that Lihir will be vulnerable to the resource curse. Therefore, good governance is needed to formulate and implement sound policies so that wealth generated from mining operations and other natural resource extractive industries are invested towards enhancement of livelihoods.

In order to avoid the resource curse on the Lihir islands, this thesis has argued that the Lihir local level government continue to invest in education. Parents must be educated to see the value in investing in their children's education, especially in higher institutions. Education will empower people to out-migrate to other areas in PNG in pursuit of jobs and remit money to Lihir. The other suggestion is to invest in community based tourism and fisheries and vanilla as a backyard cash crop. The theory is that if this investment is done years before the mine closure, the negative impact of the mine closure will not be too drastic on livelihoods on Lihir. If they are invested poorly, mining may provide little or no benefit to Lihirians in the future. Therefore, the resource curse or the Dutch disease will be greatly felt on Lihir. A quote from a young Lihirian sums up the importance of avoiding the resource curse on Lihir. *I do not want to show my kids the big hole on my island and tell them that some Australians dug that hole and left us nothing. Instead I would love to tell my kids that this is what the hole has given us.*

## Chapter 8: Conclusion

### 8.1 Introduction

The purpose of this chapter is to assess how the thesis has answered the research questions relating to the aim of the study. It begins with a summary of each chapter, followed by the research questions and their answers. Limitations and further research are then presented. First the research questions are restated.

*Research Question 1: What are the major livelihood systems of Lihir and how are they changing as a result of the historical and recent interventions?*

*Research Question 2: How have the mining operations impacted on livelihoods of Lihir?*

*Research Question 3: How can the livelihood systems on Lihir be made sustainable and enhanced?*

### 8.2 Summary of the Chapters

#### *Chapter 1*

Chapter 1 presented the research interest, context and problem, and justified the research. These aspects of the thesis led to stating the research aim, objectives and questions. The theoretical framework used in answering the research questions, in order to achieve the aim, was also outlined in this chapter.

#### *Chapter 2*

This chapter expanded on the theoretical research framework introduced in Chapter 1. Argued in this chapter was the necessity to be clear about the epistemological and ontological questions prior to the elucidation and production of knowledge about the subject of study. Based on this argument, the chapter presented and justified the use of qualitative research methodology underpinned by the constructivist-interpretive paradigm. The sustainable livelihood framework was the principal research framework applied in this study. However, because the research was inductive and aimed at building theory, elements of grounded theory and systems thinking were used. The chapter also documented the use of case study as a

research strategy and the justified the use of unstructured, semi-structured interviews and observations as research methods within the strategy.

### ***Chapter 3***

The generation of this chapter provided part of the answer to the first central research question stated above. In doing so, it identified and described the cultural and traditional livelihood system on Lihir. This livelihood system existed in a socially circumscribed environment, largely centred on culture. Money as cash had very little use in this livelihood system. This is largely ascribed to the isolation and remoteness of Lihir.

### ***Chapter 4***

Chapter 4 also contributed to answering the first research question, but focusing on the historical interventions that have contributed to influencing the people's livelihood on Lihir. Changes were brought about by the early interaction with the colonial labour trade and administration, and sporadic engagement with the cash economy. The churches especially, played a leading role in establishing educational and health infrastructures. Despite this exposure, Lihir remained isolated from major economic activities.

### ***Chapter 5***

This chapter also contributed to answering the first research question, but the focus was on viewing the gold mine operation as a major intervention to the livelihoods on Lihir. In addition, the chapter contributed to answering the second research question mentioned in Chapter 1, Section 1.8. The chapter examined inevitable transformations to the cultural and traditional livelihood system. These include the transformations at the local government level and the various institutions that have emerged. It also examined access to wage employment and business opportunities. Thus, Lihir was on a route to a cash-based livelihood system, which is dependent on the mining operation.

### ***Chapter 6***

This chapter also contributed to answering the second research question. However, the focus was on examining the changes occurring at the micro level - the village and household level. The chapter examined the stratification of households and how these households are managing these changes in order to sustain their livelihoods.

## *Chapter 7*

Given the changes in the livelihood system discussed in Chapters 5 and 6, the focus in this chapter was on answering the last research question. The question was answered in the context of avoiding the 'resource curse'. The concern is for livelihoods on Lihir to sustain and enhance the positive impacts of the mining operation in order to attain intergenerational sustainability. Suggested in this chapter are new interventions which must be put in place to attain long term sustainability of livelihoods.

### **8.3 Research Questions and Answers**

*Research Question 1: What are the major livelihood systems of Lihir and how are they changing as a result of the historical and recent interventions?*

In answering this question, the cultural and traditional livelihood system is identified and documented in Chapter 3. The characteristics of that livelihood system and the historical inventions presented contribute to answering this research question. It had been revealed that this traditional livelihood system is largely based on subsistence production of yams, pigs, *mis* and reciprocal exchanges. The production of these items is found to be driven by the Lihirian cultural practices. The cultural practices were commonly illuminated through a myriad of mortuary feasts and rituals. In the context of this thesis, culture has been viewed as a livelihood strategy, as its practice empowers Lihirians to attain both tangible and intangible wealth. Tangible wealth includes access to land, fruit trees, and physical properties. Intangible wealth includes social capital, which is a very important asset in this livelihood system.

The study found that cultural practices enhanced people's capability in order to sustain their livelihoods. The matrilineal clan system is an important institution identified in this livelihood system. The institution underpinned all cultural activities. Clan members collectively practice the cultural practices to justify their existence in the Lihir society. Thus, it was found that the men's house is regarded as a site for cultural practices and it is a physical symbol of the clans' existence in the Lihir society.

Lihirians were exposed to the outside world through a labour recruitment exercise to work in sugar plantations in Queensland, Australia, in the 19<sup>th</sup> century. Under the German colonial

administration, very little economic development was seen on Lihir. However, they appointed *luluais* and *tutuls* as agents to facilitate recruitment of labour for their plantation economy.

The arrival of the missions in the 19<sup>th</sup> century brought some changes. Lihir began to experience some tangible changes in 1933 when the Catholic Mission established a modern station at Pali. After World War II, the mission influenced the people's livelihoods by building schools and health facilities, a copra buying facility and a shipping service. Lihirians began to experience changes to their livelihood system as a result of interventions by the Catholic Church. Certain aspects of the culture was discouraged and eventually ceased. An example was the initiation of young girls into marriage (*Tolup*) discussed in section 3.4.2, Chapter 1. From the sustainable livelihood perspective culture was important as it triggered the commencement of wealth accumulation by Lihirian women. Another example was the bush fallow system of gardening began to decline; the fallow period began to reduce as a result of increase in population.

It was found that during the 1950s and 1960s, significant changes to the cultural livelihood system started to occur with the establishment of coconut plantations. However, very few Lihirians were employed on these plantations. Political changes emerged with the introduction of the council system. Producing copra was the major new livelihood strategy, but production was sporadic. It was largely produced by clan leaders as they had control over coconuts growing on their clan land. Cash became available, but because of lack of economic development it had very little impact on livelihoods. Annual income per capita was estimated at K65 per head. Under the Australian colonial era, Lihir continued to be seen as isolated, and economic development had a minimal impact on island livelihoods. Livelihoods on the Lihir remained socially circumscribed and continued to be based on culture.

The study revealed both from literature and interviewees that a cargo cult movement was introduced to the Lihir Islands, which eventually evolved into an economic association known as TFA. Lihirians began to drive their own economic agenda through the political and institutional changes. The NRLLG was formed under the government reform. Lihir began to experience one of the biggest interventions in its history through the discovery of gold on Niolam Island in 1982. Changes to the livelihood system became more conspicuous and dynamic, which is expounded in the next research question.

***Research Question 2: How have the mining operations impacted on livelihoods of Lihir?***

The answers to this question are presented under the five headings consistent with the five livelihood assets.

1) Financial assets

Access to financial assets has been made possible through several income earning strategies:

a) Lihirians have been employed by the mining operation since the exploration phase. This is indicated by flow of income into the villages. In 2008, 5 percent of the population was employed, earning K26 million. From a sample of 40 wage earners who were interviewed, the average annual wages per village from the mine ranged between K117, 000 to K728, 390. The mining policy on employment preference is empowering Lihirians to seek employment with the mining operation.

b) It is estimated that in 2008 13 percent of the population received K8 million in mining royalties and allowances. Since the mine started, more than K20 million has been paid to the recipients. Evidence from qualitative interviews shows that a disparity existed in the distribution of royalties amongst clan members, and villages.

c) Income from wage employment, mining royalties and allowances has triggered other income livelihood strategies. The majority of Lihirians financially benefit from these multiplier effects of the mining operation. The study found that betel nut, which is a traditional crop, has become a major backyard cash crop. This is evidenced by an estimated 80 percent of the villagers selling it for cash. The average income from the sale of betel nut for the sellers in the three villages ranges from K364 and K1581 per fortnight in 2008.

d) All spin-off businesses are either partly or wholly owned by Lihirians. The mine operation has stratified households into big contract businesses, small businesses contracts, market-centric local businesses and non-market local centric businesses.

e) Cash incomes are used in cultural activities, for physical assets, for purchase of consumables, and for investment in businesses. People are investing in capital goods and children's education. Lihirians who owned permanent homes are renting them out to tenants. Income from the rentals for 12 interviewees ranged from K330 to K600 per fortnight. Lihirians have 6.8 percent of the shares in the mining company, which equates to K1 billion kina.

Dividends from this equity have been distributed, beginning in 2009. Lihirians have access to financial institutions and credit facilities. At the local level government, it had been found that the NRLLG is the richest in PNG, with an annual budget of K20 million kina. Lihirians per capita has been elevated from K65 prior to the mine operation to K2,500.

## 2) Physical Capital

Lihirians have access to improved education and health facilities. An all weather road has been build around the biggest island. A modern town has been established which has two supermarkets, an open market, a car dealer, a hardware, a gas service station, an airport, and sports and recreation facilities. A vast improvement is also seen in the communication system, as mobile phone services are available in most villages. Electricity is available in six villages on Niolam Island. Observation shows that Homes on the outer islands are installed with solar power. At the household level, people are investing in permanent homes, and other capital goods. More than 600 permanent homes have been built under the VDS. Households in the relocated villages have been allocated permanent homes. However, some elderly Lihirians who are allocated permanent homes prefer to dwell in their semi-permanent or bush-material homes. Other Lihirians are learning to value living in permanent homes, apart from owning them. Lihirians have access to other centres in PNG and overseas through an international airport and shipping services.

## 3) Natural Capital

The special mining lease agreement has occupied 217 hectares of land. This has deprived three villages from the use of their forest, gardening and hunting grounds. On the other hand, Lihir has the potential to establish ecotourism, diving facilities and fishing, as it is endowed with sandy beaches, a pristine ocean and corals. Land shortages are notable, as evidenced by the many land disputes and land court cases since the exploration phase of the mining operation. The bush fallow system is threatened and is in danger of extinction as a direct response to the increase in population. Prior to the mining operation the population was 6,000 whereas after more than 10 years of operation the population has increased to 14,888.

## 4) Human capital

The mining operation has opened up many educational opportunities through a number of ways: a) scholarships for Lihirians; b) provision of skills training to empower human capital for technical jobs in the mine; c) establishment of 26 elementary schools, a high school, an

apprenticeship program and a University Centre; d) adult training is offered at the village level through the IATP and Personal Viability to up skill villages in livelihood and decision making and management type modules provision of training to up-skill people in business management skills.

Enhancement of human capability through training and education has helped people to sustain their livelihoods under the changing livelihood system. This is evidenced by employed Lihirians and Lihirians who are operating businesses. On the other hand, it had been found that some school age children in the relocated villages are not attending school. They see no point in going to school when they are receiving cash every month. A similar case was found in the low enrolment of Lihirians at the University Centre. Lihirians preferred to be employed and earn an income rather than going to school. The study found that capacity building for planners at both the Ward and Village levels is needed.

#### 5) Social Capital

Social capital continues to be enhanced through the staging of mortuary feasts. It had been found that the frequency and scale of mortuary feasts had increased since the construction phase of the mining operation in 1995. This has occurred as a direct response to easy access to financial assets. At the household level, inter and intra household linkages have been strengthened through the dispensation of wealth. On the other hand, it was notable that certain aspects of the Lihir culture have been weakened.

The study also found that several institutions were established to facilitate the changes impacting on livelihoods relating to the answers revealed above.

a) The Nimamar Rural Local Level Government. This institution was established prior to the arrival of the mine on Lihir. It evolved from the *Tutrome* Farmers Association, which had ensued from the cargo cult movement. The cargo cult movement was introduced to Lihir in 1969. NRLLG has a separate management structure beside the public service on Lihir. It is apparent that these two institutions are not functioning cohesively to serve the people of Lihir. The study also found that the NRLLG management has the administrative duty in the expenditure budget for Lihir. It is well resourced in terms of staff capacity and physical resources.



b) Public Service. This includes all the government agencies stationed on Lihir. Administratively they are responsible to the Namatanai District, as Lihir is a sub-district. However, it has been found that public servants on Lihir have been operating independently.

c) LMALA. The land owner association is well resourced with funding and human capacity. It has been found that the association is well supported by LGL and the NRLLG with funding. With the level of support from LGL, it is assumed that the association is to a certain extent compromising its mandate as the people's representative in dealing with mining issues.

d) Nimamar Investment and Nimamar Special Authority – The former deals with investments and the latter implements physical infrastructure projects funded by NRLLG.

All institutions have a supply side and a demand side; the supply side provides and meets the expectations of the demand side. It has been found that expectations are always high on the demand side. The interactions and power plays between the supply side and demand side are varied and complex. Specific consideration needs to be given the linkages and power play between these institutions in future studies to capture the richness and complexity of their linkages.

No previous studies were identified that specifically focused on the impact of large scale natural resource extraction projects on household livelihoods in the PNG context. Notably, in this study, the households have been stratified into semi subsistence households, business households, households on mining royalties and allowances and households with employed members. There is a need to conduct further in-depth study to understand the complexity of the intra and inter linkages between these households.

The study has found that all facets of livelihoods on Lihir are dependent on the mining operation. Therefore, the 'resource curse' alone could become the biggest vulnerability in the people's livelihoods. With the level of financial capital and the enhanced capabilities of the human asset, it has been found that Lihirians have started planning towards avoiding the resource curse. They have devised a plan which they have called the Lihir Sustainable Development Plan. The main thrust of the plan is to facilitate the establishment of projects towards sustaining livelihoods on Lihir after the mine ceases operation. This study has also found that an opportunity exists for other interventions which have to be included in the plan.

This then, leads to presenting the answers to the next question relating to avoiding the resource curse.

***Research Question 3: How can the livelihood systems on Lihir be made sustainable and enhanced?***

The answers to this question are underpinned by the resource curse theory as to what could happen on Lihir, unless other interventions are designed and implemented during the life of the mine. Firstly, Lihir being a group of islands, the potential for community based ecotourism is enormous. Secondly, with the vast fishing ground the islands are located in, coupled with the availability of water and electricity, there are prospects for a community fisheries enterprise. Thirdly, the existing literature on the resource curse has suggested that failure to invest a proportion of income from extracting natural resources leads to poverty. Therefore, the need for people to invest some of their income from the mining operation in long term investment is paramount. Fourthly, the study has revealed the need to revive the production of vanilla as a backyard crop. The new interventions will require improvement of the people's management skills in tourism and hospitality management, agriculture fishing skills and processing and presentation of fish products for sale. In addition, the interventions will need commitment and above all good governance.

## **8.4 Review of the Research Methodology**

The purpose of this study has been to understand the dynamics of livelihoods on the Lihir Islands of PNG where historical interventions and a mining operation have caused social-economic changes, and continue to influence the people's livelihoods. The thesis has documented the changes to the livelihood system within a holistic framework of livelihood analysis, complemented by grounded theory and systems thinking. These research frameworks are each separate bodies of theory and applications. However, they provide compatible bases for the application of a constructivist research approach. Therefore, they complemented each other in the production of knowledge in this thesis.

The sustainable livelihood framework is concerned with humans and how they use their resources within a given vulnerability context to sustain their livelihoods. In that context it is a human system, which consists of assets as inputs. Depending on the capability and

functionings of people in their context, these assets are transformed through human processes to attain livelihood outcomes. In this study, the sustainable livelihood framework was applied as a research lens, while the system thinking viewed the study context in its holism. That is, Lihirians in using their assets to operate in a vulnerable context are connected or linked with other actors and institutions to derive livelihood outcomes. The soft system thinking is also concerned with human systems. In addition, systems thinking helped shape and define the boundary of the study. In this regard the study is contextual to Lihir, underpinned by single case study approach with multiple units of analysis.

The strength of grounded theory is the emphasis it gives to the emergence of theory from contextual data. There are differences in world views and application of grounded theory in research originating from the original authors of grounded theory. Glaser (1992) emphasises avoiding reading of existing literature in order to allow the inductive nature of the study take its rightful course. On the other hand, Strauss and Corbin (1998) recognised that the researchers bring their research background, experiences and familiarisation to existing theories. The data emerging from studies could therefore be informed by other theories to draw conclusions. The author respects these differences and arguments, however at the same time he recognised that there is no right or wrong course to follow. In this study, literature on the research framework was read prior to the study. As a novice researcher it was important to establish some guidelines to what type of data would be collected in order to answer the research questions and achieve the aim. This is where the use of the sustainable livelihoods framework as a lens was brought to the fore. Understanding the sustainable livelihood framework as research lens prior to conducting the research influenced the construction of questions used in the study. To this end, it guided the research process in elucidating data relating to livelihood systems on Lihir. However, most importantly, specific literature on Lihir was available to the author after the first phase of the research. The same applies to literature on the socioeconomic impact of mining on people's lives. Therefore, the investigations were informed by prior theory and the data generated from the study was not applied to falsify theories, as no specific hypotheses were tested. Analysis of the accumulated contextual data consequently led to understanding the dynamic nature of livelihoods on Lihir, and how it can be sustained and enhanced.

According to the social constructionist ontology and epistemology embodied in this study, the social world is said to be multi-faceted and abstract.

## **8.5 Limitations**

Limitations of this study arise from the qualitative nature of the study. The inevitable methods used in collecting the data limited the statistical analysis of quantitative data. Besides, restrictions in the internal sources of certain secondary data also contributed to the lack of richness in certain units of analysis. An example was the salary levels of Lihirians who are employed with certain contracting businesses. Inclusion of such data could have enriched the limited quantitative data presented in this thesis. Reliance on interviewees to recall historical and important events in their livelihoods in oral societies is a major limitation. Limited scope for triangulation of data resulting from knowledge gap between generations about historical events became obvious. This situation contributed to apparent early saturation of data without achieving full richness of information. In cases to do with income earned from the sale of items such as betel nuts, it was easy for interviewees to recall their recent incomes because they would normally count their takings after their sales. However, it was difficult for interviewees to recall their expenses as there are too many to remember. With the absence of records, it was difficult to assess their income and expenditure trends over a long period.

Although case studies were selected as the research strategy, in certain livelihood issues larger samples of units of analysis on different cases and longer periods spent in the villages could have contributed to the richness of data. Besides, in some households the head of the households and their spouses were interviewed together. It is possible that mistakes may have been made in accurately translating what the respondents have stated in Tok Pisin into English. Participatory tools could have been applied in one or two villages to elucidate other future interventions. However, time was a major limiting factor. Further, the holistic approach taken in this thesis contributed to limiting the depth of investigating the units of analysis. These factors have influenced the richness and reliability of data.

## **8.6 Further Research**

Based on the limitations of this study, longitudinal research could be undertaken in one or two villages focusing on household livelihoods using the rights-based approach (CARE, 2002). This approach shifts the study from being wholly holistic to a more focused study on household livelihoods. The approach requires a more systematic analysis of households in order to understand the complex inter and intra linkages between households, their access to resources, the barriers they face in accessing these resources, the application of these

resources, and how the desired outcomes impact their livelihoods. Participatory approaches such as wealth ranking, venn diagrams, and institutional SWOT analyses could be applied in such a longitudinal research. Analysis of these livelihood issues could lead to identifying the most marginalised households. These households would become targets in the introduction of other interventions. The introduction of these interventions during the life of mining projects and involving the marginalised households or household members would ensure balanced development. It would also ensure that the resource curse is well taken care off before it happens.

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# Appendix

## *Interview Guidelines*

**A. Interviewee: villager (Male or female) who is not on wage employment & live in a village.**

**1. Describe the changes that you have seen and being experienced in your village?**

*Prompts:*

- What are the reasons for those changes?
- What are the main causes?
- How have the changes affected the way people live in the village?
- How are people managing these changes?
- What do people require in terms of knowledge, skills & attitude in order to manage these changes?
- What are the strengths & weakness of these changes?
- Have you noticed any problems in your village as a result of these changes?
- What opportunities have come about as a result of these changes?

**2. What are the main activities you are involved in for your living in the village?**

*Prompts*

- How did you decide to establish or get involved in these activities?
- What is the main purpose of establishing these activities?
- How are these activities contributing to your living in your village?
- What are the major issues you are facing in these activities?
- How are you dealing with these issues?
- Did you have to spend money to establish these activities? How much did you spend? What was the source of the finance? How did you get it? Who did you see?
- What knowledge and skills do you consider important in managing these activities?
- What is the future like for these activities?

**3. What types of people have you seen/heard off visiting the village recently?**

*Prompts*

- Why did they visit your village?
- How many times have they visited in the last month?

- Who did they talk with? (*Leading to identifying potential interviewees*)
- Where are they from? Which organisation or organisations are they from? Where are these based? (*Leading to potential institution to be investigated*)

#### **4 What is the biggest and most important issue being talk about in your village today?**

##### *Prompts*

Why is it important? How did it come about & why? Who is affected by this issue & how?  
What are people doing about the issue & how?

### **B. Interviewee: Head of Households & other members of households**

#### **1. What is the main activity that supports the livelihood of your household?**

##### *Prompts*

- How do you spend a typical day in your village? – leading to activities.
- Who decided that such an activity is important for your household?
- Why is this activity important for your household?
- Who manages this activity and why?
- Who does what and why in this activity?
- How is the activity maintained and why is this important
- What major issues if any do you face in this activity?
- How do you manage these issues?
- Who do you ask for support or advice if needed?
- What is the future of this activity?
- What changes do you envisage in this activity?
- How will these changes happen? Why?
- What opportunity do you have for expansion?
- What is the current issue talked about in your village? How will this affect your household?
- Any other issues you wish to discuss or tell me.

### **C. Interviewee: A Lihirian who is employed by the mine**

##### *Prompts*

- Describe your job with the mine? What does it involve?
- How is your job affecting or contributing to the livelihood of your household?
- Has your job affected your social ties with your local folks in your village? If yes, how has it affected it? If no how are you able to maintain your social ties?
- What is your future plan in the event that the mine ceases operation?



- Apart from your wage employment, what other activities do have going as part of your livelihood? Why did you choose these activities? How are you managing these activities? What knowledge & skills are important in managing these activities?
- How are these activities contributing to your livelihoods?
- Who do you seek advice from to sustain these activities and why?
- What is the future of these activities?
- What other things/issues do you wish to discuss

#### **D. Interviewee: Ward Councillor**

##### *Prompts*

- What is your role as a councillor? What do you do?
- Generally how does your role affect livelihoods in your ward?
- Who funds your ward development initiatives?
- How are these initiatives decided and planned?
- Who implements them?
- Who manages them?
- What changes have you seen in your ward recently? What causes these changes? How are people managing these changes?
- What is the biggest or main issue being talk about in your ward?
- Why is it the biggest and main issue?

#### **E. Interviewee: Business man or women**

##### *Prompts*

- What is the nature or focus of your business?
- How & why did you start it?
- What makes it to work?
- How did you initially fund your business?
- What knowledge & skills are essential in the management of your business?
- How do you mix modern business management with the PNG culture?
- How important is the business to your local community?
- What can ruin your business? How are you managing to avoid it being ruined?
- What are the strengths & weakness of your business?
- What are the major threats?
- What opportunities do you have?
- How do you envisage your business to be in the future?
- How is your business related to the mining operation?
- In the event that the mine ceases operation, how will this affect your business?
- Who do you see for advice?

#### **F Interviewee: Youth Leader/Member/or Youth**

Examples of formal youth organisations in a village setting in PNG: Sports club, youth fellowship group etc. What is the purpose of your organisation? What do you do? What regulations/policies/constitutions do you have? Who decided them? How did you go about designing them? How do they affect the youth in your village? Who and how do you finance your organisation?

### **How do the people community see your organisation?**

What would be a normal day for a youth in your village?

What is the future of the youth organisation? How do you see it developing in the next 5-10 yrs or so?

What are some of the good things about your village or happening in your village? Why are they the way they are? Why are they good? Who is responsible and why?

How are the youths contributing to these good things? Why?

Overall how can the village ensure the good things continue into the future?

What else can you tell me about your village?

*With regards to training provided by IATP or other providers.*

Has there been any training provided specifically for the youth in your village? If yes, what was covered in training? Who provided the training? How many people (males & females) attended? How have you used the knowledge and skills you gained from the training & why? What constraints are you facing in practicing these knowledge & skills?

What types of people have you seen/heard off visiting the village recently?

*Prompts*

- Why did they visit your village?
- How many times have they visited in the last month?
- Who did they talk with? (*Leading to identifying potential interviewees*)
- Where are they from? (*Which organisation or organisations are they from*)? Where are these based? (*Leading to potential institution to be investigated*)

What is the biggest and most important issue being talk about in your village today?

- Why are people talking about it?

### **G Interviewee: Women Leader**

## **Describe your role as a women leader**

### *Prompts*

What do you do?

- Describe the support you get from other women or men?
- Why would they support you?
- Describe the constraints you face in your role?
- How do you handle these constraints?

## **Describe the changes that you have seen and being experienced in your village?**

### *Prompts:*

- What are the reasons for those changes?
- What are the main causes?
- How have the changes affected the way people live in the village?
- How are people managing these changes?
- What do people require in terms of knowledge, skills & attitude in order to manage these changes?
- What are the strengths & weakness of these changes?
- Have you noticed any problems in your village as a result of these changes?
- What opportunities have come about as a result of these changes?

## **H Interviewee Village woman**

### **Describe the changes that you have seen and experienced in your village since the mine began its operation?**

#### *Prompts:*

- What are the reasons for those changes?
- What are the main causes?
- How have the changes affected the way people live in the village?
- How are people managing these changes?
- What do people require in terms of knowledge, skills & attitude in order to manage these changes?
- What are the strengths & weakness of these changes?
- Have you noticed any problems in your village as a result of these changes?
- What opportunities have come about as a result of these changes?

### **Describe the main activities you are involved in your village?**

### *Prompts*

- How did you decide to establish or get involved in these activities?
- What is the main purpose of establishing these activities?
- How are these activities contributing to your living in your village?
- What are the major issues you are facing in these activities?
- How are you dealing with these issues?
- Did you have to spend money to establish these activities? How much did you spend? What was the source of the finance? How did you get it? Who did you see?
- What knowledge and skills do you consider important in managing these activities?
- What is the future like for these activities?

**Describe the life style Lhirians tend to live now days as a result of the mine.**

### *Prompts:*

- Changes in life style
- Characteristics; strengths & weaknesses
- Sustainability, how can livelihoods on Lihir be enhanced & sustained?
- Describe what is needed to enhance & sustain livelihoods in your village

## **H Interviewee: Agricultural or Rural Development personal**

**Describe your job; what do you do? If you were here before the mine came into operation describe the changes you have experienced in your job?**

### *Prompts*

- Policies that enhance livelihoods
- Policies that inhibit livelihoods
- Strengths, weakness, opportunities & threats, strategies to minimise the threats and capitalise on opportunities of livelihoods on Lihir.
- Challenges being faced
- If there is anything to improve, what is it & how can it be improved?
- Sustainability of livelihood – how can livelihoods be sustained, what is needed to sustain & enhanced livelihoods on Lihir? How can this be done? What strategies or policies are needed? How will these strategies be designed? Who is responsible for these strategies?

## **I Interviewee: President of the Local Level Government**

**How has Lihir changed since the start of mining operation? Describe the changes.**

### *Prompts*

Economically; what has changed? What types of economic activities are people involved with? What is the current situation? What proportion of the Lihirian population is involved in economic activities? How many of these activities commenced at the start of the mine? What are these activities? Why have they lasted?

What is the status of financial assets of people in the villages? Has there been an increase or a decrease? What is the general trend? Why is this so? Where do people spend most of their money? What common things do people spend their on? Are people investing now to take care of their future? Socially; what has changed? Why? What has not changed? Why? How has the mine enhanced social norms, trust and intra and inter – family networks & network?