Empowering Technologies?
Introducing Participatory Geographic Information and Multimedia Systems in two Indonesian Communities

by

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A Dissertation Submitted in Partial Fulfillment of the
Requirements for the Degree of

DOCTOR OF PHILOSOPHY

in the Department of Geography

We accept this dissertation as conforming
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ABSTRACT

Inclusion of local knowledge in decision-making is recognized as important for land-use planning. However, this is prevented by communication constraints. Increasingly local communities throughout the world are using community mapping and simple Geographic Information Technologies (GIT) to communicate information about traditional lands to decision-makers. This corresponds to the trend, primarily in North America, for practitioners to apply Geographic Information Systems (GIS) technologies in public participation settings. Claims have been made that use of Public Participation Geographic Information Systems (PPGIS) by disadvantaged groups can be empowering. However, others claim that PPGIS is disempowering due to the cost and complexity of the technologies, inaccessibility of data, restrictive representation of local geographic information, and the low level of community participation.

The research described in this thesis sets out to contribute to the debate regarding PPGIS and empowerment. Participatory Geographic Information and Multimedia Systems (PGIMS) technologies were developed for this project in an attempt to overcome the weaknesses of PPGIS described above. A PGIMS project was introduced into two communities in West Kutai, Indonesia. The PGIMS technologies enabled local communities to gather information using a digital camera and video camera, and store, manage and access it. A participatory process ensured that communities made all decisions related to the project and were trained in the necessary technical skills. Functional PGIMS were created in both participating villages. These PGIMS were relevant to the communities' needs to record information for future generations and communicate information about boundaries and land use to outsiders.

The research question addressed in this thesis was: *How does the PGIMS project empower or disempower local communities?* The author developed a working definition of empowerment to enable evaluation: *empowerment is an increase in social influence or political power.* Furthermore the author determined that empowerment is achieved through a combination of internal changes in an individual or community as well as external factors. These are defined as changes in 'empowerment capacity'.

This thesis presents a framework to structure an analysis of empowerment. It enabled the author to examine how four catalysts related to the PGIMS project empowered and disempowered, as well as increased and decreased empowerment capacity of the individual and community. Catalysts included the *information* contained within the PGIMS, the participatory *process* used, the technological *skills* acquired and the *tools* applied to develop the PGIMS.

Qualitative data were gathered in the field using participant observation, semi-structured interviews and questionnaires. Data were categorised into indicators of increased or decreased empowerment and empowerment capacity. These indicators were sorted into the relevant cells of the framework.

The empowerment framework offered a logical structure to categorize the data and enable an analysis of how different components of the PGIMS project impacted individuals and communities. It was also useful for differentiating between empowerment and empowerment capacity impacts. There were weaknesses with the methods and framework. These included the inability to determine the extent to which the PGIMS project contributed to the observed indicators relative to other influences; the difficulty of interpreting the data to create indicators, and the difficulty of measuring some indicators or defining their relative importance in the framework.

This research concluded that the PGIMS project empowered participating individuals and communities, and also increased their empowerment capacity, but it is difficult to determine how lasting or significant this is. It also disempowered individuals and communities. Individuals were more empowered by skills and processes, while communities more empowered by information and tools. The benefits of individual empowerment can conflict with community empowerment. Empowerment in the PGIMS project was highly influenced by pre-existing conditions in individuals and communities.

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LIST OF ACRONYMS

ABRI	Armed Forces of the Republic of Indonesia
CAD	Canadian Dollar
CD	Compact Disc
CIDA	Canadian International Development Agency
CCLF	Canada CGIAR Linkage Fund
CGIAR	Collaborative Group for International Agricultural Research
CIFOR	Center for International Forestry Research
GIS	Geographic Information Systems
GIT	Geographic Information Technologies
ICT	Information and Communications Technology
IDRC	International Development Research Centre
NCGIA	National Center for Geographical Information Analysis
NGO	Non Government Organization
PGIMS	Participatory Geographic Information and Multimedia Systems
PKI	Indonesian Communist Party
PLA	Participatory Learning and Action
PPGIS	Public Participation Geographic Information System
PRA	Participatory Rural Appraisal
SHK	*Sistem Hutan Kerayakatan*
VCD	Video Compact Disc

GLOSSARY OF INDONESIAN AND BENUAQ TERMS

Adat	Indonesian	Customary law, or the body of tradition that sets out how individuals relate to each other with respect to marriage, divorce, inheritance, land and property rights. This term covers religious rituals as well as non-religious forms of socially regulated behaviour
Akulturasi	Indonesian	Thought to infer reciprocal modifications that occur when individuals from two or more different socio cultural systems come into contact
Aturan Main	Indonesian	Literally translated as 'the rules of the game'
Bahasa Benuaq	Indonesian	Local dialect in West Kutai used by the Benuaq Dayak tribe
Bahasa Indonesia	Indonesian	National language of Indonesia
Belian	Benuaq	Healing ceremony
Beliatn Nalitn Tautn	Benuaq	Rituals to appease forest spirits used at the start of a new agricultural season or at the opening up of a forest
Bengkar	Benuaq	Primary forest
Berinuq	Benuaq	Community meeting
Brijooq	Benuaq	Traditional song
Bupati	Indonesian	Regent of a region
Dongin	Indonesian	Storytelling of traditional folktales
Gotong Royong	Indonesian	Communal work
Kabupaten	Indonesian	Regional administrative unit (sometimes referred to as Regency)
Kampung	Indonesian	Village administrative unit
Kebun Rotan	Indonesian	Rattan garden
Kecamatan	Indonesian	District administrative unit
Kepala Adat	Indonesian	Traditional head (usually at the level of the village)
Kepala Desa	Indonesian	Village head

Kwangkai	Benuaq	Secondary mortuary rites performed on a person's remains any time up to one year after death.
Ladang	Indonesian	Shifting rice swidden field and the agricultural process used to cultivate it
Lumbung	Benuaq	A traditional system used in the village to separate and store different rice varieties to prevent them getting mixed up
Mantiiq	Benuaq	Aristocratic social stratum
Marantika	Benuaq	Commoner social stratum
Narasumber	Indonesian	Source of information, normally refers to an elder in the community
Pancasila	Indonesian	The Five Principles: 1. Belief in only one God; 2. Just and civilised humanity; 3. The unity of Indonesia; 4. Democracy guided by the wisdom of deliberations among representatives; 5. Social justice for all Indonesian people.
Reformasi	Indonesian	The democratic reform era of post-Suharto Indonesia
Ripatn	Benuaq	Slave social stratum
Roh	Benuaq	Spirit / ghost
Saukng Piaq	Benuaq	Cock fighting
Sawah	Indonesian	Wet irrigated rice agriculture
Sekretaris Desa	Indonesian	Village secretary
Simpukng	Benuaq	Fruit tree garden
Sistem Hutan Kerayakatan	Indonesian	Traditional Forest Management Systems
Temai	Benuaq	Specific form of *adat* that regulates the exchange of traditional knowledge
Temputn	Benuaq	Benuaq mythology
Tongkok	Benuaq	A game of chance involving gambling on the probability of your side of a square being chosen by a randomly drawn coloured cube
Ulin	Indonesian	Iron wood (*Eusideroxylon zwageri*)
Wook	Benuaq	Forest spirit

ACKNOWLEDGEMENTS

I thank my supervisor Peter Keller for his continuous guidance, enthusiasm and most of all for his unswerving support through all stages of this research and other life projects. I am grateful to many people at the University of Victoria who have assisted me immensely during the course of this work. Among them, my committee members Phil Dearden, Stephen Owen, Margot Wilson and Colin Wood, have been particularly helpful and generous with their time and expertise. I should also like to thank my external examiner Dr Trevor Harris from the University of West Virginia for his excellent and insightful questions and comments.

I am thankful to the CGIAR-Canada Linkage Fund (CCLF), a program managed by the Canadian International Development Agency (CIDA), for funding the research described in this thesis.

I am indebted to Lini Wollenberg at CIFOR for her excellent advice and friendship before, during and after the fieldwork; also to CIFOR as an institution for helping with Indonesian visa administration and other matters.

I thank all the staff at SHK for their support and kindness over the full course of this research, in particular Rudi Ignatius and Fidelis Nyongka for their truly amazing organisational skills and friendship in the field. Of honourable mention is Jay Forsyth, a Canadian intern at SHK, who proved an exceptional ping-pong partner in the unstoppable 'Team Buleh'.

It is difficult to overstate my gratitude to the people of Benung and Tepulang. They took me into their community and treated me as one of their own. This thesis would never have been possible if it were not for them. Of particular note are Nota and Serani from Tepulang and Rio, Minang, Rumin, Djung, Sentitn and Selumudin from Benung.

To friends whose encouragement and support have remained constant in spite of the long periods of absence. These include Lorraine Gibson, Nicholas Cohen and Natasha Blanchett-Cohen who read through drafts of this thesis and Ze'ev Gedalof who helped with presenting the statistical data and was a good companion on the disc golf course.

My parents-in-law, Peter and Judy Stockdale, provided the encouragement and support that enabled the completion of this thesis. My parents, Robert and Susan Corbett, and brothers, Tom and Michael, have always given me the space to be myself, never trying to limit my aspirations. Most importantly I thank my children Emma and Tom, and friend and wife Mary Stockdale, who has shown untiring patience and support, reminding me of my priorities and keeping things in perspective.

DEDICATION

To Mary and her little lambs.

CHAPTER ONE:
INTRODUCTION

1.1 EMPOWERING COMMUNITIES TO COMMUNICATE INFORMATION

The focus of this research is to evaluate how Geographic Information Technologies (GIT) serve to empower local communities.

In Indonesia, local communities have for many years been removed from decision-making processes related to land use and management as well as other topics (Peluso, 1995; Runyan, 1998; Gautam *et al.*, 2000; Chidley, 2002), thereby effectively disempowering them. Recent decentralization of Indonesian government, bringing increased decision-making responsibilities to the regional level, has brought decision-makers closer to their constituents both physically and culturally (Read and Cortesi, 2001). The intention of this change is to provide the opportunity for improved two-way sharing of information between government and local communities.

These changes mirror a wider recognition of the need to develop a better understanding of local knowledge (Roach, 1997; Rahman, 1998; World-Bank, 1998; World-Bank, 1999). Among other things, it recognizes that local knowledge contains a wealth of important information about natural resource management practices that are ecologically and culturally appropriate for their locality and that can make a powerful contribution to land-use planning at the local level (Carter, 1996; Carter, 1997; Shariffadeen, 2000).

Despite the recognition that local knowledge can contribute positively, it remains an underutilized resource in natural resource management (Quiroz, 1996) because of communication constraints between stakeholders (Lawrence and Warren, 1999). The challenge is to find ways that enable communities to contribute information to the planning process. In order to do this

there is a need to enhance the capacity of local communities to communicate their views and knowledge and become more meaningfully involved in land use planning and decision-making (Lawrence and Warren, 1999).

In response to the need for improved information exchange between government and communities, a number of methodologies have been developed. Some of the more popular methodologies have used participatory processes for gathering and analyzing information – these include Participatory Rural Appraisal (PRA) and Participatory Learning and Action (PLA) (Chambers *et al.*, 1989; Davis-Case, 1990; Pretty *et al.*, 1995; Chambers, 1997; Abbot *et al.*, 1998). More recently new Information and Communication Technologies (ICT) are also being used to facilitate this information exchange (Richardson, 1997; McConnell, 1998; Moetsabi, 1998; Norrish, 1998).

1.2 COMMUNICATING GEOGRAPHIC INFORMATION

Parallel to the wider changes mentioned above, the closely related disciplines of cartography and geography are contributing processes and Geographic Information Technologies (GIT) to facilitate the communication of spatial information. Community mapping is a participatory map-making process that attempts to make information about community lands visible to outsiders by using the commonly understood and recognized language of cartography (Peluso, 1995; Poole, 1995b; Carter, 1996; Aberley and George, 1998; Alcorn, 2001). Community mapping projects have sprung up throughout the world (Momberg *et al.*, 1994; Flavelle, 1995; Peluso, 1995; Poole, 1995c; Aberley and George, 1998). Community maps can pose alternatives to the images of the existing power structures and become a medium of empowerment (Peluso, 1995) by allowing groups of people to represent themselves spatially. Used in this context, community maps have become a powerful tool with which communities can seek recognition and inclusion in land and natural resource planning and management (Brody, 1981; Fox, 1994; Fox *et al.*, 1994a; Momberg *et al.*, 1994; Bird, 1995; Flavelle, 1995; Poole,

1995c). The process of making these maps is also an empowering activity that can often serve to unify and embolden a community (Aberley, 1993; Flavelle, 1995; Harrington, 1995; Flavelle, 1996; Aberley and George, 1998).

Although community maps are useful and powerful tools for communication they cannot describe everything there is to know about the land. For this reason they are often supplemented using the written word. This is an imperfect medium to represent local knowledge, especially for traditional people who may be illiterate and accustomed to communicating orally and by using examples rather than generalities. Johnson (1992) notes that much local knowledge about the land is transmitted in the form of stories and legends that use metaphor and sophisticated terminology; thus much of the context might be lost if the information is transcribed to written text. Therefore there is a need for GIT that can combine the usefulness of maps with other communication media, such as video, images and audio, which are better at documenting the oral and visual aspects of local knowledge, as well as its complexity.

One possible tool for recording local knowledge in a more comprehensive manner than that available to community maps is the new generation of information management software that uses maps to organize and reference other information, which can be stored as still images, audio and video as well as written text. Geographic Information System (GIS) software is one of the best known and widely used types of information management software because of its usefulness for land and natural resource management. GIS software can be distinguished from other software types by its ability to perform powerful analyses of spatial data. This ability makes GIS software considerably more costly to purchase and complex to learn to use than other mapping software.

Within the field of community development in less developed countries until recently there has been little interest in GIS; as a result there have been few examples of its successful use at the community level. It has been noted that there are few examples of GIS being pertinent to local-level needs (Carter, 1996). However, since 1995, substantive research on the theory and

potential of social and community GIS application has begun to emerge (Curry, 1995a; Harris *et al.*, 1995; Hock *et al.*, 1995; Barndt, 1998; Harris and Weiner, 1998b; Obermeyer, 1998; Stonich, 1998). This research is primarily involved with studies of communities in North America, although some relevant commentary and discussion has appeared from other areas in the world (Fox *et al.*, 1994b; Harris and Weiner, 1998a; Jordan, 1998; Kyem, 1998; Alcorn, 2001; Harris and Weiner, 2002; Jordan, 2002; Kyem, 2002;). This research field has built up a substantial following, and is now referred to as Public Participation GIS (PPGIS). Despite a growth in publications on this topic, however, there remain comparatively few instances of real life usage of PPGIS (Carver, 2001; Harris and Weiner, 2002).

Claims have been made throughout the literature that various PPGIS approaches, models and products empower participating communities (see for example the NCGIA special session on Empowerment, Marginalization and Public Participation). There are also those that claim that PPGIS disempowers communities due to the complexity of the technology, associated high cost, inaccessibility of data, the inability to use the technology to record diverse ways of understanding space and a lack of genuine community participation (Goss, 1995; Pickles, 1995; Rundstrom, 1995). Despite these claims, the discourse on PPGIS offers no commonly accepted operational definition of empowerment (Elwood, 2002; Kyem, 2002), nor does it establish a clear link between empowerment and PPGIS. The latter is due to a paucity of discussion over the methodologies and frameworks by which empowerment due to a PPGIS initiative can be measured and analysed (Howard, 1998).

There is a need for the many definitions of empowerment in the literature to be further analysed in order to develop a common understanding of its underlying assumptions and meaning. A clear understanding of the term will enable the development of meaningful models that can be used to measure and analyse empowerment, and prevent the term from being used to make false claims or to obscure debate about PPGIS application and evaluation. Weiner and Harris (in preparation) speculate that the "GIS-empowerment-marginalization nexus ... will

likely be one major component of PPGIS research", in recognition of the importance of this area of study.

1.3 THE PGIMS PROJECT

This study set out to select an assemblage of GIT and multimedia technologies, as well as a participatory process for using them, that would overcome the constraints and criticisms of PPGIS described above. The researcher referred to the product as a Participatory Geographic Information and Multimedia System (PGIMS). Unlike many PPGIS projects, the PGIMS uses relatively inexpensive software that is simple to operate. This removes the cost constraints and the 'expert driven' (Harris and Weiner, 1998b) aspects of PPGIS initiatives by enabling community members to control the technologies themselves. The focus was on enabling community members to use their own data and represent it in ways of their own choosing. The researcher developed a participatory process to ensure that community members made all decisions related to the project and were trained in the necessary technological skills.

A PGIMS acts as a system for managing, referencing and accessing digital information stored in textual image, video and audio format, using an interactive Cartesian map interface as the organisational tool. The map gives spatial reference to the attribute multimedia components and allows the user to navigate through the community's data; this is a style of information retrieval referred to as "hyper media" (Aitken and Michel, 1995).

A PGIMS project was introduced into the villages of Benung and Tepulang in the district of West Kutai, in the province of East Kalimantan, Indonesia. The villagers are members of the Dayak Benuaq ethnic group. They are predominantly agriculturalists who, as with most indigenous ethnic groups on the island of Borneo, rely on upland swidden rice farming (*ladang*) for the production of their staple food crop. They are also dependent upon the surrounding forests for subsistence and income generating functions (Abdoellah *et al.*, 1993; Gönner, 2000). The PGIMS project ran in these two villages from September 2000 until April 2002.

The PGIMS project was established through a research project funded by the CGIAR-Canada Linkage Fund (CCLF), a program managed by the Canadian International Development Agency (CIDA). The project involved collaboration between the Spatial Sciences Laboratory, Department of Geography, University of Victoria, the *Sistem Hutan Kerakyatan* (SHK) (or Consortium for Traditional Forest Management Systems), a regionally based Indonesian non-governmental organization (NGO), and the Centre for International Forestry Research (CIFOR), an international research organisation based in Bogor, Indonesia.

1.4 THE RESEARCH QUESTION

The primary goal of this research was to investigate the assumption made in the literature that PPGIS and related technologies contribute to the empowerment of marginalized local communities. In doing so the research will set out to answer the question:

How does the PGIMS project empower or disempower local communities?

Wording the question in this way enables a study not only of whether the PGIMS project empowers or disempowers local communities, but how, or in what way it has this impact. In the process of answering this research question a working definition of empowerment and a framework for analysing the impact of the PGIMS project on the participating communities was developed and applied.

1.5 THESIS STRUCTURE

In this thesis, Chapter Two places the research in the context of the relevant literature. Chapter Three describes the development of a working definition of empowerment and presents a framework used to structure an analysis of the impact of the PGIMS project. Chapter Four provides a description of the research methods used. Chapter Five describes the research site, positioning the two villages where the research took place within the wider geography of West Kutai and Indonesia. Chapter Six discusses the design and implementation of the PGIMS project

and evaluates the content, format, relevance and post-project sustainability of the PGIMS produced in both villages. Chapter Seven organizes and sorts the research data obtained during the field work period into the relevant cells of the empowerment framework presented in Chapter Three for the purpose of analysis and discussion. Finally, Chapter Eight concludes the thesis by presenting the main findings of the research.

CHAPTER TWO:
LOCAL KNOWLEDGE, INFORMATION TECHNOLOGIES AND COMMUNITY PARTICIPATION

The research outlined in this thesis has connections to a broad range of fields in both the academic and practical development literatures. Both of these fields are changing rapidly. This chapter reviews the relevant literature, highlighting important works in these fields as well as recent developments.

This chapter begins by exploring the roles of and linkages between local knowledge, Information and Communication Technologies (ICT) and community participation (Section 2.1). It then goes on to explore the more specific subject of geographic information, Geographic Information Technologies (GIT), and community participation (Section 2.2). It concludes with a review of the debate over how accessible and participatory current GIT initiatives are, and whether they have the ability to empower local communities (Section 2.3).

2.1 LOCAL KNOWLEDGE, ICT AND COMMUNITY PARTICIPATION

Information is a vital element of decision-making processes. The quality of decisions made is directly related to the quality of information available (Shariffadeen, 2000). Communication is another essential element in these processes. Inclusion of local people and their knowledge is increasingly seen as pivotal in planning and decision-making processes (Warren, 1992), especially in relation to natural resource management (Carter, 1997). This is because of a rapidly growing set of evidence which indicates a strong relationship between local information and development which is both ecologically and socially sound (Posey, 1985; Carter, 1997). Yet there still remains a lack of meaningful local information in the planning process (Warren, 1992; Rajasekaran, 1993; Quiroz, 1996).

There is a trend for countries from the South[1] and people from disadvantaged sectors of society in the North to be informationally dependent on more advanced nations and sectors of society (McAnany, 1980). In addition, it is now commonly accepted that local information "is being lost at an unprecedented rate, and that its preservation, preferably in database form, must take place as quickly as possible" (National Research Council, 1992 cited in Warren, 1992 p. 46). So if local information is to play a meaningful role in decision-making and to be of importance to future generations, there is a growing need to explore and develop mechanisms for documenting and communicating that information (Gonzalez, 1995).

This section will discuss the nature and importance of communities' local knowledge, after which it will investigate some of the technologies and methodologies being used to document and communicate this information.

2.1.1 Local knowledge

The words 'information' and 'knowledge' are often used interchangeably. However, the literature does attempt to define these words and distinguish between them. Information "takes the shape of structured and formatted data sets that remain passive and inert until used by those with the knowledge needed to interpret and process them" (David and Foray, 2002 p. 12). Knowledge is the sense that people make of information; it enables "its possessors with the capacity for intellectual or manual action" (David and Foray, 2002 p. 12). Knowledge in society is not objective or static, but is ever-changing and infused with the values and realities faced by those who have it (Panos, 1998). 'Knowledge' used in this context is not just cerebral, but includes values, beliefs, skills, attitudes and practices (UNDP, 1999). "Knowledge can also be

[1] Throughout this thesis the terms South and Southern (Lister, 1997) will be used to describe countries that in the literature have previously been referred to as 'less developed', 'underdeveloped', 'developing' or 'Third World'. Conversely the terms North and Northern will be used to describe countries that are economically and industrially more developed.

misinterpreted, manipulated, distorted and controlled [and] is nearly always incomplete" (Panos, 1998 p. 1).

It is interesting that the literature tends to refer to global society as possessing and communicating 'information' whereas local communities are considered to possess and communicate 'knowledge'. This obscures the existence of a dominant knowledge system in global society, commonly referred to as western scientific knowledge, by masking its subjective 'knowledge' as objective 'information'. For the sake of consistency with the literature, however, this thesis will use the term 'local knowledge[2]' when referring to the information of local communities.

2.1.1.1 Local knowledge defined

Local knowledge is "unique to a given culture or society. It is the information base ...that facilitates communication and decision-making" (Warren and Rajasekaran, 1993 p. 9). It is owned and shared collectively within a local community[3] (Greaves, 1996). This knowledge

[2] In the literature the concept of local knowledge takes on many different guises; these include indigenous knowledge (IK), traditional knowledge (TK), traditional ecological knowledge (TEK) and farmers' knowledge (FK). Although there are distinctions between the terms they are used to convey the same general concept. Local knowledge is not the domain of a single group such as indigenous or rural communities (Moralez-Gomez 1997). This thesis will use the term 'local' knowledge because it is less restrictive and exclusive compared to terms such as 'indigenous', 'traditional', 'ecological' and 'farmer'.

[3] The term 'community' is used frequently to describe many different manifestations of the concept across varying levels and scales. Within the context of this research 'local community' is defined as a group of people who regularly associate with one another in one geographic location on the basis of a shared interest, reliance, relations and identity. The local communities referred to in this thesis are defined by space, location and by cultural association. When using this definition the author recognizes that the 'community' is not a homogenous entity, but rather an affiliation of individuals, and that "communities are differentiated in terms of status, income and power" (Midgley 1989 p. 35). This thesis refrained from using the term indigenous community in place of local community, although the participating communities are 'indigenous' according to the definition of the term as "first occupiers of a territory which has subsequently been overwhelmed by another group of people from a dramatically different technological and cultural background" (de Varennes, 1996 p. 311). This is mainly because 'indigenous' is a contentious term in Indonesia, where the dominant ethnic groups such as the Javanese also claim indigenous status.

has been accumulated over time by successive generations. These communities have used this knowledge to sustain themselves and to maintain their cultural identity (Johnson, 1992).

Local knowledge is commonly derived from empirical observation of the local environment and trial and error experiments; however, it is not restricted to any one set of issues (Moralez-Gomez, 1997). It often results in a vast reservoir of information that leads to the formation of effective self-management systems to govern local resource use (Johnson, 1992; Grenier, 1998). It is also vital in other local level decision-making processes that direct food security, human and animal health, education and other activities (Woytek, 1998; World Bank, 2002).

It is important to note that although the roots of local knowledge are often firmly positioned in the past (de Varennes, 1996) it does not cease to develop (Bains and Hviding, 1992). It is dynamic and continues to adapt to current conditions (Rajasekaran, 1993). This dynamism makes this knowledge both relevant and applicable. The experiences of older generations are continuously supplemented by innovation from within the community and the adaptation of exogenous knowledge and technology that suit existing local circumstances (Grenier, 1998; UNDP, 1999). This continual metamorphosis over time has meant that it is now difficult to determine whether technologies, beliefs or views used by a community originated from the community or were adopted from outside (IIRR, 1996). However, it is argued that the origins of that knowledge are irrelevant, provided that it is assimilated and seen as locally owned (Lawas and Luning, 1996; UNDP, 1999).

All members of a community will have some level of local knowledge. The type and extent of this knowledge will be dependent on the individual's own subsistence requirements, curiosity, societal status and communal duties. Defining factors might be age, gender, socio-economic status, intellectual capability, profession, education, outside influences and ability to travel (Johnson, 1992; Grenier, 1998). This results in different types of knowledge existing simultaneously within a community. These include; common knowledge, held by almost all

people in the community; shared knowledge, held by many; and specialized knowledge, held by a few with special training (IIRR, 1996).

Local knowledge is embedded in community practices, institutions, relationships and ritual (Woytek, 1998). Much of it is transferred informally; it is usually unwritten (Brush, 1996) and instead is preserved and communicated orally in the form of stories, songs, folklore, proverbs, dances, myths, rituals, community laws, local taxonomy and agricultural practices (Grenier, 1998). There are also formal traditional systems in place to facilitate the transferral of some of this knowledge, such as ceremonies, festivals and other processes.

2.1.1.2 Importance of local knowledge

Local knowledge is an important factor in helping local communities to maintain their cultural identity. Preservation of identity is important because "a people without a memory are not a nation" (Roach, 1997 p. 1). Local knowledge is also important for its users because it provides a basis for problem solving (Woytek, 1998; Woytek, 2000). Thus it is "a key element of the social capital of the poor and constitutes their main asset in their efforts to gain control of their own lives" (World-Bank, 2002 p. 1) through promoting self-sufficiency and self-determination of the user group (IIRR, 1996).

Large institutions, such as the World Bank and Canadian Federal Government, now view local knowledge as being important to sustainable development issues, in particular in the area of natural resource management, because these systems of knowledge contain a wealth of important empirical knowledge that up until now has been underutilized (Posey, 1985; Posey, 1997; Roach, 1997; Rahman, 1998; World-Bank, 2002; World-Bank, c. 2000). If used in planning processes local knowledge can help to improve the impact, responsiveness and sustainability of development assistance (Rajasekaran, 1993).

Local knowledge has been lauded as "an alternative collective wisdom relevant to a variety of matters at a time when existing norms, values and laws are increasingly called into

question" (Berkes 1993, p.6 in Grenier, 1998). Grenier (1998) cites the example of the failed Green Revolution, a centralised, technically oriented approach to agriculture that caused serious ecological deterioration and social and economic decline (see also Shiva, 1992). Local knowledge systems rarely find themselves in situations similar to the Green Revolution because they have been developed over time to minimise risk, not to maximize profit.

2.1.1.3 Why local knowledge is underutilized

Despite the growing recognition that local knowledge has a positive contribution to make to sustainable development, it remains an underutilized resource (Quiroz, 1996; Warren and Rajasaran, 1993; World Bank, 1998, 2002). Five main factors contribute to this.

Firstly, the dominant knowledge system, commonly referred to as western scientific knowledge, defines the concepts of correctness and progress (Moralez-Gomez, 1997; Pétillon, 1997) and has a monopoly in decision-making processes. This dominant knowledge system assumes local knowledge to be subordinate (Johnson and Ruttan, 1992). Among other things, it considers local knowledge to be " 'primitive', 'unproductive' and 'irrelevant' " (Rajasekaran, 1993 p. 2), lacking scientific rigour and validity, and partial and anecdotal in nature (Arce and Long, 1992; Brodnig and Mayer-Schönberger, 2000). As a result, local knowledge is seldom incorporated into official decision-making and is often marginalized (Agrawal, 1995). Consequently local communities who hold this knowledge also become peripheral to core political processes.

A second limitation is the growing reluctance for local communities to contribute their information because of concerns about losing control of their knowledge once it is released into the public domain. The debate over local knowledge and Intellectual Property Rights[4] (IPR) has

[4]Intellectual property rights (IPR) are mechanisms used to protect individual or industrial 'inventions'. They are legal rights attached to information that prevent others from copying, selling or importing a product without authorization. In practice IPR regimes have evolved into mechanisms that allow corporations to protect markets and to trade technologies among themselves (Grenier 1998).

been raging over the past decade. The most common example of this is the development of medicines and other pharmaceutical products by companies from traditional medicines derived from local plants (Posey, 1997; Zerda-Sarmiento and Forero-Pineda, 2002). Local people rarely benefit from these products or see more than a tiny proportion of the royalties accruing from their sale. For many traditional communities the IPR process has become a reaffirmation of imperialism, where the laws work to protect the interests of the large corporations at the expense of the less educated and poor. They believe that, following a legacy of domination of natural resources, now the appropriation of knowledge in now beginning without any payment or acknowledgement to the communities where the knowledge originates (Brush, 1996). This in turn discourages local communities from wishing to share their information with outside groups. As Pétillon (1997) states the challenge is to seek ways in which local people can appropriate, articulate and share their own knowledge in a way in which they maintain control.

A third limitation is that local knowledge is often given meaning and value through its cultural setting and interpretation (Brodnig and Mayer-Schönberger, 2000). Stevenson (1997) stated that it is the spiritual dimension of local knowledge that determines how this information is collected, managed and transmitted and it is this dimension that sets local knowledge apart from a basic form of knowledge that anyone can acquire through observing and experiencing their environment over time. As a result local knowledge at times is "providing a world view of which outsiders are rarely aware, and at best can only incompletely grasp" (Greaves, 1996). This complicates the codification and recording and therefore communication of this knowledge. Furthermore, by "being unique to and part of a particular culture of people transferring local knowledge would render it irrelevant, inappropriate or even harmful" (World-Bank, 1998 p. 13). This implies that much local knowledge can only be useful and maintained *in-situ*.

A fourth limitation results from the lack of suitable communication channels to present local knowledge. Local knowledge is often communicated orally and is represented by hundreds of different languages. As Warren and Rajasekaran (1993 p. 8) state "in most instances, the

knowledge systems...have never been recorded systematically in written form, hence they are not easily accessible... [and] remain invisible." This makes the collection of local knowledge a laborious, time-consuming and costly process (Johnson, 1992; Lawas and Luning, 1996) as well as making it difficult to find a medium of communication that is appropriate for presenting the information and accessible to an audience external to their community.

A final limitation is that the local languages used to express this knowledge, and the local communities themselves, are diminishing rapidly (Maundu, 1995; Harmsworth, 1998; WWF, 2000). This accelerating loss (IIRR, 1996; Roach, 1997; Grenier, 1998) is due to correspondingly rapid changes in the natural environment, as well as economic, political and cultural transformation (Brush, 1996; IIRR, 1996).

In response to the stated need for improved information exchange between local communities and decision-making groups, a number of technologies and methodologies have emerged that encourage and facilitate community involvement in decision-making processes. The next section will discuss two mechanisms, the use of ICT and community participation.

2.1.2 Using ICT to communicate local knowledge

ICT are becoming increasingly important in the communication of information and local knowledge between disparate groups.

2.1.2.1 The Information Society

"On an average weekday the New York Times contains more information than any contemporary of Shakespeare's would have acquired in a lifetime."

Anonymous in Brown and Duguid, 2000.

In the not so distant past, "lack of information appeared to be one of society's fundamental problems" (Brown and Duguid, 2000 p. 12). Over the past decades, Information and

Communication Technologies[5] (ICT) as well as other technologies have enormously increased the capacity of people to access new information sources and accumulate huge volumes of information. It has been noted that yesterday's informational famine has turned into today's glut (Brown and Duguid, 2000). The significance of recent advances in information sharing has been compared to the invention of moveable print in the fifteenth century (Toffler, 1990; Ryder, 1998), or the transition from an agrarian to an industrial society in the nineteenth century (McPhail, 1981; Siochr, 1997). For this reason the era in which we live is often referred to as the 'Information Society' (Siochr, 1997).

2.1.2.2 The digital divide

"Left unchecked, the globalization of information will widen the gap between developed and developing countries. It will further distance elites from the general population and it will limit traditional social and economic development efforts."

(Rivers-Moore and Hay, 1998)

Not everyone is a member of the Information Society. Although the distribution of ICT has occurred globally it has been and continues to be a very uneven 'revolution' (Byron and Gagliardi, 1998). The discrepancy between different sectors of society in their ability to access information through ICT is a phenomenon that has become known as the 'digital divide'.

This divide does not only exist between Northern and Southern countries. It is also prevalent within Northern countries, as access to the benefits of these technologies is not equally available to all sectors of the population (Crampton, 1995; Ernberg, 1999; Heeks, 1999a; Hudson, 1999). In many Southern countries, which because of technological leapfrogging[6] are developing

[5] ICT encompass tools such as the telegraph, radio, telephone, fax and most recently the internet.

[6] In Northern countries "newer versions of technology are often used to upgrade older versions, but in Southern countries where still older versions of technology are often prevalent...the opportunities for

their technology base very rapidly (Davison *et al.*, 2000), this internal divide is also becoming obvious between different sectors within society (Chareonwongsak, 2001). Inequality in access to information occurs between the traditionally powerful and powerless sectors of society. As Heeks (1999 p. 8) points out: "the poor will be very unlikely to control ICT...[unless through] intermediary institutions such as government agencies." The digital divide is also visible between urban and rural populations (Sirimane, 1996; Hudson, 1999), as well as between genders (Lawley, 1993; Rostagnol, 1997; Hudson, 1999). Hafkin and Taggart (2001 p. 9) note that "most women within developing countries are in the deepest part of the divide, further removed from the information age than the men whose poverty they share."

Lack of access to ICT often results from a physical unavailability of the technologies, a deficiency in basic infrastructure (particularly electricity) and paucity in the human resources required to use the technologies. These restrictions are further exacerbated by the cost of training human resources, as well as purchasing, maintaining and updating the technologies (Byron and Gagliardi, 1998). Language and cultural issues, highlighted by computer software being dominated by the English language and designed with a Western audience in mind, are also significant.

Effective bridging of this digital divide can further be hindered by the national policies of some states (Scouarnec, 1997). Some governments are interested in the benefits of ICT purely from a macro-economic or technical angle (Heeks, 1999a), rather than seeing them as being of benefit for local communities (Anderson *et al.*, 1997). The authorities in some countries may also oppose these technologies for fear of the potential for "cultural colonization" (Byron and Gagliardi, 1998). It has been noted that in attempting to enhance local communities' access to ICT the challenge is often not technical or financial, but political and ideological (Hudson, 1999).

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leapfrogging over the successive generations of technology to the most recent version are much greater" Davison *et al* 2000 p. 2).

2.1.2.3 Opportunities and risks of bridging the digital divide

In today's Information Society, there is a growing consensus that the future prosperity and progress of all countries will depend on how people and governments access, interpret, communicate and use information (Balit, 1998; World-Bank, 1999). Agenda 21, the Action Plan of the United Nations Conference on Environment and Development, dedicates a whole chapter to the role and importance of information for sustainable development[7]. Agenda 21 states that:

> In sustainable development, everyone is a user and provider of information ... The need for information arises at all levels, from that of senior decision-makers at the national and international levels, to the grassroots and individual levels. (United-Nations, 1992)

It has been further noted that the ability to access and share information by less powerful individuals and groups is absolutely essential if they are not to be further marginalized (Anderson *et al.*, 1997; Pétillon, 1997; Balit, 1998; Carver, 2001).

For this reason many commentators suggest that local communities should seek opportunities and mechanisms to contribute their knowledge using new and emerging ICT (Sirimane, 1996; Balit, 1998). There remains disagreement over the ways in which marginalised people can best access the opportunities to do so (World-Bank, 1999).

Other commentators view the implications of ICT for the future of human society with considerable scepticism. Byron and Gagliardi (1998) note that ICT are owned and controlled by Northern corporations and nations, and that countries of the South are increasingly pressured to:

> Develop efficient information accessing and processing capacities so as to avoid marginalization or exclusion. Yet these efforts often breed greater dependency on the North, since poor countries lack the resources to build indigenous information technology infrastructures. (Hawkridge et al., 1990 cited in Byron and Gagliardi, 1998)

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[7] The concept of 'sustainable development' was made popular with the publication of 'The Brundtland Report' the report of the World Commission on Environment and Development in 1987. The Brundtland Report defined sustainable development as "meeting the needs and aspirations of the present generation without compromising the ability of future generations to meet their needs" (WCED, 1987 p.14). Since then, the concept of sustainability has become central to development processes throughout the world.

Some perceive a threat to democracy from the erosion of national and local culture caused by global networks, and the corresponding rise in corporate hegemony and "technocratic consciousness" (Habermas, 1970). The new technologies and information gloss over cultural difference and collide with existing values to change them. Thus although ICT open channels for global dialogue, they potentially destroy localism in favour of globalization (Noveck, 2001).

A third criticism is the inappropriateness and irrelevance of introducing ICT to less developed, largely rural countries. Some people feel that this type of initiative is directed at too sophisticated a level of consumption rather than at solving the basic socioeconomic problems that should be a priority of sustainable development (Rahman, 1991).

Despite this criticism most commentators recognize the importance of including marginal groups in the future application of ICT. At any rate, ICT are increasingly pervasive and are expanding with a momentum of their own. However, in the enthusiasm for applying these technologies and exploring their potential it is important to remember that the "focus should be on people, organisations and processes rather than the technologies themselves" (Anderson *et al*, 1997: Electronic Source). The challenge therefore is to introduce and use technologies which are relevant and suit the needs of local communities (Richardson, 1997) and to recognize that the technologies are only tools to facilitate a broader social process (Richardson and Rajasunderam, 1996; Balit, 1998).

2.1.3 Community participation

2.1.3.1 Defining community participation

The term 'community participation[8]' implies a style of planning and governance that involves and promotes the two-way exchange of information between local communities and

[8] The term 'community participation' has become a 'container concept' (Heeks, 1999). It is defined in many different ways, some complementary and some contradictory (Huizer, 1997). In this thesis the term community participation will be used to describe what others refer to as 'peoples' participation' (Clayton *et*

outsiders (Chambers, 1994b; Bass *et al.*, 1995; Carter, 1996; Guijt, 1996). Currently the term is much used because of the widespread and growing recognition that participation of local communities in decision-making is critical to achieving sustainable development (World-Bank, 1994; Carter, 1996; Allen, 1997; UNDP, 1997; Clayton *et al.*, 1999; Lengeler and Jones, 1999; UNDP, 1999; Crosby, 2000; Holmes, 2001; Pratt, 2001). As a result community participation has become a central precept underpinning the development agenda (Zetter and Hamza, 1998) and "use of the term participation has become virtually mandatory in development projects, programmes and policies" (Cornwall *et al.*, 2001 p. 1).

The underlying premise of community participation is an ancient and fundamental expression of the cultural traditions of many societies. The term has recently, primarily through its association with development strategies and literature, become identified with the poor and oppressed members of society being mobilized by external agents and encouraged to participate in decision-making for social development at the local level (Cohen and Uphoff, 1977; Midgley, 1986; Chambers, 1994a; Chambers and Guijt, 1998; Cornwall *et al.*, 2001). The implicit intention of this participation is the redistribution of power so that the 'have-nots' of society will be "deliberately included in the future" (Arnstein, 1969 p. 216).

2.1.3.2 Levels of community participation

As community participation becomes increasingly accepted in principle by many national governments, wide variations in how participation is interpreted and implemented are beginning to emerge (Lengeler and Jones, 1999). Alongside the commonly held view that participatory development needs to be flexible and not prescriptive, there has been considerable debate over

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al., 1997; UNDP, 1999), 'public participation' (Moote *et al.*, 1997), 'citizen participation' (Arnstein, 1969) and 'popular participation' (Huizer, 1997). Although there are distinctions between these terms (see Midgley, 1989), for the purpose of this thesis they can be combined under one term.

inconsistent approaches to understanding participation and the existence of variable levels of meaningfulness and authenticity in its implementation (Arnstein, 1969; Pretty, 1995).

Arnstein (1969) and later Pretty (1995), have developed diagnostic models that facilitate an understanding of the significant gradations of participation employed by various agencies and processes. Arnstein (1969) refers to her model as an eight rung 'ladder of participation' (see Figure 2.1).

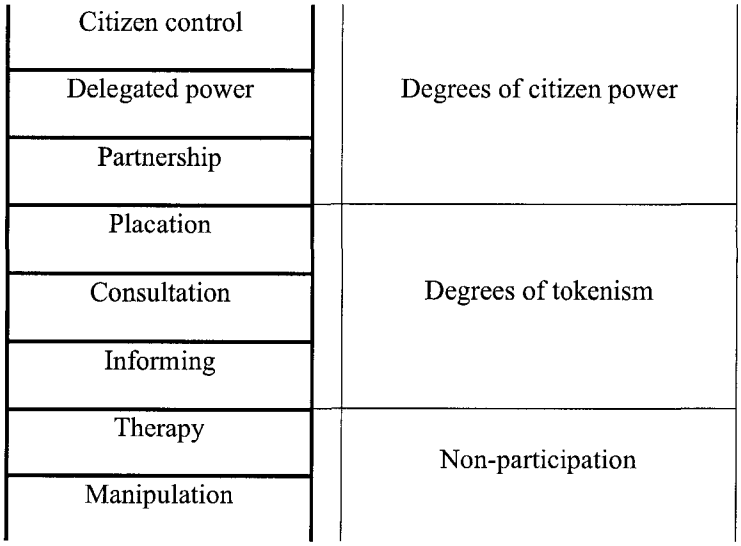

Figure 2.1 Arnstein's (1969) eight rungs on the 'Ladder of Citizen Participation'

Each rung on the ladder corresponds to the "extent of citizens' power in determining the end product" (Arnstein, 1969 p. 217) of a process or program that uses participatory mechanisms. The bottom two rungs illustrate 'non-participation', where participation is used with the intention of the power holders to manipulate participants. The next set of rungs up the ladder are referred to as tokenism, where participation is employed but views and ideas are not necessarily acted upon. The top rungs of the ladder involve citizens taking various degrees of control over decision-making processes, managerial power and responsibilities. Although the top rung is

ambitious, perhaps utopian, it is considered to be a worthy goal for which to strive. However, Legeler and Jones (1999) suggest that different levels of local people's participation are likely to be appropriate in different circumstances, and it is certainly not always appropriate to consider citizen control as the goal.

Arnstein's model provides a useful illustration of the lack of uniformity in participatory approaches. It also serves to illustrate that community participation is intrinsically linked to the concept of empowerment.

2.1.3.3 Critique of community participation

One criticism of the concept of community participation is that its proponents often portray communities as homogenous entities whereas they more usually "suffer from conflicts, rivalries and factionalism" (Midgley, 1989 p. 35). Often the oppressors are located within the community (as is particularly the case with gender[9] equality issues) and it is a mistake to assume that the process of participation breaks down these existing inequalities (Heeks, 1999b). Indeed there is some criticism that participatory community development programs have sharpened these divisions and increased the potential for social conflict by supporting the already strong factions within the community (Huizer, 1997) who select themselves to participate (Heeks, 1999b; Cornwall *et al.*, 2001) in order to serve personal agendas.

A second criticism is of the hypocrisy often attached to the practice of community participation. As argued in the previous section, one of the core principles of community participation is the vehement rejection of 'top-down', imposed and prescriptive models of development. Yet by its very nature community participation is an imposed intervention

[9] Gender is the culturally specific set of characteristics that identifies the social, political and economic roles and behaviour of women and men. Gender, therefore, refers not simply to women or men, but to the dynamic interactions between them and the way this relationship is socially constructed. Like the concepts of class, race and ethnicity, gender is an analytical tool used to better understand social processes (Benjamin and Fancy, 1998; IDRC, 1998).

(Midgley, 1986; Harris and Weiner, 2002); furthermore, it is becoming increasingly prescriptive, standardized and inflexible (Guijt, 1996; Chambers and Guijt, 1998; Holmes, 2001). This is partly due to the ideals and methods of community participation being "subverted and neutralized" (Midgley, 1986 p. 37) by the state and large institutions such as the World Bank (see World-Bank, 1994; World-Bank, 1996). These large institutions seek to standardize the methods used in community participation into procedures which are replicable and can be applied universally (Huizer, 1997).

Further criticisms call into question the commitment of participating communities[10] (Midgley, 1986), the cultural and political appropriateness of community participation (Heeks, 1999), and the high time investment (Pratt, 2001) required for the participation of local communities. Midgley (1989 p. 36) notes that these factors might be the reason why a large number of participatory programmes fail "to secure [the] indefinite and total involvement" of local people. However, the criticism that participation is limited because of community apathy and resistance to change has been challenged (Huizer, 1997). Huizer (1997) states that the issue is not whether people participate but how, or in what form. Of some concern, and one that is not covered extensively in the literature, is whether the orthodoxy of participation is culturally or politically appropriate (Heeks, 1999b). One certainty is that meaningful success in participation can only be achieved in a supportive political and cultural environment (Clayton *et al.*, 1999).

2.1.3.4 Methods for promoting community participation

Recent discourse on community participation, particularly in the development literature, has focused less on the theory surrounding the term and more on the mechanisms required to establish it (Chambers, 1994; Carson *et al*, 1997; Chambers and Guijt, 1998). This has involved discussion and analysis of two principal methods, institution building and community organizing.

[10] Dubious commitment is not the sole realm of local communities, state institutions that have been coerced or pressurized into participatory development may also be reticent to participate (see Zetter and Hamza 1998).

One important mechanism used in community participation is institution building. Institutions, particularly well established and bureaucratic agencies, whether willing or unwilling to adopt participatory principles (see Zetter and Hamza 1997), are often not set up to accommodate the participation of local communities in decision-making processes. Often a precursor to effective participation is to modify, establish or strengthen these institutions and the procedures they use (Naryan 1990 cited in Allen, 1997) so that they can be more responsive to local demand (Allen, 1997). It is assumed that institution building leads to good governance, a concept closely tied to community participation (Osmani, 2000). Related to this is the promotion of political decentralization[11] by groups such as the World Bank, which aims to establish and strengthen local level decision-making institutions and processes (Midgley, 1986).

The second mechanism used to promote community participation has been the use of participatory methodologies for gathering and analyzing information. This diverse range of methods (Cornwall *et al.*, 2001) includes processes collectively termed Participatory Rural Appraisal (PRA) and Participatory Learning and Action (PLA) (Chambers *et al.*, 1989; Davis-Case, 1990; Pretty *et al.*, 1995; Chambers, 1997; Abbot *et al.*, 1998). PRA and PLA have been defined as:

> A growing family of approaches, methods, attitudes and beliefs that enable people to express and analyze the realities of their lives and conditions, to plan themselves what action to take, and to monitor and evaluate the results. (Chambers, 1997 p. 102)

PRA utilizes an array of participatory tools to involve local people in analyzing, sharing and taking action on issues that affect them (Pretty, 1995; Pratt, 2001). These primarily involve the use of graphic representations created by the community that attempt to legitimize local

[11] Political decentralization is the process of devolving governance from a centralized core to peripheral regions, towns and villages – it has been promoted as a means of enabling community participation and efficiency, especially in many previously centralized Southern countries. Local officials and politicians are thought to be more accessible and accountable to local communities than national governments. Indonesia is currently going through a period of decentralization.

knowledge and promote empowerment (Pretty, 1995). These tools include participatory mapping and modeling, institutional diagramming, and trend and change analysis, among others, all of which are undertaken by local people (Chambers, 1994 p. 1437).

PRA and PLA methods are strongly influenced by Paulo Freire's writings (Chambers, 1994). Freire (1970) based his views on the belief that every human being was capable of looking critically at the world, perceiving his/her personal and social reality, and transforming it through conscious action. Through this process local people could be empowered to act on their enhanced awareness, to challenge the structures that constrained them and so to improve the quality of their lives (Anyaegbunam *et al.*, 1999). Freire was adamantly opposed to prescription, calling it one of the basic elements of the 'top-down' relationship between oppressors and oppressed: "Any situation in which some men prevent others from engaging in the process of inquiry is one of violence. The means used are not important; to alienate men from their own decision-making is to change them into objects" (Freire, 1970 p. 73).

2.1.4 Participatory communication and ICT

2.1.4.1 Defining participatory communication

Central to the debate over enabling local communities to efficiently and meaningfully participate in decision-making processes is the concept of participatory communication (Richardson and Rajasunderam, 1996; Richardson, 1997; McConnell, 1998; Moetsabi, 1998; Norrish, 1998). Participatory communication is intrinsically linked to the broader participation movement, particularly its use of PRA/PLA processes (Johansson, 1999) [12].

Participatory communication is an increasingly recognized development process that focuses on promoting the two way flow of information between local communities and outside

[12] The methodological approach to applying participatory communication is sometimes referred to as 'Participatory Rural Communication Appraisal' (PRCA) (Anyaegbunam *et al.*, 1999). This shows an ideological link to the broader participatory methodologies (PRA and PLA) mentioned above.

groups. It is based on bringing different social groups together (Balit, 1998) and facilitating the sharing of peoples' culture, attitudes, ideas and local knowledge (Anderson *et al.*, 1997; Anyaegbunam *et al.*, 1999), or any form of information that addresses local communities' needs (Anderson *et al.*, 1997). The intention of participatory communication is to reach consensus (Balit, 1998) on actions required to improve the quality of life of those communities (McConnell, 1998).

When using participatory communication the 'techniques' of communication have not changed. What have changed profoundly are the "ideologies and philosophies behind the practice of the techniques" (Yoon, 1996). Participatory communication views communities as:

> Becoming generators, creators, transformers and users of communication, information, skills and education for their own benefit and for working with outside agencies who can enable and facilitate their moves towards change. (Norrish, 1998: Electronic Source)

Unlike traditional communication methods, participatory communication is not a technique that can be applied in a series of rigidly defined steps (Rajasunderam, 1997). Rather, it involves and motivates local communities (Balit, 1998) through encouraging traditional and interpersonal methods of communication such as street theatre, folk songs, group activities (Yoon, 1996) as well as more novel forms and uses of ICT (Richardson and Rajasunderam, 1996).

2.1.4.2 Participatory communication and ICT

Measures to enable local communities to access and use ICT have grown rapidly. This has occurred in response to the recognition that ICT are in the hands of the professionals and not available to communities who are seen only as recipients of information (Norrish, 1998).

The challenge, as stated by Norrish (1998), is to use those new technologies that rely less on technical skills and more on sophisticated but easy-to-use equipment. She goes on to say that:

> Such technologies have enabled non-professionals to become skilled at using media (particularly video), opening up great opportunities for them to have access to, and

> control over, the tools for information and communication generation and exchange. (Norrish, 1998 p. 34)

Despite these claims it has been noted that "there is a worrying lack of empirical evidence or analysis of the actual experiences and effects of ICT upon poor people's economic and social livelihoods" (O'Farrell *et al.*, 2000 p. 1). This is partially because the use of modern ICT is still the exception rather than the rule in the exchange of local knowledge. What literature exists is overwhelmingly promotional in nature with few rigorous frameworks for evaluation and with failure downplayed (O'Farrell *et al.*, 2000).

2.1.4.3 Participatory communication and video

Video imagery has until recently remained exclusively in the domain of the professional user. This monopoly is now breaking down and is being replaced by a continuum of different groups, using video with various levels of skills and sophistication in response to their changing needs and contexts (Norrish, 1998). Using video as a tool of participatory communication has become popular over the last twenty years and is referred to as participatory video. This development has been facilitated by technological improvements in video equipment. Video cameras have become lighter, easier to transport and straightforward to learn and handle. The videos produced do not need to be processed and the results are easily disseminated (Snowden, 1987). Video has also been recognised as a particularly good tool to use with oral societies and the illiterate[13] (Snowden, 1987; Satheesh, 1999).

One of the most famous examples of using video for participatory communication is the 'Fogo Process' (Yoon, 1996; Scott, 1998). This process was developed by Don Snowden on the small island of Fogo, off the coast of Newfoundland, Canada, in the 1980s. He used video within a village in an attempt to show individuals and groups what they already know. The video

[13] In Asia alone there are 862 million illiterate people (UNESCO, 2003).

became a 'mirror' with which the community could objectively analyse their own hopes and problems (Snowden, 1987; Braden, 1997).

2.2 GEOGRAPHIC INFORMATION, GIT AND COMMUNITY PARTICIPATION

Parallel to wider changes resulting from the ICT revolution, the disciplines of cartography[14] and geography are undergoing similar innovation. These changes are characterised by advancement in Geographic Information Technologies (GIT)[15]. Central to GIT are Geographic Information Systems (GIS). GIS are popularly described as a series of computer-based instruments for the collection, storage, retrieval, display and analysis of spatially referenced data (Aronoff, 1989; Bonham-Carter, 1994).

In recent years GIS software has become more powerful, less expensive and easier to use. As a result it is proliferating at an unprecedented rate (Obermeyer, 1995). Coming into widespread use only in the last two decades, GIS are already the basis of a large and still rapidly growing global industry. The potential of GIS for growth is huge, as Maguire (1991 in Pickles 1995 p. 11) states "it is not fanciful to suggest that by the end of the century GIS will be used every day by everyone in the developed world for routine applications."

In its current state GIS is widely used as a tool by government, business and academia, and less so by local communities. The disproportionate access to GIS by 'professional' groups and organisations has meant that the main focus of research in GIS has been on fine-tuning the

[14]"Cartography is the science and technology of analysing and interpreting geographic relationships and communicating the results by means of maps" (Harley, 1989). "Maps are graphic representations that facilitate a spatial understanding of things, concepts, conditions, processes, or events in the human world." (Harley and Woodward, 1987). Maps are used as tools to represent large quantities of spatial information visually in a synthesized, commonly recognizable and generally acceptable format.

[15] Geographic information technologies (GIT) are new tools for representing and understanding geographic space. They include geographic information systems (GIS), geographic positioning systems GPS (a satellite based navigation system), computer assisted cartography and remote sensing (high resolution aerial imagery).

technology to suit the current demands of its primary users better. Until recently little attention has been given to the social, political and philosophical implications of the technology. Since 1995, research has begun to question the prevalent GIS paradigm[16] and to examine the potential for modification of GIS so that it might be used more effectively by local communities and other non-professional groups in society (Weiner *et al.*, 2002). This direction has partially been spurred by realisation of the potential for GIS to assist ordinary people with decision-making and advocacy. One emerging question from this view is whether the spread of GIS facilitates equal access to the benefits of geographic information for all groups within society, thus promoting community empowerment and democratic participation in the resolution of social problems, or whether the use of GIS systematically favours certain groups over others (Sheppard, 1995).

Dunn *et al.* (1997 p. 152) argue that "all geographical information is problematic in its power of representation and...GIS is merely more so by virtue of its technical power and mystique." It is therefore necessary to consider the historical context within which GIS has developed in order that practitioners be aware of the "danger of creating or reinforcing dominating discourses" (Aitken and Michel, 1995). This section will discuss the historical background to GIS by investigating how the discipline of cartography has been inherently exclusive and able to be used by some sectors of society to claim and maintain power. It will go on to critique the recent Public Participatory GIS (PPGIS) movement that attempts to address this inequality of power.

[16] Materials from the National Centre for Geographic Information and Analysis (NCGIA) Varenius Project, in particular their Initiative 19, examine the social implications of how people, space, and environment are represented in GIS.

2.2.1 Geographic information

2.2.1.1 Historical context of geography

"Geography was a service discipline...it served the military and it served the state. But in the '60s and '70s some of us started to take a line that was anti-capitalist, anti-state, and anti-military" (Harvey in Byles, 2001). This view reflects the views of a growing number of geography scholars who are now drawing on the discipline's radical past and have begun to use cultural politics to re-examine space through a neo-Marxist and radical anarchist lens, in an effort to take "geography on a turn toward critical intellectual citizenship" (Byles, 2001: Electronic Source).

Radical geographers in the past include Russian geographer and revolutionary anarchist Petr Kropotkin. Krapotkin saw geography as a practical enterprise that could render an important service to society (Baldwin, 1927); he strenuously advocated Geography's active engagement with society and obligation to educate students that "we are all brethren, whatever our nationality." Krapotkin favoured mutuality, decentralism and community self-government. He felt that it was the task of the geographer to bring this truth "into the midst of the lies accumulated by ignorance, presumption and egoism" (Kropotkin, 1885) that was typical of the ideological domination of imperialist geography in England in his time (Livingstone, 1992).

The need for Geography to engage in social issues and promote social awareness is once again being recognised as important within the discipline because current battles over indigenous peoples land rights, globalization and environmental degradation have brought the debate over space and place to the forefront again. As Byles (2001) notes whereas history was supposed to be about chaps and geography about maps, now geography was about chaps, too: "It is about homeless chaps, hard-up chaps, and downtrodden chaps of all kinds." In other words the role of the geographer is to empathise, support and represent these more marginal groups in society.

However, cartography and geography also remain closely connected to the military-industrial complex, particularly through the growth of GIS.

2.2.1.2 Historical context of cartography

"Cartography...is never merely the drawing of maps; it is the making of worlds"

Harley, 1990

The view that "maps...convey a sense of authority" (Alcorn, 2001 p. 1) has contributed to the "premise that mappers engage in an unquestionably 'scientific' or 'objective' form of knowledge creation" (Harley, 1989) that represents the 'truth' (Coulson, 1977; Dorling, 1998). However, this misconception has increasingly been questioned by academic discourse seeking to reveal the subjective and manipulative nature of geographic information and cartographic communication and questioning the objective and apolitical claims of the scientific model (Wright, 1942; Harley, 1988; Harley, 1989; Harley, 1990; Harvey, 1990; Monmonier, 1991; Belyea, 1992; Dahl, 1992; Wood, 1992; Crampton, 1995).

Representation of geographic information, usually through the science of cartography, is not neutral and is in no way separate from the power relations of society (Livingstone, 1992). Since the inception of Cartesian map-making, colonial and ruling powers have used maps as a tool to exert their claims over land (Wood, 1992). These claims have often been made to the detriment of societies already living on the land (see Brody, 1981; Peluso, 1995; Weiner and Harris, 1999; Harris and Weiner, 2002). As Hall (1993) states, "with centuries of distance and historical hindsight, we can see that error and bias, exploitation and colonialism, self serving centrism and ecological harm can so easily be read into the subsoil of old maps that they may as well be listed with symbols and explained in the legend" (in Pickles, 1995 p. 21).

2.2.1.3 Community mapping

Despite forces which have served to exclude non-experts from map making, a growing number of local communities and organisations associated with communities have begun to harness the potential power associated with maps for their own gain. The association between local communities and their land is one of synergy. They cannot survive materially, economically or culturally without it (Varese, 1996). Community mapping[17] is a map-making process that attempts to make the association between land and local communities visible to outsiders by using the commonly understood and recognized language of cartography (Carter, 1996).

Community mapping projects have sprung up throughout the world (see Poole, 1995c); from Southeast Asia - specifically Indonesia (Momberg *et al.*, 1994; Flavelle, 1995; Peluso, 1995), through Central Asia (Jackson *et al.*, 1994; Poffenberger and McGean, 1998), Africa (Jackson and Bond, 1997; Harris and Weiner, 1998a), Europe (Wright *et al.*, 1997), North, South and Central America (Bird, 1995; Brown *et al.*, 1995; Kemp and Brooke, 1995; Toledo-Maya-Cultural-Council and Toledo-Alcaldes-Association, 1997) to Australasia (Harmsworth, 1998). Many different types of communities have undertaken mapping projects, ranging from relatively

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[17] In the literature there are a growing number of references to community maps and mapping methodologies. Where examples do exist they are often referred to using different terms as there is no commonly agreed classification for this type of map. Different terminology includes:

- Alternative mapping (Dorling and Fairbairn., 1997; Dorling, 1998);
- Indigenous peoples (or aboriginal) mapping (Brody, 1981; Rundstrom, 1991; Aberley, 1993; Orlove, 1993; Robinson *et al.*, 1994; Flavelle, 1995; Marozas, 1995; Poole, 1995; Laituri, 1998));
- Counter-mapping (Peluso, 1995; Poole, 1995; Kosek, 1998);
- Bioregional mapping, or community resource mapping (Momberg *et al.*, 1994; Harrington, 1995; Aberley and George, 1998);
- Participatory mapping for local community development (Freudenberger, 1994; Jackson *et al.*, 1994; Carter 1996; Jackson and Bond, 1997; Poffenberger and McGean, 1998); and
- Resource mapping (Rambaldi *et al* 1998).

The common theme linking these different types of mapping is that the process is usually undertaken and led by a group of 'non-experts' that are associated with one another on the basis of a shared interest. In this thesis the term 'community mapping' provides an all-encompassing definition for these different types of grassroots mapping.

prosperous groups in areas of Northern Europe and America (King, 1993; VIDEA, 1998), to local communities and forest-dwelling indigenous groups in the tropics (Momberg *et al.*, 1994; Sirait *et al.*, 1994; Flavelle, 1995; Peluso, 1995; Poole, 1995a; Flavelle, 1996; Alcorn, 2001).

The popular evolution of community mapping has occurred during the same period and has moved alongside the academic discourse about mainstream mapping[18] and cartography's tendency to reflect the interests of the powerful groups in society and maintain existing power structures (Harley, 1988; Harley, 1989; Wood, 1992; Poole, 1995c; Dorling, 1998). However, there have been few academic studies that specifically analyze community mapping. What does exist is primarily confined to the grey literature and concerned with case study description.

Community maps often represent a socially or culturally distinct understanding of landscape and include information that is excluded from mainstream maps, which usually represent the views of the dominant sectors of society. This style of map can therefore pose alternatives to the languages and images of the existing power structures and become a medium of empowerment (Peluso, 1995) by allowing local communities to represent themselves spatially. Community maps often differ considerably from mainstream maps in content, appearance and methodology. Indicators used to recognize and denote community maps include the following:

- Community mapping is defined by the process of production. Community maps are planned around a consensus based goal and strategy for use (Alcorn, 2001) and made with input from a whole community in an open and inclusive process (Aberley, 1993; Flavelle, 1996; Johnson, 1997a). The higher the level of participation by all members of the community the more beneficial the outcome as the final map will reflect the collective experience of the group producing the map (Brody, 1981).
- Community mapping is defined by a product that represents the agenda of the community. It is map production undertaken by communities to show information that is

[18] Mainstream mapping is characterized by its emphasis on scientific accuracy, a polished appearance and a one way flow of information (from the expert map producer to the user).

relevant and important to the community's needs and is for use by the community (Aberley, 1993; Johnson, 1998).

- Community mapping is defined by the content of the maps which depict local knowledge and information (Flavelle, 1995; Poole, 1995d; Aberley and George, 1998). They contain the community's place names, symbols, scales and priority features (Orlove, 1993) and represent local knowledge systems.
- Community mapping is not defined by the level of compliance with formal cartographic conventions (Aberley, 1993; Orlove, 1993). Nor are they confined by formal media; a community map may be a part of a GIS or a drawing in the sand. Whereas regular maps seek conformity (Edney, 1993) community maps embrace diversity of presentation and content. Indeed idiosyncrasy and variety have been encouraged in some cases (Wright *et al.*, 1997).

There are four main purposes for initiating a community-mapping project: to increase the capacity within communities; to allow communities to record and archive local knowledge; to help communities to draw attention to and communicate important matters internally and to external agencies; and to enable communities to apply pressure for change. These four points will be addressed below.

To increase the capacity within communities

Perhaps one of the greatest strengths of community mapping is the ability of the mapping process itself to help build community cohesion (Alcorn, 2001) through providing a forum that brings together and unifies a community. When elders share traditional place names and histories with other members of the community through the map making process it can generate a resurgence of interest in their local knowledge (Harmsworth, 1998). This can help a community sustain a sense of place and a connection to the land (Aberley, 1993; Johnson, 1997; Chapin, 1998; Stone, 1998)

The mapmaking process can also act as a focus for discussions that will assist with recognising concerns and issues within the community. Discussions might raise community awareness about local and regional environmental issues (Flavelle, 1996) or amplify community capacity to manage and protect lands (Poole, 1995c).

During the course of these discussions a community can formulate a common vision, which in turn may help to develop an effective community-based plan for future development (Harrington, 1995). Community mapping is not about being an expert cartographer, but about community building. Once a community has a clear understanding of its own identity and a vision for the future it will be in a stronger position to effectively communicate and deal with external agencies, and it will be more likely to be involved in planning for its own future (VIDEA, 1998).

To allow communities to record and archive local knowledge

Local communities and indigenous groups are increasingly using community maps as a means to record and store important local knowledge and cultural information. Under threat from development and change, indigenous groups have used mapping projects to collect and preserve cultural histories (Robinson *et al.*, 1994) and to record the knowledge of their elders about the land (Flavelle, 1996). This information is being recorded in the fear that it will otherwise be lost as the older generations pass away and traditional ways of life change (Harmsworth, 1998).

To help communities to communicate important matters to external agencies

Community maps have proved to be an effective, legitimate and convincing media to demonstrate to external agencies how a community values, understands and interacts with its immediate space (Orlove, 1993; Peluso, 1995; Poole, 1995a; Flavelle, 1996; Olive and Carruthers, 1997; Fox, 1998). They have helped communities to communicate their often "long but invisible history of managing resources" (Hitchcock 1996 cited in Alcorn 2001 p. 9). Maps

present complex information in a well-understood and easily accessible format. This enables groups with language and cultural barriers and differences in values to easily communicate and understand the information presented. In the words of Aberley (1993 p.4) "maps can show a vision... more clearly than thousands of words."

To enable communities to apply pressure for change

In some cases maps have been used to request ownership over areas of customary land that have been claimed by the state (Aberley, 1993; Denniston, 1994; Nietschmann, 1995; Kosek, 1998; Sparke, 1998). For example the Gitxsan and Wet'suwet'en First Nation bands in British Colombia, Canada have used maps in their attempts to have their native sovereignty recognised by provincial and federal governments (Olive and Carruthers, 1997; Sparke, 1998). Community maps have become a tool with which communities can seek recognition and inclusion in governance and decision-making processes, particularly in reference to land and natural resource management (Aberley, 1994; Fox, 1994; Fox *et al.*, 1994a; Sirait *et al.*, 1994). At times they have also succeeded in empowering grassroots efforts to hold governments accountable. In this sense, map making is a form of political action (Alcorn, 2001) that is capable of bringing about change.

There also exist a number of negative impacts from community mapping activities and products. As well as contributing to community cohesion these maps can also be the agent for conflict and disagreement, both between different groups within a community and between different communities. Documenting sensitive information using the community mapping process might also serve to make that information more vulnerable to exploitation, this is particularly the case when maps draw attention to valuable natural resources or archaeological sites.

2.2.2 Using GIT to communicate local geographic information

Although community maps are useful and powerful tools for communicating local knowledge they are limited in describing the complexity and extent of what is known about the land. For this reason maps are often supplemented with the written word. This is often an imperfect medium to represent local knowledge, especially for traditional people who may be illiterate and accustomed to communicating orally. Johnson (1992) noted that much local knowledge about the land is transmitted in the form of stories and legends that use metaphor and sophisticated terminology that might be lost if the information is transcribed. In Northern Canada Inuit groups believe that the written word fails to capture the depth and power of the spiritual relationship with the land (Johnson, 1992). There is a need for a tool that can combine the usefulness of maps with other digital media, such as video, images and audio, which are better at documenting the oral and visual aspects and the complexities of local knowledge.

Some practitioners argue that GIT, particularly GIS, can help demonstrate the close relationship between local people and their land by illustrating the multiple dimensions of human-land relations and as a result are well suited to preserve, revitalize and disseminate local knowledge (Harmsworth, 1998; Brodnig and Mayer-Schönberger, 2000). These technologies maintain the benefits of the Cartesian map to organize and reference spatial information and combine this with the capability of linking to attribute databases and other information in the form of digital images, audio and video.

2.2.3 Community Participation and GIT

2.2.3.1 The research area of PPGIS

Since 1995, there has been increasing interest in the use of GIS by local communities and organisations working with local communities. Research literature covering the theory and potential of social and community GIS application is beginning to emerge (Curry, 1995b; Hock *et*

al., 1995; Obermeyer, 1995; Pickles, 1997; Barndt, 1998; Obermeyer, 1998; Stonich, 1998). This research area, methodological development and project application is referred to as Public Participation GIS (PPGIS), which in turn is rooted in the National Center for Geographic Information and Analysis (NCGIA) initiative 'GIS in Society', in particular the NCGIA Varenius Project which examines "social implications of how people, space and environment are represented in GIS" (NCGIA, 1995).

This PPGIS discussion is linked to the broader political discussion related to enhancing local community participation in decision-making and development (Obermeyer, 1995; Peluso, 1995; Abbot *et al.*, 1998; Brodnig and Mayer-Schönberger, 2000). However, Abbot *et al.* (1998) note that participation is the least understood component of PPGIS. Dunn *et al.* (1997 p. 155) argue that participatory ideals and mechanisms traditionally "reject techniques or technologies which are complex, expensive or time-consuming." This argument is further reiterated by Abbott *et al.* (1998 p. 12) who state that "the more complex and centralized the technology, the more likely that others will control the process and use of the product." These statements imply that many ICT, including GIS, are in essence inaccessible and therefore of limited value to local communities.

Despite criticisms Dunn *et al.* (1997) and Abbott *et al.* (1998) go on to say these technologies are potentially a valuable complement to participatory mechanisms. This is taken up by Harris and Weiner who assert that "Community–Integrated GIS (CIGIS) is a more realistic objective" (Harris and Weiner, 1998b p. 74). Through CIGIS they propose to increase the number of people participating in the use of the system. Although recognising that GIS is an 'expert system' and is "likely to be agency driven" (p. 74), they argue that it can still be used to serve the communities interest so they are less peripheral to spatial decision-making processes and politics. This is similar to the "chauffeur driven" Coastal Spatial Decision Support System recommended by Canessa (1997) to assist in multiple stakeholder decision-making processes.

If we apply the CIGIS methodology to Arnstein's (1969) ladder of participation it appears to lie within the realm of tokenism, but with the potential to slip downwards into non-participation. There is therefore a need to question the significance of the benefits of such a form of community involvement. Their justification is that by sacrificing elements of community control (i.e. participation), project success is more likely; however, this view denies the intrinsic value of the training, education and development of critical awareness that is developed when a community uses GIS for itself. It has been stressed within the PPGIS literature that central to the success of all PPGIS projects is the mechanism and form of participation and not the hardware / software configuration (Jordan, 1998; Jordan, 2002; Weiner *et al.*, 2002).

Within the PPGIS debate there is recognition that despite the potential benefits of GIS to suit the needs of documenting and representing community's local knowledge, the full promise of this technology has yet to be realised. Four constraints to communities' use of GIS, including technological, cost, data and representational exclusivity are discussed below.

2.2.3.2 Technological exclusivity of GIS

Harris *et al.* (1995) assert that GIS favours top-down 'expert' knowledge developed by technocrats within hierarchical institutional frameworks. Within the academic discourse there has been much debate about the positivistic imperialism that GIS imposes (for discussion see Openshaw, 1991; Taylor and Overton, 1991; Openshaw, 1992; Taylor and Overton, 1992). The danger, as Harley (1990 p. 13) points out, is that computer technology will remain elitist and that its public availability will continue either to be limited or centrally controlled.

This trend has resulted in a situation where the technology, either intentionally or unintentionally, is being used to distort communication, manipulate others and dominate the planning context by the use of technical jargon to confuse the opposition, as well as data to overwhelm them (Aitken and Michel, 1995). Aitken and Michel (1995) give the example of an

exquisite and statistically complex set of GIS maps being preferred in a planning process over a special interest group presenting its concerns via personal narratives.

Technological exclusivity is a major consideration when assessing the capacity of local communities to operate a GIS. Inability to operate a GIS was one of the major concerns voiced by community groups using the technology in Minneapolis in the United States (Elwood and Leitner, 1998). To learn how to use GIS software is a complex task, even for the computer literate. To involve local communities, especially in the developing world, in the use of such a tool would be a huge task. There are currently few examples of success in this area. Some work has been done on how to incorporate GIS technology into a decision-making process led by non-GIS trained participants (Harris *et al.*, 1995; Canessa, 1997). However the processes and tools are often directed or driven by experts (Harris and Weiner, 2002; Kyem, 2002). Central to this theme of technological exclusivity is the need to develop a process that allows greater involvement of local communities in the use of GIS – and not just in a token way. This can only realistically be achieved by reducing the current complexity of GIS operation and providing training opportunities for local community members (Dunn *et al.*, 1997).

2.2.3.3 Cost exclusivity of GIS

One of the main criticisms of local communities using geographic information technologies is the expense (Yapa, 1991; Dunn *et al.*, 1997; Abbot *et al.*, 1998). Communities cannot afford to buy and maintain sophisticated and expensive computers and software. Although the prices of computers are falling there are a large number of communities, primarily in countries in the South, that are limited by the costs. GIS software can be distinguished from other software types by its ability to perform powerful analyses of spatial data. However, this ability tends to make GIS considerably more expensive to purchase and complex to learn than other mapping software.

2.2.3.4 Data exclusivity of GIS

Another major issue is that of access to information in the form of digital data. Gathering information and converting it to digital format is a time consuming and expensive undertaking. Because of this, data gathering is increasingly regarded as a commercial activity, and data as a commodity (Crampton, 1995). These data therefore become owned by the agency involved with their collection and compilation, even though this information is an example of what economists refer to as a public good (Sheppard, 1995). The financial cost of these data (which can be high) means that local communities will often be least able to acquire the information that they require. Sheppard adds that "the best information is [often the] most expensive, this will tend to create an information gap between better-off and less well-off social groups" (Sheppard, 1995 p. 13).

Many GIS deny access to all but a few users (Clark, 1998). This is because there are occasions when the owners of the GIS may be to lose their advantage by distributing this data. To maintain exclusive rights to a data set is to secure advantage over a competitor who might be vying for the same resource.

Furthermore as Taylor and Overton, (1991 p. 1088) point out "data do not just exist, they need to be created." These data are not created in an economic, social and political vacuum; they are created by an agency that requires their use for a predetermined "selection of coverages and attributes, scale, analytical procedures, and the decisions and outcomes arising from these analyses" (Dunn *et al.*, 1997). Therefore large quantities of the data that do exist reflect the desires of the agency that compiled or commissioned their gathering. This may limit their use for other people.

A GIS is only as useful as the data it stores. Ideally there needs to be a greater democratisation of access to data in order to prevent a situation whereby data becomes exclusive because it is expensive, controlled by a minority group and irrelevant to peoples' needs.

2.2.3.5 Representational exclusivity of GIS

A final constraint of GIS is that it limits the ability of communities with alternative perceptions of space to represent their local knowledge. By the very nature of data input and storage and of spatial representation, a GIS promotes the assumption that all geographic knowledge is homogenous. It does not take into account that socio-cultural perception of space is not a uniform standard and that communities from different societies might view space very differently. This 'alternative' cognitive information may be 'geographically imprecise' and lack the ability to be "expressed comfortably within the "point, line, polygon paradigm" (Harris *et al.*, 1995 p. 216). Rundstrom argues that local knowledge might possibly be squeezed into a GIS, but such an attempt will only serve to undermine and devalue that information so that "it becomes a mere shadow of what it used to be" (Rundstrom, 1995 p. 52) and so separate the knowledge from the knower.

Rundstrom (1995), takes this argument further and states the impact of Western technology in non-Western settings make GIS "potentially toxic to human diversity, notably the diversity of systems for knowing about the world" (p. 45). Fox (1998), a central figure in the discourse on community mapping, supports Rundstrom's point by giving the example that in traditional communities a consequence of mapping territorial boundaries can be to create conflict both within and between villages. As long as boundaries remain fluid and flexible, defined only in each person's mental image of the landscape, conflicts between competing interests can be minimized (Harley, 1988); however, "once the boundaries are mapped and legitimized...conflicting images of reality cannot be overlooked" (Fox, 1998 p. 5)[19].

[19] Despite these criticisms Mac Chapin (1998) points out that local people have no choice, they are forced to use these tools and suffer the consequences because "either they draw up maps and fight through the political and legal channels to define, claim and legalise their lands, or they lose what they have" (Chapin, 1998 p. 7).

2.2.3.6 The way forward for GIT

In response to the weaknesses laid out in the this section, there is a need for GIS technologies to be simplified, or else abandoned in favour of simpler and cheaper GIT, if they are to be useful to local communities. There also needs to be an emphasis on the ability of these technologies to record, manage and store local knowledge and to present it in a manner which closely represents traditional systems for communicating this knowledge. Overcoming the constraints described above is the aim of the GIT, namely the technologies associated with Participatory Geographic Information and Multimedia System (PGIMS) that have been used specifically for this research. These technologies and the process by which they were implemented will be discussed again in Chapter Five.

2.3 GIT AND EMPOWERMENT

2.3.1 Background to the PPGIS and empowerment debate

Central to the debate over the role of GIS in society and its ability to assist disadvantaged groups has been the theme of empowerment. The term has been used extensively throughout the PPGIS literature (for example see Harley, 1989; Wood, 1992; Aberley, 1993; NCGIA, 1996; Craig and Elwood, 1998; Heckman, 1998; Laituri, 1998; NCGIA, 1998; Alcorn, 2001; Ghose, 2001; Elwood, 2002; Harris and Weiner, 2002; Kyem, 2002) and has become a main indicator of the success of a PPGIS project (Weiner *et al.*, 2002).

A workshop was held in Durham in 1998 to give PPGIS researchers and practitioners the opportunity to address and debate the strengths and weaknesses of combining participatory methods and GIS (Dunn *et al.*, 1997; Rambaldi and Callosa-Tarr, 2001). Empowerment emerged as a key focus point during the workshop (Abbot *et al.*, 1998). The NCGIA organised a special session to follow up the Durham meeting. This session, held in Santa Barbara in October 1998, was entitled "Empowerment, Marginalization and Public Participation." Here, participants further

took up the debate of PPGIS with an explicit emphasis on empowerment. Presenters described a wide variety of approaches to applying and implementing GIS in a participatory context (Weiner *et al.*, 2001). These approaches ranged from the use of demographic information and secondary data within a standard GIS environment through to a more inclusive involvement of local communities in GIS initiatives (Harris and Weiner, 1998a; Jordan, 1998; Kyem, 1998; Macnab, 1998). Lacking from all the approaches presented at the workshop was evidence of local communities being given significant levels of control and ownership over the tools, although this issue is now beginning to be addressed (Ghose, 2001).

During this NCGIA special session, a theme common to 23 of 31 papers presented is the claim that the communities were empowered by accessing and using GIS technologies. Despite these claims there was little or no explanation given in these papers as to what was meant by the term empowerment and how empowerment was to be identified. This lack of clarity has persisted throughout the PPGIS debate. Elwood (2002), writing four years after the special session, noted that there remained "a dearth of studies that explicitly conceptualize empowerment in the examinations of the impacts of GIS" (p. 906). This has led a number of academics to question the validity of such claims associated with PPGIS initiatives (Kyem, 2002).

2.3.2 Main themes of the PPGIS and empowerment debate

Brodnig and Mayer-Schönberger (2000) suggest that within the PPGIS debate three clear groups of practitioners and academics emerge. The first represents those in the GIS community who consider GIS technologies as inherently democratic and empowering, because they allow an ever increasing number of users to participate in a process of information collection, processing and dissemination (Harris *et al.*, 1995; Pickles, 1995). By mere association with and involvement in the use of GIS individuals and communities are empowered. This view dominated the early stages of PPGIS debate.

The second is the growing number of more sceptical and openly critical voices (Goss, 1995; Pickles, 1995; Rundstrom, 1995; Fox, 1998; Rundstrom, 1998). These observers have started to acknowledge and question the inherent positivism and hegemonic power relations embedded in GIS (Brodnig and Mayer-Schönberger, 2000). They have emphasized a concern over the claims that GIS is objective and value-neutral, further they have noted that GIS have emphasized the disproportionate importance of facts and data over knowledge (Weiner *et al.*, 2001). Further concerns have addressed the issues of cultural incompatibility and noted the potential for GIS to act as a "tool for epistemological assimilation" (Rundstrom, 1995) and as "the newest link in a long chain of attempts by Western societies to subsume or destroy indigenous cultures" (p. 45). Another common concern is the difficulty of access to GIS data and equipment. "GIS and related tools reinforce... the prevalent positivist and technocratic paradigm. As a result, those groups in society that are already disadvantaged are further marginalized" (Brodnig and Mayer-Schönberger, 2000 p. 9).

The third group notes that GIS empowers society's elites and disenfranchises the weak via the selective participation of certain groups over others (Yapa, 1991; Obermeyer, 1995; Pickles, 1995; Harris and Weiner, 1998b; Obermeyer, 1998). This theme is taken up by Harris and Weiner (1998, 2001) who claim that GIS simultaneously empowers and marginalises. They provide examples showing that providing communities with greater access to data about their own area, while a laudable goal for a number of reasons, also increases the capacity for surveillance of the actions of neighbours, which may have negative implications. Empowering communities through GIS technology can simultaneously disempower traditional leaders of those communities who are uncomfortable with computer technology. Weiner and Harris (in preparation) go on to speculate whether the championed PPGIS will empower new technical elites and thereby act to reinforce an information underclass. They speculate that this "GIS-empowerment-marginalization nexus ... will likely be one major component of PPGIS research" (Weiner and Harris, in preparation).

2.4 THESIS OBJECTIVES

Claims have been made throughout the literature that PPGIS approaches, models and products empower participating communities. Despite these claims, there is no commonly accepted operational definition of the term empowerment and its association with GIT and PPGIS and other GIT. There is also a paucity of discussion over the mechanisms and frameworks with which it can be identified, observed and measured (Howard, 1998).

This thesis will address this weakness. It will examine the literature and develop a working definition of the term empowerment. It will then build an analytical framework to help structure an understanding of empowerment. This will be discussed in Chapter Three. The thesis will then apply this framework to data collected during the implementation of the PGIMS project in two Indonesian communities. The results will be presented in Chapter Seven.

CHAPTER THREE:
DEVELOPING A FRAMEWORK FOR ANALYSING EMPOWERMENT

This chapter outlines the methodology used to address the research question of this thesis: *how does the PGIMS project empower or disempower local communities?* It begins with the development of a working definition of empowerment (Section 3.1). It goes on to discuss other studies that attempt to evaluate empowerment and shows how they contributed to developing an analytical framework for the purpose of evaluating the PGIMS project (Section 3.2). Finally, it presents the framework (Section 3.3).

3.1 DEFINING EMPOWERMENT

Empowerment is a widely used term. Since the 1990s it has been employed by a wide spectrum of users in a manner uncritically assumed to be universal (Rocha, 1997). These range from business management gurus and self–help aficionados through to radical citizen groups and development agencies. Ristock and Pennell (1996 p. 3) draw attention to the way politicians, bureaucrats and professionals have used the term empowerment to mean nothing more than individual self assertion. As Cook (1995) notes, the term has suffered from "semantic inflation, in which it has been used to represent almost anything, and so has come to mean almost nothing."

However, since its first use in the 1960s, the term has usually been applied across a range of politicized issues (IRED, 1996; Rocha, 1997). It has been a core concept in a number of social movements, including urban planning in depressed areas in North America (Rocha, 1997; Ghose, 2001; Elwood, 2002), gender initiatives and the feminism movement (de Koning, 1995; Parpart, 2000a) and adult education in Latin America (Freire, 1970). In most applications, the term has

been used to imply political and social transformation, whereby powerless or marginal individuals and groups in society attempt to increase their own power base through struggle against injustice (Swift and Levin, 1987 cited in Dubois and Miley, 1992). As Rappaport (1987 p.121) suggests, the term empowerment:

> Conveys both a psychological sense of personal control or influence and a concern with actual social influence, political power and legal rights. It is a multilevel construct applicable to individual citizens as well as to organizations and communities.

The roots of empowerment lie in the political and philosophical foundations of western culture that strive to enable individuals to take a meaningful and equal role in democratic processes and civil society so that democratic institutions and democracy itself might be sustained (Dubois and Miley, 1992; IRED, 1996).

Empowerment is often referred to as both an outcome and a process (Dubois and Miley, 1992). The outcome describes the final state; in other words, a certain level of power achieved. The process of empowerment implies to "gain mastery over" (Rappaport, 1987 p. 121), or "exercising psychological control over personal affairs, as well as exerting influence over the course of events in the socio-political arena" (Dubois and Miley, 1992 p. 209). It has been noted that "empowerment is not an achievement, but it is an ongoing process" (Nanavaty, 2002 p. 5).

The outcome of empowerment entails more than examining individual development or community solidarity. In order for power structures to be altered and the powerless to gain a level of control over the distribution of power and decision-making processes in society, there must be tangible and measurable impacts in the wider political arena (Thomas, 1992; Ristock and Pennell, 1996) and a visible demonstration of change that the world around is forced to acknowledge, respond to and accommodate (Rowlands, 1997).

However, the social work literature notes that if power can be freely given it can be just as easily withdrawn. Therefore the simple handing over of power does not involve a structural change in power relations, in fact it may hide an attempt to maintain control (Rowlands, 1997).

Critical to an understanding of empowerment is that this process is undertaken by an individual, group or community, it is not something done 'to' or 'for' these social units (IRED, 1996; Rowlands, 1997).

Thus examining the process of empowerment is important too. In essence the process of empowerment involves growth and development leading to deliberate efforts to participate in, share control of and influence social, economic and political events and institutions (CPFP, 1992). Empowerment can take place within individuals or communities and the growth and development needed at these different social scales to bring about increased influence or power can take many forms. For example, for an individual the acquirement of new knowledge and skills may bring about social influence and political power, while for a community it might be the development of a common identity and vision (Rappaport, 1987; Parsons, 1991; Thomas, 1992; Fetterman, 1996; Ristock and Pennell, 1996). There is no generic formula that can be followed in order to achieve empowerment. The process is multifaceted and multidimensional (Rappaport, 1987); it is "a philosophical orientation, the process emerges and solutions evolve that are uniquely tailored to each situation" (Dubois and Miley, 1992 p. 210).

From the above we can see that an observed change in power (i.e. 'community members participate in a regional decision-making forum') may not be permanent or meaningful unless it is linked to some deeper process of change in the condition of an individual, group or community (i.e. 'community members are backed up by a common and articulated community vision, and have the confidence and ability to communicate it'). Thus in this study we end up with not one, but two important working definitions for the purpose of evaluating the PGIMS project:

1. *Empowerment* is an increase in social influence or political power. Conversely disempowerment is a decrease in social influence or political power.

2. *Empowerment capacity* refers to aspects of the internal condition of an individual or community that influence their empowerment.

3.2 OTHER EMPOWERMENT STUDIES

One of the restrictions to using the term empowerment in a useful way is related to the level of confidence one can take in the observation and measurement of this phenomenon. As noted by the Centre for Population and Family Health (CPFP, 1992) the "serious assessment of empowerment as a result of a particular program or approach is hindered by the lack of tools with which to document and measure the process." The challenge remains to translate the ideals of empowerment and empowerment capacity into a series of recognizable indicators that can be observed, monitored and perhaps even measured.

Examples from the literature for characterising and evaluating empowerment do exist (for a synopsis see Heckman, 1998). Most assessments of empowerment are based on qualitative interview techniques that look for indicators of empowerment. Indicators are increasingly being used to measure programme success and are gaining prominence in many development agencies (Oxaal, 1997; CIDA, c. 1999). Here, indicators are defined as specific/explicit verifiable measures of change or results brought about by social action or activity; they are standards against which to measure, assess, and show progress and change over time (IISD, 1999). For example, evaluations of Bangladesh Rural Advancement Committee micro-credit programmes used indicators to measure women's empowerment, these included: mobility, economic security, involvement in major household decisions, political and legal awareness and involvement in political campaigns (Oxaal, 1997).

More recently, frameworks to categorise and analyse empowerment have begun to emerge (for examples see Friedmann, 1992; Rocha, 1997; Scheyvens, 1999; Elwood, 2002). For instance, Scheyvens (1999 p. 247) in her study of the links between ecotourism initiatives and empowerment offers a framework to examine different kinds of empowerment (each with an associated set of indicators) at the community scale. Scheyvens (1999) notes that empowerment manifests itself on four levels: economic empowerment related to equal and lasting economic

gains for the local community; psychological empowerment related to the enhanced or eroded self-esteem of community members; social empowerment related to local community's equilibrium and cohesion; and political empowerment related to a fair and just political structure.

Three of the levels of Scheyvens's framework are drawn from Friedmann's (1992) theoretical work on empowerment, which claims that empowerment involves households gaining one of three related types of power; he argues that these follow each other in a linear progression from social to political to psychological power. However, Friedmann's linear progression is not backed up with evidence, and it can be argued that these types of power do not invariably follow such a sequence.

Unlike the other frameworks discussed above, Elwood's (2002) model was developed specifically in response to calls in the PPGIS literature for a clearer and more in-depth understanding of the term empowerment (Brodnig and Mayer-Schönberger, 2000; Elwood, 2002; Kyem, 2002). Because of its association with PPGIS initiatives Elwood's research is possibly most relevant to the research described here. Elwood's research was involved in urban planning and neighbourhood revitalization in Minneapolis. Elwood's (2002) study outlines a "multidimensional conceptual framework for assessing empowerment (and disempowerment) ...in examining the impacts of GIS use by community based organisations" (Elwood, 2002 p. 905). Her framework draws from propositions made in PPGIS literature as to the mechanisms through which GIS use negotiates and alters power relations between neighbourhood organisations and local government institutions. Elwood notes that there are three inter-related conceptual groups of empowerment. These are empowerment related to: *distributive change*, which refers to outcomes such as increased access to goods and services; *procedural change*, which infers shifts in perceived legitimacy of groups; and *capacity building*, or an increased ability of citizens or communities to "take action on their own behalf" (Elwood, 2002 p. 909).

All of the above frameworks are limited to providing categories of empowerment outcomes. These categories do not differentiate between empowerment capacity and

empowerment, and therefore they do not indicate the relative closeness of each category to actual power shifts, even though some (i.e. increased access to goods and services) appear less related to power than others (i.e. changes in perceived legitimacy).

Another criticism of these frameworks is that although they are useful for determining whether and what type of empowerment has taken place, they are less beneficial in helping to determine how it has taken place. One way to examine how empowerment has taken place in a community is to examine empowerment at different social scales. However, Scheyvens' (1999) study, although recognising that the communities are not homogeneous units, establishes her scale of analysis at the level of the community, and so fails to examine empowerment of the individual and how this interacts with the wider community. There is also no examination of the community's enhanced power in relation to the wider environment outside the community. Friedmann's (1992) use of households as the social unit that undergoes empowerment is also questionable, as it ignores inequalities in power within the household, commonly related to gender or age. Elwood's (2002) framework focuses on the power dynamic between the neighbourhood and local government, it does not clearly examine the way in which empowerment may occur differently at the individual vs. the neighbourhood level.

Rocha (1997), however, presents an empowerment framework that explicitly examines empowerment across different social scales. She employs a ladder metaphor similar to Arnstein's (1969) ladder of participation. The aim of her model was to allow practitioners to "clarify their goals and methods in their empowerment initiatives" (Rocha, 1997 p. 31). Unlike the previous studies, Rocha's model shows that empowerment varies between distinct scales because "in a manner similar to citizen participation, all empowerment is not equal" (Rocha, 1997 p. 31). Rocha describes five loci, or rungs, across which empowerment is manifested. The loci progress sequentially along an axis from the individual to the community. The first rung relates to individual empowerment; by the second rung the individual views themselves as embedded within a larger context; by the third rung the empowered has accumulated the knowledge and

information necessary for community decision-making and action; the fourth rung is referred to as 'transformative populism', this focuses on the process of change within a community in the context of collaborative struggle to alter social, political and/or economic relations; in the fifth rung the community experiences political power. Rocha notes that:

> These models of empowerment are not evaluatively arranged along an axis that characterizes one as less beneficial and one as more beneficial. They are arranged on the ladder based on the intended locus of their outcomes: from individual to community empowerment. (Rocha, 1997 p. 34)

Rocha believes that empowerment manifests itself differently at each of these different social scales[20] (Rocha, 1997). Rocha's framework uses McClelland's (1975) classification of power which describes a range of different power experiences that can include deeply personal changes to the individual, through to broad political changes at the community level.

Rocha's model is a conceptual model of a linear progression; it is good for understanding the dynamics underlying the overall accumulation of empowerment in a community. It is not as useful for analysing how a specific intervention or project empowers a community. Nonetheless, this thesis is influenced by Rocha's (1997) claim that empowerment is experienced differently by different social levels.

If analysis of empowerment is restricted to looking at the impacts of a project as a whole, this makes it difficult to apply the lessons learned to other initiatives. This is particularly the case in evaluating initiatives such as the PGIMS project, which employs a complex collection of technologies and methodologies to enable a community to document, manage and communicate information. An understanding of the PGIMS project's influence on empowerment requires that the project be broken down into its component parts to identify key catalysts or agents of empowerment. This framework presents four major catalysts. These include the *information* contained within the PGIMS, the participatory *process* employed by the overall project (this will

[20] Rocha refers to these social scales as 'empowerment types' (Rocha, 1997 p.33).

be described in detail in Chapter Six), the *skills* acquired through the project and the *tools* used to develop the PGIMS. The different social scales, and these four catalysts of empowerment, are presented and discussed in more detail below.

3.3 THE EMPOWERMENT FRAMEWORK

The framework is created by incorporating two social scales[21], notably the individual and the community, and four catalysts of empowerment into a simple two dimensional framework (see Figure 3.1). Analysis of the social scales differentiates between empowerment (i.e. an increase in power) and a change in 'empowerment capacity' (i.e. a change in internal condition that influences empowerment). The analysis of empowerment involves exploring how the different catalysts cause empowerment as well as changes in empowerment capacity at the individual and community levels.

	Empowerment of the individual	**Change in empowerment capacity in the individual**	**Empowerment of the community**	**Change in empowerment capacity in the community**
Information				
Process				
Skills				
Tools				

Figure 3.1 Framework for structuring an analysis of empowerment

[21] Note that a third social scale, the region, is also of significance because empowerment of the community involves the community interacting with the wider environment outside the community and in the region. Although empowerment of the region is not studied, inclusion of the region in the models shown in Figures 6.2 and 6.3 helps to provide completeness.

Each cell of the framework will be used to structure an examination of indicators[22] drawn from the field data that relate to empowerment and empowerment capacity. These indicators will show both the rise and decline of empowerment and empowerment capacity, these will be presented in Chapter Seven. The indicators presented in this later chapter are not a definitive list, they are simply the data categories that emerged from events and internal changes that occurred during the course of the PGIMS project (see Section 4.2.5 for an explanation of how the indicators were created from analysis of the field data).

3.3.1 The social scales

The social scales of relevance to the PGIMS project include the individual, community and region and the overlap between them. These are used as defining parameters for structuring the framework and for analysis of the impact of the PGIMS project. Figure 3.2 helps the reader to visualize these social scales and the way in which they interact.

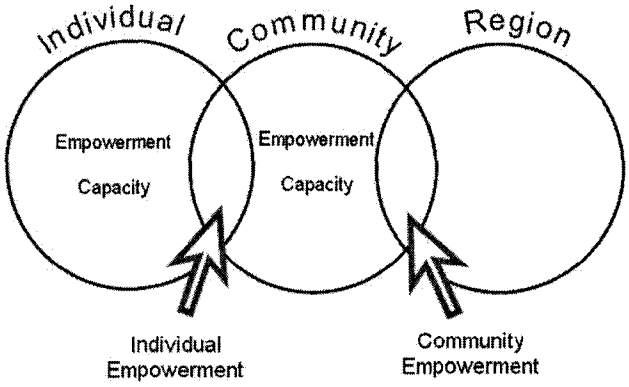

Figure 3.2 Empowerment is influenced by empowerment capacity of individuals and the community.

[22] Indicators in the context of this research are pointers, facts, stated opinions or perceptions that look into and represent changes of specific conditions or situations relating to the PGIMS project.

In Figure 3.2, the three circles refer to individuals within the community, the community as a whole and the region. The overlapping area between the circles refers to the interaction between the different social scales in terms of power. In other words, it is in the overlap that empowerment of the individual within the community, and empowerment of the community within the region occurs. Inside the circles we see the changes occurring within each social unit, in other words the changes in empowerment capacity that will influence its empowerment. As empowerment of the region is not a focus of this study, this circle representing the region is left blank.

Osmani (2000 p. 19) believes that "nobody relinquishes power easily – be they the politicians and bureaucrats at the centre or the traditional elite in the village." Figure 3.3 demonstrates that although empowerment of the community is influenced by the building of empowerment capacity within the community, it also is greatly assisted by a condition of receptivity to community empowerment on the part of the region. Similarly, empowerment of the individual is assisted by a condition of receptivity to individual empowerment on the part of the community. This research project does not attempt to evaluate receptivity of the community or region, as improving the receptivity of the community or region was not a purpose of this PGIMS project. It is discussed here because it is nonetheless a critical external factor influencing empowerment.

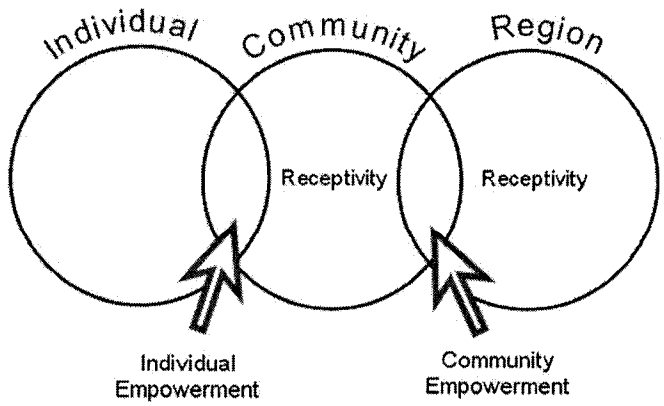

Figure 3.3 Empowerment is influenced by the receptivity of the community to individual empowerment and of the region to community empowerment.

These issues of empowerment, empowerment capacity and receptivity are discussed below for the individual-community and community-region levels of empowerment.

3.3.1.1 Empowerment of the individual within the community

The interface between the individual and the community refers to the empowerment of individuals within their community. In the analytical framework, empowerment and disempowerment are explored through examining the changing social and political role of the individual within his or her community as a result of the PGIMS project. Greater participation in decision-making might be one indicator of empowerment (Gebert and Rerkasem, 2001), as would obtaining a position of authority in the community (Parpart, 2000a), or, as noted by L. Wollenberg (personal communication, 28 September, 2000), being asked to represent the community in the wider sphere.

3.3.1.2 Increasing the empowerment capacity of the individual

"The conviction of the oppressed that they must fight for their liberation is not a gift bestowed by revolutionary leadership, but the result of their own conscientization"

Freire, 1970

Ramon (1999 p. 38) notes that most of the "debate of empowerment...remains at the individual level." A common theme throughout the social work, adult education and development theory literature has been that empowerment is a social process that helps individuals gain control over their own lives through some degree of personal development. In this context individual empowerment has been referred to as a state of mind, a perceived feeling of greater competence

or power (Dubois and Miley, 1992) and the ability to "draw on inner strength to take control of a situation and assert oneself" (Ristock and Pennell, 1996 p. 3). Empowerment at this level is related to "increased individual efficacy and the process...of altering the emotional and physical state of the individual" (Rocha, 1997 p. 34).

This theory of personal development is influenced by Paulo Freire's theory of Critical Pedagogy (Freire, 1970) which has emerged as one of the central models used when discussing and understanding empowerment. The core hypothesis of Critical Pedagogy is that human liberation from existing exploitation and historical prejudice can be achieved through education (Barry and Sidaway, 1999; Macdonald and Macdonald, 1999). According to de Koning (1993 p. 34), Freire believed that traditional educational activities do not challenge inequalities in learners' lives, rather they perpetuate existing inequalities. Freire, while working with illiterate and poor adults in North Eastern Brazil, developed teaching methods that combine learning to read and write with looking critically at one's social situation. The expectation of this approach to education was that by learning these new skills students would obtain a clearer realization of the injustices of their own situation. This would lead them to start to take initiatives towards transforming the society that had previously denied them social and educational opportunity (Thomas, 1992). Education, viewed in this light, was "primarily a political endeavour" (Wendt, 2001 p. 140). Although Freire does not use the term empowerment explicitly in his original version of *Pedagogy of the Oppressed* he does use the term liberation and notes that this is made possible through developing critical awareness which leads to critical action. Freire referred to these processes as concientization (or critical consciousness).

It is important to note that the development of a critical consciousness is not confined to the development of the skill base and education of the individual, it also involves the ability to make connections between the personal and political sphere (Miley and Dubois, 1999). Critical conciousness involves more than simple learning or understanding of facts – it involves an element of personal reflection that incorporates an understanding of how the individual positions

himself or herself in relation to those facts (Higgins, 1994) and subjectively within society. Critical consciousness involves an ability to deconstruct political practices (Wendt, 2001). A willingness to be politically radical and attempt to initiate social change is also vital to empowerment (Barry and Sidaway, 1999).

However, in addition to creating critical consciousness, the knowledge and skills obtained through education can give the disadvantaged a sense of equality with the 'educated' classes in society and help them to overcome the sense of intellectual inferiority that is a powerful force inhibiting their confidence to assert their own initiatives (Marsden and Oakley, 1990). This lack of confidence has been called 'internalised oppression' (Thomas, 1992; Rowlands, 1997). New knowledge and skills allow individuals to overcome negative social constructions so that they see themselves as having the capacity and the right to act and influence decisions (Rowlands, 1997) and the social conditions of their lives (Ristock and Pennell, 1996).

3.3.1.3 Receptivity of the community to individual empowerment

According to Freire, the main factor in empowerment must be the development of critical consciousness in the individual. However, empowerment of the individual is also influenced by the receptivity of the community in which he or she lives. A more egalitarian, open society is more conducive to individual empowerment than a hierarchical, restricted one. These societal conditions influence how much difficulty and struggle is involved in the process of individual empowerment.

This point is recognized by Parpart (2000a) when talking about women's empowerment in French West Africa. She describes how, through outsider intervention, women were given positions on village committees; however, local elites, although in principle supportive of women's involvement, continuously dismissed women's contributions during decision-making. As a result of existing local power structures, the empowerment of individual women was curtailed.

Parpart speculates that the participatory methods used, with their stress on inclusiveness and equal voice, were perceived as a threat to the existing hierarchy. This shows that simply promoting greater participation of marginal groups does not always lead to the desired outcome of their empowerment. Parpart concludes by stating that much of the writing on empowerment "too readily assumes participation can overcome deeply embedded material and cultural practices that legitimate and maintain social inequities" (p. 12). These embedded inequalities can only change after long periods of community level awareness raising resulting in attitudinal shifts, as well as institution building that encourages greater participation, as well as changes that occur in the marginalised individuals themselves.

3.3.1.4 Empowerment of the community within the region

The interface between the community and the region refers to the role of the community within the wider geographic region, in the case of this research West Kutai. Empowerment at this level is explored through examining the relationship between the PGIMS project and the changing political role of the community. One indicator of empowerment might be the community reaching a successful outcome in regional decision-making processes. Another might be an increased ability of the community to control and influence the actions of outsiders that impact the community.

3.3.1.5 Increasing the empowerment capacity of the community

Empowerment capacity is not only an individual psychological construct. Barnes (1988) states that if individuals can act and interact coherently with one another then the total power available is considerably increased, and the overall capacity for action is larger and wider ranging than that of a collection of isolated individuals. This in turn gives greater potential for empowerment because of the "shared forces and expertise which a group has at its disposal" (Ramon, 1999 p. 41). Ramon also feels that to gain some control over power structures there

must be collective public action; this can only be possible if there is a collective identity and vision.

In the planning and development literature it is believed that community participation processes can help create a shared understanding of problems and a vision for positive change, so strengthening the collective identity of a community (de Koning, 1995; Agyarko, 1998). This in turn generates the confidence of all members of a group to question and challenge the *status quo*; it is therefore seen as leading to the empowerment of the marginalized. As White (1996 p. 8) states:

> The idea of participation as empowerment is that the practical experience of being involved in considering options, making decisions and taking collective action to fight injustice is in itself transformative.

Empowerment became a widely used term in development theory and practice during the 1990s and has now become a key focus area from mainstream institutions such as the World Bank to the smallest non-governmental organizations (NGOs) (Parpart, 2000b). It has now gained such widespread acceptance that it is often being used synonymously with the term 'community participation'. Rocha (1997) notes that because of the uncertainty around the term empowerment, citizen participation often serves as a proxy for empowerment. This is because both the "concepts of empowerment and community participation...have their origins in the fight against poverty" (Barry and Sidaway, 1999 p. 14) and injustice. Their common emphasis has been on enabling the less powerful sectors in society to gain control over their own lives and become meaningfully involved in influencing decision-making processes.

Kuno (1998) believes participation and empowerment are the two sides of the same coin and that empowerment needs to be seen as the ideal output of participatory mechanisms. However, Agyarko (1998) challenges this assumption by noting participation is not monolithic and that there are significant gradations, interpretations and variations in the term, he questions whether indeed all forms lead to empowerment or whether all participatory processes even intend

to address power relations. This view is also shared by Arnstein (1969) in her 'ladder of participation'. Yet she does recognize that citizen participation in its purest sense is citizen power and is specifically linked with the redistribution of power (Heckman, 1998).

When considering empowerment at the community level it is important to note that communities are not a homogenous entity. As de Koning (1995) points out much of the empowerment literature uses broad and abstract categories, such as 'the poor' and 'the oppressed'. She feels that by treating these groups as a single category and implying that their path to liberation is the same, this literature fails to recognize the complexity of empowerment.

For instance a marginalised community that through participatory mechanisms has been empowered to take a more successful role in regional decision-making processes might in turn be marginalising groups within the community, such as women, the youth, the less educated or the less wealthy. However, participatory mechanisms that take place at the community rather than the regional level should, with their emphasis on involving marginalised groups, empower these groups to take part in decision-making. Nonetheless there is the potential for the empowerment of marginalised groups in a community to lead to increased conflict within community, thereby decreasing a community's capacity for empowerment at the regional level.

3.3.1.6 Receptivity of the region to community empowerment

It has been noted that without the institutional support at the regional level, empowerment becomes limited and temporary (Osmani, 2000). As a result international and national development efforts have focused on implementing 'good governance' programs over recent years. Indicative of good governance is a government's willingness to fulfill its democratic mandate (Navruzov *et al.*, 2000 p. 1). Within this mandate is the need for government to focus on people's needs and to facilitate their participation in local decision-making. More specifically, as noted by the World Bank Group (2002):

> Governments with authority and resources need to empower local communities through mechanisms that increase citizen access to information, enable inclusion and participation, increase accountability of governments to citizens, and invest in local organizational capacity.

Good governance has partially been approached using decentralization policies. Decentralization aims to achieve better governance through devolving fiscal, political, and administrative responsibilities to lower levels of government. The idea behind decentralization is that moving decision-making closer to people will lead to public sector decisions that better reflect local needs and priorities (Osmani, 2000). This in turn will lead to greater efficiency in public expenditures, improved governance, and greater equity.

The World Bank Group's (2002) statement implies that empowerment will more likely be attainable through a philosophical commitment and supportive policy environment at the governmental level than through acts of political mobilization. The aims of good governance and decentralisation, however, are by no means automatic or easy to achieve. Although institutions might appear to be acting for the collective benefit, they may in reality only serve to shape and reproduce relations of unequal power (Leach *et al.*, 1997) and remain distrustful of the poor and their information (Parpart, 2000b).

Unlike the World Bank approach of believing that governments empower communities Osmani notes that:

> Social forces must be created that would compel ...the sharing of power [through] the gradual empowerment of the poor, so that they can convert their numerical strength into genuine bargaining power. (2000 p. 19)

In all likelihood for empowerment to be realized effort is required from both communities and the regional government.

3.3.2 The catalysts

The catalysts refer to the specific elements of the PGIMS project that lead to empowerment, or changes in empowerment capacity, of individuals and communities. These catalysts include the information contained within the PGIMS, the participatory processes employed by the overall project, the skills acquired through the project and the tools used to develop the PGIMS. These will be discussed in turn below.

3.3.2.1 Information

The explicit link between power and information has been noted (Scoones and Thompson, 1993; Chambers, 1994a; Brown and Duguid, 2000; Parpart, 2000b). An ability to communicate one's own information place individuals, groups and communities in stronger positions (Yoon, 1996). There has also been a link drawn between communicating spatial knowledge and power (Harley, 1988; Brodnig and Mayer-Schönberger, 2000; Alcorn, 2001).

In the empowerment framework, the information catalyst refers to the information gathered during the course of the PGIMS project and stored within the villages' computer. The information is stored in textual, photographic and video format. The information in the PGIMS can be categorized in different ways. Categories include for example cultural, documentary, political, family and commercial information. The framework enables analysis of how the documentation, control and use of this information contributes to empowerment and changes in empowerment capacity at the individual and community scales.

3.3.2.2 Process

Jordan (1998) and Dunn *et al.* (1997) note that empowerment in PPGIS initiatives is most clearly linked to the requisite participatory process. Jordan, when talking about the use of PPGIS in Nepal, concludes:

> It was found that the emphasis [of the project] had to be firmly on participation rather than technical issues, and a system based approach that actively encouraged participation was found to be the key requirement for a useful PPGIS. (1998 p. 10)

In the empowerment framework, the process catalyst refers to the specific participatory process used by the PGIMS project and described in Chapter Six (Section 6.2.1). The process employed was fundamentally participatory in the sense that it invited (not demanded or coerced) and facilitated the inclusion of all individuals and groups from the two communities (men and women, old and young, educated and uneducated) to join and lead the PGIMS project. At the outset of the project the intention was to encourage participatory dialogue and community decision-making through open forums with the intention that they would enable the entire community to become involved and contribute to the development of the PGIMS. This community decision-making ranged from conceptual guidance, in the form of shaping the organization and content of the PGIMS, through to sharing skills with other community members in order to capture, manage and store the community's information in such a way that it can be incorporated into the PGIMS. The framework examines how the participatory process used in the PGIMS project contributes to empowerment and change in empowerment capacity of the individuals and communities.

3.3.2.3 Skills

In the Social Work and Further Education literature, empowerment is often described as an outcome of activities where marginalised groups learn new skills that enable them to operate more effectively in their immediate environment (Freire, 1970; Barry and Sidaway, 1999; Macdonald and Macdonald, 1999). This aspect of empowerment has appeared less in the PPGIS literature, possibly because most PPGIS initiatives are expert-driven and the technological skills remain in the in the hands of the experts.

In the empowerment framework, the skills catalyst refers to the new skills acquired by individual community members and communities as a whole through the training associated with the PGIMS project. These skills include learning to operate the video and camera equipment as well as the computer and associated software. The term 'skills' refers to the ability to use the new technologies, it does not refer to how the technologies are used. The framework will examine how these skills influence empowerment and empowerment capacity at each of the different social scales.

3.3.2.4 Tools

As information technologies proliferate and become easier to use, attention is being given to the role of the tools themselves in the empowerment process. Higgins (1994) states that "anyone expecting to be emancipated by technological hardware, or by a system of hardware, however structured, is the victim of an obscure belief in progress." Brodnig and Mayer-Schönberger (2000 p. 12) cite Krantzberg's First Law that states "technology is neither good nor bad, nor is it neutral" which points to the importance of the social, political and economic context of technologies. Yet increasingly the link between the technology, including electronic devices and software, and empowerment is being noted. This is represented throughout the PPGIS debate (Johnson, 1997b; Barndt, 1998; Kyem, 1998; Laituri, 1998; Elwood, 2002) as well as being promoted by commercial groups[23]. Furthermore digital data can be presented in very slick and impressive ways that can impress and ultimately influence an audience.

In the empowerment framework, the tools catalyst refers to the specific equipment used during the development of the PGIMS. These include the hardware, notably the computer, video camera and digital camera, and the software, notably the map interface, video, photograph and

[23] While passing through Singapore airport in December 2002 the author noted an advertisement for Acer computers that explicitly made the link between their product and empowerment by showing a young Caucasian male showing the screen of his Acer laptop to a beautiful Hmong hill tribe woman with the caption underneath describing their products as "Empowering People."

text editing programs. The PGIMS project intended that these tools be available to anyone from the village who wanted training in how to use them. The framework will examine how the tools in themselves contributed to empowerment.

CHAPTER FOUR:
RESEARCH METHODS

This chapter describes the methods used to answer the research question presented in Chapter One. It will first position this thesis within the wider theoretical debate on research methodologies (Section 4.1), before discussing the qualitative tools (Section 4.2) and quantitative tools (Section 4.3) used to gather the data.

4.1 THEORETICAL BACKGROUND TO RESEARCH METHODS

The overall research design and data collection approach were grounded in the broad methodological field of qualitative research. Qualitative research is described by Kirk and Miller (1986) as "a particular tradition in social science that fundamentally depends on watching people in their own territory and interacting with them in their own language, on their own terms" (p. 9). This leads the researcher to an understanding of the people and the social and cultural contexts within which they live.

The term qualitative research is used to refer to research that produces "findings not arrived at by means of statistical procedures or other means of quantification ... [although] some of the data may be quantified... analysis itself is a qualitative one" (Strauss and Corbin, 1990 p. 17). Kirk and Miller (1986) claim that qualitative research involves a commitment to field activities, "it does not imply a commitment to innumeracy" (p. 10). A number of other social science researchers have noted the importance of quantitative data within the spectrum of tools available to the qualitative researcher (Yin, 1984; Patton, 1990; Strauss and Corbin, 1990).

Kirk and Miller (1986) go on to note that qualitative research is identified differently by diverse social sciences, and that among its different interpretations is the research approach of ethnography. Ethnographic research comes from the discipline of social and cultural

anthropology. Ethnography is understood to be a collection of methods, including interviews and observation, for describing, interpreting, and explaining the social world (LeCompte and Preissle, 1993). Agar (1986) more specifically describes ethnography as being "a social research style that emphasizes encountering alien worlds and making sense of them" (p. 12). He further notes that this usually involves an improvisational style to meet situations not of the researcher's making and an intensive personal involvement in the area under study (Agar, 1986). An ethnographer is required to spend a significant amount of time in the field. Thus the role of the author as researcher is to interpret and make sense of the new world in which the research is located.

Because the research in this thesis is integral to a project that explicitly intended to empower marginalised communities through the introduction of PGIMS technologies, it also becomes more specifically situated in the theoretical area of "Empowerment Research". This is research that is "committed to identifying, facilitating or creating contexts in which heretofore silent and isolated people...gain understanding, voice and influence over decisions that affect their lives" (Rappaport, 1990 cited in Ristock and Pennell 1996 p. 2).

Empowerment Research stresses the imperative for a social-change agenda centred on empowerment over research process (Rappaport, 1987; Ristock and Pennell, 1996). The phrase 'research as empowerment' is used to convey the idea that "research itself can be a lived process of empowerment when it encompasses both a critical analysis of power and the reconstructing of power so that the latter can be used in a responsible manner" (Ristock and Pennell, 1996 p. 2). In this thesis, although the aim of empowering participating local communities was explicit throughout the PGIMS project, the author did not attempt to involve the community directly in a critical analysis and reconstruction of power. Nonetheless Empowerment Research theory is a useful concept because it encourages the researcher to be aware of the ethical implications of conducting research that can shift and even change power differences that are inherent in society (Ristock and Pennell, 1996).

This includes recognition that the research project might threaten the interests of power-holders in the communities, who may react unfavourably against the people involved in the project. Furthermore the project has the ability to profoundly alter relationships and the social systems within the communities, which can also have unanticipated negative consequences (an issue raised by Harris and Weiner, 1998).

Ristock and Pennell (1996) further state that when undertaking Empowerment Research the researcher needs to "critically analyse their own power and use it responsibly" (p. 8). This self awareness helps the researcher to understand how they impact, interpret and understand actions, discussion, decision-making and outcomes (Ferrier, 1998). This needs to be done in recognition of the "unequal power and the exploitative potential inherent in the relationship between the researcher and researched" (Ristock and Pennell 1996 p. 68). Despite attempts to overcome power inequalities by immersing oneself in the communities, initiating a project that aspires to benefit the communities, promoting respect, equality, empathy, and honesty with participants, the fact remains that the project, at least initially, is dependent on and controlled by an outsider. As Ristock and Pennell (1996 p. 68) note "power is always present in the complex reciprocal relationship between the researcher and research participant."

By the very nature of this research project the relationship between the author and the community members was automatically imbued with an inequality of power. The author was the donor of the PGIMS tools as well as the gatekeeper for the skills required to realise the successful use of these tools. He therefore had a disproportionate level of control over these skills and tools. Any evaluation of the PGIMS project has to take this imbalance in the relationship into account. This means to analyse the material, cultural and discursive differences between the researcher and the researched with an understanding that the researcher might be perpetuating oppressive power relations, especially in respect to gender (the author is male), ethnicity (Caucasian) and educational background (doing a PhD). This self reflection helped to define and guide the consciously subordinate role that the author played in decision-making during the PGIMS project,

a role which is also in line with that expected of an external facilitator in participatory processes (Chambers, 1994b; Freudenberger, 1994; Pretty *et al.*, 1995; Chambers, 1997).

Both qualitative and quantitative tools were used to gather information and data for the purpose of assessing how the PGIMS project empowered or disempowered the participating communities in this research project. These methods are discussed in more detail below. A working definition and an analytical framework of empowerment are presented in Chapter Three.

4.2 QUALITATIVE TOOLS

Qualitative data were collected by the field research team, which consisted of the author as well as research assistants including Fidelis Nyongka, a member of the local NGO SHK stationed in Tepulang, Maria Minang and Adrianus Rio, two residents from Benung, and Mary Stockdale, a Canadian gender consultant. Information was collected from members of the two communities participating in the PGIMS project, key influential informants from around the region, and participants in two multi-stakeholder workshops held with key regional stakeholder groups such as government, university, NGOs and community organisations.

Qualitative data gathering tools included participant observation, key informant semi-structured interviews, focus group discussions, gender analysis and questionnaires.

Qualitative data collection processes followed the principles laid down in Participatory Rural Appraisal (PRA) methodologies (Chambers and Guijt, 1998). These include:

- Observing, listening to and learning from community respondents;
- Not leading, dominating, interfering or interrupting during the data gathering process;
- Giving people time to think or discuss issues before replying; and
- Constantly analysing and questioning - who is being met and heard, what is being seen, and where and why; and who is not being met and heard, what is not being seen, and where and why?

4.2.1 Participant observation

Participant observation was the principal research method used throughout the project. Participant observation has been described as a social science method "characterized by a prolonged period of intense social interaction between the researcher and the subjects, during which time data, in the form of field notes, are unobtrusively and systematically collected"[24] (Bogdan 1962 cited in Bogdewic, 1992 p. 46). Spradley (1980) describes the participant observer having a dual purpose, "to engage in activities appropriate to the situation and to observe the activities, people, and physical aspects of the situation" (p. 54). As a result, the participant observer is an actively involved participant and, at the same time, trying to be an uninvolved objective observer.

The term in itself is contradictory as 'observation' implies non-involvement, distance, objectivity and neutrality, whereas in practice this method requires immersion of the researcher in the other world with the intention "to share and understand the intimate lives of others, if only temporarily" (Kirby and McKenna, 1989 p. 78). Furthermore, Seale (1993 cited in Ferrier, 1998) notes that during the process of participant observation the researcher is learning from the people rather than studying them, this requires that trust become an essential element of the research process.

Participant observation can circumspectly appear to be too simple to be considered a research method as it simply validates and refines processes that we use in everyday life. However, Jorgenson (1989 cited in Bogdewic, 1992) furthers an understanding of the process when he describes how it is used to: uncover the insider's viewpoint, understand the here and now of everyday life, develop interpretive theories, facilitate an open-ended process of inquiry, generate an in-depth case study approach, allow the researcher to become directly involved in the

[24] This method is rooted in social and cultural anthropology and often attributed to Malinowski's method of data collection among the Trobriand Islanders.

lives of the observed and use direct observation as a primary data gathering device, with the aim of generating "practical and theoretic truths about human life grounded in the realities of daily existence" (Bogdewic, 1992 p. 46).

During the ten months that the author spent in the participating villages, he and his research assistants were involved with daily activities around the villages, including among others: living, sleeping, cooking, eating and bathing, taking part in sports activities, attending traditional ceremonies and church services, helping with house construction, and working in the rice fields and fruit tree gardens. They were also involved with many activities related to the PGIMS project, particularly at the outset. The author's observations were recorded in a daily journal describing events in a chronological order, in a field book and also using a tape recorder. During the one month that the gender consultant was in the village, a similar process was followed. The consultant, being female, was able to interact with women and observe them in a way that was not possible for the author.

During the participant observation process, open-ended interviews became a key tool in information collection. These are defined as opportunistic, often unplanned and informal exchanges that took place with respondents in varying locations, whether at the spring washing clothes, on the volleyball court or in people's homes. Information was gathered about a range of issues from opinions and suggestions about the PGIMS project through to local gossip and community concerns. Every member of both participating communities and other people throughout the region, were considered potential informants. As the research project progressed and the field research team spent a longer time in the villages, the responses from villagers became more in depth, frank and interesting.

4.2.2 Semi-structured interviews

Semi-structured interviews were conducted with key informants. Semi-structured interviews are a data collection technique conducted with a fairly open framework that allows for

focused, conversational, two-way communication between interviewer and interviewee. They can be used with a sample of the population both to give and receive specific quantitative and qualitative information relevant to particular issues (Davis-Case, 1990).

As Davis-Case (1990) notes, semi-structured interviewing is guided only in the sense that some form of interview guide provides a framework for the interview. Questions are not phrased ahead of time, and some are created during the interview, allowing both the interviewer and the person being interviewed the flexibility to respond to and probe specific areas of concern or interest. Respondents are also encouraged to ask questions of the interviewer. Interview techniques involve: probing replies to a question in order to clarify and uncover more layers of information; asking open-ended rather than leading questions; showing an interest and enthusiasm in learning from people; having second and third meetings with the same people and above all else enjoying the research process (Chambers and Guijt, 1998).

As a research tool used in rural communities in Indonesia, semi-structured interviews were relatively less threatening for respondents than the use of formal questionnaires. This is because they encouraged two-way communication. In this way they also served as an extension tool to inform people about the PGIMS project and to get to know members of the community better and allow members of the community to become better acquainted with the researcher. Semi-structured interviews were found to be an important tool to assess empowerment of individuals as a result of the PGIMS project.

Key informants were identified as people in the villages "who have special knowledge, status, or access to observations denied the researcher" (Bogdewic, 1992 p. 57). Gilchrist (1992) further describes them as individuals who have a special link with the researcher and are able to teach the researcher. During the PGIMS project key informants with 'special knowledge' were identified as community members with specialist local knowledge about social, cultural and political characteristics of the community and the region. These people were identified by other community members. Key informants with 'status' are community members who held pivotal

power positions in the community. These were identified by their position, such as the village head (*Kepala Desa*) or traditional head (*Kepala Adat*) in the community, or were recognized by their relatively significant contribution to decision-making outcomes during community meetings, or were identified as power brokers by other community members. Informants with 'access to observations denied the researcher' included people within the community who were trusted by the author to give honest responses about developments and issues related to the PGIMS project within the community. Informants with a 'special link to the researcher' referred to community members who were involved, supportive, had expressed a strong opinion or shown an interest in the PGIMS project. These informants were identified by their level of involvement in the project by the author.

Effort was made to interview women as well as men through conscious selection of women informants and through the use of a female gender consultant as well as a local woman to interview women in the community. Key informants from outside the village were vital resources in helping to contextualise the two participating communities in the wider geography and development in the region. These were identified as people with power positions in the regional government, including the Regent (*Bupati*), and other people recognized by local informants as playing an influential role in the region in respect to social, cultural and political affairs.

Semi-structured interviews were the most formal qualitative data gathering tool used in the communities during the research component of the PGIMS project. They were used from the middle of the second research field period (February, 2001) through to the end of the research project (May, 2002). The interviews were not conducted from the beginning of the project in order to give the villagers time to become adjusted to the researcher and the project in the village, as well as enable the interviews to be more relaxed and the respondents more accommodating of the questioning (as also noted by Bogdewic, 1992). The late inception of the interviewing also enabled the respondents to provide a more informed and critical view of the project. During the

course of the PGIMS project, a total of 60 semi-structured interviews were conducted with key informants from both partnering communities and from the wider region of West Kutai. Of these, 20 were women and 40 were men. Interviews ranged in duration from 45 minutes to 120 minutes. The number of completed interviews, combined with the quality of the responses, was considered satisfactory to use for in-depth analysis of the PGIMS project.

The approach to using semi-structured interviews was as follows:

- The research team designed a list of key informants and a plan for interviewing them.
- Before each interview, informants were informed verbally of how their data would be used, and how their rights to their data and to confidentiality would be safeguarded. Their consent was requested before the interview could proceed. This procedure is outlined in Appendix A and follows the requirements of the University of Victoria Human Research Ethics Committee.
- Interviews loosely followed an interview framework that had been designed previously by the research team. This framework consisted of eight broad questions and accompanying follow up questions and is described in Appendix B.
- Interviews were recorded on cassette so that the researchers could concentrate on the questioning and refrain from having to take detailed written notes during the interview. However, outline notes were taken. Interviews were conducted in *Bahasa Indonesia* (which the author speaks fluently) and *Bahasa Benuaq* (by the research assistants). Later the interviews were transcribed in full in *Bahasa Indonesia*. Interviews in the local dialect, *Bahasa Benuaq*, were translated to *Bahasa Indonesia*.
- At the end of each day of interviewing the information was discussed and analyzed collectively by the research team. Input from local research team members was important because of their intimate local knowledge of the community and local issues. It was important to compare the responses they were given with those given to the author.

Key themes were examined during these meetings and points from the discussion were written down.

- The semi-structured interview questions were constantly added to and modified. The researchers met regularly to identify areas of significance and knowledge gaps, to adapt the questions and to prioritize the choice of key respondents.
- The overall results of the analysis were occasionally presented to and discussed with community members.

There were some difficulties in capturing recorded data and transferring it into written form. Acoustics made for poor quality of audio recording in some meetings, especially in Benung's longhouse. There were times during the initial investigations when tapes or batteries ran out, or were not switched on, reinforcing the importance of also taking outline notes during interviews, rather than relying on memory.

4.2.3 Community meetings and multi-stakeholder workshops

During the PGIMS project, 17 meetings were organized and held in both the participating communities (5 in Benung and 11 in Tepulang). Two workshops were also held with stakeholders from throughout the region of West Kutai (see Appendix C for a complete list of the meetings and workshops held by the PGIMS project). The content and objectives of some of these meetings and workshops are also described in more detail in Chapter Six (Section 6.2).

Community meetings were a key source of information during the research component of the PGIMS project. The meetings and workshops provided an opportunity to discuss and assess the impact of the PGIMS project on both of the participating communities and the potential of PGIMS for the wider region.

In research terms these meetings acted as a form of focus group interview. Focus groups are a social science qualitative research tool used for studying ideas in a group context. "They provide a means for studying one of the cherished propositions of social science: 'the whole is

greater than the parts' " (Morgan, 1988 p. 5). In essence focus groups are a group interview, but rather than relying on the question/response format of an interview they rely on the interaction within the group based on topics provided. The hallmark of focus group techniques is the "explicit use of group interaction to produce data and insights that would be less accessible without the interaction found in a group" (Morgan, 1988 p. 12).

A total of eleven community meetings were held in Tepulang and six in Benung, including a meeting specifically for women held in each village, as described in Chapter Six (Section 6.2.1.2). These meetings were open to all and were attended by between 8 and 61 participants. This style of discussion meeting became an integral part of the project process. The meetings usually followed a broad agenda based loosely around several topics. Discussion was generally ordered and respectful. They provided the opportunity for community involvement and interaction in decision-making and providing opinions about the project. At the beginning of the project these village meetings were recorded in their entirety using a video camera or cassette recorder. Throughout the project detailed notes were also taken during the meetings.

One of the drawbacks of using community meetings as a tool for data gathering was that they did not provide a setting conducive to the involvement of all participants. Some community members appeared affected by having to perform, or reveal their opinions and feelings, in such a public setting. At times the meetings would become monopolised by the loudest participants. There were times when it also appeared that the author's presence caused comments to be stifled. The author speculates that this is due to people feeling that they might be directly offending the author if they were critical of the PGIMS project. A final key drawback with this style of discussion meeting is that participants, when particularly animated, would begin to speak *Bahasa Benuaq* with the result that the author could not follow the conversation in full. These drawbacks call into question whether the full extent of information was gathered.

Two multi-stakeholder workshops were held in the regional capital of Melak, these are discussed in more detail in Chapter Six (Section 6.2.2). During these meetings there were

opportunities for question and answer sessions. Also, participants split up into small groups of five to eight for brainstorming of specific issues related to the PGIMS project. Results from these group discussions were presented back to the plenary. These meetings were recorded in their entirety using a video recorder and all the written materials produced in the small group meetings were photographed using a digital camera.

4.2.4 Questionnaires

Questionnaires were not used in the collaborating communities because of fears that their formality might intimidate the villagers, as well as doubts concerning the quality of the information derived from their application, due to lower levels of question comprehension and literacy among older village residents. Since more time was available for data gathering in the communities, the preferred methods of participant observation, semi-structured interviews and focus group meetings were used, as described above. However, a questionnaire was applied at the two multi-stakeholder workshops held during the PGIMS project due to the shortness of time available for gathering information on participants' opinions.

The questionnaire was designed not to be excessively time-consuming. However, it used a limited number of open-ended questions to stimulate analysis and to obtain the undirected opinions of the respondent. These questions were based initially on a review of the literature and adapted to include the more successful and revealing of the questions used during semi-structured interviewing in the communities (see Appendix B). The resulting questionnaire consisted of two sections (the full questionnaire is shown in Appendix D). The first section inquired about background information including factual questions about the respondent's age, gender, ethnic origin and their job status or position in society. It then went on to request information on the respondent's level of knowledge of computers and computer software. The second section contained questions requesting the respondent's opinions of the information that had been

presented in the workshop and of the potential for PGIMS to be applied in a wider regional setting.

The first occasion at which the questionnaire was applied was at the multi-stakeholder dissemination workshop held in April, 2001. The workshop was attended by 36 participants, 27 of whom completed, or partially completed, the questionnaire[25]. The second occasion for applying the questionnaire was during the one week training workshop held in July, 2001 (described in Section 6.2.2). All 12 of the people trained in this workshop completed the questionnaire. During this second workshop the first section of the questionnaire was given out at the beginning of the workshop and the second section at the end.

4.2.5 Analysis of qualitative data

As a result of the multiple methods used, a large quantity of data was collected. These data were organised, transcribed, cross-checked and analysed both during and after the fieldwork.

Participant observation, the notes taken at community meetings and multi-stakeholder workshops and the responses in the written questionnaires[26] produced data in hand written form. The recordings of the semi-structured interviews, community meetings and multi-stakeholder workshops were transcribed directly onto the computer. Of the semi-structured interviews, 57 were fully transcribed and 3 were partially transcribed because much of the content was not relevant to the research. The recorded meetings and workshops were also partially transcribed for the same reason. Where necessary, dialogue in the local *Bahasa Benuaq* was translated by the research assistants to *Bahasa Indonesia.*

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[25] It is likely that illiteracy was the reason why some participants did not complete the questionnaire.

[26] The questionnaires also produced some numeric data; however, their potential for statistical analysis was limited as the sample populations were 27 and 12. It is recognized that a larger sample size would have enabled the testing of hypotheses, such as statistical analysis of the variability in responses between people of different societal backgrounds and roles.

Sometimes the data were contradictory and required cross-checking. Participant observation and open-ended interviews proved to be particularly important tools for reassessing situations where formal responses gathered from the semi-structured interviews did not concur with observed behaviour and emerging events.

The challenge in the analysis phase was in determining what information was important. The research question was used to narrow down the data and focus on issues related to empowerment. These issues emerged through categorizing expressions, responses and opinions from interview data and triangulating and combining them with observed events which could be used to indicate empowerment. In the end, analysis was not as complex as anticipated. Ristock and Pennell (1996) suggest a structured approach for developing categories from research participants' responses, involving seven steps. These are:

1. Listen closely to what research participants are saying;
2. Compare their statements;
3. Notice interesting and reoccurring themes;
4. Give a name to each theme (categorizing);
5. Check each category against more statements;
6. Clarify each category against the other categories being developed; and
7. Reshape the categories to fit the participants' statements.

The above approach was used to determine 'indicator' categories. Key points were transcribed from the field notes and other transcribed data into the computer; these were then colour coded using word-processing software[27]. New categories were added as themes emerged. Some points were double coded (in other words they were representative of several themes). This method was flexible enough to allow for reordering and rethinking. The investigation initially began with many codes; these were cut back significantly as analysis progressed. Specific

[27] The author opted not to use any analytic software package, such as NUD*IST, partially because all transcribed data was in Indonesian, adding complexity to the analytical process.

categories used to indicate empowerment and empowerment capacity are presented in Chapter Seven.

4.3 QUANTITATIVE TOOLS

Quantitative data were also gathered during the PGIMS project. These included the monitoring of the computer usage in both communities and the collection of secondary data on village demographics.

4.3.1 Computer usage monitoring

FindOut!® computer monitoring software was installed on the computers in both villages. Computer monitoring provided quantitative data about computer use, such as the time and date the computer was used, the duration of use, the software being operated and what information formats (i.e. file types) were being stored on the system. These data were used to build a profile of how the computers were being operated and to determine a level of importance associated with a particular program or information format.

Benung's computer was monitored from November, 2000 until March, 2002. Tepulang was monitored from March, 2001 until March, 2002[28]. Monitoring was not done covertly. Both communities were informed during a community meeting of the purpose of the software and of how the data would be used. They were also told that data would be gathered anonymously, as the purpose was not to profile individuals but rather to assess total computer usage in the community. Following this, permission to use the software was requested and granted.

FindOut!® generated a large amount of quantitative data. This data was managed and analysed using Microsoft Access® and Microsoft Excel® software. One problem with the monitoring software was that the final five months of Benung's monitoring data and the final four

[28] This discrepancy between the two villages in the monitoring periods was the result of a fault in Tepulang's computer, causing the first four months of monitoring data to be lost.

months of Tepulang's could not be referenced to specific times and dates because the battery on the computer motherboard ran out, disabling its clock. For this reason, the data on computer usage were averaged over the time period in which they were collected, making it impossible to see what variation had actually occurred over those final months. To understand the variation observed in the earlier months, information collected in the author's field journal proved to be very useful for cross-referencing data gathered from the computer monitoring software with events in the field.

4.3.2 Community monograph

Every village secretary in Indonesia maintains a community monograph (*monografi*) that contains the basic demographic statistics of each person living in the village. This includes information about the date of birth, religion, sex, marital status, position in the family, number of children, education and employment. They provided some useful profiles for comparing demographics, education levels and migration patterns in both villages.

In both villages the monographs contained obvious gaps and omissions, were rarely updated and contained inaccurate data, especially when describing the age of the older members in the community. Checking the data with the village chief and secretary helped to improve the reliability of the data. The monograph data were then incorporated into a Microsoft Excel® spreadsheet for descriptive analysis.

CHAPTER FIVE:
RESEARCH SITE

This chapter describes the geographic, social, historical and political environment in which the research took place. It begins with an overview of Indonesia (Section 5.1); it goes on to discuss West Kutai, the administrative region in Indonesia where the research project took place (Section 5.2); and then describes Benung and Tepulang, the two villages that participated in this research project (Section 5.3).

5.1 INDONESIA

5.1.1 Geography

Indonesia is an archipelagic nation of 13,667 islands, an estimated 6000 of which are inhabited (see Figure 5.1). These include five main islands (Sumatra, Java, Kalimantan, Sulawesi, and West Papua), two major archipelagos (Nusa Tenggara and Maluku Islands), and sixty smaller archipelagos (Frederick and Worden, 1993). The capital of Indonesia is Jakarta, located on Java. The total area claimed by the nation is 7.9 million square kilometres, the bulk being seas and ocean. The total land area of Indonesia amounts to 1.92 million square kilometres (Frederick and Worden, 1993).

Indonesia's climate is classified as a tropical, hot, humid climate. There is little variation in temperature because of almost uniformly warm waters that surround the archipelago. Through much of Indonesia the dry season lasts from June to September, and the rainy season from December to March (Frederick and Worden, 1993).

Indonesia has vast and diverse natural resources, including timber, oil, natural gas, rubber, palm oil, coal, tin, copper and gold. Since the end of the 1970s, Indonesia has been

relying on these natural resources, particularly its forests, to support national economic development (Kartodihardjo and Supriono, 2000). Different types of tropical forest, with variable rates of use and degradation, comprise the 1.47 million square kilometres of forested area estimated to exist in Indonesia: this is 77% of the total land area (Gautam *et al.*, 2000). As a result of this developmental pressure, Indonesia's forests are now "in crisis" (Chidley, 2002 p. 1). Forest degradation and conversion have accelerated to over 1.5 million hectares per year (Gautam *et al.*, 2000) and the nation's forests continue to be seen purely as a means for "generating much needed revenue and bestowing political patronage" (Chidley, 2002 p. 1). Little regard is given by the political decision-makers to the local communities dependent on the forest for their survival.

Figure 5.1Map of Indonesia, showing the location of the island of Borneo.

5.1.2 Ethnicity

Indonesia is a pluralistic society, with its 262 million people divided among more than 300 distinctive ethnic groups (Suryadinata, 2002). The overall collage is dominated by the ethnic groups living on or from the islands of Java and Madura, which comprise 68% of the total population of Indonesia.

The nation's religion is primarily Moslem at 87%, followed by Protestant (6%), Catholic (3)%, Hindu (2%), Buddhist (1%), and other religions (1%) (Frederick and Worden, 1993). Indonesia officially accepts all five religions listed above; nonetheless, religious tension and conflict exist in some places.

5.1.3 Political history

Indonesia was under Dutch colonial rule for more than three centuries. The disadvantages the population suffered at the hands of Dutch rule became the impetus for the growth of a strong nationalist sentiment in the post independence decades and has in many ways served to shape the modern political climate in the country (Chareonwongsak, 2001). This section will outline some of the major developments of Indonesia's post-independence period.

5.1.3.1 The Old Order (1945 - 1965) – "Guided Democracy"

Indonesia proclaimed independence from the Netherlands on August 17th 1945 and named Sukarno as the country's first president. This unilateral proclamation gave rise to the 'Revolution', an armed uprising against the Dutch who resisted ceding power, which eventually led to the formation of the Republic of Indonesia in 1950. The Revolution has become a defining episode in modern Indonesian history and a powerful element in shaping the new nation's self perception and identity (Ricklefs, 2001).

Despite the euphoria of independence won through struggle, the new state faced ethnic, religious, and social divisions throughout the archipelago. The early 1950s saw experimentation with parliamentary democracy. This failed and Sukarno replaced it in the 1959-65 period with 'Guided Democracy', a form of benevolent dictatorship (Frederick and Worden, 1993). Guided Democracy was a "fluid system, born of crisis and constantly changing...that was dominated by the personality of Sukarno" (Ricklefs, 2001 p. 312). Sukarno had a vast following amongst the

peasants, but his power base rested on the support of two antagonistic groups: the Armed Forces of the Republic of Indonesia (ABRI) and the Indonesian Communist Party (PKI).

The Guided Democracy phase became one of the more dysfunctional periods in modern Indonesian history. It ultimately led to national isolationism and ostracism from the global theatre. Famine ensued, as did general discontent because of obvious and growing levels of "extravagant corruption and hypocrisy" (Ricklefs, 2001 p.341).

5.1.3.2 The New Order (1965 – 1999) – "Mandated uniformity"

In 1965 Major-General Suharto forcibly took power in a bloody coup that led to the deaths of up to half a million people, mainly people from the PKI and ethnic Chinese (Chareonwongsak, 2001). Suharto appointed himself as president and established what became known as Indonesia's period of 'New Order'. From the outset he adopted a strong anti-communist stance, legitimised the role of the armed forces in politics and institutionalised the *Pancasila*[29] as the ideological foundation of all groups in society; these measures contributed to a tightly controlled, centralized system.

Friendly ties were restored with Western countries and Japan, and Indonesia began to accept large amounts of Western and Japanese aid and private investment (Frederick and Worden, 1993). During this period a strategy of national development via industrialized capitalism led to a period of rapid economic growth and helped dramatically to upgrade the general standard of living (Ricklefs, 2001). By 1984 Indonesia was able to meet domestic demand for rice production. The sale of oil and timber has been an important means of generating revenue for national development. This was particularly important during the initial stages of the New Order

[29] **Pancasila:** The Five Principles: 1. Belief in only one God; 2. Just and civilised humanity; 3. The unity of Indonesia; 4. Democracy guided by the wisdom of deliberations among representatives; 5. Social justice for all Indonesian people.

period when huge price rises during the oil crisis of the 1970s helped to kick start the economy (Ricklefs, 2001). This economic boom helped foster substantial domestic support.

The disproportional distribution of wealth became a primary restriction to further growth. The gap between the poor and the rich grew. Such conditions dissatisfied the poor and caused occasional hostilities. Moreover, migration into big cities increased resulting in a profusion of slums and crime (Chareonwongsak, 2001).

Groups outside of Indonesia began to question whether Indonesia was economically viable and had, despite appearances, made real and tangible progress toward development. Critics argued that the nation was dependent on foreign aid and that only a small and unproductive elite had enriched itself as a result of modernization policies. The less critical noted the government's conservative fiscal management, investment in infrastructure, and concern for material improvement at the village level (Frederick and Worden, 1993).

People also began to note that the New Order regime had tightened rather than loosened social hierarchies, preventing significant modernization and social change. The government was noticeably heavily staffed with military personnel and "its policies were distinctly anti-populist, intent on improving the New Order's own position by keeping the village populace sealed off from change and power" (Frederick and Worden, 1993). The military did not intend to democratize Indonesia and had minimal respect for human rights and basic freedoms (Frederick and Worden, 1993). This led critics to believe the New Order was politically unviable because of its authoritarian and coercive nature.

For a long time, many in Indonesia were "prepared to tolerate much of the corruption and some of the oppression exercised by the regime because of the benefits" (Ricklefs 2001 p. 366). However, rising Islamic sensibilities, diminishing foreign support for the despotic administration due to easing Cold War tensions, and finally a downturn in the economy due to the Asian financial crisis in 1997 led to the general population rejecting the government through open

protest. This resulted in the swift disintegration of the New Order regime and the resignation of Suharto.

5.1.3.3 The Post New Order (1999 to Present) – Reformasi and regional decentralization

Habibie stepped into the position of interim president on 21 May, 1998. He faced a population demanding political reform, or *Reformasi*[30] (Budiman *et al.*, 1999). Although he implemented a number of reform based policies, there was a popular belief that, because of his close associations with Suharto, he still represented the remnants of the New Order regime. Habibie was swiftly replaced by the first democratically elected president Abdurraham Wahid, or Gus Dur as he is more commonly known.

Unlike previous presidents Gus Dur represented civilian rather than military interests. He actively attempted to disengage the military from politics (Suryadinata, 2002) and appeared to be committed to reform. However, he failed to turn around the deepening economic crisis and was unable to redefine a national identity during this period of tumultuous change. Along with accusations of cronyism and increasingly open conflict with the nation's legislative body, these failures led to his impeachment.

Megawati Sukarnoputri, the daughter of the first president Sukarno, replaced Gus Dur in July, 2001; she remains in office to this date. Since her coming to power Indonesia has regained a modicum of political and economic stability. However, the country remains in danger of losing its reform momentum and is rocked by growing ethnic separatism and religious conflict.

There is little doubt that democratic reform is occurring within Indonesia and that political power is gradually ebbing away from the Jakarta-based elites. A new, more fragmented array of influential players, including newly elected politicians, their respective parties, and bureaucrats, are emerging. This power shift is partly due to sweeping national reform, but also

[30] The term *Reformasi* is used ubiquitously throughout Indonesia and designates "an ideal state, a process, a clichéd slogan and a state of mind...it implies the aspiration of democracy" (Budiman *et al.*, 1999).

due in a large part to specific legislation on political decentralization. Law 22/1999 on Regional Governance and Law 25/1999 on Fiscal Balance between the State and Regions were introduced by Habibie to redefine the role of government in Indonesian society. These laws were instituted on January 1st, 2001.

The main effect of these laws was to decentralise many key responsibilities, power and authority from the centre, Jakarta, to the regional level (these regional administrative units are called *kabupaten*). This was done with the intention of "cracking open the blockage of an inert central bureaucracy, curing managerial constipation, giving more direct access for the people to the government and the government to the people" (Malo, 1997 p. 1). It was hoped that decentralization would stimulate grassroots participation in regional level development planning and generate policy that was responsive to local communities needs and aspirations (Achnas, 2001). It is still too early to assess the impact of the policy.

A more practical reason for decentralization is due to the rising ethnic conflicts, provincial level secessionist movements and widespread discontent felt throughout Indonesia. The legacy of the Dutch colonial period was to create the boundaries of a nation state that ignored and cut across cultural and ethnic groupings. Since independence a primary goal of politicians and the army has been to maintain national integrity, foster unity and spread national consciousness (Kooistra, 2001). This was achieved through introducing common principles such as the adoption of *Bahasa Indonesia* as a common language, the state ideology of *Pancasila* and a controlled and manipulative education system and mass media (Leigh, 1999). Despite these attempts at homogenization it became increasingly obvious to the more marginalized ethnic groups around the archipelago that these strategies were enriching and reinforcing the dominance of the Javanese people, who controlled the politics, army and to a large extent business in the nation.

Within this unstable environment decentralization was considered a way of appeasing the regions' demands for equality and justice, while preventing the nation from fragmenting. To

devolve power to provinces (a far larger and potentially powerful administrative unit) was likely to exacerbate calls for secession. By devolving power to the regions, considered too small to make such claims, the central government could still maintain elements of control over the nation as a whole.

Despite the optimistic claims for decentralization, lack of managerial experience and legal frameworks to handle the shift at the regional level has impeded the transition to devolved governance. Within this context "Indonesia's natural resources are now a major flashpoint for conflicts" (Read and Cortesi, 2001 p. 6). There also remains suspicion that powerful vested interests will prevent the regions from fully realizing the potential of the law's provisions and that "under the new law [regions] will simply become the implementers of central government policies" (Kooistra, 2001 p. 27). There also continues to be fear of ongoing corruption. A survey conducted in December 2000 by the Centre for Strategic and International Studies in Jakarta reported from its research that 64% of respondents in their nation wide survey felt corruption was still a problem (Achnas, 2001). This is in part due to a lingering mindset in the public service generated and perfected during 30 years of New Order rule.

5.1.4 Adat

"The godly laws, revealed in mythical times and transmitted through the generations, form the corpus of adat, a set of rules touching every aspect of the individual and social life, including what we call religion."

Sellato, 1989 p. 36

In a country as ethnically diverse and geographically diffuse as Indonesia it is unsurprising that a wide variety of local traditions, laws and customs exist. In Indonesia the term *adat* is used to encompass this variation. *Adat* is a complex term that describes customary law, or the body of tradition that sets out how individuals relate to each other with respect to marriage,

divorce, inheritance, land and property rights (Hooker, 1978). The term is also used to cover "religious rituals as well as non-religious forms of socially regulated behaviour"(Rousseau, 1998 p. 6). Rousseau (1998) goes on to speculate that as a meta-definition *adat* is "socially-established activity." Like most forms of local knowledge *adat* is not static, it has evolved through generations and has been "sustained through practice and orally...little exists as written documents" (Chidley, 2002 p. 5).

Adat has been poorly understood and acknowledged under Dutch rule and the successive post-independence Indonesian governments. As a result it has never been allowed to fit within the national legal and administrative scheme. This is primarily because claims to *adat* rights were perceived as a threat to national unity and development. The 1945 Indonesian Constitution, drawn up by the first Indonesian president Sukarno, explicitly notes that the state has the right to "manage all resources above, below and on the ground for the well being of its entire people" (Clause 33, Sub-Clause 3). This was further exacerbated by The Basic Forestry Law No. 5/1967 which effectively ratified the national government to 'control, manage, and administer all state forest lands'[31]. These laws became the foundation for repressive and exploitative measures imposed during the New Order regime and "underpins all land and natural resources conflicts in Indonesia today" (Chidley, 2002). Chidley (2002 p. 5) notes "*adat* forests were claimed as state lands; *adat* land and resource tenure were not recognized; *adat* systems of forest management were disregarded."

This severing of the people's traditional link with their land also helped contribute to a decline in all facets of *adat*. As noted in the Congress of Indigenous Peoples of the Archipelago position statement of 1999, "Indigenous peoples' understanding and control over our own natural wealth have been destroyed by policies which enforce social and cultural uniformity" (Down to Earth, 2000). It also states that *adat* beliefs, "which lie at the heart of their understanding of the

[31] Even the recent reworking of the Forestry Act does little to recognize *adat* or ancestral rights over forest resources on traditional lands.

world are gradually being lost, especially to the younger generation. Traditional knowledge...is not part of the formal educational curriculum" (Down to Earth, 2000).

Moves have been made during the post New Order era to recognize *adat* and *adat* rights over ancestral territories. This is partially and debatably being achieved through decentralization policies. It is also being sought through the formation of new organizations and alliances that are now more tolerable in the new era of '*Reformasi*' and open democracy. In March, 1999 the first Congress of Indigenous Peoples of the Archipelago was held in Jakarta. AMAN, the Alliance of Indigenous Peoples of the Archipelago was established at that event. During the congress the group declared that:

> *Adat* is supreme and forms the very basis of indigenous peoples' lives. The *adat* systems of the archipelago are complex and diverse; there is no place for uniform state policies. Long before the Indonesian nation was created, indigenous peoples developed their own social systems based on their own needs and understandings. The state must respect this. (Source: Down to Earth, 2000)

There are conceptual similarities between *adat* and local knowledge (described in Chapter Two). The documenting and communicating of *adat* became a focus for the two communities participating in the PGIMS project and will be discussed in greater detail in Chapter Seven.

5.2 WEST KUTAI

5.2.1 Geography

The southern two-thirds of the island of Borneo is under Indonesian control; this area is known as Kalimantan, and is divided into the provinces of West, Central, South, and East Kalimantan. The northern third of Borneo is comprised of the Malaysian states of Sabah and Sarawak, and the small nation-state of Brunei Darussalam. West Kutai is one of the eleven administrative regions (*kabupaten*) of East Kalimantan province. It is a land locked region

spanning the equator and located upstream along the River Mahakam (see Figure 5.2). The regional capital of West Kutai is Melak.

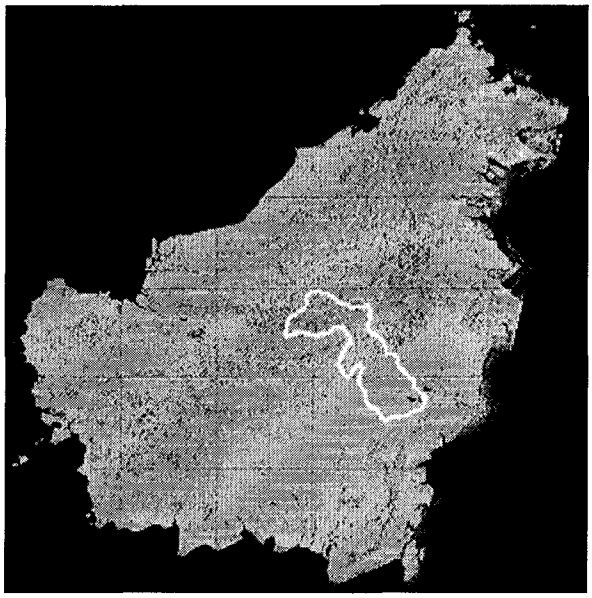

Figure 5.2 RadarSat composite image showing the boundary of West Kutai on the island of Borneo

West Kutai is approximately 3.3 million hectares in size and is further divided into 15 subregions (*kecamatan*) and 205 villages (*kampung*). Of the total area 1,481,000 hectares is assigned to production forest, 744,000 hectares to unopened forest and 5,500 hectares to protected forest. The remaining 932,000 hectares is assigned as non-forest cultivation, which includes agriculture (KK-KPD, 2001). Agriculture is primarily shifting rice swidden (*ladang*), although recent statistics indicate 34,000 hectares is now being farmed under intensive wet rice (*sawah*) (KK-KPD, 2001). West Kutai is highly dependent on its natural resource base. Mining provides 43% of the region's income and forestry and agriculture 30% (KK-KPD, 2001).

The entire region remains difficult to access from the outside. The primary means of transport to and from Samarinda, the nearest large urban centre and capital city of East Kalimantan, is by a 20 hour boat journey. A partially metalled road links the region to the outside world, but it is unusable for a large part of the year because of seasonal flooding and rains. There

is an airport in Melak, the regional capital; however, since removal of governmental fare subsidies in 1999 there has been no service.

Inside the region infrastructure is also minimal. There are approximately 100 kilometres of metalled road in and around Melak. Outside this area, transportation is limited to rivers and active and decommissioned logging roads (see Plate 1). At the time of writing this thesis, there is a large road building project underway in the region. This has involved widening existing dirt roads and building a metalled road between two of the principal regional towns, Melak and Damai.

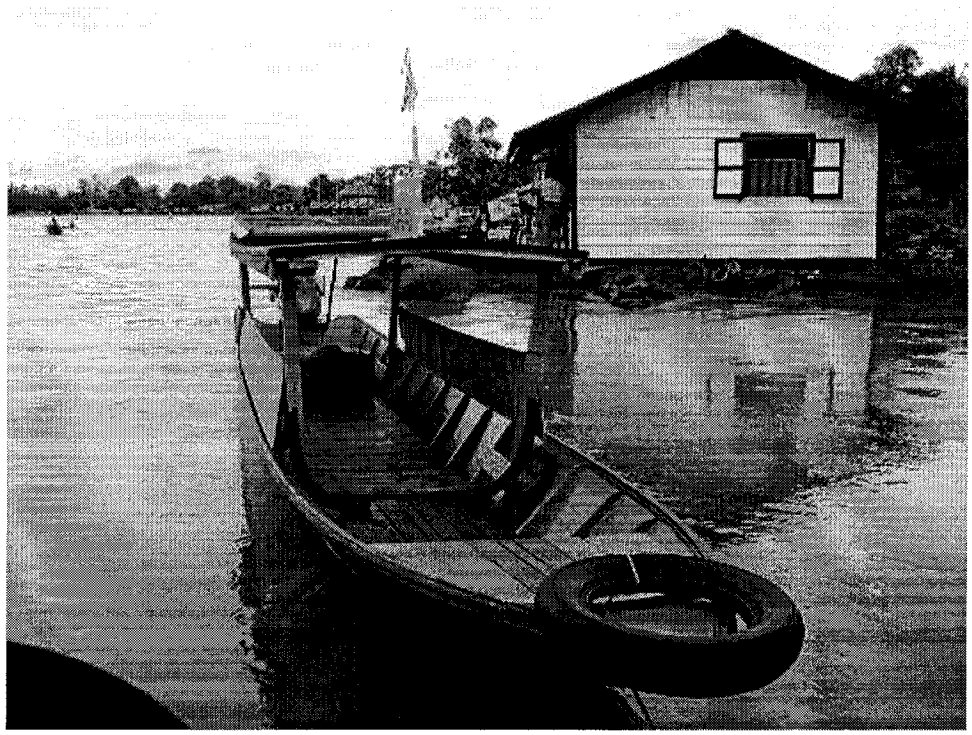

Plate 1 Transportation to and from West Kutai is limited to rivers

Serious efforts are being taken by the administration to improve the telecommunications capacity in the region. According to Hardi (personal communication, 10 December, 2002) at present there are 129 telephones, primarily in and around Melak. Public telephones exist in all major towns. There are plans to introduce cell phones into West Kutai, with the intention of

having a telephone in every village in the region, without the expense of having to lay telephone cables. There are also plans to develop a regional television station and to open up an internet café.

Electricity production using oil fired generators is a relatively new development in the region. The major towns and some adjoining villages are now on the grid, but in many more remote villages electricity is still not available.

Recent developments in access to computers in West Kutai have been striking. During the course of the research project (1999 - 2002) the region went from having virtually no computer services available to three computer rental/repair shops and four private computer training schools.

In West Kutai primary schools are available in or close to most villages. Junior and senior high schools are located in the major towns. However, the quality of the education offered is not considered to be high. Many families with the financial means send their children to Samarinda for high school education. In May 2000 a university was established in Melak. At the time of writing this thesis there were 400 students enrolled in part time courses and 70 members of the teaching faculty. The rector D. Wilson (personal communication, 8 December, 2002) states that 50% of these students are government officials.

5.2.2 Ethnicity

The total population of West Kutai stands at 156,423 (KK-PKD, 2001). Of this population, 90% are Dayak. The term Dayak - literally meaning 'those of the upriver' (Hopes *et al.*, 1997) – is used to denote collectively all the indigenous ethnic groups who inhabit the inland areas of the island of Borneo. The Committee for the Development of the Dayaks of East Kalimantan (PDKT) (personal communication, 10 October, 1999) notes that there are a total of 12 distinct ethnic Dayak groups in West Kutai. The Benuaq and Tunjung, two closely related ethnic Dayak groups, dominate the downstream and administrative areas of the region.

According to M. Hopes (personal communication, 15 July, 2001) these groups have a disproportionately large influence in the regional and provincial government, and in decision-making mechanisms.

There also exist several transmigration sites comprised of people transferred to this area in the New Order era; these people are primarily from the islands of Java and Madura. Their sites tend to be located close to the region's major towns.

5.2.3 Political history

5.2.3.1 Before decentralization

During the periods of Dutch colonialism and subsequent centralized Indonesian governments, Dayak groups struggled to maintain their traditional culture and their primarily agricultural and forest-based way of life. From the immediate post-colonial period until January 1st, 2001, West Kutai was a part of Kutai, a much larger region administered from Tenggarong, a town 200 kilometres downstream from Melak (see Figure 5.3). The regional government at this time was to a large part controlled by the central Jakarta-based government. This government, staffed mainly by non-Dayak appointees, was physically and culturally far removed from local Dayak communities. As a result the government did little for the Dayak people, instead supporting the appropriation of valuable natural resources by the dominant outsider ethnic groups and economic elites for their own material benefit (see Dove, 1993). The government perceived Dayaks as backward and actively intervened to 'develop' them; for example by supporting communities to move out of 'primitive' traditional longhouse settlements into individual houses (Gönner, 2000).

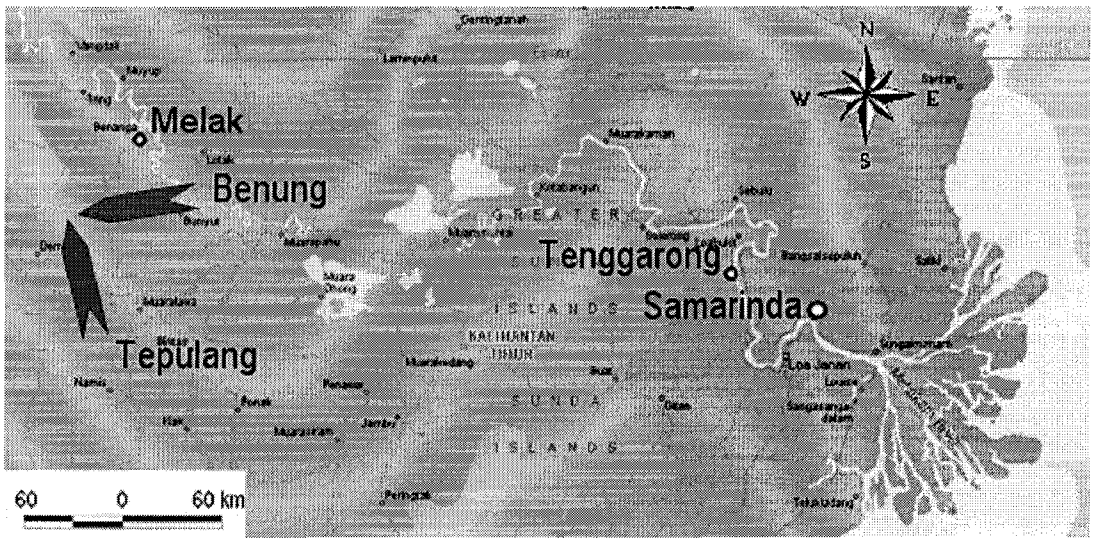

Figure 5.3 Map showing location of Tenggarong; the old regional capital; Melak, the new capital; and the two village research sites, Benung and Tepulang

5.2.3.2 Decentralization

As a result of Law 22/1999 on Regional Governance, Kutai was subdivided into three regions, of which West Kutai was one. West Kutai was officially created on 1 January, 2001. This entailed the formation of a whole new regional government and legislative assembly as well as the mechanisms, infrastructure and regulations needed to ensure they could run effectively. The new government inherited a non-existent industrial base, an outdated infrastructure and was desperately short of locally born public servants with the requisite qualifications and experience. Despite this, the region's population was very supportive of the new administration. The main reason for their enthusiasm was that for the first time their government consisted mainly of people from their own ethnic groups. The government was physically closer to most of the population and could be accessed, lobbied and held accountable for their actions.

On 28 March, 2001, Rama Alexander Asia, a Benuaq Dayak with a strong record of public service, was instated as the first *Bupati* or regent of West Kutai, after a sweeping election victory (see Plate 2). His inaugural ceremony was attended by thousands of people from

throughout the region. Among other things, the new *Bupati* initiated a number of forward looking and populist policies that called for greater community participation in regional governance. As he stated "the communities have the land, their culture and the manpower. They had these things even before Indonesia existed. The state must not crush these basic rights" (Rama Asia, 2001 cited in Read and Cortesi, 2001).

Plate 2 First *Bupati* of West Kutai Rama Asia involved in a traditional local ceremony.

5.3 VILLAGE RESEARCH SITES: BENUNG AND TEPULANG

Two neighbouring Benuaq Dayak communities participated in this research project. Their geographic closeness means that they share many similarities in their traditional way of life, as well as similarities in the changes that this way of life is currently experiencing. This section begins by explaining why these two communities were selected for this project. It then goes on to describe the area in which the research took place, followed by a description of the distinctive features of each village.

5.3.1 Site choice

From October to December of 1999, visits were made to West Kutai and Malinau, two regions in the province of East Kalimantan, to identify potential NGOs and communities to collaborate with in this research project. It soon became apparent that the NGO *Sistem Hutan Kerakyatan* (SHK), or the Consortium for the Revitalisation of Traditional Forest Management Systems, would be a good partner organisation. SHK is a well-respected institution that has worked extensively in West Kutai, whereas there is no equivalent NGO working in the region of Malinau. Many SHK members are themselves Benuaq Dayak from West Kutai; they therefore understand the local customs and culture, have an appreciation for the challenges faced by the local communities, and are able to speak the local *Bahasa Benuaq*. This, plus other social (Malinau communities were larger and more complex and were experiencing more internal conflict) and logistical reasons (West Kutai was relatively more accessible) made working in West Kutai with SHK a logical choice. Discussions with SHK about research plans, combined with previous experience in working together with the author, led to their agreement to collaborate in this project. It is recognised by the author that these special relationships described above do affect the replicability of this research.

The researcher decided to work with two communities in order to have some form of comparative analysis. The neighbouring villages of Benung and Tepulang were chosen because they had an existing working relationship with SHK, which has maintained a field station in the village of Tepulang since 1997. This station was staffed by a SHK field manager, Rudi Ignatius, a person highly valued in the community and involved in village activities and decision-making processes. It was anticipated that working in these communities would help to minimize risks of failure and shorten the time needed for the start-up of the project. To work in 'new' communities would have required a longer process of gaining familiarity and building trust between the researcher and the communities.

Another advantage to working with these villages was that both Benung and Tepulang already possessed maps of their traditional territories. These maps could be used as base maps for the PGIMS project, again saving much valuable time for the research team.

Geographically the two villages are located approximately seven kilometres apart. Culturally they are comprised of people from the same Benuaq Dayak ethnic group; they also share family links through intermarriage. The many similarities between the two villages were felt to be an advantage to this research project, as it limited the possible causes of any observed differences in their responses to the introduction of this project. The most noticeable differences between the communities are in their dwelling types, demographic composition, educational levels, political leadership, decision-making process and political representation outside of the village. These differences will be described in more detail in Section 5.3.4 below.

5.3.2 The Benuaq Dayak culture

5.3.2.1 Geography

The Benuaq are based in a well-defined geographic area in the mid Mahakam region of West Kutai. The two villages of Benung and Tepulang are located approximately 250 km west of the provincial capital Samarinda, close to the River Idaatn, a small tributary of the larger Kedang Pahu Hulu watershed (see Figure 5.3 above). Compared to some Dayak groups inhabiting the island of Borneo, the Benuaq are relatively small in numbers. There are no government statistics on their total numbers, although Rama A. (personal communication, 16 June, 2001) believes the number to be around 25,000.

5.3.2.2 Traditional land and resource management

The Benuaq are traditionally rural swidden (*ladang*) agriculturalists. For many Benuaq, as indeed for all non-nomadic Dayak groups, rice holds a very prestigious position in their culture. It is "the source of life and its cycle is heavily accompanied by taboos and rituals"

(Sellato, 1989 p. 39). Furthermore the agricultural system of making the rice field or *ladang*, requiring the annual clearing of secondary forest, is a common point of cultural identification for many Dayak groups (Herjon and Natalis, 2001). Most households, including the full-time teachers and even government workers, cultivate rice in their *ladang*.

The Benuaq are also renowned for their sophisticated system of fruit tree and rattan cultivation, which takes place in the fallow periods between rice crop rotations (Weinstock, 1983; Mayer, 1989; Godoy, 1990; Fried and Mustafa, 1992; Abdoellah *et al.*, 1993; Gönner, 2000; Belcher, 2001). They also rely on the primary forest for timber and many other plant species (Gönner, 2000). Family groups often have a number of head of livestock, including pigs, cows, chickens and occasionally water buffalo. Meat protein is also supplemented by fishing and by hunting wild boar and deer in the forest.

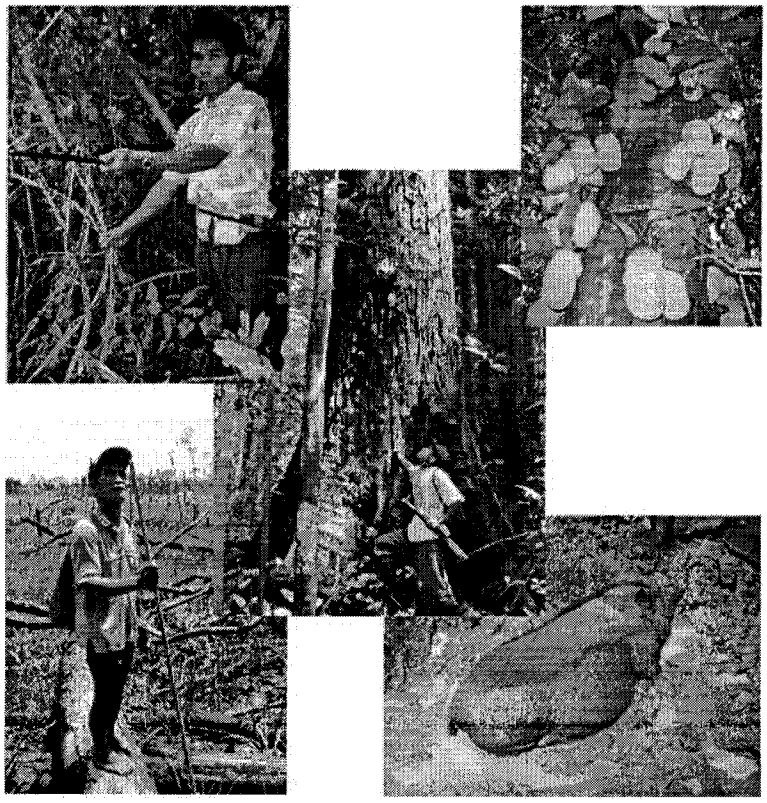

Plate 3 A man in his rattan grove (upper left); a *cempedak* fruit tree (upper right); a man standing beside a *meranti* tree in the primary forest (centre); a pig raised in the village (lower right); and a man standing in his *ladang* (lower left)

Land tenure in both villages is based on the family and the individual (often the head of the household). The person who first clears a piece of primary forest (*bengkar*), normally for *ladang*, may claim ownership of the land. Land is inherited within the family and equally divided among the children. Most accessible land around the villages and transport routes are now usually owned individually according to the traditional *adat* law and often contain fruit tree gardens (*simpukng*) or rattan groves (*kebun rotan*). Most of the primary forest that is still some distance from the village remains communally owned. There are usually *adat* laws that regulate its use (Gönner, 2000).

5.3.2.3 Religion

The Benuaq are a subgroup of the Ot Danum (Herjon and Natalis, 2001), which in turn belongs to the Barito language family, Borneo's largest language group originating from Central Kalimantan (Sellato, 1989). The main reason to put the Benuaq into the Barito group, besides linguistic relations, is because of their "sophisticated religious beliefs" (Sellato, 1989 p. 21), which include the shamanistic curing rituals and secondary mortuary rites found among all groups of the Barito-speaking Dayaks.

As in most groups throughout East Kalimantan, the Benuaq have largely converted to Christianity, in their case Catholicism. However, in contrast to other parts of Borneo, the traditional belief system remains an important aspect of daily life. This retention of local culture can partially be explained by the approach used by the Catholic missionaries who have been very successful in the area since 1906. Unlike the Protestant missionary groups who missionized most of the area in Northern Borneo, the Catholics in this area employed an approach referred to in the local monastery as '*akulturasi*', thought by the author to infer acculturation[32] (as described by

[32] In the Anthropology literature acculturation refers to "reciprocal modifications that occur when individuals from two or more different socio cultural systems come into contact" (Spindler, 1997).

Spindler, 1977). In West Kutai *akulturasi* was done with the justification that it was better to assimilate parts of the existing belief system into Catholicism than require the total rejection of all remnants of the original belief system.

Gönner (2000) claims that a further reason for the survival of the Benuaq religion is its open and adaptable character, which has always incorporated new elements originating from other belief systems, including the supreme deity *Lantalah.* Gönner (2000) quotes Weinstock (1983) as "saying "*Lantalah* is an exogenous concept probably influenced by Islam (Allah Ta'ala) and Hinduism (*maha* = great)."

Inclusive to this is the belief that spirits (*roh* and *wook*) dwell in the forest. The spirits must be treated in an appropriate way or else they pose a threat of disease and misfortune (Gönner, 2000). "Sickness is caused by a malevolent spirit who abducts and retains the human soul...or dwells in the [sick person's] body" (Sellato, 1989 p. 39). Rituals to appease forest spirits at the start of a new agricultural season (*beliatn nalitn tautn*) or the opening up of any forest are still prerequisite (Anon, 2002) – see Plate 4.

Plate 4 A *Beliatn nalitn tautn* performed in Lambing, West Kutai

The Benuaq perform secondary mortuary rites (*kwangkai*) on a person's remains any time up to one year after death. The timing of the ritual depends more on the ability of the family of the deceased to organize and give an impressive and expensive feast. It is the expense of the *kwangkai* in the past that has limited its practice to wealthy families (Sellato, 1989). Besides their ceremonial focus, including the nightly recitation of myths (*temputn*[33]) (Hopes *et al.*, 1997), the *kwangkai* are great social events (Gönner, 2000). They attract people from throughout the area, especially at the time of the final sacrifice of the water-buffalo(s), which can range in number from 1 to as many as 20 (see Plate 5), where the more valuable the sacrifice, the better the position of the deceased in the afterworld (Sellato, 1989). Hundreds of guests congregate to gamble at *tongkok*[34] or cock-fighting (*saukng piaq*) or simply to meet with family and friends. Gönner (2000) notes that much of the previous year's income is redistributed during these events.

Plate 5 Buffalo sacrifice during *Kenyau* ceremony

[33] *Temputn* are myths that recount the history of the world and "the complex and ambivalent relationships that exist between humans and different groups of spirits" (Hopes *et al.*, 1997 p.1). They have been passed between generations. Yet they are not simply narratives, they actively seek to influence outcomes by encouraging the intercession of spirits in real world events. Furthermore they "encapsulate "the most fundamental concepts and beliefs that animate Benuaq...Dayak culture" (Hopes *et al.*, 1997 p.2).

[34] A game of chance involving gambling on the probability of your side of a square being chosen by a coloured cube.

At the community level the smaller *belian* healing ceremonies are also of social importance (see Plate 6). They are managed by an extended family and shamans often include close friends. They provide the opportunity for long social nights to discuss the respective illness, as well as other issues and culminate often with the sacrifice of, and subsequent feasting upon, one or two chickens and pigs. Gambling has also become popular at these smaller events.

Plate 6 Belian Sentiyu healing ceremony conducted in Benung

Most Benuaq villages have resident specialists, or shamans, who practice healing rituals (*belian*) while only some villages have shamans capable of leading secondary mortuary ceremonies (*kwangkai*). These shamans can be male or female. There are many forms of healing ceremonies, as each specific illness requires a specific healing ceremony. It is unusual for a single individual to hold the ritualistic knowledge of most healing ceremonies; more often the knowledge is spread throughout the inhabitants of a village. In the past this strategy would have helped spread the load of the ceremonies across the village and reduce reliance on a few individuals and also prevent power imbalances based on ownership and control of knowledge.

These ceremonies are generally quite taxing on the time and energy of the shaman as they require almost total dedication to the ceremony for anything from three to fifteen days. Some of the larger ceremonies, including the *kwangkai*, can last months (Hopes *et al.*, 1997).

5.3.2.4 Social structure

Traditionally the Benuaq society was divided into three social strata. These were the *mantiiq* (aristocrats) consisting of the village headman and his core family, who had power and privileges associated with the title and who ruled what was until post independence Indonesia autonomous village communities; *marantika* (commoners) who made up the bulk of the village population and *ripatn* (slaves). Slaves were most often bought by the Benuaq for sacrifice, as traditionally they were less warlike than other groups and they rarely hunted heads like other Dayak groups throughout Borneo (Sellato, 1989). Today, the family descendency is said to be only of minor importance, but it is well remembered and occasionally used as an argument during the election of village chiefs (Gönner, 2000).

The traditional leadership of the *mantiiq* was divided by the Indonesian government into a dual system consisting of a political leader (*kepala desa* – literally translated as village head) and a traditional leader (*kepala adat* or traditional head). Decisions of public interest are usually made in village meetings (*berinuq*), where a consensus is sought through long discussions. Nevertheless, conflicts remain common in all villages, sometimes reflecting the rivalry between the *kepala desa* and the *kepala adat* (Gönner, 2000).

5.3.2.5 Gender roles

In Benuaq communities gender roles can be delineated, but there are numerous exceptions to this rule. In terms of daily subsistence tasks, men and women are both capable of undertaking most tasks, even though they may tend to focus on different activities. For example, men tend to do more of the heavier labour, such as carrying loads or cutting down trees.

Generally speaking, women play a larger part than men in subsistence activities such as cooking, washing, child-rearing, livestock maintenance and rice, vegetable and fruit cultivation (Colfer, 1997). The main reason for this is that men are more likely to be involved in the cash economy, whether as laborers for the timber companies or mines, or as growers of cash crops such as rubber or rattan. Taking work as labourers can keep men away from the community for long periods of time.

Women do not play as important a role in decision-making as men, although they regularly also attend community meetings. During meetings that require comments or decision-making, women are often hesitant to contribute and when they do they will often speak some time after men have already contributed their ideas. This is true even for the educated women, although they tend to have more confidence than the less educated women.

Women in both communities tend to be more outspoken in domestic/internal decision-making processes involving issues that affect their daily activities, for instance organising community activities such as *belian* ceremonies, church activities, or the sale of livestock or fruit and vegetables. M. Stockdale (personal communication, 21 February, 2001) noted that when outsiders come to the community it tends to be the men who address them in the meetings. In activities that involve informing or negotiating with parties from outside of the village (i.e. government, NGOs, or logging or mining companies), women will leave the talking to the men. Although certain women might attend and even contribute to meetings in the village that include outsiders, they will rarely represent the community outside of the village in a role that requires decision-making about important matters.

5.3.2.6 The longhouse

In the past, primarily as a form of defensive strategy, many Dayak groups lived in heavily fortified settlements "developed by a core of kin-related people" (Sellato, 1989 p. 24). These often took the form of a longhouse, the traditional, although not pervasive, Dayak dwelling.

Sellato (1989 p. 21) states that "the peoples of the Barito group live in rather loosely organised villages and some of them never built longhouses." However, this does not appear to be the case with the Benuaq, where communities lived in the longhouse in the past, with some continuing this practice to the present.

Plate 7 The longhouse 'Lamin Tolan', Muara Lawa, West Kutai

A longhouse is an impressive structure (see Plate 7). The foundational beams are cut from iron wood (*ulin*) for longevity and are often carved with detailed and intricate motifs. A longhouse can reach 200 metres in length or more and rise up to five metres above ground (Margareta, 2000). Inside it is usually divided into adjoining or sometimes linked apartments (*bilik*) which are used by extended family groups. Outside the apartments there is an open gallery that runs the length of the longhouse, this vast space is often a focal area for communal activities, ceremonies and socializing. Village meetings were traditionally held on the gallery in front of the *mantiq's* apartment. As with the Kenyah (see Armstrong, 1991), the Benuaq measure the size of the population by the number of doors (corresponding to apartments) found in the longhouse.

"Each family owns the materials of its apartment and section of gallery, however, the whole community is responsible for the spiritual welfare of the longhouse" (Sellato, 1989 p. 25).

5.3.3 Cultural change

"No culture is impervious to change. No culture today is as it has always been. All cultures change, and for a variety of reasons"

Naylor, 1996 p. 1

Naylor (1996 p. 1) states that "in situations of contacts between vastly different types of culture, new ideas and changing aspirations will insure that change will occur." The Benuaq people, as well as other ethnic groups in the region of West Kutai, are currently going through rapid social and cultural transformation. Within the time period of a single generation there have been unprecedented changes. These changes are related to the intentional imposition of new values on these people through the centralized New Order governance system, environmental change, manipulative education systems, religious missionizing and state-controlled media. It is also due in part to much wider social changes resulting from inception of the cash economy, globalization and related ideologies. Some of the more prominent changes to Benuaq culture include a crisis in community cohesion, rising intra and inter community conflict centering on resources and a decline in practice and respect given to *adat* – particularly by the younger generations (Herjon and Natalis, 2001).

5.3.3.1 Individualism and community cohesion

Traditionally Benuaq life had a cohesive social organization which allowed for efficient collective action. This communality manifested itself both ritualistically and through more practical activities such as shared construction and agricultural harvesting. The community's mutual dependency is furthermore symbolised by the nature of the longhouse settlement. However, individualism is a rising tendency among the Benuaq. People are less prepared to take

part in communal activities (referred to as *gotong royong* in *Bahasa Indonesia*) and less inclined to share resources and tools, unless a cash payment is made. As Margareta (2000 p. 25) states "it is not difficult to build a longhouse. The most difficult thing is finding people who are enthusiastic to work together."

5.3.3.2 Intra and inter community resource conflict

There is little doubt of the profound impact of the introduction of the cash economy in bringing about change and conflict. This has motivated individuals to place their short term gain over long term communal objectives. This, combined with a changing political environment, has led to the current conflict over timber.

During the early pre-colonial trading period of Borneo's history there existed neither the technology nor the desire to remove timber from the forest. The forest was more valuable in its pristine state because of the non-timber forest products provided by it. During the New Order regime however, trees became known as 'green gold'. Timber was extracted and sold by large logging companies and the local people realized few of the benefits from its sale.

Due to the authoritarian nature of the state, resistance to this model was dangerous for local communities. Of importance during this period was that local communities began to realize the economic value of the timber. They also acquired the technologies and requisite skills to harvest this timber. During the post New Order period and subsequent transition towards decentralization many local communities took advantage of the uncertainty regarding the forest ownership status and began to harvest timber from ancestral lands and to sell this timber into a newly emergent processing and marketing chain.

The social impacts from this change have been far reaching. Conflict has arisen between neighbouring communities over boundaries. L. Wollenberg (personal communication 10 September, 2000) noted that previously inter-community boundaries tended to be fuzzy, now because of the economic implications local communities feel they need to be accurately mapped

and enforced. Even so, illegal logging between communities is rampant. Furthermore conflict is not confined with other communities; it has also spread itself within communities. Conflict can be sparked by individuals laying claim to areas of forest to the exclusion of other members of the community. Polarization within a community can also stem from decisions made over how to divide the income generated from such activities amongst people in the community.

5.3.3.3 The state of adat

One of the most prevalent cultural changes occurring presently in West Kutai is the decline in *adat* institutions and practice. Traditionally amongst the Benuaq, generational precedence is a determining factor in establishing social authority. "Elders enjoy degrees of prestige and power from which juniors are excluded" (Hopes *et al.*, 1997 p. 3). Hopes *et al.* (1997) go on to state that to a large part this power is institutionalized through possession of knowledge about *adat* acquired only after long apprenticeship. However, after 35 years of repression, *adat* and the institutions that maintain it have lost support and are not as valued by the younger generations. This is due in great part to younger generations being heavily influenced by external value systems (Herjon and Natalis, 2001). *Adat* ceremonies, including the *kwangkai*, have become associated with syndicated gambling and prostitution rackets, demeaning their role in the eyes of the general public. *Belian* are still being practiced, but there are very few younger people, especially if they have a high school education or higher, who want to learn the ceremonies.

Respect for elders has declined because of a more egalitarian view of society; new elites are emerging in the form of public servants, school teachers, successful business people and educated youth coming back into the area after being educated downstream. Church is also filling the role left behind by *adat*, as they are also effective in initiating collective activities and are becoming symbols for social identification.

Furthermore local languages are miscegenating with *Bahasa Indonesia.* Brush (1996) states that "language and culture are repositories of information gained through evolution...[and they] have incalculable value to present and future generations" (p. 5). Brush (1996) directly links the loss of language with the loss of knowledge.

There is a growing recognition of these social and cultural changes by the new administration within West Kutai and regionally operating local NGOs and other community groups. From this has arisen an apparent willingness to address and resolve these problems. The government is assisting in re-establishing *adat* institutions, such as the Dewan Adat, and granting them substantial decision-making and legislative power. Presently new legislation is being proposed to remove gambling and prostitution from *adat* ceremonies and concentrate them in one area of the region that can be controlled and taxed by the government (Anon, 2002).

5.3.4 Site description

5.3.4.1 Benung

The traditional territory of the village of Benung covers approximately 3,993 hectares. The area is flat and dominated by lowland dipterocarp forests; other land use types include rice fields, fruit tree gardens, rattan gardens, rubber plantations and other managed secondary forest.

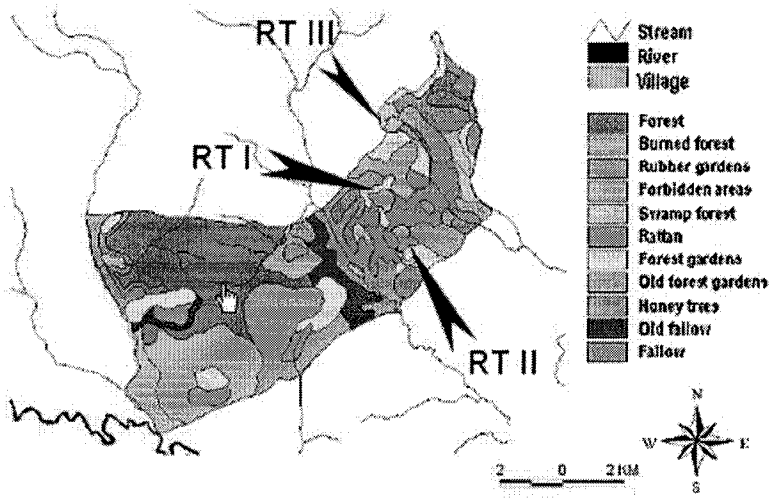

Figure 5.4 Map of Benung's land-use types, boundaries, rivers and administrative units

The village of Benung consists of three distinct administrative units called 'RT'. Two units form the central focus of the village, notably Benung (RT I) and Pintuq (RT II), while the third, Lomuq (RT III), is seven kilometers away by road in the direction of Barong Tongkok, the nearest town. Lomuq is remote geographically, socially and politically from the rest of the community (see Figure 5.4).

RT I by appearance is very traditional looking. The village is dominated by a longhouse (see Plate 8). This longhouse is approximately eighty metres long and comprised of 11 apartments. In front of the family units is a long balcony that runs the length of the whole longhouse. This balcony is approximately three metres off the ground and is reached by climbing one of two narrow ladders with steps notched out of a small diameter log. Mature fruit trees surround the longhouse and village elders tell of at least three former longhouses in the vicinity. This reveals a settlement history of more than 300 years. The longhouse does however, appear to be in decline. It is badly in need of repair, for which there are not enough funds. Increasingly families are building their own single family dwellings rather than building onto the end of the longhouse, as is traditional, or repairing their existing apartments. RT II also has a longhouse,

although it is much smaller in size and is inhabited by only one extended family. The remaining dwellings are single family units. RT III is comprised solely of single family units.

Plate 8 The longhouse in Benung

The village statistics indicate that the population of Benung is approximately 235 persons living in 54 family groups. Of these households, 33 are in RT I, 13 in RT II and 7 in RT III. This population level is fluctuating with a large number of people from RT I working and studying outside of the village in Melak, the regional capital, or Samarinda. A village elder once stated, "if all the people born here came back to Benung there would not be enough room for them to stay in the longhouse."

Demographically many people from the village are elderly (18% of the village are under 20 years old and 34% are over 50), although there are some young families with children. There are few unmarried villagers of working age. This is partially due to the high levels of education

in the village (43% of people had a high school education and a further 8% had a university diploma or degree) which have led to many villagers finding work in the regional and provincial centres (22% of the village were living and working outside of the community in West Kutai and a further 18% outside of West Kutai in Samarinda and as far away as Java). A number of reasons can explain the higher importance placed in education. Benung is a longer established village than Tepulang, and contains more people of aristocratic origin. M. Hopes (personal communication, 15 November, 2000) believes that it was for this reason that the Dutch missionaries in pre-independence times focused their education efforts on the children of Benung. This highly educated population has given Benung considerable political clout for a small community, as some of the leading political figures regionally and provincially are from the village.

A difference noticed between the two villages at the time the research project was in the style of their leadership and decision-making process. In Benung, the *Kepala Desa* was widely respected by the community and had been made leader by popular vote. However, in village meetings, decisions were made in a more traditional rather than democratic manner. The younger men and the women did not contribute much to the discussion whereas the most senior and important of the men would be given the opportunity to offer their opinions. In the end, however, even they would defer to decisions made by their official leader.

The population is comprised almost entirely of Benuaq people (99%), although there is some intermarriage with people from outside the village, tribe and in a few instances from other islands in Indonesia. According to village statistics, 72% are Catholic, 19% are members of various Protestant churches and 9% were of no religious denomination (these people tended to be over 50 years in age).

There is an elementary school located on the road between RT I and RT II. The school serves children ages 7-13 from RT I, RT II and Tepulang. The school is popular among most families in the village, although some of the more wealthy families send their children away for

schooling in Melak, Barong Tongkok and occasionally Samarinda. Many of the school teachers were born in either Benung or Tepulang and are already a part of the community.

The electricity grid arrived in the village in mid 1999, approximately three months prior to the research project commencing. Before that, electricity was confined to a few hours in the evening, and came from a diesel generator. Electricity is used to pump up water into the longhouse, for lighting and more recently for watching television and video compact discs (VCDs). Water is piped in from seven kilometers away. It is taken from above a waterfall and brought to the village reservoir by gravity flow. Individual families will take water for their needs directly from the reservoir. During the dry season (from July until September) the pipe runs dry and villagers have to walk a kilometre to a nearby spring which always has water.

Until recently transport to the village from the regional centres meant a tortuous and bumpy 12 kilometre journey through the forest. This was mostly by motorcycle, as cars could not drive up some of the steeper hills, especially after rain. In June 2001 a wide road was bulldozed into the area. People from the village are happy with the road because they now have better access to the regional centres to buy and sell goods at the market and access government services such as health care and high school education. RT I and RT II each have one small shop that provides the villagers with basic necessities.

5.3.4.2 Tepulang

The traditional territory of the village Tepulang covers approximately 3,097 hectares. The area is similar to Benung in land use types.

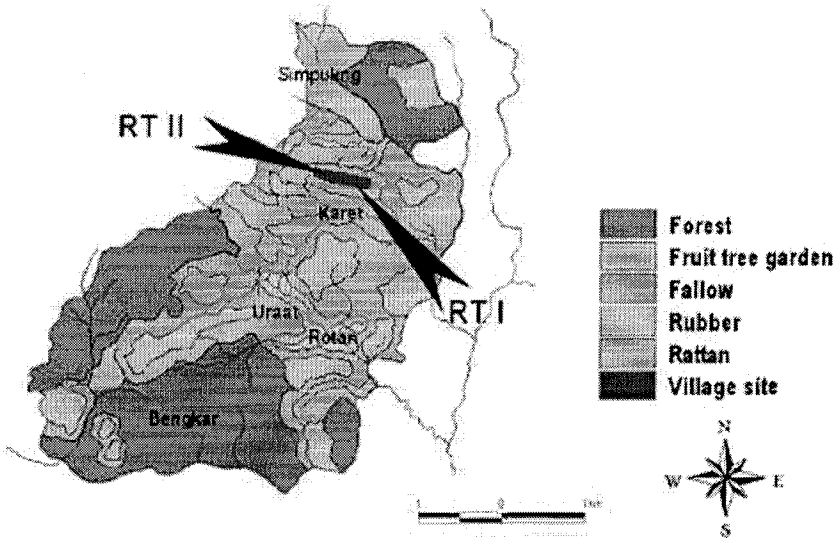

Figure 5.5 Map of Tepulang's land-use types, boundaries, rivers and administrative units

The village of Tepulang consists of two administrative units, Ledok (RT I) and Tepulang (RT II). The distinction between the two is hardly recognizable as the village is strung out evenly over a kilometer along the small earth road that runs through the village.

To all appearances Tepulang appears to be a typical rural Indonesian village. Most families live in nuclear-family dwellings (see Plate 9). There is a small traditional longhouse in the village; however, it is only inhabited by two families and is in a state of decline, although efforts are being made to restore the timber foundations. As in Benung, mature fruit trees are distributed throughout the village. Villagers claim to have lived in this site for at least 70 years and in the vicinity of the village for much longer than that.

Plate 9 A typical nuclear family dwelling in Tepulang

The village statistics suggest that the population of Tepulang is 259 persons living in 69 family units. Unlike Benung, the population has many more young and middle-aged people living in the village (29% of the village are under 20 years old and 17% are over 50). This is because education levels in the village are lower (18 % of people have a high school education and 1% have a university degree or diploma), restricting the villagers' access to employment opportunities; for this reason, fewer people work outside the village (5% of the community are living and working outside the village). Occasionally working age males may undertake daily waged work for locally operating companies, usually in natural resource extraction, road construction and maintenance and other physical labour.

In Tepulang, the *Kepala Desa* was an unpopular man imposed upon the villagers by the district government, who had involved himself in personally profitable deals with outside investors to sell the community's timber. Village meetings, often held in his absence, were

marked by strife between different factions. People would freely give their opinions and decisions were often made, but follow-up was often poor since there was little feeling of accountability due to a lack of official leadership.

The population is comprised almost entirely of Benuaq people (96%), although there is some intermarriage with people from outside the village, but no instance with people from other islands in Indonesia. There are also three groups of protestant missionaries in the village. According to village statistics, 81% are Catholic, 16% are members of Protestant churches and 3% were of no religious denomination.

Children under the age of thirteen attend elementary school located on the road to Benung. There is an additional very small school for children under the age of seven in the village. This is attended solely by children from Tepulang and at the time of writing this thesis had approximately ten students in attendance.

As in Benung, Tepulang was attached to the electricity grid in mid 1999. The same improved road that has increased Benung's access to outside towns also now passes through Tepulang. Water is a very serious issue in Tepulang. There exist three springs in the village; however, the village is located on top of a ridge, making it impossible to pipe water by gravity flow into the village. During the dry season (from July until September) the springs regularly dry out and water can become very scarce. The villagers at times have to walk four kilometres to a nearby river to collect water. Attempts have been made to dig wells in the village, but with no success. There are several small shops in the village that provide basic necessities.

CHAPTER SIX:

DESIGNING, IMPLEMENTING AND EVALUATING THE PGIMS PROJECT

A PGIMS project was introduced in the villages of Benung and Tepulang in the district of West Kutai, East Kalimantan, Indonesia. This chapter will describe how the PGIMS project was designed (Section 6.1) and implemented (Section 6.2). It will go on to describe and evaluate the PGIMS project, drawing out some of the differences between the two communities (Section 6.3).

6.1 DESIGNING THE PGIMS PROJECT

6.1.1 Selecting appropriate technologies for creating a PGIMS

6.1.1.1 Creating the initial concept

At the outset of the PGIMS project the researcher intended that information would be gathered using digital video and camera equipment, stored on a computer, and managed and accessed using an interactive Cartesian map. The interactive map interface enables the creator to manage digital multimedia information by referencing it to a particular point, line or polygon on the map. Thus the map acts as an organisational tool and allows the user to access this information and so navigate through information associated with the represented geographic area.

GIS software contains the functionality to undertake the above task. However, the expense of commercial GIS software, the high requirement for training, and the limitations in support made it necessary to look for options with the functionality mentioned above, but without the associated drawbacks of GIS software.

Hypertext Markup Language[35] (HTML) and more specifically 'What You See Is What You Get' (WYSIWYG) authoring software[36] was used. This software can create 'hotspots' on a digital map image so that when the user clicks on an area on the map with their mouse cursor it will link to and display text or multimedia information related to that site or area. This is a style of information retrieval referred to as "hyper media" (Aitken and Michel, 1995).

Using WYSIWYG software allows the user to explore digital spatial data through the interface of a map. However, maps displayed are not georeferenced, they are only visual depictions. This means that the query and analytical functionality of GIS are sacrificed. The WYSIWYG software cannot be used to measure distance or area, or execute the buffering and overlay analytic commands found in GIS. Despite the loss in analytical functionality, WYSIWYG software still maintained the management, storage, access and presentation functionalities found in GIS software. The decision to use this software was made because it is cheaper and easier to learn and operate than most GIS packages, and furthermore, the higher analytical functionality of GIS was inappropriate for the presentation of local knowledge using multimediafor the PGIMS project. The author speculated that by gaining mastery over the WYSIWYG software participating communities would be able to take greater control of the system and therefore of the information contained within it.

6.1.1.2 Pilot project

Between January, 1999 and April, 1999 a pilot project was developed in Canada that combined digital Cartesian maps with multimedia information; this pilot PGIMS represented the

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[35] HTML is a simple computer language used to create hypertext (text with embedded hyperlinks) documents that are portable from one platform (operating system) to another. HTML files are simple ASCII text files with codes embedded (indicated by markup tags) to denote formatting and hypertext links.

[36] WYSIWYG is Windows interface software commonly used to develop websites by users with no knowledge of HTML code. The software is cheap to purchase, readily available and requires substantially less training when compared with GIS software. Examples of WYSIWYG software include Adobe Pagemill®, Macromedia Dreamweaver® and Microsoft FrontPage®.

University of Victoria (UVic) disc golf course[37] and associated information. The project aimed to provide a comprehensive and interactive representation of the course as well as allow the author to gain familiarity with available tools and software. The pilot project linked multimedia imagery (still photographs, video, 360 degree interactive panoramas and animated maps) to a digital map of the university. This project was developed as part of a graduate level course 'Geography Internet 528: An intermediate level introduction to Geographical Information Systems' taught by Dr C. P. Keller at the University of Victoria.

The project was useful in allowing the author to test existing multimedia software and choose those that were appropriate to PGIMS. It also helped to expose some of the weaknesses and problems of using multimedia technologies in combination with maps. Firstly, multimedia files are inherently large. Therefore sharing multimedia files, whether across the internet or using other storage media, is limited. In order to overcome this weakness the computers to be used by the PGIMS project would need to have the capability to copy and back-up large files; a compact disc (CD) burner was considered an appropriate choice for this function. In addition, the computers would need large quantities of hard-disk storage space. Secondly, to process, edit and compress video data requires fast computer processing speeds. Computers used by the PGIMS project therefore required high-end processor chips and large quantities (256 megabytes) of Random Amplified Memory (RAM). Thirdly, the exponential development of multimedia technology and software means that systems, software and skills require constant updating for the user to keep up to the 'state-of-the-art'. There was no simple solution to overcome this final weakness.

[37] The sport of disc golf is similar to its more conventional cousin. Throwing a round shaped disc, a player has to go from the tee to the pin with as few throws as possible.

6.1.1.3 Equipment choice

The equipment used in the PGIMS project, both hardware and software, was intentionally kept as simple as possible (for a full list of equipment and associated costs see Appendix E). "State-of-the-art" technology was rejected in favour of "state-of-the-market" technology, which is cheaper, better tested and more reliable.

Computers were built to specification. The hardware choice was based on robustness. All sound and video chips were hard-wired onto the motherboard to minimize hardware conflicts. Video and camera equipment was chosen for simplicity of use and durability. This equipment was digital to enable easy transfer of information to the computer. Wherever possible, equipment was purchased in Samarinda in order that product warranties could be used easily if needed.

In order to protect the hardware from problems such as dust, insects, lizards[38] and fluctuating electricity, dust covers, gauze across the cooling fan and uninterrupted power supplies (UPS) were obtained and used.

Through experience gained during the pilot project, software was chosen to be functional yet user-friendly. An important criterion was the use of software that relied on visual icon command prompts, rather than text, in order that non-English speakers could better understand and remember commands. Although the computer did have the more commonly used software programs installed, such as popular word processing and spreadsheet software, the external collaborators (notably the author and two members of SHK) offered no formal training in their operation. The focus of the training was on the WYSIWYG and multimedia software required to produce a PGIMS.

[38] This was found out the hard way when the power supply on one of the computers blew up after a lizard crawled inside.

6.1.2 Designing a participatory methodology for PGIMS

Central to the project design was the philosophy that the communities themselves would be full participants in the PGIMS project. The communities would not be manipulated or coerced into taking part. Instead, they would be provided with all the facts and anticipated risks so that they could make informed and independent decisions over the adoption and use of these new technologies. This would make it more probable that the communities would develop a PGIMS that was relevant to their own needs and aspirations.

The project would use a participatory process throughout to ensure that the communities themselves would undertake all important decision-making, information gathering and management. Through community decision-making meetings the community would identify:

- their own needs and priorities as to how the PGIMS would be developed and used;
- what information would be incorporated into the PGIMS;
- how the tools would be used and managed, who would take responsibility for them, and where they would be located in the village;
- who would have initial access to the training and equipment; and
- in what language (*Bahasa Benuaq* or *Bahasa Indonesia*) the information would be documented and presented.

The intention of promoting decision-making at the community level was to enable openness and interaction among all interested community members and thus prevent the creation of 'new exclusion zones' (Richardson and Rajasunderam, 1997). Actions were planned to ensure that all major groups in the community, including men and women, young and old, powerful and less powerful, had access to both the decision-making processes and to the training and equipment.

Ownership and control of the equipment was intended for the community as a whole. The equipment would be operated by members of the community; this was not the role of the

external project collaborators, who were to act as facilitators and trainers rather than equipment operators. The aim of the external collaborators would be to enable the communities to create their own PGIMS and not to lead or influence the process. As a result the external collaborators worked with the community with the ultimate aim that as the skills of the community members grew, their reliance on external assistance would lessen.

In the literature many PPGIS projects appear to be a part of a wider development initiative which has its own objectives (see Heckman, 1998; Ghose, 2001; Elwood, 2002). The PGIMS project was not a part of a wider initiative. There were no guiding principles as to how, when and for whose benefit the PGIMS might be used. The effectiveness of PGIMS was dependent on how well it complemented existing needs and initiatives of the participating communities. This was considered a strength of the project because it ensured that the villages were less influenced by the agendas of the external collaborators and allowed them greater control over how the tools were developed and used. Yet this lack of focused objectives meant there was an initial confusion and uncertainty over how the tools and skills might be used.

6.2 IMPLEMENTING THE PGIMS PROJECT

6.2.1 Community implementation

The project was planned and implemented collaboratively by members of UVIC, SHK and CIFOR. The PGIMS project duration was confined by limitations on timing and funding. It ran in the two participating communities from September 2000 until April 2002 (see Figure 6.1 for a project timeline).

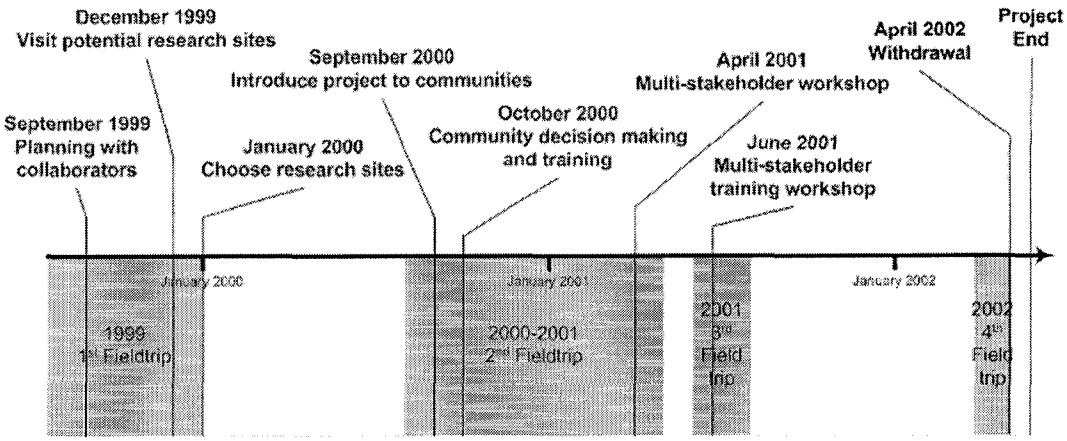

Figure 6.1 Project timeline shaded areas showing time in the research site

The remainder of this section documents the participatory process used to implement the PGIMS project in the two communities. It further outlines how members of the communities decided on what information to gather, and how they went about collecting that information. The flow diagram in Figure 6.2 outlines the steps of the project. Each step is described in more detail subsequently.

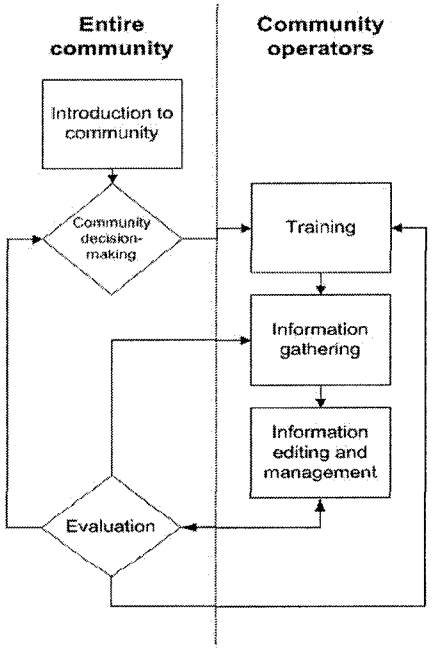

Figure 6.2 Flow diagram of the steps followed in the implementation of the PGIMS project

6.2.1.1 Introduction to the community

Community meetings were held in both participating communities to introduce the PGIMS project (see Plate 10). These meetings were well attended (45 adults attended in Benung and 50 in Tepulang) and lively with many questions. They provided the communities the opportunity to get to know the external collaborators, learn about the project purpose, to discuss what a PGIMS and associated technologies were, discuss how they might benefit the community as well as some of the risks that might be involved, and decide whether or not they wished to collaborate in the project.

The purposes of the PGIMS project were explained after preliminary introductions. These were to:

- introduce, plan and implement a PGIMS project in both communities using participatory methodologies,
- train community members to use the PGIMS technologies, and
- support both communities in the development of functional PGIMS.

It was also made clear that the author's own research purpose was to:

- examine how the PGIMS project empowered or disempowered the community.

Plate 10 Introductory meeting in Benung

During these meetings the concept of a PGIMS was introduced. This was illustrated using the somewhat abstract example of the UVic disc golf course developed during the pilot project phase. Each of the tools was explained and people in the audience were given the opportunity to use the digital still camera and video camera.

Loose parameters for use of the communities' equipment were set, notably that they were intended to show explicitly the link between the community and their land. Details of how this was to be achieved were left up to the community. It was stressed that the villagers would take a central role in the planning and collecting of information and in using the tools. It was also stressed that these tools were for everyone in the village, old and young, men and women, and that each person in the village had something to contribute in the development and use of the PGIMS. It was suggested that everyone in the village who wanted to learn would be able to use the camera and video camera because they are not too complex to use. However, because of limitations in equipment, external collaborators would begin by training just three representatives from each village in how to operate the computer. It was also explained that the tools would stay in the village at the end of the project at which time it was hoped that people in the community would be self-sufficient in using them.

During the meeting examples were given of how the PGIMS might be used by the communities. These included using the tools to communicate community information to parties outside the village as well as to compile and manage information for the village's own internal use. These uses were illustrated using short dramas[39]. Some of the risks of the system were also discussed during this meeting, especially in relation to maintaining the equipment and protecting the information contained in the PGIMS. It was made clear during these meetings that this was a

[39] Drama has been used often in PRA methodologies; it is an entertaining and non-threatening way to get important messages across (Yoon, 1996; Stockdale and Corbett, 1997, 1999).

trial project and that there was no certainty that the project would benefit the community. Yet both communities still agreed to participate.

6.2.1.2 Community decision-making

The initial introductory meeting was followed by a second community meeting in which members of the community determined the specific objectives of the PGIMS. The objectives were defined as information the community wanted to collect. These decisions were based on community members' reflection on the current conditions, problems and aspirations within the community and a discussion of how these technologies might be used favourably to address them.

This was followed by discussion of who in the community would act as the source of information (from hereon referred to as informant) and who in the village was to be responsible for collecting that information. A simple matrix matching information to be gathered with informants, information collectors and dates was created during these community meetings to help structure the decision-making process (see Figure 6.3 below).

Information type	Informant	Who has responsibility to collect information	Date information to be gathered

Figure 6.3 Simple matrix used to guide community decision-making about information to collect for the PGIMS

Benung decided to collect information on the history of the village, the village boundaries, the economic potential of the village resources, their culture and the *ladang* process. The informants chosen were all representatives of the village administration. Tepulang decided to collect information on the history of the village, the *belian* culture, the location of the village boundaries, the village natural resources and more specifically the history of the football pitch

and how Christianity arrived in the village. The informants chosen were elders in the village; no members of the village administration were represented.

During this second meeting the villagers also decided who would be trained initially by the external collaborators in using the PGIMS computer equipment. The next part of the community meeting was spent choosing three representatives (from hereon referred to as computer operators) from each village to follow a four-week intensive computer training course.

The criteria set for these village operators by the external collaborators was that at least one operator must be a woman, they must have the time available to attend the course, and they must be prepared to organise and subsequently train other members of the community as well as contribute to creating the PGIMS.

The processes used to choose the operators were very different in the two communities. In Benung operators put their own names forward (with the exception of the woman representative who was chosen by the men who had already put their own name forward). The initial operators were the village head and village secretary. The head subsequently dropped out because of other commitments and was replaced with a man in his early 30's with a junior high school education. The village secretary had primary school education and continued throughout the training course. The woman operator was in her early 30's with a high school education.

In Tepulang names were put forward by members of the community; these names were then discussed and agreed on by all those present in the meeting. They chose two men and one woman. All were under the age of 25 and had all been senior high school students. In Tepulang education level emerged as an important determinant of who accessed and used the equipment.

A small follow up meeting was held with the future computer operators to determine a timetable for the training. Operators from both villages discussed a number of points concerning the training. This included the number of days per week, the number of hours per day and what time the training was to start in the day. Both groups agreed that the training should take place five days a week, for three hours a day starting at noon.

A number of other village meetings were subsequently held in both villages to discuss the regulations for using the tools. In Benung a village meeting was called by one of the village operators. In the meeting the operators presented some draft regulations. There was little community discussion and the operators were requested to draw up the final set of regulations, which they did (see Appendix F).

The people in the Tepulang meeting found it difficult to decide on a set of rules because there was little point of reference by which to establish them. The only other communal tool was the chainsaw. Although it had a set of rules associated with it, these were initially considered irrelevant to the PGIMS tools. Tepulang had to meet three more times before a set of regulations was achieved[40]. The first meeting yielded no results. The second meeting produced a set of regulations similar to the regulations governing the use of the village chainsaw and were consequently considered inappropriate. The final meeting produced a satisfactory set of regulations (see Appendix F). These were typed out, received the signatures of the administrative bodies in the village and were posted around the village. These rules were considered a work in progress and could be added to or amended at any time.

Still other community meetings were held to discuss the use of community information, to deal with problems that arose concerning conflicts between operators, as well as other topics. Appendix C contains a list of all community meetings and a description of the purpose for which they were held.

Decision-making meetings exclusively for women were held in both communities in March, 2001 to encourage their greater involvement in the PGIMS project (see Plate 11). At these meetings women discussed the information they would like to include in the PGIMS and then made plans for a following training and information gathering session. There was much

[40] This might be directly linked to the villagers having developed a better understanding of the computer. At the outset the computer was an alien object, by the third meeting in early December, after the computer had been in the village for over two months, members of the community were beginning to understand its uses and the appropriate regulations to govern its use.

overlap in the information topics chosen by the women in the two villages which fell under the broad themes of local culture (dances and songs) and local *adat* ceremonies. The only difference was that the women in Benung focused on recording historical information, while the women in Tepulang chose to cover the use of medicinal plants.

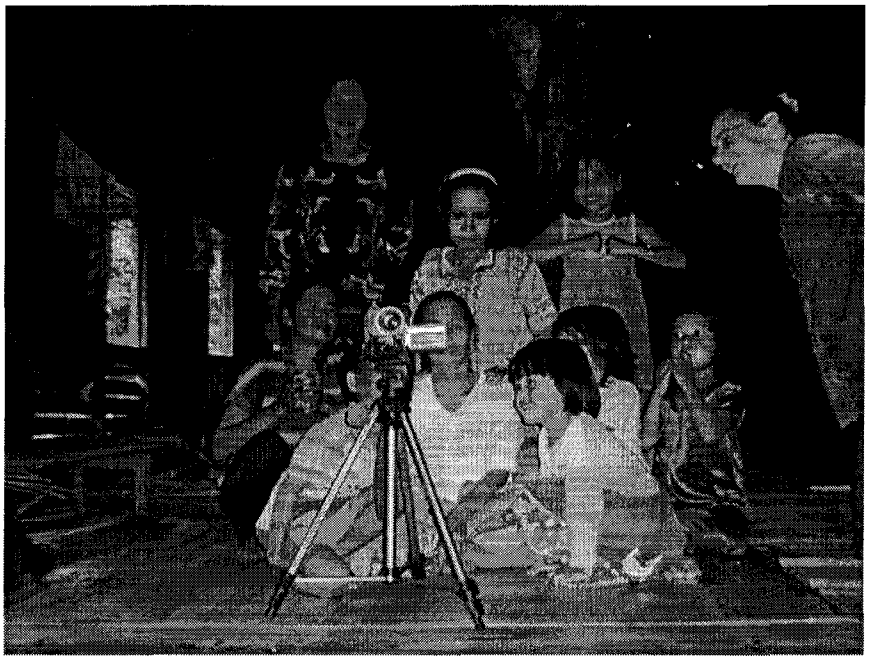

Plate 11 Women learning about video equipment at a decision-making meeting in Benung

6.2.1.3 Training

Training began in SHK's field station soon after community decision-making was completed. The training was divided into two sessions. The first session was open training for anybody in the village who wanted to learn how to use camera and video equipment. The second session taught selected members of the community how to use the computer equipment.

Training in using the video and camera equipment began in Benung during a *belian* ceremony one week after the decision-making meeting. Around 50 people were present at the ceremony and four people learned to use the equipment. In Tepulang training was held the day after the community decision-making meeting (see Plate 12). The training session was attended

by 30 people, of which five learnt to use the equipment. Training in the use of this equipment was on-going through the duration of the project. Not as many people as were initially anticipated took up the training. People who had been involved initially tended to become 'branded' as the video or camera operator and were requested by others in the community to use the equipment at certain times.

Plate 12 Villager in Tepulang learning to use the video camera.

Training of computer operators (see Plate 13) was undertaken by external collaborators, including two members of SHK staff, a woman living in Tepulang who had received a diploma in computing from Samarinda, and the author. The training was conducted in the local language, using materials developed exclusively to meet the learning needs and preferences of the trainees. The content and method of delivery were evaluated daily by both trainers and computer operators.

At the outset of the training, the Indonesian trainers had only minimal computing skills. As a result the instructors' technical skills were often learned in conjunction with computer operators. This was not perceived as a weakness; rather it provided the context for a mutually

supportive and beneficial learning environment. Training of trainers began the morning before each session and was led by the author. The trainers were then given time to practice the material before the training began.

Plate 13 Intensive computer training in SHK's field station in Tepulang

The computer operators began with an intensive four-week computer-training program. Initially, training sessions lasted around three hours a day. Due to the newness of the material, participants found that any longer a period of training was exhausting. Had the time been longer, the training would also have clashed with other commitments and responsibilities. Because this was the first time the operators had used a computer, the training began with material on basic computer skills. The operators then went on to learn how to:

- transfer digital images from the digital camera to the computer and edit and store them;
- move videos from the digital video camera to the computer and edit and store them; and
- import a map onto the computer and link areas of that map with text and the video and image information stored on the computer.

The training also had an ongoing focus on equipment maintenance and trouble-shooting skills.

Once the intensive training was complete, formal training for computer operators and other people interested in the PGIMS project continued over the next ten months. At no point were the computer operators, or anyone else from the community, paid to participate in the training or any other part of the PGIMS activities.

The training provided an excellent opportunity for the author to work closely with people from both communities. The training became a mutual learning venture whereby the author learned about the people in the two villages, became involved in their lives and ultimately began to establish a role in both communities.

6.2.1.4 Information gathering

The gathering of information began soon after the communities had decided what types of information to include in their PGIMS. After the external collaborators had demonstrated the use and maintenance of the video and camera equipment they handed over the equipment to the community. External collaborators provided demand-driven and on-going assistance with the use of this equipment. This training approach was referred to as 'learning by doing' and allowed for skill sharing in a practical and applied manner. This style of training proved very effective.

6.2.1.5 Information editing and management

Early information gathering overlapped with initial intensive computer training, this was done deliberately so that the computer operators could be trained in video and photographic editing and file management using information that was relevant and that could be immediately incorporated into the PGIMS. This meant that almost immediately after the information was gathered, villagers could access and view the information on the computer.

6.2.1.6 Evaluation

Community members would gather frequently to view the PGIMS and discuss the quality and content of the images and video. Suggestions arose from these gatherings about how to improve the training, the information gathering process, the types of information to gather, and the editing, management and presentation of the information. This evaluation acted as a feedback loop enabling community members to modify and improve the quality and content of information being documented and stored within the PGIMS.

6.2.2 Engaging stakeholders

The PGIMS project held two workshops in the regional capital in Melak to present the results of the PGIMS project to individuals and groups outside of the two participating communities. Both these gatherings provided opportunity to assess, using questionnaires and focus group discussions, how people outside of the project viewed the use and impact of these new technologies.

6.2.2.1 Multi-stakeholder dissemination workshop

A multi-stakeholder[41] workshop was held on the April 23, 2001. The purpose of this workshop were to evaluate the PGIMS as a tool for communicating information between the communities involved in the project and other stakeholders operating in the region. It was also an opportunity to gather opinions and perceptions of these stakeholders towards the PGIMS. A broad cross-section of stakeholders operating in West Kutai were invited (see Plate 14). A total of 36 participants attended. They represented community members, regional and district (*kabupaten* and *kecamatan*) government, regional legislature, local and provincial universities,

[41] A stakeholder is defined as a person, organization or government department that had some interest in learning about the PGIMS project. Stakeholders were either self-selected through having expressed an interest in the project, or else were chosen by the author in conjunction with members of SHK, who already have close dealings with a broad range of groups throughout the region.

schools, *adat* institutions, NGOs and other groups working with communities. Presentations of the project results were made by the PGIMS project collaborators, including the computer operators from Tepulang and Benung. The workshop participants discussed the relevance of this type of project within the wider sphere of developments in the region and made recommendations for future use of PGIMS in West Kutai.

Plate 14 Community computer operator giving a guided tour of Tepulang's PGIMS at the multi-stakeholder dissemination workshop

6.2.2.2 Multi-stakeholder training workshop

A six day training workshop was hosted between 23 and 28 July, 2001 for participants from around Indonesia. The workshop was held because of requests made for skill-sharing at the regional level during the multi-stakeholder meeting, and partially because of funding requirements. The purpose of this workshop was to inform the participants about the PGIMS project process, output and uses and to train them to develop such a system themselves. A total of twelve participants attended representing the local university, government, the media and several NGOs. Six participants were invited from West Kutai and six from organisations outside

the region. There was a high demand from organisations to send participants, with requests being made from groups that were not invited, and groups that had been invited requesting that more than one participant from their organization attend the training workshop. All of the organisations invited accepted the invitation. Workshop trainers included the author, members of SHK, and two operators from Benung and Tepulang.

The training workshop introduced the PGIMS process and philosophy. Presentations were made by computer operators from Benung and Tepulang and discussion held about how participants might use PGIMS in their own work. The workshop also had a field session for gathering material that was later used to learn the technological skills required for developing a PGIMS. Throughout the workshop there was a lot of participant input in the form of brainstorming, role-playing exercises and question/answer sessions. Each day included a formal written and oral evaluation.

6.2.3 Project withdrawal

Project withdrawal[42] refers to the point when external collaborators finish their involvement in the project in the research site. Withdrawal was determined not by the two communities indicating their readiness to take complete charge of the PGIMS, but rather by project timing and funding limitations. However, the timing was considered satisfactory by people from both communities. The withdrawal was gradually phased in with external collaborators withdrawing for a period of time and then returning to address specific needs.

[42] A crucial ethical consideration in withdrawal is that of funding. As Richardson and Rajasunderam (1997) point out, short-term projects that take no account of the community's ability to provide funding once the project is over lead to dead technologies around the world. This research project intentionally did not provide additional funding at the end of its term in the community. This decision was taken in the belief that if the communities truly valued the tools and the PGIMS, they would be prepared to pay for repairs or modifications required. This sentiment was further expressed by several community members and other notable people in the region.

However, withdrawal was not total as SHK continue to work on other projects in both villages, and the author remains in contact with people from both communities.

6.3 EVALUATING THE PGIMS PROJECT

This section evaluates the PGIMS project. It begins by evaluating the PGIMS map-interface as a tool for organising and accessing information. The relevance of the information in the PGIMS for the needs of the community are then assessed, followed by the related topic of the anticipated sustainability of the PGIMS initiative in the communities after the project ends.

6.3.1 Evaluating the PGIMS map interface

6.3.1.1 The PGIMS

Over the 18 month period that the computers were monitored, both communities documented, produced and stored large quantities of information, some of which was incorporated into the PGIMS through the map interface and some of which was not. For this reason the term 'PGIMS' was used to define all the information stored on the computer, whereas 'map-linked PGIMS' was used to define the subset of that information that was selected to be linked to the map interface. The information in the PGIMS was managed in both villages using a simple filing system where video information was contained in one single communal folder and all other information edited by each computer operator was stored in a folder bearing his or her name. All the information included in the map-linked PGIMS was in another communal folder.

The types of media used to document the information contained in the PGIMS are broken down and presented in Table 6.1.

Table 6.1 Comparison between Benung and Tepulang villages of the different file types used to store all the information gathered during the project period (September 2000 until April 2001).

Village	Videos produced[43]	Total photographs captured[44]	Photographs stored on the computer[45]	Other documents[46]
Benung	53	2,349	1,670	112
Tepulang	35	2,076	2,049	54

Much of the information gathered during the PGIMS project was related to the categories chosen during the second community decision-making meetings (see Section 6.2.1.2). Additional information types were also collected spontaneously in response to emerging events and issues. Other information was also collected premeditatedly as the villagers' knowledge of the tools and their potential use matured.

The information contained on the computers in both villages can be classified into five major categories: cultural, documentary, political, family and commercial.

- The cultural category includes historical, cultural and *adat* information. Examples of this include traditional dances and songs, descriptions of traditional land use systems, as well as ceremonies that were not recorded as family mementos.
- The documentary category includes information that was recorded at specific events with the anticipation that this might be useful for communication with outsiders or as evidence in the future. Examples of this category include recording promises made by a timber

[43] This figure is determined by the total number of videos on the hard drive and from information gathered during interviews.

[44] This figure is determined from the digital camera which records the total number of photographs taken.

[45] This figure is determined by the total number of photographs stored on the computer hard drive at the end of the fieldwork period.

[46] This figure is determined by all other documents stored on the computer (e.g. Microsoft Word and Excel documents).

merchant, recording an illegal logging activity or recording an important talk given by the *Bupati* in the regional capital.

- The political category includes statements made expressing the views of people within the community with the purpose to mobilise political support for a cause, and/or create alliances with more powerful stakeholders. Examples of this category include a video explaining the need of the community to be able to manage their forest areas using traditional management systems.
- The family category includes recordings made for specific families for sentimental reasons, such as recordings of weddings, births and funerals. These were made for the benefit of the families only.
- The commercial category is video information stored and distributed on Video Compact Disc (VCD). This category includes information from the above categories that were requested by groups from outside of the village. The operators were paid the sum of 200,000 Rupiah (approximately $40 CAD) per VCD produced.

The information documented in Benung and Tepulang is laid out in Table 6.2.

Table 6.2 Information categories and sub categories documented in Benung and Tepulang.

Information categories	**Information sub-categories**	
	Benung	**Tepulang**
Cultural	Healing ceremonies	Healing ceremonies
	Description of land use types	Description of land use types
	Mythology of forest trees	Mythology of forest trees
	The *ladang* or rice cultivation process	The *ladang* or rice cultivation process
	History of the village boundaries	History of origins of the village
	History of way of life before mechanisation	Traditional tenure and land rights
	History of rubber plantations in the village and wider region and process of planting and tapping rubber trees	History of village rubber project
	Mythology and species found in fruit tree gardens	Description of the primary forest
	Local folk dances	Description of system for managing rattan
	Local folk tales	Medicinal plants
		Funeral ceremonies
		Local folk songs

Documentary	Boundary negotiations between communities	Boundary negotiations between communities
	Meetings with government	Meetings with government
	Election of new *Bupati*	Election of the new *Kepala Desa*
	Evidence of illegal logging	Meetings with timber investor
		Marking the boundary of the conservation forest area
Political	Traditional forest management strategy	Views on the need for conservation forests
	Discussion of the importance of the primary forest for community livelihood	
	Eco-forestry management strategy	
	History of the longhouse leading to discussion of disrepair and the need for funds for revitalisation	
Family	Family healing ceremony	Family healing ceremony
	Family funeral ceremony	Location of family *simpukng*
	Family wedding ceremonies	
Commercial	Contract for the Tourism Department	
	Contracts for the regional and district government	
	Contracts for regional NGO	
	Contracts for private events and functions	

6.3.1.2 The map-linked PGIMS

From the intensive training session onwards, the communities began to organise some of the gathered information into a map-linked PGIMS. This was in line with the project's initial concept of creating a PGIMS that used an interactive Cartesian map to manage, reference and retrieve digital information. The PGIMS graphical interfaces for accessing information were digital maps (saved in GIF format) of the villages' traditional territories (Figure 6.4). These maps contained information on the location of the village, the village boundaries and different land use types[47]. Benung's map was made in 1996 and Tepulang's in 1997. Using these pre-existing maps saved the researcher much valuable time.

[47] Benung's map contained eleven land use types and Tepulang's contained six.

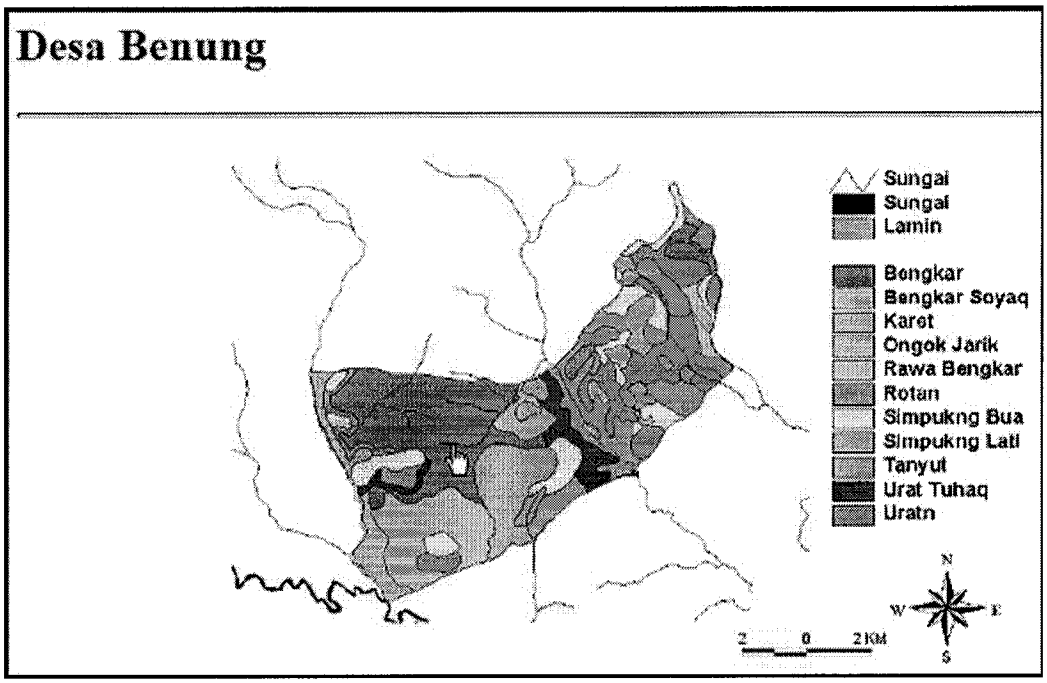

Figure 6.4 Benung's PGIMS map interface (note that this map is not presented at the same scale as is presented within the PGIMS, where it is much larger).

These maps were produced by SHK in conjunction with the villagers using a community mapping process. However, there remain questions about the level of community participation involved in creating and then using the maps. The original purpose of these maps was for communicating information about the village land uses from the village level to the regional and provincial government.

The process used by SHK and the communities to create these maps was as follows:

1. Community elders met to discuss the traditional territory. In particular they determined the local names of different land use types, rivers and streams and other sites of special interest.
2. This information was drawn onto a sketch map. Co-ordinates for key points were collected using a Global Positioning System (GPS) receiver. Selected boundaries were surveyed by people from the community using a compass and measuring tape.

3. Members of SHK took this information downstream to Samarinda where they digitized it onto a base map of the area using ArcInfo® software. This digitized information was then manipulated in ArcView® to produce a final map output.
4. These maps were printed in Samarinda and then returned to the communities for further discussion and display.

(Source: SHK, personal commu nication, 1 October, 2000)

Using the mouse cursor the user can click on different areas on the map and open new pages containing information about the features depicted by these points, lines or polygons. Less emphasis was placed on the specific geo-referencing of information and more on using the map as a means to categorize the spatial information. Most information was categorised by broad land use types displayed as polygons on the map. Selecting one of these polygons opened a new page including information, whether cultural, political or documentary, associated with that particular land use. These land use types included *ladang*, fruit tree gardens, rattan gardens and primary forest. Cultural and historical information that could not be linked to land use types on the map were instead associated with polygons depicting the village areas. There ended up being a large quantity of such information. Line features were used only once, to show the boundary of a conservation forest established in Tepulang; this was linked to further information about the rationale, management and location of the conservation forest. There were no examples of point features on the map interfaces.

The pages that were linked to the map contained menus to other pages, text and photographs (see Figure 6.5), or a link to a digital video (Figure 6.6). Table 6.3 shows a synopsis of the links, pages and file types contained within the two communities' PGIMS.

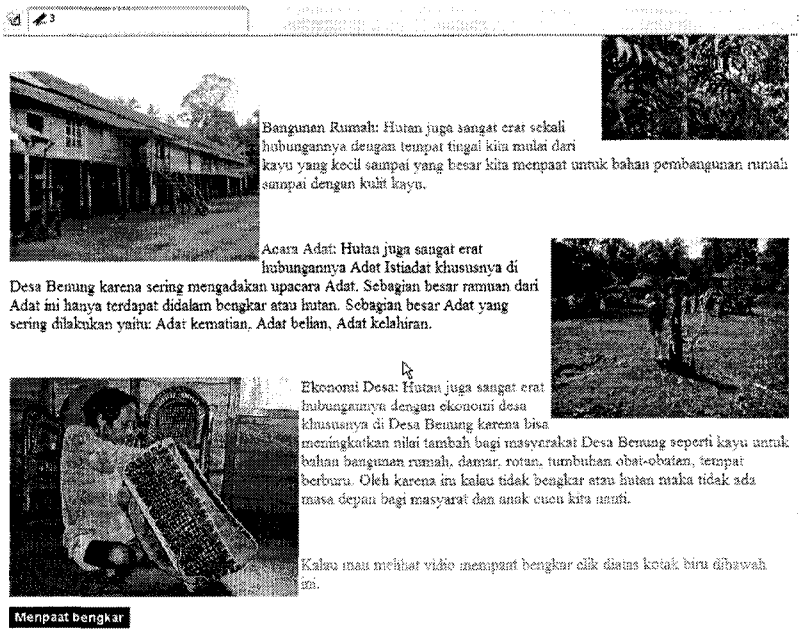

Figure 6.5 A page containing text and photographs linked to Benung's map interface.

Figure 6.6 A video linked to a page that is linked to Benung's map interface.

Table 6.3 Links, pages and file types contained in Benung's and Tepulang's map-linked PGIMS.

Village	Number of links from the map	Number of pages in the map-linked PGIMS	Number of internal hyperlinks	Number of videos displayed	Number of photographs displayed
Benung	63	57	210	19	218
Tepulang	36	46	142	20	63

Table 6.3 shows that the video, photographic and textual information incorporated into the map-linked PGIMS comprises only a small proportion of the total information contained in the computer (Table 6.1).

It is important to note that, even at the time of writing this thesis, the PGIMS project is an ongoing initiative and information, certainly in Benung, continues to be incorporated into the PGIMS. The intention of the project was not to produce a final product during the narrow period of the fieldwork, but rather provide the village with the means and skills to continue to develop and modify the PGIMS on their own after completion of the project.

6.3.1.3 Evaluating the map interface as an organisational tool

The map interface as an organisational tool was evaluated by outside stakeholders and computer operators. Their level of satisfaction and understanding was examined using questionnaires and interviews.

The map interface was approved by the people from outside stakeholder groups. During the multi-stakeholder dissemination meeting, when asked whether the map was a good tool to communicate information, 81 % of respondents agreed that it was[48]. Respondents noted that the map "provides a good overview of the village's traditional land", and using the map allows the reader to "easily see and structure the information." It was also noted that using the map reduces the need for written data to explain certain areas within the community boundary.

Computer operators in both communities also expressed satisfaction with the map interface. One operator from Benung noted that:

> The map is important because it lets us present information about different areas in our traditional lands using video, photographs and text to describe those areas. (Ori[49], 33-year-old male computer operator from Benung)

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[48] 16 respondents answered this question.

[49] Names have been changed throughout this thesis for reasons of confidentiality.

An operator from Tepulang stated that:

> A map is a really good way of managing information, because we can straight away click above the map and see what special information we have associated with that part of the map. I think that the map is really good as a baseline to organise the information. I think that if there was not a map it would be difficult to access the information. (Rado, 25-year-old male computer operator from Tepulang)

He further likened the map to *lumbung*, a traditional system used in the village to separate and store different rice varieties to prevent them getting mixed up.

Despite the creation of two functional map-linked PGIMS in the partnering communities, and favourable outsider and computer operator evaluations of the map interface, other data showed that the map interface was seldom used by the community members themselves.

Computer monitoring data shows low usage of Microsoft Internet Explorer®; the software required to access and view the PGIMS through the map interface. Figure 6.7 shows that use of this software is dependent on the external collaborators' presence in the village. While external collaborators are absent from both villages, Internet Explorer® is not used. It should also be noted that the map-linked PGIMS were put together to be displayed in the multi-stakeholder dissemination workshop on April 23rd, 2001. This accounts for the spike in Internet Explorer® activity seen in Figure 6.7 during April, 2001.

Low use of Internet Explorer® does not mean that the information contained on the computer was not being accessed. It implies that the PGIMS map interface was not being used as the primary system to manage and retrieve that information. Instead, information management and retrieval was being done through the operating system's default file manager, namely Microsoft Windows Explorer[50]®. This is supported by the high usage of this program shown in Figure 6.8.

[50] Care needs to be taken not to confuse Microsoft Windows Explorer® and Microsoft Internet Explorer®.

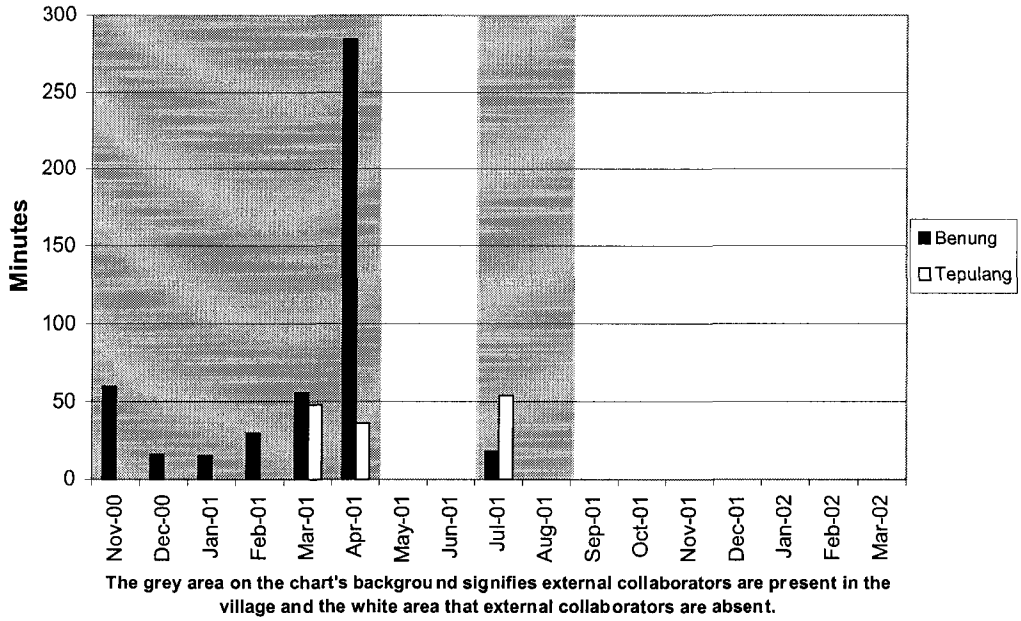

Figure 6.7 Use over time in Benung and Tepulang of Microsoft® Internet Explorer for accessing files through the map interface.

Low usage of Internet Explorer® provides a clear indication of the low value that the community placed on the map interface of the PGIMS for managing and retrieving information. However, as reflected in multi-stakeholder workshop participants' evaluations (mentioned earlier), the map interface provides a straightforward method for accessing information for a person that is not acquainted with the PGIMS, particularly if their intention is to learn more about the community's interaction with the land.

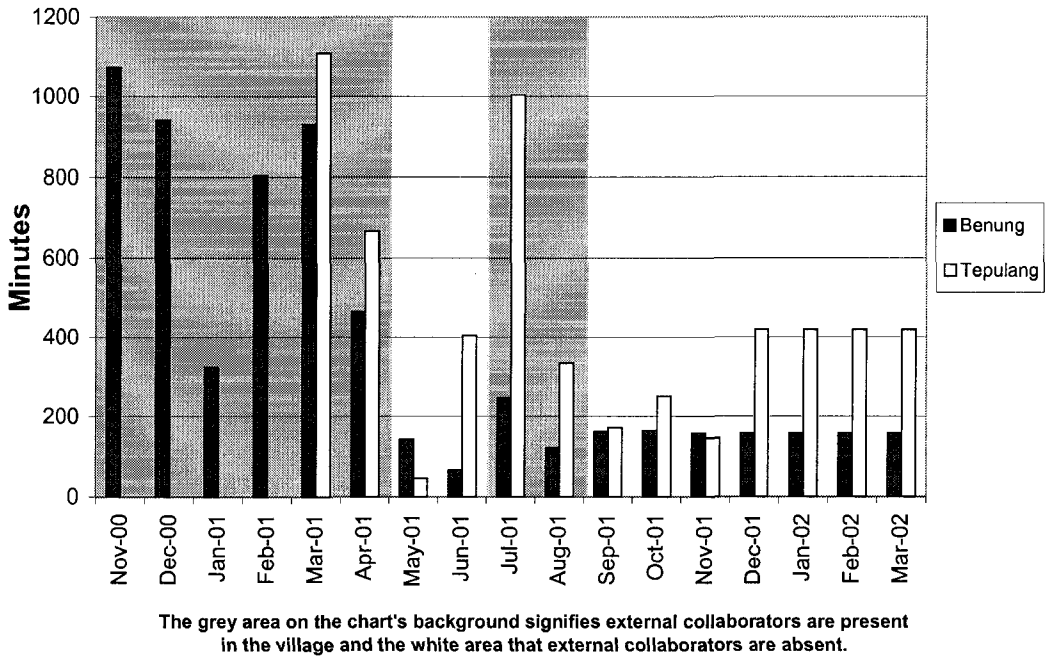

Figure 6.8 Use over time in Benung and Tepulang of Microsoft® Windows Explorer for accessing files directly from the hard drive.

The PGIMS map interface was intended to be an organizational tool for storing, managing and retrieving information; the author initially speculated that it would draw together information about the communities' lands into a cohesive and accessible system. The reasons for the low usage of the PGIMS map interface by community members to organise and access information was twofold.

Firstly, and most pragmatically, it is easier for people familiar with the PGIMS to access information directly through Windows Explorer® file manager without going through the conduit of the map interface. This may change as the information accumulates and more people begin to access the system. However during this early stage in the project people were not concerned about this issue, as noted by one computer operator:

> I have not really thought about this issue [of managing a large amount of information] yet. (Maria, 34-year-old, female computer operator from Benung)

Secondly, people in the community do not need a guided tour of their traditional lands in the same way that an outsider might because they already know these basic facts; the community users tend to access the information on the computer for more specific purposes that do not require them to use the map interface.

6.3.1.4 Evaluating the map interface as a means of communicating local spatial information

It is interesting to note that when conflicts emerged over village boundaries in Benung, information in the PGIMS was used successfully to resolve these conflicts, this is discussed in more detail in Chapter Seven (Section 7.4.1). The resolution of these conflicts was achieved not by using the map interface of the PGIMS but by using video information on the location of the boundaries. There are several reasons for this.

Firstly, a number of individuals in Tepulang, including several elders involved in the creation of the community map, stated that they did not fully understand the map interface. They found it hard to understand that different colours represented certain land use types and to orient themselves to the relative distribution of different features on the map. This was perplexing because the same map, using identical colours and design, created by the community elders was on public display as a poster in a prominent position in the village meeting hall. However, even after the similarity between the map on the computer and the map on the wall had been explained to the elders, they remained confused about the depiction of different land use types on the map. This confusion might have been because of a mental block related to seeing the map on a computer screen. Or, this lack of understanding might reflect the fallacy of the assumption that the Cartesian map offers a universal language (Poole, 1995a; Alcorn, 2001). It also raises questions about the level of community participation during the initial community mapping

activity[51] since participating in creating the map should have contributed to a greater understanding of it.

Secondly, the multimedia information stored on the computer provided a more culturally relevant tool for representing and communicating spatial information about the territorial boundaries than the map interface. The Cartesian map, even though present in the community and used by outsiders and the government in the region, was not a tool commonly used at the community level. According to M. Stockdale (personal communication 29 April, 2003), spatial description is most often given orally, with boundaries described by "talking the boundaries as if they are walking them." A similar system of boundary demarcation is used in aboriginal Australians' songlines (Chatwin, 1993). The video recording of a walk along the boundaries thus more closely reflects the traditional way of communicating spatial information.

Harris and Weiner (1998) present a view that can be used to better understand the significance of the failure of the map interface used by the PGIMS. They note that "a community-integrated GIS should be capable of incorporating information and knowledge in alternative forms which are not dependent on the map as the mode of representation" (p. 74). They further assert that the Cartesian map is just one way of representing geographic information. Even though the Cartesian map interface was not used by the communities during the external collaborators' absence from the villages, this did not mean that the communities were not collecting and presenting important spatial information about their relationship with the land, including its boundaries and different land uses. For this reason, the information contained in the computer as a whole can legitimately be referred to as the communities' PGIMS, with the words 'geographic information' remaining in the title despite the absence of a Cartesian map.

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[51] It is recommended that future PGIMS initiatives should make the participatory creation of the base maps an important initial part of the process. In addition to helping people to understand and feel ownership over the map, it will serve as a starting point for discussion of what information associated with the land should be included in the PGIMS.

6.3.2 Relevance of PGIMS

6.3.2.1 Relevance of PGIMS to future generations

Documenting information for future generations was considered important, particularly by women and elders in the communities. The topics chosen to be recorded by the women in both villages focused on local history and culture. In the discussion at meetings, women considered these to be 'women's subjects' – subjects in which they were known to be expert. The women stated that their aim was to pass traditional, local information on to future generations. Women from both communities decided to record cultural information, such as local songs and dances. The women in Benung additionally chose to cover historical information on their way of life in pre-mechanised times (i.e. how water was fetched and rice was processed), while the women in Tepulang chose to cover the use of medicinal plants.

The desire to record information for future generations was not confined to women. In Benung an elderly man stated:

> I have been getting old and realise that when I leave a lot of my information will be lost. I have been thinking how am I going to record this information for our grandchildren. Now I can use this tool [PGIMS] to record this information. (Raniq, 60-year-old male elder from Benung)

The importance of communicating information to the current younger generations within the community will be discussed further in Chapter Seven (Section 7.5.1.4).

6.3.2.2 Relevance of PGIMS to outsiders

Interviews showed that younger and middle aged men in both communities believed that the PGIMS was most relevant in addressing the current problems and issues facing the community. This meant using PGIMS to collect, store and present information on contentious issues involving land ownership, boundary determination and natural resource rights and use. This information was used to successfully resolve disputes with outsiders on two occasions (Section 7.4.1).

Like the women, men were interested in recording the village's history, but the information gathered was used as the basis for their claims to the village territory, rather than

showing a past way of life. In Tepulang community elders stated that they saw the PGIMS as a useful tool to document village boundaries:

> With such a system we can document agreements and keep this as proof. This will be a very important tool for the security of our children and grandchildren; too often people forget about agreements that have been reached. (Kopoc, 67-year-old male elder from Tepulang)

This delineation of information by gender might be linked to traditional gender roles. Most interaction with outsiders is dominated by men. Thus all village information intended for outsiders' eyes is considered to be men's information (i.e. knowledge about boundaries). Women did not choose to cover any of the contemporary conflicts or issues with parties outside the village, even though in interviews some of them claimed information on such issues were more important than any of the others. For instance one woman respondent from Benung noted:

> The most important information to record is about our forests; at the moment there are often problems around the forest, sometimes there are people who want to steal the wood, sometimes there are companies who enter, we don't want that. (Karo, 36-year-old female resident of Benung)

However, women were willing to be involved with contentious internal issues. For instance one female computer operator in Benung noted the growing conflict between families in the village relating to the inheritance of fruit tree gardens. She wanted to begin an initiative that would agree upon and document the exact boundaries of the gardens so that future generations would be clear of the exact delineation of the gardens.

6.3.3 Sustainability of the PGIMS in the long term

PGIMS project sustainability is defined as the ability of the participating communities to manage and maintain the equipment and continue to add information to the PGIMS after the external collaborators have left the village. This is a key indicator of the relevance and appropriateness of PGIMS to the community, as well as the success of the training and support.

Despite the overall project process being the same in both villages, there was a significant difference between the two villages in how they adopted the PGIMS.

6.3.3.1 Analysing computer usage in the two villages

Computer monitoring showed that Benung used their computer more than Tepulang. Benung's computer was in use (i.e. active, rather than just switched on) for a duration of 76,725 minutes during the monitoring period (517 days), an average of 148 minutes a day. Tepulang's computer was active for 39,078 minutes during its monitoring period (396 days); an average of 99 minutes a day[52].

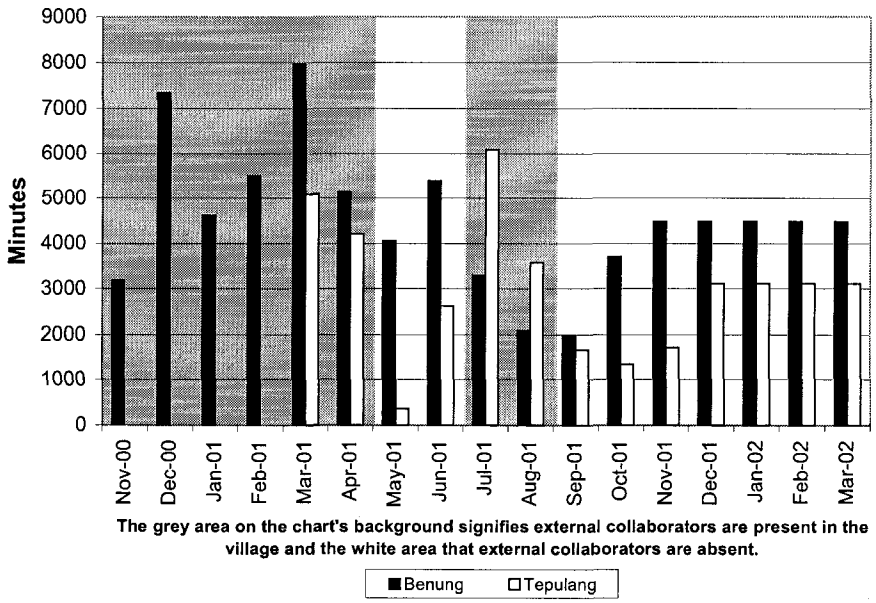


Figure 6.9 Total computer use over time in Benung and Tepulang

[52] Initially it was thought that this difference between the villages average computer usage was due to a greater initial use during the PGIMS project that is not reflected in Tepulang's average because of missing data from the first four months of the project (described in Chapter Four). However, if Benung's usage data is averaged over the same time period as Tepulang's, the computer was in use for a total of 56,072 minutes, an average of 142 minutes a day, still a significantly longer daily average than Tepulang.

In Benung the initial high rate of use peaks in March, 2001 (see Figure 6.9). These early rates of use correspond to on-going training and an initial high level of interest in the computer. Usage dips and then rises slightly during the external collaborators' absence from the village in the months of May and June, 2001. Of interest is that Benung's computer use then diminishes when the external collaborators return to the village and subsequently rises when they leave the village again in October and November, 2001[53]. This would imply that the presence of the external collaborators in the village in some way acted as a hindrance to overall computer use.

Examination of specific software used during the second peak of the months of May and June 2001 show a high level of Microsoft Excel® and Microsoft Word® use during the external collaborators absence. Neither of these programs was included in the community operators training because they were not needed for the development of the PGIMS. It is likely that the directors of the local credit union were attempting to train themselves in use of these programs. On the return of the external collaborators Microsoft Excel® and Microsoft Word® were used less and overall computer usage also declined.

In Tepulang the data shows the inverse occurring in overall computer usage; while external collaborators are in the village usage appears very high, when they leave in the May to June 2001 and September to November 2001 period it falls dramatically. These statistics imply that the initial enthusiasm generated at the start of the project was not sustained. They also suggest a high level of dependency on the external collaborators.

The statistics show a rise in usage between December 2001 and March 2002. Usage during this time is dominated by Microsoft Word® (33% of total computer usage) and Windows Media Player®[54](21% of total usage). In April 2002, during the external collaborators' final trip into the village, it was discovered that Tepulang's computer was being used by one computer

[53] Dips in computer use during August and September 2001 likely correspond to the efforts being directed towards rice planting at that time.

[54] Windows media player is the default program used to view videos.

operator to watch and copy Video Compact Discs (VCD) rented from a nearby store, thus the high usage of Windows Media Player® during this time.

This contrasting association between productivity and the presence of external collaborators is further supported by an analysis of the results showing the chronology of video production in both villages. In Benung 30 videos, of a total of 53, were produced while the external collaborators were absent from the village. In Tepulang two videos, of a total of 35, were produced under similar circumstances. These statistics imply that Benung was more independent in both their use and application of the computer equipment. Furthermore computer monitoring data showed that from May 2001 until April 2002, the final two thirds of the monitoring period, no videos were made in Tepulang.

6.3.3.2 Evaluating PGIMS sustainability in Benung

In Benung initial enthusiasm was guarded and it took time for the community to warm to the PGIMS project. This was possibly because initially:

> People in the village think that you [the author] are organizing this to collect the information for yourself, especially some of the older people in the village. (Duhon, 62-year-old male elder from Benung)

Once the community was more comfortable with the presence of the author in the village and clearer of the project's objectives many more people became actively involved. This became obvious by the large number of people who passed through the computer room every day. The community began proposing new, innovative ways to use the PGIMS beyond those laid out in the second community meeting. These included recording promises made by the government as well as other aspects of their culture, such as folk tales (*dongin*). One elderly woman simply wanted to record a message for her grandchildren. The community also considered recording information about family wills so there could be no dispute over inheritance of belongings:

> Straight from the mouth of the person and the computer does not lie! (Setin, 42, Benung)

A suggestion was also made to record an interview with the external collaborators as a means of providing some background information on the project and why it was introduced in this village.

PGIMS sustainability is more assured in Benung. The community continued to add information to its PGIMS after the external collaborators left the village. This indicated an independent community vision for the PGIMS, and successful attainment of the requisite skills and independence. The community also began to sell information to outsiders and so generate some income for the upkeep of the PGIMS tools. This also provided an additional incentive to use and maintain the system. When the video camera broke, the community paid 810,000 Rupiah (approximately $165 CAD) to have it fixed. This indicates that the PGIMS technologies were considered sufficiently relevant and worthwhile to warrant paying for their maintenance.

6.3.3.3 Evaluating PGIMS sustainability in Tepulang

In Tepulang the PGIMS project began enthusiastically, however, the initial impetus was not sustained. Conflict between computer operators prevented the transferral of skills to other people in the community (this will be discussed in more detail in Chapter Seven - Section 7.1.3.1). At the same time the entire community was polarized by a large internal conflict involving the sale of timber from the village's traditional territories to an outsider investor. The PGIMS project was overwhelmed by the frictions caused by this event. During the periods that external collaborators were absent from the village, computer monitoring data show the community did not continue to add data to their PGIMS.

Although there were a number of successes with recording and using information in Tepulang the long-term prognosis is that the PGIMS will not be sustainable. This does not mean that the computer will no longer be used for word processing and watching VCDs. However, it will likely no longer be used to record information about the relationship between the land and the community.

6.3.3.4 Understanding the differences in PGIMS sustainability

There are a number of possible explanations for the differences seen between the two villages in the level of success of their adoption of the PGIMS project.

M. Wilson (personal communication, 3 January, 2001) believes one cause might be the difference in dwelling patterns. In Benung the community is concentrated in the longhouse which by its design is more communal than Tepulang. One respondent in Benung noted:

> There is little privacy in the longhouse. People come and go between different apartments at will. (Mudin, 61-year-old male elder from Benung)

The people of Benung even refer to themselves as one family. This is recognizable during computer training sessions when people from the village would wander in and get involved with the training. Yet conflict and other negative relationships do also exist in Benung. In Tepulang families are already split into nuclear family dwellings and the focus is often on the immediate family rather than the community as a whole. The communal nature in Benung seemed more likely to complement the co-operative effort required to develop the PGIMS than the more insular arrangement in Tepulang.

A second cause might be linked to the demographic differences between the two villages. There was a higher proportion of older people in Benung than Tepulang (as described in Chapter Four). This difference becomes apparent every evening, when the people of Benung headed to the river to wash, whereas in Tepulang they congregated to play soccer or volleyball. This age difference was reflected in the choice of computer operators from two villages. In Benung they were older, more mature, organized and effective. In Tepulang they were young and competitive.

A third cause is that successful implementation of PGIMS was ultimately dependent on the level of support and guidance given by the existing political administration within the village. As already mentioned Benung's village head was freely elected, respected and forward looking,

although with a tendency for autocracy. In Tepulang the village head, who was appointed by the district chief, was widely distrusted and unpopular.

A fourth cause might be that the external collaborators spent less time in Benung (three days a week) because SHK's field office, the author's home base, was located in Tepulang. This might have helped to foster a greater sense of dependency in Tepulang on external assistance for information processing and storage. External collaborators often provided the stimulus to organise community meetings and guide the information gathering process in Tepulang, perhaps stepping in to fill the power vacuum described above.

In conclusion this study speculates that the sustainability of PGIMS appeared less dependent on the technologies and skills acquired and more dependent on pre-existing conditions such as the level of community cohesion, the maturity of the operators and the leadership provided by the village head *versus* the external collaborators.

6.4 RECOMMENDATIONS FOR FUTURE RESEARCH

Many aspects of the PGIMS project, other than an examination of its ability to empower or disempower communities, could have benefited from further exploration. These include:

1. Closer evaluation of how the PGIMS technologies and participatory process could be improved, particularly examining whether the PGIMS project did manage to overcome the constraints experienced with other GIT projects, such as complexity, cost, geographic representation, data issues and level of participation weaknesses.
2. Investigation of factors affecting community members' comprehension of Cartesian maps. Such research should compare understanding of maps produced using community mapping processes with maps produced by outsiders. There is also a need to understand differences in comprehension of maps presented on paper and digital maps viewed on a computer screen.

3. Examination of how communities traditionally understand and communicate spatial information, especially information about the boundaries and land uses of the villages; and how PGIMS converged or conflicted with these mechanisms of information exchange.
4. Examination of how communities traditionally understand and communicate non spatial forms of local knowledge (e.g. *adat*), and how the PGIMS converged or conflicted with these mechanisms of information exchange.
5. Assessment of how age, gender, education and other factors influenced peoples' opinions of the importance of different categories of information to be included in the PGIMS, as well as peoples' styles of planning, recording and editing information.
6. Assessment of the overall impact of the computers on the communities, looking at how the communities' use of the computer was influenced by preconceived notions about computers and the extent to which these notions conflicted with the purpose of the PGIMS project.
7. Comparative application of a PGIMS project in other oral based traditional societies for documenting and communicating their relationships with the land. For example interest in PGIMS has been shown by a number of First Nations groups in Canada. A PGIMS project implemented in Canada could be compared with the project in Indonesia.

CHAPTER SEVEN:

THE PGIMS PROJECT AND EMPOWERMENT

As discussed in Chapter Three, the framework is created by incorporating two social scales, notably the *individual* and the *community*, and four catalysts, notably the *information* gathered and incorporated into the PGIMS, the *process* used by the PGIMS project, the *skills* learned by the village participants and the *tools* used during the PGIMS development, into a simple two dimensional framework (see Figure 7.1). Analysis of the social scales differentiates between empowerment, i.e. an increase in power, and a change in 'empowerment capacity', i.e. a change in internal condition that influences empowerment (a full explanation is given in Chapter Three, Section 3.1).

	Empowerment of the individual	**Change in empowerment capacity in the individual**	**Empowerment of the community**	**Change in empowerment capacity in the community**
Information				
Process				
Skills				
Tools				

Figure 7.1 Framework for structuring an analysis of empowerment

The analysis of empowerment involves exploring how the different catalysts cause empowerment as well as changes in empowerment capacity at the individual and community levels. Each cell of the framework will be used to structure an examination of indicators (see Section 4.2.5 for an explanation of how the indicators were created) drawn from the field data that relate to empowerment and empowerment capacity. These indicators will show both the rise

and decline in empowerment and empowerment capacity. The indicators presented in this chapter are not a definitive list. They are simply the data categories that emerged from events and internal changes that occurred during the course of the PGIMS project. If the same framework were applied to a different project different outcomes may emerge. Although each cell theoretically is used to structure the examination of empowerment as it relates to the PGIMS project there are cells that are left blank because there were no indicators of that particular catalyst demonstrating an impact on empowerment and empowerment capacity at that scale (see Appendix G for examples of indicators derived from the PGIMS project).

This chapter will analyse the research data using the framework presented in Chapter Three. Section 7.1 explores empowerment of the individual as a result of the four catalysts: information, process, skills and tools, and Sections 7.2 and 7.3 examine how this might have been affected by changes in individuals' empowerment capacity and the receptivity of the community to individual empowerment, respectively. Section 7.4 looks at empowerment of the community, and again Sections 7.5 and 7.6 examine how this might have been affected by changes in communities' empowerment capacity and the receptivity of the wider region to community empowerment, respectively. Section 7.7 discusses the key themes of empowerment that emerge from this analysis and evaluates the effectiveness of the framework to organize an analysis of empowerment.

7.1 EMPOWERMENT OF THE INDIVIDUAL

In both communities, individuals closely associated with the project, notably the computer operators and informants, experienced changes in their social and political roles as a result of the PGIMS project. Other individuals in the communities were observed to have not been affected as significantly.

7.1.1 Information

7.1.1.1 Decreased social influence of inaccurate informants

At the outset of the research the author speculated that the informants whose information was recorded in the PGIMS project would experience some change in political power or social influence as a result of having their views heard. However, no-one seemed to gain status through sharing information; those informants who were already powerful figures in the community only had their power reinforced and those informants who were less powerful stayed less powerful.

On the other hand, some informants in Tepulang lost status through making inaccurate and unsanctioned recordings of information. A village elder in Tepulang recorded information about the location and extent of his fruit tree garden (*simpukng*). This was done to provide proof of ownership that might be used to insure its inheritance to his descendents. Others in the village contested the truth of his claim. They claimed that this elder used the PGIMS to try to validate a contentious claim to an area of land for his own family's gain, and as a result the recording was deleted.

Complaints were also heard when a computer operator in Tepulang, an outsider who had married into the community, documented information about traditional systems of land use, using himself as the informant. Villagers stated that it was wrong for him to do this because "he has no idea about what is true" (Joni, 21-year-old male computer operator from Tepulang). It was further insinuated that he did not have the right to present information about a community that he was not originally from.

A number of villagers noted that accuracy of information was important because "even though the information on the computer is wrong, once it is presented in that way it is considered to be true" (Kuran, 47-year-old elder from Tepulang). The selection of informants was also considered important. As one elder in Benung noted:

> Not everyone is able to give accurate information, only the elder generation are capable, and even they are only 90% right! (Nimo, 39-year-old male village administrator from Benung).

This view is backed up by a woman in Tepulang who states "we have to use information sources that are correct, they really must know, don't choose any old person" (Lyn, 35-year-old female teacher from Tepulang). However, the accuracy of information and legitimacy of informants is to some extent determined by the powerful members of the community. The above examples show how individuals who made bids for power through unilaterally recording their own information were thwarted in their efforts by the rest of the community.

7.1.2 Process

7.1.2.1 Increased social influence of female computer operators

As part of the participatory process, several interventions were made to increase the involvement of women in the project. One of these interventions was to request that at least one of the computer operators in each village was a woman. Both women were empowered through becoming operators, but to different degrees.

The woman selected from Tepulang was very young, having just returned to the village after graduating from high school. She did not show a high level of initiative or interest in the PGIMS throughout the course of the project. This was partly because of conflict that occurred between operators in Tepulang (this is discussed in more detail in Section 7.2.3.2); it may also have been because she was intimidated by the fact that all the other operators and the external collaborators were men. However, she did show leadership in facilitating a women's meeting, and people observed that she spoke confidently and authoritatively at that meeting, even though at general community meetings she would not speak, if she attended the meetings at all.

The woman selected from Benung was married with a young family. She became a very able and involved member of the computer operator team. As well, she began to be more

involved in general community meetings, particularly those related to PGIMS project decision-making. She called and facilitated several community meetings and contributed substantially to meeting's outcomes. This was a marked change from her previous role in the community:

> Before I was never brave enough to say anything during community meetings. Even when I was a child I could never say anything in front of my class! (Maria, 34-year-old female computer operator from Benung)

However, tensions emerged between this woman and her husband concerning her involvement with the project. He claimed that the computer training and information collection was detracting her from domestic chores, and he prevented her from acting as a trainer at the multi-stakeholder training workshop.

7.1.2.2 Increased social influence of less powerful villagers

The participatory process used in the project was intended to encourage the participation of all interested individuals in project decision-making. The impact of this process on people's involvement in project decision-making turned out to be quite different in the two communities (see discussion of community receptivity in Section 7.3).

Some people appeared to benefit from the process. One villager from Benung, an older man who was not one of the major power brokers in the village, was interested in making a video on the stages of the *ladang* process because he felt that future generations might not know about this part of their culture. Although other villagers clearly did not see this as a priority, he was persistent and eventually got his way. In his case, the relative openness of the meetings enabled him to exert some influence that he might not otherwise have had. Several other examples exist of less powerful individuals promoting their ideas through to acceptance. However, the overall rise in the influence of less powerful villagers was relatively minor.

7.1.3 Skills

7.1.3.1 Increased and decreased social influence of male computer operators

Several of the male computer operators experienced a significantly changed social and political role as a result of the skills acquired from involvement in the project. A young male computer operator from Benung noted that prior to the PGIMS project:

> I was capable of contributing ideas in community meetings, now after being involved with the project I can make decisions for the community. (Ori, 33-year-old male computer operator from Benung)

This project, combined with other work he was involved in, has led to suggestions that he should run for the position of *village head* in the future.

A changed social role is not necessarily one of empowerment. In Tepulang another young male computer operator was disempowered by his increased skills. He was considered "too ambitious and put on airs of intelligence" (Lyn, 35, Tepulang). This, plus his efforts to monopolise the skills and tools, contributed to his marginalization within the community and led to his resignation as the head of the village advisory committee.

Two other male computer operators did not appear to have been empowered or disempowered by their new skills. One was already well established in the leadership structure (village secretary), and the other was young and never became seriously involved in the project.

It is hard to determine how much these changing social roles are a direct and exclusive result of the PGIMS project or how much they can also be attributed to other influences.

7.1.4 Tools

No examples were observed of the tools used in the PGIMS project either increasing or decreasing power at the individual scale.

7.2 CHANGES IN EMPOWERMENT CAPACITY AT THE INDIVIDUAL SCALE

Changes in capacity for empowerment were noted in individuals in both communities, including individuals who were computer operators, informants, and community leaders as well as community members not as closely involved in the project.

7.2.1 Information

7.2.1.1 Increased confidence to communicate information to outsiders

Individuals sometimes appeared to feel an increased sense of confidence when communicating information through videos, compared to presenting this information directly. For example a middle-aged male from Tepulang recorded a video piece describing the importance of the forest for the community and the need for any forestry companies to consult with the community before starting logging operations. In the video he expressed some strong opinions about the role of *adat*, the village's rights to its forest and the responsibilities of the regional government with respect to this situation. He explicitly intended for this video to be shown to the *Bupati* of West Kutai.

This man is often accused by other members of the community of being opinionated in the community, yet freezing up when talking to government officials. Because of the informal nature of the way in which the video was recorded he was very articulate on the video. It allowed him to state his feelings in a way that he had not been able to in the past because of social conditioning and the difficulty of expressing views to political leaders. This man described himself as feeling great pride and wanted to make more recordings.

In this example it was not so much the information itself that increased the man's confidence as the fact that he could better present his views in video format.

7.2.2 Process

No examples were observed of the participatory process used in the PGIMS project either raising or diminishing empowerment capacity at the individual scale.

7.2.3 Skills

7.2.3.1 Increased self-esteem of computer operators through mastery of skills

There is a connection between social status and mastery of computer skills in West Kutai. Computers are associated with life in the city and high levels of education and are believed by many people in both villages to lead to emancipation from the drudgery of rice farming by increasing the likelihood of obtaining paid office work. Operators from both villages expressed great satisfaction with having the opportunity to learn to use the tools; one operator described it as "a gift from God." This satisfaction was in part due to not having to pay for a computer course which would be in excess of 700,000 Rupiah (approximately $140 CAD) making it out of the reach of most villagers.

At the scale of the individual, mastery of the skills needed for using PGIMS technologies offered a link to empowerment through challenging existing stereotypes and societal roles and fostering a sense of self-confidence. As one computer operator in Benung noted, "I feel that I have been taken up a step in life by this project" (Ori, 33, Benung). Another noted, "before I could never speak in front of other people, now I am brave enough to be involved and contribute to the public" (Maria, 34, Benung).

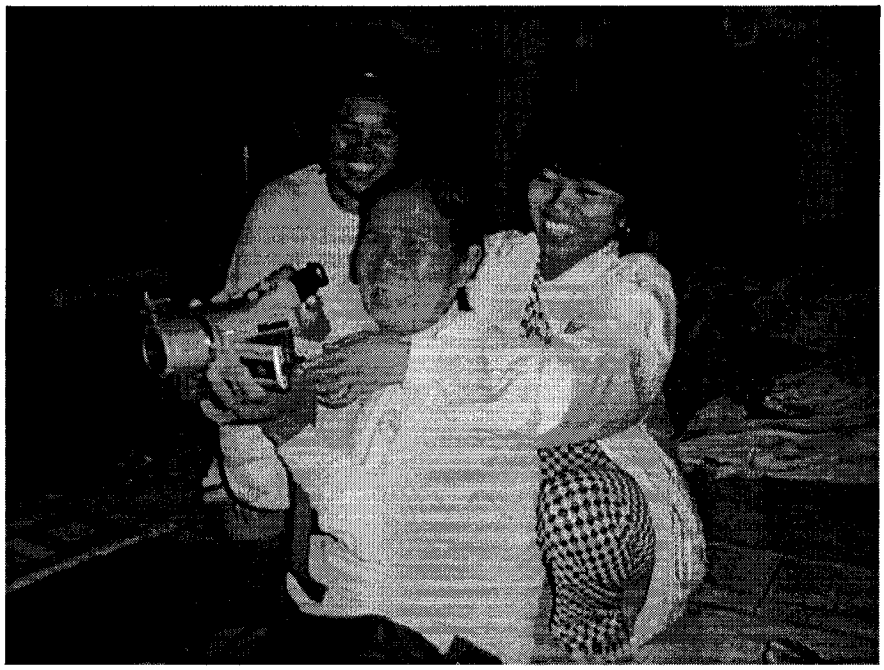


Plate 15 Female computer operator from Benung trains other women to use the video camera

An increase in self-confidence also became apparent during the multi-stakeholder workshops, when computer operators from both communities presented their PGIMS to notable people from throughout the region. During a workshop one of the computer operators demonstrated his skills to his old high school headmaster. He remarked

> Within my heart I felt that I was truly proud because before [my headmaster] taught me, now I could teach him! I was happy to have been able to demonstrate my skills and I was happy to see the participants were interested to use the tools. (Ori, 33, Benung)

7.2.3.2 Increased and decreased self-esteem of other villagers through access/non-access to training

As noted in Section 7.2.3.1, mastery of technological skills was considered highly desirable by people in both communities. However skill transfer to other members of the community was not as successful as hoped by the author at the outset of the PGIMS project. Use

of some tools such as the video camera and digital camera were much more widespread through the villages, but computing skills were restricted to a few.

The concentration of skills in a small number of people led to frustration in others who wanted to access the tools. This is well summarized by an elder in Tepulang:

> There are many benefits from having these tools in the village, but to be really useful there is a great need for more people in the village to be able to use the tools. (Lundin, 42-year-old teacher from Tepulang)

These limitations in access were mostly due to the PGIMS project only being able to install one set of equipment in each community. This led to a bottleneck in the number of people able to receive training in the PGIMS skills. However, at the outset of the PGIMS project emphasis was placed on the responsibility of the computer operators to pass on their skills to other people in the community. This gave other community members high expectations that they too would receive computer training.

The operators' level of commitment and approach to training was very different between the two communities. Benung used an informal method. The computer operators announced that they were prepared to train others in the community, but would only respond to direct requests. Demand from other community members was not high, perhaps because of the relatively high concentration of older people in the community. The operators also had limitations to the time available to provide training. By the end of the project fieldwork, seven people (in addition to the operators) had been trained to varying levels by the community operators in Benung, and the training had been informal and unstructured. Despite this, photographs taken by community members show a large number of different people using the computer; this would imply a broad level of interest and ability to use the tools throughout the community. A teacher in Benung who had been trained to use the computer said:

> This project has really helped me take a step forward and has provided a great opportunity to learn new skills. (Beng, 36-year-old male teacher from Benung)

In Tepulang a community meeting was held to choose villagers who would attend two computer training courses given by the three computer operators during the time that the author was in Canada. Trainees were limited to six people per 10-day course. The first workshop was completed successfully, but the second failed because of disagreements that grew into an open conflict between the operators. The failure of the second workshop acted as a watershed in the interest shown in the PGIMS project by the community in Tepulang. Prior to this enthusiasm was high and support for the PGIMS project strong throughout the village. After this conflict surfaced, few people from the community, including the operators, continued to show the same level of interest in the project.

The main source of disagreement was one operator who was accused by other people in the community of monopolizing the skills. This operator announced that if people wanted to learn how to use the computer they would have to pay him between 100,000 and 200,000 Rupiah ($20 - $40 CAD). He also attempted to control use of the computer by other villagers by using it as often as possible, and by pulling the cables out when not using it in order to prevent other people in the community from being able to access and use the PGIMS. His actions created substantial anger in the village, as was expressed by one woman:

> If we want to learn to use the computer he is always using it. We are made to feel embarrassed and to feel like beggars. While he still uses the computer I cannot be bothered to learn. Better I do not use it rather than fight about it. Many people feel this way. (Lyn, 35, Tepulang)

One of the primary causes for the conflict in Tepulang was that the operator was only interested in learning the skills for his own benefit. By monopolising the skills this individual was attempting to gain power over other community members. For this operator, however, the power was short lived, as the community responded by isolating him and withdrawing from the project. He, in reaction, resigned from an important administrative position in the community (as described in Section 7.1.3.1).

7.2.3.3 Increased critical awareness of computer operators leading to demystification of popular media

As noted by Richardson (1997), few communities live in total isolation from the outside world. In terms of external influences, the villages of Benung and Tepulang are reached by, among other things, television, radio and newspapers. Richardson (1997) further states that there is a need for people to sharpen their ability to interpret the information reaching them through these channels.

During the PGIMS project individuals were observed to be showing a more analytical approach to understanding popular media. While watching the news on the television, a pair of computer operators began to comment on different shots, cuts and transitions used in a particular news commentary. Their PGIMS-related skills gave them a new way to analyze the information and manner in which it is presented on the television. They also commented on how they might have done a better job at editing and presenting the information. This new awareness that the popular media was fallible and that their own capabilities and skills were comparable, and perhaps superior, to that of outsiders is a further indication of how their new skills had given them an increased confidence in their own abilities.

7.2.3.4 Increased economic opportunity for computer operators

It was strongly believed in both communities that learning new, in particular computer, skills would "allow the youth to get jobs in companies in the region" (Bensin, 44-year-old male resident of Tepulang). As a result of the skills learnt during the PGIMS project, two operators, one from Benung and one from Tepulang, were employed by the regional government. One of these operators had previously felt that getting this type of work was "beyond my imagination" (Maria, 34, Benung). Both were explicit about their feelings of pride and betterment, which in turn are indicative of increased capacity for empowerment.

Computer operators who remained in Benung were also able to apply their new technological skills to moneymaking ventures through recording videos, transferring them to VCD and selling them outside of the village. Operators were requested to record videos by the regional government, the Department of Tourism, an NGO and other individuals. In addition to providing economic benefits, this helped the operators to develop wider networks in the region.

The intention of the training in the PGIMS project was not to focus on job related skills, especially if they resulted in village operators being hired into the commercial marketplace rather than remaining in the community in which they were trained. Although the individual may have increased his or her capacity for employment and empowerment, the community as a whole lost capacity as they lost a valuable resource for developing the PGIMS and passing on their skills to others in the community.

7.2.4 Tools

7.2.4.1 Increased self-esteem of villagers from association with tools

There was some minor evidence that the tools themselves were used by people to increase their status. Some people on outings from the community would take the digital camera and video camera with them in order to be seen using them in public places, even if they did not know how to use them. However, sometimes people operating the tools in public were exposed to derogatory comments from other community members, such as "here comes the journalist" (Carop, 24-year-old female resident of Tepulang). This made the person using the tool feel conspicuous in the eyes of other people in the community, as it implied that they were propping themselves up through the tools. On the other hand, this comment may have reflected feelings of envy or jealousy on the part of the person making the comment, indicating that these tools were indeed associated with enhanced prestige. M. Wilson (personal communication May 2003) notes that this behaviour is indicative of "levelling mechanisms" used in "simple societies" that strive

to keep everyone equal, so that no one rises above others. Techniques used to achieve this level playing field include gossip, ostracism and sarcasm.

7.3 COMMUNITY RECEPTIVITY TO INDIVIDUAL EMPOWERMENT

Despite the participatory nature of project decision-making, it appeared that other factors were equally if not more important in ensuring that all community members' voices were heard. These included the existence of institutions for overseeing the implementation of decisions and the relationship of the computer operators to the other villagers. Without strong governing institutions and good relations between the operators and the community, the computer operators were in danger of becoming self-directed 'technological elites' in the type described by Harley (1988).

In Tepulang, the decision-making process appeared superficially to be participatory as meetings involved input from a broad spectrum of community members. However decisions made during community meetings were often not followed through. One reason for this was the weak leadership of the unpopular *Kepala Desa*, resulting in the lack of a coordinating body for overseeing implementation of decisions. Also, the computer operators often ignored the input of others in the community and made unilateral decisions about the collection and use of information.

Despite the *Kepala Desa* being popular and democratically elected, Benung was relatively traditional and exclusive in its decision-making processes. Community meetings often took place without the participation of the women and youth; consequently decision-making remained in the hands of a powerful minority. The PGIMS project gave all individuals in the community the opportunity to become more involved in PGIMS related decision-making; however, these meetings were still dominated by the community leaders. Nonetheless the strength of the governing institutions, together with the role of the computer operators as

executors of the decisions of the community, led to greater receptivity in Benung to empowering individuals in the community, relative to Tepulang.

7.4 EMPOWERMENT OF THE COMMUNITY

This section will examine the impact of the PGIMS project on the communities in respect to empowerment. This is indicated by an increased ability of the community to influence decision-making processes and other events within the wider region.

7.4.1 Information

During the PGIMS project there were two prominent examples where information was used successfully to communicate with groups outside of the village and influence events in the wider region. Both these examples involved illegal logging on Benung's traditional lands by neighbouring villages.

7.4.1.1 Increased social influence with regional decision-makers

The first incident involved multiple incursions by illegal loggers from the neighbouring village of Muara Tokong onto Benung's traditional land. In Benung, a hunting group of young men discovered the illegal loggers in their forest. The group immediately returned to the village and informed the village leaders. The leaders gathered together and decided to confront the loggers and record the incident. The next day they returned with the video equipment to where the illegal logging was taking place.

As the group of leaders approached the logging camp, they saw and recorded evidence of felled timber. Entering the camp, they gathered together the loggers, who were already known to the elders, and informed them of the illegality of their operations. The loggers apologised, offered a weak excuse, and departed that day. The leaders took no further action.

Four months later the same group of illegal loggers returned to the forest and began to fell timber again. The leaders immediately wrote to the local government requesting a meeting, where they presented the recorded evidence from the previous encounter. The government was sympathetic and ordered all the felled timber to be returned to Benung. They also threatened the illegal loggers with severe fines if they encroached again.

7.4.1.2 Increased social influence with other communities

The second incident involved illegal logging by Tepulang on the traditional lands of Benung. As logging activities increased in the area, the people of Benung and Tepulang decided it was necessary to document the location of the boundary between the two villages. On a prearranged day, elders from both villages met and walked the boundary between the two villages, agreeing on the position of the boundary without conflict. Using a video camera, people from Tepulang recorded the entire process.

Six months later Tepulang began logging in the vicinity of the boundary between the two villages. Soon after operations had commenced Benung claimed that the logging operation was straying onto their territory. A joint village meeting was called. The computer was set up in the meeting hall and the video taken during the boundary walk was displayed. As a result of the information contained on the video, the conflict swiftly was resolved, and the logging operations withdrew from the contentious area leaving the felled timber behind.

Both these examples show the community of Benung using the information gathered as part of the PGIMS project to resolve conflict with outside groups successfully. However, it cannot be assumed that these successes indicate a long-term increase in power for local communities. It is also unlikely that these incidents of themselves will lead to greater involvement in regional decision-making processes, and even if they should happen it would be impossible to relate this exclusively to the PGIMS project.

7.4.2 Process

No examples were observed of the processes used in the PGIMS project either raising or diminishing power at the community scale.

7.4.3 Skills

No examples were observed of the skills used in the PGIMS project either raising or diminishing power at the community scale.

7.4.4 Tools

7.4.4.1 Increased bargaining power with outsiders

Increased bargaining power associated with the project's tools occurred when a timber investor came to the village of Tepulang with the intention of purchasing timber from the community's traditional forest land. Timber investors are known to verbally offer large sums of money during the negotiation stage with the villagers; often, at the end of the operations these high sums are not paid in full.

A village meeting was called in order to negotiate the price for the timber being sold from Tepulang's territory. Members of the community recorded the meeting using the camera and video camera. The video operators made a big show of using the equipment in front of the investor. The investor was noticeably uncomfortable about being recorded and cautious about promises that he made, and the community felt that the equipment had given them a more powerful position from which to negotiate a good price for their timber. The community appeared to be less interested in the recording itself, as the information was never edited or incorporated into the community's PGIMS.

It is speculated that the presence of the tools provided the community with some advantage by representing them as not just simple farmers, but people with access to tools more

often used by educated elites. It is unclear how lasting this means of empowerment will be in the region as these tools lose their novelty value.

7.5 CHANGES IN EMPOWERMENT CAPACITY AT THE COMMUNITY SCALE

The analysis of empowerment capacity at the community scale explores how groups within the community, defined by gender, education level and age, as well as the community as a whole, gained increased empowerment capacity through the PGIMS project.

7.5.1 Information

7.5.1.1 Increased community confidence to make statements to outside groups

The PGIMS project provided communities with a medium for communication that had previously been unavailable. Benung used their PGIMS to present evidence to outside groups, as shown in the two examples described in Section 7.4.1. These examples show how information that was documented by video was taken more seriously by regional government and other villages than the verbal statements and maps that would have been used previously. This increased legitimacy of recorded information made Benung more confident about making claims.

As well, the PGIMS was used by Benung to present community views on their vision or plans for the future. One recording was made to show regional government members at the multi-stakeholder workshop the community's ideas on how to log the forest using more sustainable traditional methods. This occurred soon after the beginning of a pilot project with SHK on ecosystem-based forest management. Another recording from Benung explained the importance and history of their longhouse, and ended with a request for funding for its repair.

Previously communities were capable of communicating with the government; the difference is that now they are using novel tools to increase their influence on decision-making

processes. Showing information in this way complements the traditional oral system of communication and furthermore enables villagers to present visual information that might otherwise be missing. It also bolsters the villagers' confidence by giving them the means to prepare a presentation in advance, rather than have to talk directly to people in positions of power. However, success in influencing decision-makers still depends on the non-technological ability of community members to interact with these powerful people. As Shiffer (1999 p. 1) notes "information is only powerful when it is effectively understood by those who use it." The information as it stands alone is unlikely to influence outsiders, but it might be useful in providing communities with support and increased confidence in promoting evidence and plans to decision-makers.

7.5.1.2 Increased community identity through understanding local history, culture and adat

In West Kutai traditional leaders recognize the need to reconstruct their local history, culture and *adat* (as opposed to local culture, such as songs, dance, folk tales, etc., *adat* refers to the Benuaq system of traditional laws for the living of one's life). An understanding of *adat* is recognised as key to restoring a strong sense of Benuaq identity. It is also thought to be key to understanding the more ecologically sustainable land and resource management system that traditional Dayak culture was known for.

There are a number of examples of historical and cultural information being recorded, primarily by the women (described in Chapter Six). There are also examples of *adat* being recorded on the PGIMS, mainly those laws relating to rights over land and resources, the location of territorial boundaries and the *belian* and *kwangkai* ceremonies. One prominent traditional chief stated:

> People need to know about the *adat* of their older generations. These days everything is a disaster. Before, things were well organized. If we explore and learn our adat

> hopefully we can rekindle and use it so we can return to the past conditions. (Ajaw, 85-year-old traditional chief-of-chiefs from Maura Lawa)

Despite recognition of the importance of documenting *adat* within the community, there were times when tensions emerged over the use of the PGIMS as a mechanism to record and store that information. This is because control over who may learn and use *adat* knowledge is tightly regulated in Benuaq society. Certain information may only be known by certain people within a community; as one elder in Benung noted "there are many secrets in this village and systems for regulating them" (Setin, 42-year-old male teacher from Benung). Information is acquired only after long apprenticeship and the payment of expensive gifts. It is then carefully guarded because power is institutionalized through possession of this knowledge (Hopes *et al.*, 1997). The mechanism used to maintain control over this information is called *temai:*

> *Temai* is the law which determines that we cannot give information to others even if we know it, because if we tell people the knowledge looses its potency. (Salmo, 72-year-old traditional chief from Benung)

This traditional mechanism of knowledge transfer conflicts with the idea proposed by the PGIMS project, notably that local knowledge needs to be recorded and stored for communal use. As noted by Scoones and Thompson (1993 p. 2 cited in Parpart, 2000b) "knowledge is not just ready to be picked like an apple on a tree. It is embedded in social contexts and attached to different power positions." The individual wanting to record or contribute information that is regulated by *temai* is breaking traditional *adat* law. Thus when recording information about traditional medicinal plants in Tepulang, the woman describing the plants was very conscious not to break the *temai* attributed to this knowledge; as a result the information gathered was superficial and incomplete.

However, others disregarded *temai* to describe some forms of *adat* knowledge such as the location of territorial boundaries. They did this in recognition that the information was too pressing and important to be hidden. They also felt that there is a danger of information being

lost if they continue to respect *temai*, as most youth are unwilling or unable to spend the time and money necessary to undergo the traditional apprenticeship. Nonetheless the existence of *temai* diminishes the potential of the PGIMS as a mechanism for increasing understanding of *adat* in the youth and future generations.

7.5.1.3 Increased and decreased community ability to own and control information

Both communities demonstrated a need to balance communicating information with outsiders with limiting information distribution so that it remains in the control of people in the village. As noted by one external collaborator

> Of most importance is the need to organize the information by having some form of filter. There is information which can be shared widely, because that information will help to strengthen the community, there is also information which is secret and cannot be shared with other people. (Ambon, 42-year-old NGO activist living in Samarinda)

As asserted by Parpart (2000b p. 7) recording information "can disempower if it removes the ability to control the dissemination of knowledge." As with the *temai* system, there appears to be an explicit relationship between empowerment capacity and the regulatory mechanisms that the community develop to control and effectively manage information contained within the PGIMS. The presence and use of these mechanisms indicates that people in the community remain in control of their information, even though they are adopting new ways of communicating and storing it.

Both communities developed regulations to control the accessing, copying and dissemination of information (see Appendix F). Yet these regulations appear only to have been enforced in Benung. An example of this occurred when representatives from a local NGO requested a copy of Benung's PGIMS from the computer operators. Computer operators and other prominent community members responded that they could not freely distribute the information before they had discussed the issue in more detail in a community meeting. Despite pressure the community continued to resist handing over the information until they were satisfied

as to how the information was to be used. The restraint shown by Benung is an indicator of empowerment capacity, but it is difficult to know if this can be directly attributed to the PGIMS project or to pre-existing levels of empowerment capacity in the community. It does however show an ability to use traditional social mechanisms to control the information contained within the PGIMS.

In Tepulang, the PGIMS was treated in an open-access fashion. One young man from the village stated that:

> If people want to see the information that is not a problem, if they want to use the computer without permission that is a problem. (Daro 30-year-old male resident of Tepulang)

Outsiders were observed coming into the community and freely accessing the computer and information contained within. Despite protestations from some community members, there was no control exercised within the community to regulate access. This *laissez faire* attitude might in part have been because the computer was located in SHK's field office and not in a neutral location. The villagers as a result might not have felt true ownership over the PGIMS. This attitude could also have been related to the tensions concerning monopolization of the skills and tools. As a backlash to this nobody was prepared to enforce the community's regulations for fear of appearing equally monopolistic. This attitude is further indicative of the low value given by the community members of Tepulang to the information contained in the PGIMS. Unlike in Benung, the information was not considered important or sensitive enough to warrant its tight control.

7.5.1.4 Increased and decreased community cohesion between generations through sharing information

Successive political regimes over the past 30 years have sought an homogenous Indonesian identity. The resultant monoculturalism has been introduced and reinforced through

the education system (Leigh, 1999) and popular media. As a result, a strong Benuaq identity has been declining primarily through a growing alienation between the youth and elder generations. This decline is clearly outlined by a young man from Tepulang:

> In my village I do not know anything at all about the history of the village. I am not joking; I really know nothing. We are not aware, from a young age we never ask the elder people. The older people also do not have the awareness to tell the generation that follows their own. (Rado, 26-year-old male resident of Tepulang)

Many indigenous groups throughout the world are attempting to reconstruct their identity through the process of documenting and expressing their cultural information (Davidson-Hunt, 1999).

During the PGIMS project youth in both villages were attracted to learning to use the technologies. The community elders, however, controlled the local knowledge. Successful development of the PGIMS therefore required an exchange between these two groups, this process in turn contributed to strengthening community cohesion as well as identity (see Plate 16).

There is evidence from Benung that the PGIMS project facilitated the transfer of information between different generations within the community and contributed to greater community cohesion. One example began with four elders in the computer room watching two computer operators being trained. The operators were adding information to the PGIMS about the history of the rubber plantations in the village. Soon the elders began discussing the development of rubber in the region. The younger people in the room typed their words into the computer, and together they produced a comprehensive record. There was a feeling of satisfaction expressed by all participants with the end product. The group agreed to meet again and make a similar document to describe the history of traditional forest management practices in the community. This they completed three weeks later.

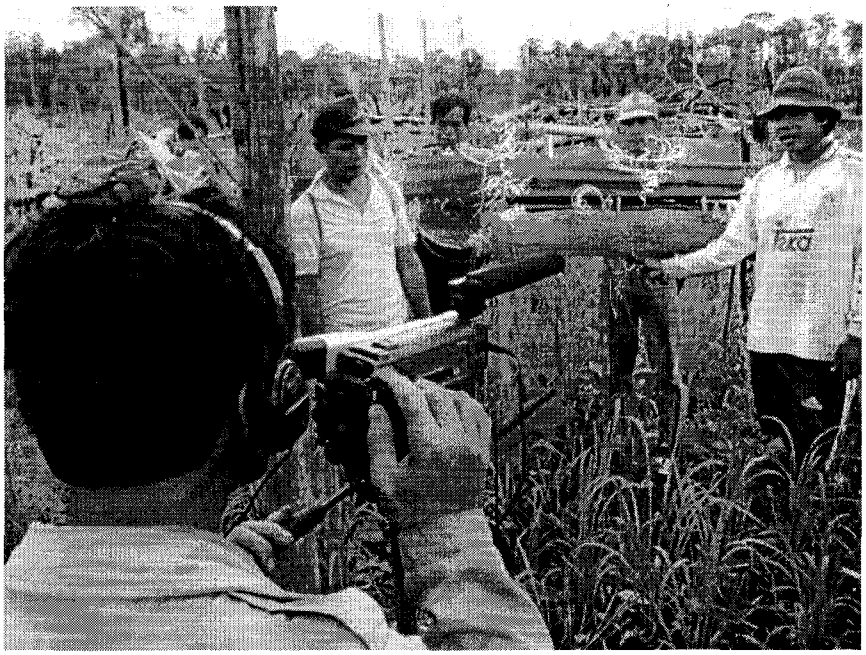


Plate 16 Elders and youth in Tepulang talking about a traditional ceremony

There are several examples that indicate that the interest of younger computer operators in cultural information was raised as a result. For example Ori (33, Benung) began to record his father's folktales. As he became increasingly well known for his interest in culture, history and *adat*, a regional NGO offered to pay for the expenses involved for him to undergo an *adat* apprenticeship as required by *temai.*

There remains a need to have an existing bond between elders and youth within the community in order for successful information flow to take place. In Tepulang, there were only two elders who were involved and highly motivated by the project. The others felt removed from the process, and persisted in thinking that these tools were only something for the young to use to find work. This view is summed up by the village chief at that time:

> There are limits to the number of people in the village who want to use these tools. Only the youth in the village have a use for these tools, children need to know because they have to use them at school. (Kuran, 47, Tepulang)

The result was that the management of the tools was largely left to the youth who ended up using the computer in an undirected way and without the support of the elders. At the same time some people from the older generations accused the young operators of documenting information that was false and asserted that they had no right to be recording this information in the first place. It was partly because of the emphasis on the youth to manage the tools and implement the PGIMS process that the project came to a halt in Tepulang. This reflected the dysfunctional state of the community, where the PGIMS project appeared to further exacerbate pre-existing divisions between generations.

7.5.2 Process

7.5.2.1 Increased and decreased community cohesion among villagers

A participatory process was considered important for this project because it would ensure that all groups within the village felt ownership over the PGIMS that was produced, which in turn would increase community cohesion and unity.

Throughout the course of the PGIMS there was a notable difference between the two villages in the style of their administration. In Benung, the *Kepala Desa* was democratically elected and held the respect of the community. However, decision-making mechanisms were relatively formal and authoritarian, and turn-out to community meetings, as well as the level of participation by people at them, was generally low, especially for women. Throughout the PGIMS project, the village leadership remained in tight control of the proceedings. Nonetheless, the participatory process eventually led to a more relaxed meeting style where more people made contributions. Turnout was high at the early PGIMS meetings, probably due to the novelty factor. However, it continued to stay high throughout the duration of the project.

This participatory process received positive feedback from community members. As noted by one computer operator in Benung:

> I think the process has been good because it has always relied on community meetings. By including as many people as possible, the benefits are spread to many more people. It is very important to engage the community and to be as open as possible, as many projects do not do this; they only visit the village chief. By being open and honest with the village they will be more likely to support the programme. (Ori, 33, Benung)

In Benung, tension between the leadership and others in the village seldom occurred as a result of this increased participation, mainly because the leaders and the other villagers were generally in agreement. However, a situation where there was strong but unpopular leadership might have caused the introduction of more participatory processes to result in an open display of the existing internal conflict.

In comparison Tepulang exhibited high initial participation as well as high turnout in community meetings, even by some women. However, the *Kepala Desa* was a weak, unpopular man. The PGIMS village meetings, often held in his absence, were marked by strife between different factions. People would freely give their opinions and decisions would appear to be made, but follow-up was often poor since there was little feeling of accountability due to a lack of official leadership and no clear delegation of responsibilities. This was recognized by people in the community who noted that "the reason that [the PGIMS project] was less successful in Tepulang was because they are not capable of working together" (Nimo, 39, Benung). By the end of the project, turnout to meetings was low. The participatory process of this project therefore was not enough to ensure that community cohesion was increased in Tepulang.

7.5.2.2 Increased ability of women to organize themselves

Despite encouragement at community meetings for women to contribute, it was still felt by women interviewed that as a group they were excluded from the PGIMS project. In Benung women were often absent or noticeably silent at most meetings. As noted by the female computer operator from Benung:

> Generally, women here aren't given the right to speak. This began a long time ago. Women here truly are too passive, not brave enough to speak out, they must sit behind the men, and it is rare for women to give their opinions. (Maria, 34, Benung)

In Tepulang, more women attended and contributed to meetings. Even here, however, women felt that they were excluded from access to the tools, because, apart from one young woman computer operator, all of the operators and external collaborators were men.

> When Jon is here, he's closer to the men. The trained people have more been men, now we need to add more from women, so that those who gather the information will be the women too... We want to use the equipment, it's only been the men, and we want to use them too! (Rita 28-year-old resident of Tepulang)

For this reason, a female Canadian gender consultant spent one month in the communities with the objectives of increasing the participation of women in the PGIMS project, as well as assisting with research aimed specifically at looking at the impact of the project on women. Involvement of women was encouraged by holding a decision-making meeting and training session in each community specifically for women.

Women stated that in the past there had only once been meetings held specifically for women. These were in the New Order era, when government officials assembled women to tell them about family planning and other issues. After the PGIMS project revived the concept of women's meetings, the women in both communities went on to organise their own. After making a video showing older women teaching girls and young women how to do local dancing, the women in Benung revived a women's dance group (*tarian gantar*) which was then invited to perform at weddings outside the village (see Plate 17). The women in Tepulang organised the recording of a singing session where traditional songs (*brijooq*) were sung using contemporary guitars and drums as accompaniment. Audio and VCD recordings of this session were requested by the regional radio station as well as people from other communities. Afterwards the women continued to meet to sing.

Plate 17 Women from Benung dancing at a wedding in the upper Mahakam area.

Although the participatory process did not have any noticeable effect on changing the role of women at general community meetings, it did have notable achievement in helping women to take a greater role in the project and providing them with an element of influence and control over the PGIMS development and use. This they used to increase information content aimed at fostering the community's sense of cultural identity. It also contributed to improving the ability of women in both communities to organise themselves. These are indicators of increased empowerment capacity.

7.5.2.3 Increased and decreased community dependence on external collaborators

Initially, the presence of the external collaborators was necessary for the progress of the project in the communities. They were the ones to introduce the project and facilitate the initial process, as well as provide skills and support to the community. Furthermore the external collaborators were important in attempting to facilitate and mediate between computer operators when conflict emerged. However one intention of using a participatory process was to enable the

community to increasingly take the process on for themselves. An important indicator of increased empowerment capacity is the ability of the community to continue the project independently after the withdrawal of the external collaborators.

As presented in Chapter Six (Section 6.3.3), the computer monitoring information showed increasing signs of independence in Benung, this was demonstrated by an increased use of the PGIMS software during the time the external collaborators were absent from the community. In Tepulang, the computer monitoring data showed that dependency on the presence of the external collaborators continued to the end of the project. This was further summed up by a village elder during a final community meeting

> We recognize that we will need continuous support from SHK with this tool. (Setui, 44-year-old male resident of Tepulang).

7.5.3 Skills

7.5.3.1 Decreased community cohesion between educated and less-educated

It was observed that the PGIMS skills were monopolized by the better-educated youth in the village while the less educated were further marginalized. To illustrate this, a young woman in Tepulang had asked to learn to use the equipment from the outset of the project. After some time of not meeting the author asked her whether she was still interested; she responded that she was certainly still interested, but that she could not use the computer because "she was not schooled." She was told that this was not a problem, to which she responded:

> Maybe it is not a problem for Jon, but it is a problem for some people in the village. (Carop, 24, Tepulang).

The educated elites in the village were preventing her from accessing the tools.

The tools were initially chosen for the simplicity of their use. The computer remained above the capabilities of some people in the village. However, there were examples of people

with only primary school education using the computer and learning specific software as well as village elders learning to navigate around the information on the computer using the mouse (see Plate 18). It is speculated that education level was not the main factor influencing the ability to use the computer equipment. The more important factors were unhindered access to training and the equipment.

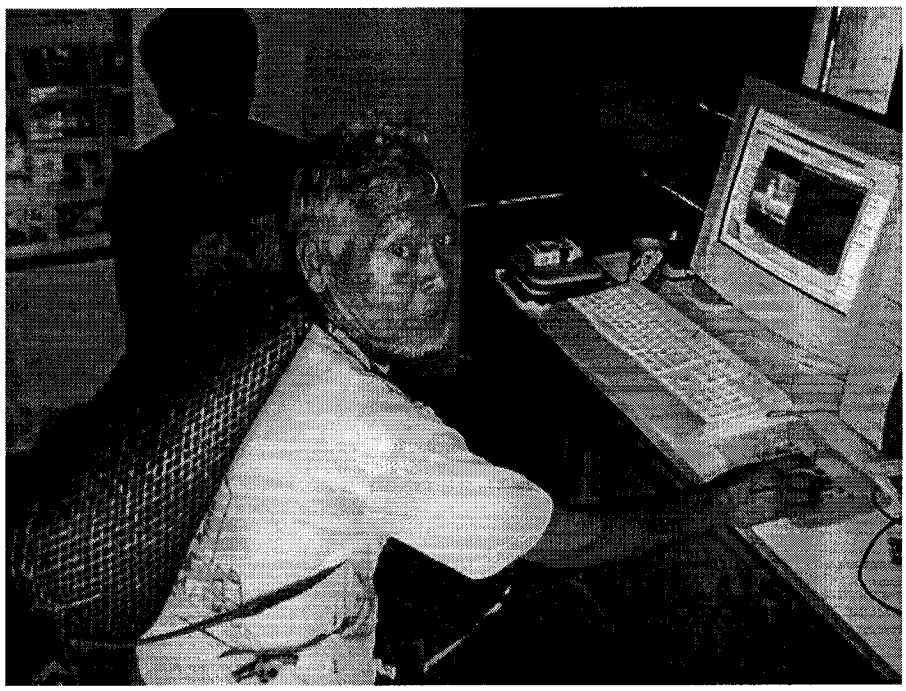


Plate 18 Elder in Benung using the computer

7.5.4 Tools

7.5.4.1 Increased community prestige associated with the tools

In Tepulang community members were active in promoting the PGIMS tools to other communities. They were especially proud about having a computer located in their village. The tools generated a sense of social prestige for the whole community. Community members were swift to inform their neighbours of the PGIMS project. As noted by one elder in Tepulang:

> The people from the village are very proud when they talk with outsiders about the computer, even if they don't know how to use it! (Osaq, 43-year-old pastor living in Tepulang)

In Tepulang the tools were used in such a way as to give prominence to the village. A large regional meeting was held in Melak to discuss the issue of decentralized governance and the impact on the village level. The villagers representing Tepulang at the meeting decided that they wanted to record the meeting using the justification that they could then show the results to people from the community who could not go to the meeting. Duly they recorded the meeting with much fanfare, and the result was that the village and the PGIMS project received a great deal of public exposure. Yet on return to the village, there was no interest by the two representatives who recorded the meeting in showing the video material to the other community members. This material was soon forgotten and eventually erased. The author believes that the intended objective of the exercise was to be seen in public using the equipment and that the information from the meeting was of lesser importance. The individuals undertaking this activity on behalf of the community felt they had enhanced their social prestige through associating themselves with these high technology tools.

In Benung the opposite took place. A man originally from the village, now working as a lawyer in Samarinda, ridiculed the community. This man stated:

> The people of Benung are farmers, for what do they need a computer! Better you give them a bush knife (*parang*) or hoe (*cancul*), at least they will have use for these tools! (Abu, 53-year-old male lawyer living in Samarinda)

As a result computer operators and others supportive of the PGIMS project in the village felt embarrassed by their involvement in the PGIMS project. This embarrassment however, soon turned to anger toward the man, who represented the elite of Samarinda and owned a computer himself. It is possible that the man felt threatened by the villagers using tools which he associated with his own enhanced prestige.

7.5.4.2 Increased and decreased community ability to own and control tools

The ability of a community to organise itself is an indication of empowerment capacity. One sign of ability to organise came from the way in which the communities chose to manage and mobilize resources around the tools. Effective management is an indicator of the communities taking ownership and showing a level of mastery over tools which are novel and have the potential to be intimidating to people unused to them.

The management of these tools has both a formal and an informal component. The formal component refers to the establishment and agreement on institutions and rules that govern their use. The informal component refers to processes that do not derive from structured authority but are equally essential to the tools use and management, although they are often not stated and only become apparent through observation.

Benung was efficient in managing the tools. The computer was meticulously maintained, the dust screen was always in place, the computer room swept and maintained and the camera and video equipment kept in a cupboard. All the equipment was kept in a locked room. Village elders even considered password protecting the information contained within the computer. The village administration and other power brokers in the community invested time and resources into managing the use of the tools and locating them in a neutral and accessible location. They also organized for the electricity bill to be paid by the village through the community tax. This showed their willingness to pay for the potential benefits derived from the computer[55]. They also oversaw the development of the list of regulations to govern the use of the tools.

Tepulang were more haphazard in their management of the tools. Nobody in the village appeared prepared to take responsibility and as a result informal and anarchic management was the norm. Initially there was reluctance to create a list of regulations due to a feeling that the

[55] Willingness to pay for long term maintenance and upkeep of tools is also indicated by Benung paying for fixing the video camera when broken at the cost of 810,000 Rupiah (approx $165 CAD)

tools were open access for everyone in the community. The video and camera equipment were frequently scattered throughout the village and there appeared to be no centralized or recognized system for managing the equipment. There also appeared to be little willingness to pay for the upkeep of the computer. The author believes that one of the main reasons that the computer remained in SHK's field office is that nobody in the village was prepared to pay for the electricity bill if it were stored elsewhere.

This location of the computer in the SHK field office was problematic. Despite having access to a key, many people in the village were not confident about using the office if there were no external collaborators or other SHK staff present. One Tepulang inhabitant summed up this feeling:

> I think that there is one important problem that we must address, where the computer will be put. I have said that we need to find a new place. [SHK's field office] is a place for sleep, eat but not for study. It is therefore not a place to stay a long time. The computer is common property, but while it stays in that place it becomes private. (Osaq, 43, Tepulang)

The location of the computer limited the number of people using the tools freely because they felt they needed to ask permission to use the tools; this showed that they lacked a sense of ownership over these tools. On several occasions it was decided in large community meetings to move the computer, but the initiative was never taken and the computer remained until the end of the project in the SHK field office. This is indicative of a failure by community members to take control and ownership of the tools, which in turn seems influenced by the absence of a decision-making body that might authorize and enable this move to take place.

The ability to manage the tools is indicative of empowerment capacity, but it appears from these examples that this was dependent on pre-existing empowerment capacity within the community.

7.6 REGIONAL RECEPTIVITY TO COMMUNITY EMPOWERMENT

The ability of the two communities to be empowered by the PGIMS project is enhanced by the current political climate in West Kutai, which is very receptive to requests coming from the communities. Until recently, local communities in West Kutai were almost completely removed from decision-making, especially concerning issues related to land use and management. The current trend of political decentralization (See Chapter Five) has meant that local officials and politicians are now more open to public involvement in decision-making processes, as well as more accountable and responsive to the communities they serve.

The receptivity of government and other regional institutions was examined at the multi-stakeholder and training workshops held to promote and provide training for the PGIMS technologies. Below are some of the participants' suggestions for use of the PGIMS at the regional level. These new ways of using PGIMS have implications for the empowerment of communities.

7.6.1 Adoption of PGIMS by the regional government

Adoption of ICT by local governments throughout the world is becoming increasingly important because of the growing understanding of the association between these technologies and economic development and poverty reduction (Wakelin and Shadrach, 2002). This recognized need for increased ICT use and accessibility is further reflected by the views of people from the wider region of West Kutai. During the multi-stakeholder workshop, one regional *adat* leader noted in reference to the PGIMS project that:

> We really need these [PGIMS] tools right now because during the New Order regime we were the people who were most left behind and also the people who were most held down. (Multi-stakeholder workshop participant's quote)

Evidence of the recognition of these views within the political framework of West Kutai is reflected in two recent policy initiatives, namely the *Teknoplan* and *Pelayanan Prima* (Primary

Service), both of which seek to improve the inception and spread of ICT use within the region and to make these tools and associated benefits available to people from all sectors of society, including rural communities. When the PGIMS made by the two communities were shown to the regional government in West Kutai, interest was expressed in adopting the PGIMS tools in order initiate a two-way flow of information between communities and the regional government. Government members saw the PGIMS as an opportunity and mechanism to realize their *Pelayanan Prima* policy and to enable information exchange between more remote communities in the region and the regional centre. As noted by one government official:

> At the moment the biggest problem in West Kutai is getting information from the centre [i.e. Melak] to the subdistrict level, let alone the communities. (Government official's quote)

Overcoming this blockage was recognized as being important because, as the head of the civil service (personal communication, 27 July 2001) stated "information is one of the best ways to realize the hopes of the people."

The provision of an information service for remote communities would be useful and well received by communities. However, members of the regional government seemed focused on using the PGIMS to suit their own means and objectives, primarily through using it as a conduit to disseminate and promote their own information. Information types considered important by the government include providing access to:

> Government policies, laws and benefits so that the communities are not wrong in their actions, and so they can protect themselves from outsiders that know the law. (Government official's quote)

Also it was noted that if people had access to this information by digital means it would greatly reduce bureaucracy in the government offices. Other information considered useful included informing Dayak communities of agricultural systems used in Java (systems that have been found to be ecologically unsustainable for soil types in Borneo) in order that "West Kutai is not left even further behind" (Government official's quote). Information flow from the top down can be

used to impose views and techniques that might act to the detriment of traditional systems and culture and maintain existing power relations between the government and local communities.

Receiving information from the community appeared secondary to their objectives and was considered "too complicated" (Government official's quote). For this reason, a number of NGO and community representatives emphasized that the information, process, skills and tools of PGIMS should also be controlled at the community level as they will not have the same meaning if controlled by government, or quasi government institutions; nor is there the same potential for empowerment of the marginalized communities in the region.

7.6.2 Adoption of PGIMS for regional adat centres

During the multi-stakeholder workshop participants from the wider region asserted that the PGIMS project at the community level "would not be possible without the help of outsiders" (Multi-stakeholder workshop participant's quote). Furthermore participants, particularly those in positions of power, felt that the PGIMS is misapplied at the community level because there are "neither the human resources nor infrastructure to fully appreciate and use the technologies" (Multi-stakeholder workshop participant's quote). These arguments were used as justification of why the PGIMS project ought to be working with the regional institutions, and not on the community level.

During the multi-stakeholder workshop it was suggested that these sorts of tools should be developed by Dewan Adat and other regional *adat* experts as a means of compiling all the *adat* from the area. This was suggested partly because adat experts at the workshop criticised some of the information presented in the PGIMS as being inaccurate and incomplete. This commonly occurs when *adat* is discussed among experts because there are a multitude of interpretations of ceremonies and rituals. The existing *adat* power brokers' disagreement served to delegitimize the information and caused embarrassment to the community presenting the information. However, this point was challenged by other workshop participants, one of whom noted:

> How can *we* say what information is true? To give an example of upstream Mahakam, there are several groups of Kenyah. They each have their own individual *adat* customs for marriage, healing and other things. How can we say that some are right and others are wrong? (Multi-stakeholder workshop participant's quote)

There is a danger that if these tools are institutionalized within higher decision-making structures the individual and community will ultimately become more doubting of their own knowledge because they will be heavily influenced by the information types and standards that are presented by the 'experts'. Also, subtle variations that exist between different villages and districts might be lost. The fact that much community culture, history and adat information is community specific is one of the strongest arguments for PGIMS being targeted at the community as well as the regional level.

7.7 CONCLUSIONS ON THE PGIMS PROJECT AND EMPOWERMENT AND AN EVALUATION OF THE EMPOWERMENT FRAMEWORK

This final section will summarise the overall findings of the empowerment framework analysis as well as some of the major themes and constraints to emerge during the project. It will then discuss and evaluate the empowerment framework developed in this thesis.

7.7.1 The PGIMS project and empowerment

7.7.1.1 How significantly did the PGIMS project empower and increase empowerment capacity

There was evidence of the PGIMS project being a factor in empowering individuals as well as communities, as indicated by several specific incidents. It is difficult to assess to what extent this increased influence is linked to the novelty factor of the new technologies, which in itself confers greater prestige to the individuals and communities using the technologies. If the novelty factor is the main reason for empowerment, then the use of the tools associated with

PGIMS will give these communities only a temporary advantage over the communities that do not yet possess them.

The PGIMS project appeared to fit into, rather than change, the pre-existing power structures of the community and region. In itself PGIMS did not lead to structural change within the communities although there was some increase and decrease in power at the individual level. Furthermore, there is no evidence that the PGIMS project facilitated structural change within the region (an empowerment requisite identified by Thomas, 1992; Ristock and Pennell, 1996), although the communities experienced some limited success in influencing certain decisions. However, perhaps it is unrealistic to assume that the PGIMS project in itself is capable of overcoming "deeply embedded material and cultural practices that legitimate and maintain social inequities" (Parpart, 2000b).

It is useful to have separated empowerment from empowerment capacity in the analysis, because it is in the latter category that the potential for the project to empower the communities in the future can be seen. These internal changes in capacity are likely to be more substantial and hence more permanent than the direct indicators in empowerment observed in this study. Observed indicators of increased (and in some cases decreased) individual empowerment capacity included increased (and decreased) self-esteem, increased critical awareness and increased economic opportunities. Observed indicators of increased (and in some cases decreased) community empowerment capacity included increased (and decreased) confidence, cohesion (between old and young, between more and less powerful), sense of cultural identity, independence from external collaborators, and ability to own and control information and tools, as well as the increased ability of women to organise themselves.

7.7.1.2 Different catalysts of empowerment and empowerment capacity were more important than others at different social scales

The empowerment framework revealed that different catalysts of empowerment were more significant than others at different social scales. For an overview of these trends the information has been put back into the empowerment framework (Appendix G presents the full list of indicators incorporated into the framework) and summarised in Figure 7.2.

Individuals appear to have been more empowered by the skills learnt and by the participatory process used. The skills that the individuals acquired helped to alter their social role within the community and wider region. Combined with this for some people was the influence of the process which, by ensuring that less powerful people were included (particularly women), served to increase the influence of these people in project decision-making. However, the skills increased empowerment capacity whereas the process did not, mainly because skills were something that individuals obtained for themselves and internalised, whereas the process that gave them power in project decision-making could just as easily be taken away in other decision-making situations.

At the community level the primary catalysts of empowerment appear to be the information gathered and the tools used by the PGIMS project, as these were used to increase the community's power over outside groups or individuals. These two catalysts were owned and used by the community as a whole, as opposed to the skills and the process, which only empowered individuals. The empowerment capacity of the communities, indicated by, among others, increased cohesion, identity, confidence and ability to organise, was increased by the information, the process and to a lesser extent the tools.

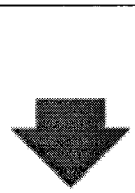
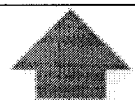
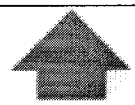
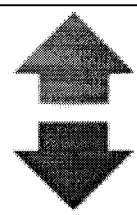
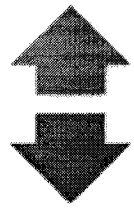
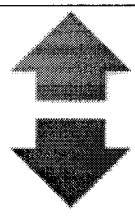
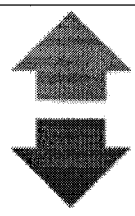
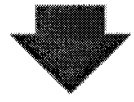
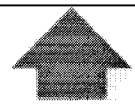
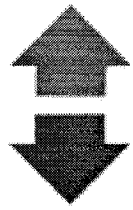
	Empowerment of the individual	Individual empowerment capacity	Empowerment of the Community	Community empowerment capacity
Information				
Process				
Skills				
Tools				

Figure 7.2 Using the framework to analyse empowerment by catalysts at the different social scales. Red arrows denote decreased and green arrows denote increased empowerment and empowerment capacity.

When examining other PPGIS initiatives, it is inadvisable to assume that a particular project is empowering across all social scales. Rather there is a need to analyse what aspects of the initiative are empowering at what social scale. This can help project designers to better plan a project to achieve certain empowerment targets. There is also a need to differentiate between increasing empowerment capacity (something that is internal and might be long lasting) as

opposed to increasing empowerment itself (something that may be more visible, but that is likely to be less long lasting).

7.7.1.3 The PGIMS project empowers and disempowers, and raises and lowers empowerment capacity

In concurrence with Harris and Weiner (1998b), this research shows and provides clear examples that PGIMS simultaneously empowers and disempowers people within the two participating communities, as well as that it empowers and disempowers communities within the region. This happens in two ways. The first way is through the project impacting individuals or communities differently. As shown earlier in this chapter, obtaining technological skills empowered some individuals but disempowered others, depending upon their personalities and their relationship with the community and to the project. At the community level, the project contributed to one community developing increased cohesion and ability to organise its information and tools. However in the other community the project only added to the existing state of conflict and disorganisation.

The other way was through the PGIMS project only impacting some individuals and communities, giving them relative power over those that the project did not reach. For example, obtaining these skills gave the trained individuals an increased sense of self-esteem at the expense of those who did not get trained, and who consequently felt diminished. It can be assumed that the increased confidence of the participating communities might also have been at the expense of neighbouring communities.

In conclusion, any evaluation of how a project empowered an individual or community should also evaluate how it disempowered others.

7.7.1.4 Individual and community empowerment and raised empowerment capacity can sometimes be in conflict

The benefits of individual empowerment can conflict with community aspirations for empowerment. Motivations for learning these new technologies are often selfish and not aimed at empowerment of the community. An elder from Tepulang states:

> If people consider this project to be important to them they will become involved. When I say important, I see this from the perspective of economic importance...even though this is important value for history, maybe people still do not consider it to be important for themselves. (Osaq, 43, Tepulang)

This feeling is reinforced by a middle aged man in Benung who states that

> Many people think that if it does not help give me rice why should I have to busy myself? Why should I be involved if it is for the communal good and not for my personal gain? (Edo, 42-year-old teacher from Benung)

Increased economic opportunities resulting from the new skills contributed to individuals being hired away from the community, so decreasing the community's capacity for empowerment.

In Benung the computer operators were motivated for personal and communal reasons. Their actions were directed by the decisions of the community, perhaps because of the more communal nature in Benung discussed in Chapter Five. As a result, their capacity to take a greater role in community decision-making as well as to access new economic opportunities was raised because of the PGIMS project. In Tepulang one individual appeared to be involved in the project for personal benefit. This motivation hindered the community from benefiting because he did not want to share his skills with other community members or take direction from the community. The conflict surrounding the PGIMS project led to the disempowerment of the operator within the community and overall loss for the community because the full extent of empowerment capacity of the PGIMS project was never realized.

In the long term, those individuals who worked with their communities benefited more than those who did not, by gaining rather than losing status in the community. Several examples

that have already been discussed show how the community is still able to exert quite strong control over individuals who try to act selfishly, such as the operator described above or the informants who tried to unilaterally record their own information (see Section 7.1.1.1).

7.7.1.5 Empowerment was experienced differently by different communities

Despite the PGIMS project being implemented more or less equally in both communities, the two communities appear to have been empowered by different catalysts and observed indicators of empowerment differed greatly between the two.

Benung appears to be empowered by the information that they collected through the manner in which they used it to influence decision-making processes. It is speculated that this strategic use of the information was only possible through the pre-existing level of community cohesion, and the strength of the governing institutions in the village. The community was sufficiently high in empowerment capacity that they recognized how the use of the information could increase their power base. Different catalysts of the PGIMS project, such as the information, process and skills, served to further increase this empowerment capacity, with none observed to have had a negative effect.

Conversely Tepulang appeared to be initially empowered by the superficial benefits of having these new tools located in the village, as they were able to use them in order to increase their bargaining power with outsiders. Empowerment in Tepulang is based on having the tools located in the village and the prestige and 'novelty factor' associated with this. It is not based on strategic collection and use of information with the intention to influence decision-making. It is unclear how effective or lasting empowerment related to the use of tools in this way will turn out to be. The low pre-existing empowerment capacity in Tepulang, particularly its low level of community cohesion and poor ability to organise, meant that these villagers were less able to use the PGIMS strategically. Different catalysts of the PGIMS project mainly served to decrease their empowerment capacity further, although there were some exceptions; notably the increased

ability of women to organise themselves and the increased cultural identity through learning about local history, culture and *adat*.

7.7.1.6 Empowerment is dependent on pre-existing conditions in individuals and communities

Empowerment in the PGIMS project appeared to be significantly affected by pre-existing conditions within the communities. For example, computer operators who were mature and committed with good relations with their community were able to become more empowered by the project than the operators who were more immature, less committed and in conflict with other members of the community. Likewise, a community needed to already be cohesive and well governed in order to take advantage of the PGIMS project and use it in a meaningful and efficient way that served to increase and consolidate their power. It further appears that PGIMS, if developed in a community that is fractured and poorly governed, may serve to heighten levels of disharmony.

In other words the higher the empowerment capacity an individual or a community already had, the more likely they were to use the PGIMS project to empower themselves. Other pre-existing conditions not related to empowerment capacity also had a significant effect on the individuals and communities ability to be empowered by the PGIMS project, such as the conflict over timber sales taking place in Tepulang at the time of the project.

7.7.1.7 Recommendations for future research

The findings of this study are only applicable to the PGIMS project over the short eighteen month time frame in which it operated in the field. Future research might look at the application of the PGIMS project in different settings. More specific recommendations for further research include:

1. Assessing through a longer term study whether observed changes in empowerment capacity in the participating communities later contributed to empowerment in decision-making and the resolution of conflicts. This could be used to assess the permanence of the impact of the PGIMS project.
2. Examining whether indicators used to represent empowerment and empowerment capacity in the PGIMS project are observed and considered relevant in other PGIMS or PPGIS initiatives.
3. Assessing how the observed disempowerment effects on individuals and communities might have been decreased, and testing this in a new project.
4. Examining in more detail the tensions between empowerment of individuals, groups such as men/women, old/young, educated/less educated, and communities as a whole.
5. Examining whether the pre-existing conditions within an individual, community and region, including pre-existing empowerment capacity, receptivity to empowerment and other factors, are more influential in enabling empowerment than the PGIMS or PPGIS project itself.
6. Exploring the issue of two-way communication, how could PGIMS be set up to support information exchange between communities and regional government and what are the implications for empowerment at the community level.

7.7.2 An evaluation of the empowerment framework

7.7.2.1 Empowerment framework strengths

As noted by Heckman (1998) and Elwood (2002) there are various ways of evaluating empowerment, each with different goals and methods. The challenge of this thesis was to develop an analysis of empowerment that showed the impact of the PGIMS project on individuals and communities in West Kutai, Indonesia.

The framework presents a clear and logical structure that allowed the author to categorize the field data and enabled an analysis of empowerment. The framework analysis helped to reveal that different catalysts of the project were more instrumental in empowering or increasing empowerment capacity than others at different social scales in the community. It also was useful for differentiating between increasing power and increasing empowerment capacity.

7.7.2.2 Empowerment framework weaknesses

The weaknesses of the empowerment framework analysis presented in this thesis can be divided into two categories, those associated with the analysis itself, and those associated with the use of indicators.

Weaknesses of the analysis:

1. One area of potential weakness lies in determining to what extent the PGIMS project catalysts contributed to observed indicators of empowerment capacity or empowerment, as there may have been other more important external factors influencing the emergence of these indicators. It might have helped if community members had been more involved in the definition and analysis of the indicators and the processes behind these indicators.
2. When using the framework it was found that sometimes several catalysts may contribute to observed indicators of empowerment or empowerment capacity. This makes it difficult to determine which indicators belong in which cell of the empowerment framework. For example, the participatory process used in this project empowered the women computer operators by stipulating that at least one woman should be given the opportunity for training, but the skills that they were taught could also be said to have empowered them.
3. Similarly, several social scales may be affected by a given catalyst at the same observed event, again making it difficult to determine in which cell the indicator belongs. The participatory process can be said to have increased a marginalised individual's involvement

in decision-making; it can also be said to have increased a community's cohesion through increasing involvement of marginalised community members.

Weakness of using indicators

1. The author's interpretation of the qualitative data might not have been correct when forming the indicators. Possible causes of bias or error in interpretation include cultural differences, language constraints, lack of objectivity, and closer associations with certain individuals. It might have helped if the author had involved community members more directly in the interpretation of data, although they also have the potential for bias and error.
2. Indicators may be small and internal, making them difficult to observe. Some indicators of empowerment capacity, such as feelings of self esteem, require delicacy in the questioning of the researcher and self awareness and articulacy on the part of the respondent.
3. It was sometimes difficult to gauge the relative importance of different indicators, especially with indicators based on single events or statements.
4. It was also sometimes difficult to determine how permanent the observed indicators of empowerment or changes in empowerment capacity were, especially since the study took place over a fairly short period of time.

7.7.2.3 Recommendations for future research

Further research could explore the potential of the empowerment framework. Further possibilities include:

1. Examining whether different conclusions are reached if the researcher works together with community members on interpreting the data to create indicators and analysing the impact of a PGIMS or PPGIS project using the empowerment framework.

2. Testing the usefulness of the framework for analysing the impact of other projects under other contexts and environments.
3. Examining the potential application of the framework for monitoring empowerment over the course of PGIMS or PPGIS projects. Such research could test the framework's potential as a tool for enabling projects to set and achieve empowerment objectives, rather than solely as a tool for evaluation.

CHAPTER EIGHT:
CONCLUSIONS

Inclusion of a community's local knowledge in decision-making is recognized as important for land use planning. However, its application is prevented by communication constraints between stakeholders. Increasingly, local communities throughout the world are using community mapping and GIT to communicate important information about their traditional lands to decision-makers. This corresponds to the recent trend in North America particularly for GIS practitioners to apply their technologies in public participation settings. Claims have been made that use of GIS by disadvantaged groups can be empowering. However, others claim that GIS is disempowering for communities due to constraints associated with the complexity of the technology, the associated high costs, inaccessibility of data and a restrictive representation of local geographic information. They also criticize the lack of real community control over the public participation process. The term empowerment has become important in the introduction of PPGIS activities and has been used by academics and field practitioners as well as the NCGIA Initiative 19 to indicate success of PPGIS projects. However, there remains confusion over defining and using the term empowerment within the context of community use of GIT and disagreement in how it might be observed and analysed.

This study set out to select and design an assemblage of GIT and multimedia technologies, as well as a participatory process for using them, that would overcome the constraints and criticisms off PPGIS technologies and processes described above. The product of this process and associated technologies was called a Participatory Geographic Information and Multimedia System (PGIMS). A PGIMS project was conducted in two communities in West Kutai, Indonesia. The aim of this project was to introduce a system that would be of benefit for

these communities, by enabling them to become more involved in decision-making and documenting their local knowledge for future generations.

The research then contributed to the debate regarding empowerment and PPGIS by examining the term and developing a framework to structure its analysis. This study set out to answer the following research question:

How does the PGIMS project empower or disempower local communities?

This final chapter reflects on the research and ties the major findings together. Section 8.1 offers a summary of the PGIMS project as it was designed and implemented in two communities. Section 8.2 presents and evaluates the empowerment framework developed to analyse the PGIMS project's impact. Section 8.3 sums up the impact of the PGIMS project on the communities in terms of how it affected empowerment and empowerment capacity.

8.1 THE PGIMS PROJECT

The participating communities were enabled through the PGIMS project to gather information related to their traditional land and culture, in digital photograph, video and text format. This information is categorized as cultural (information about local history, culture and *adat*), documentary (recordings used to provide proof of an event), political (information about the communities' vision, usually intended for outsiders), family (mementos of family events) and commercial (information from all of the above categories recorded and sold by contract). Some of this information was managed and accessed using an interactive Cartesian map interface linking points, lines and polygons on the map with other multimedia information. Thus functional map-linked PGIMS were created in both participating villages.

Outsiders and computer operators positively evaluated the map interface as an organizing tool and a way of learning about the communities' relationship with the land. However, computer monitoring data showed that the map interface was little used by community members as a means of managing and accessing information. Reasons for this low usage included firstly, that it was

easier for people familiar with the PGIMS to access the information directly using Microsoft Windows Explorer®, the default file management software; and secondly, local people tended to want to access specific information for specific reasons, rather than take a guided tour of the PGIMS via the map interface. It is unclear whether the map interface might have been of greater importance if there was more information contained on the computer and therefore a greater necessity for organizing and managing the information.

Furthermore, the community's maps did not appear to be seen by community members as being as good as video media for portraying geographic information. This may have been because some people did not understand how to interpret the Cartesian map, or could no longer recognise important features on the map after it was transferred to the computer screen. Another reason may have been that the video recording of a walk along the community's boundary more closely reflects the traditional way of orally describing boundaries. For the above reasons, all of the information contained on the computers became referred to as the PGIMS, with the words 'geographic information' remaining in the title despite the absence of a Cartesian map.

The PGIMS in both communities was seen by community members as being relevant to their needs. In particular, elders and women in both communities recognized the loss of local knowledge, particularly local history, culture and *adat*, and used the system to record these types of information for future generations. Information about boundaries and land uses, evidence of illegal incursions by other villagers and political statements about the community's vision for ecosystem based logging were also documented and successfully communicated by younger and middle-aged men to outside communities and the district government. Some of this information was instrumental in the resolution of two disputes involving illegal logging in the traditional lands of Benung.

PGIMS project sustainability is defined as the ability of the participating communities to continue to add information to the PGIMS after the external collaborators have left the village and to continue to manage and maintain the equipment. Benung's overall computer usage

remained high when the external collaborators were away, and community members continued to gather video and photographic information and store it on the computer. They also began to think of new and innovative ways of using the PGIMS. For example, they began to package and sell information for outsiders and so generate some cash income from the PGIMS technologies. This provided an additional incentive to use and maintain the system. A strong indicator of sustainability was Benung's willingness to pay to repair the video equipment when it was broken. Long-term sustainability of PGIMS therefore seems quite likely in Benung. Tepulang showed a significant drop in computer usage while external collaborators were outside the community. A main cause of this was a conflict that broke out between community members, mainly centered on the monopolization of the computer skills by one operator. People in Tepulang began to use the computer for watching VCDs and other tasks not related to the PGIMS project. Sustainability of the PGIMS project appears less likely in Tepulang.

The sustainability of PGIMS appeared less dependent on technology and related skills and more on pre-existing conditions such as the level of community cohesion, the maturity of the operators and the level of leadership provided in the project by the village head versus the external collaborators.

8.2 EMPOWERMENT FRAMEWORK

Empowerment is defined in this thesis as: *An increase in social influence or political power.* Empowerment is usually caused by an internal change in condition in an individual or community, as well as by external factors. This change in condition is defined in this thesis as a change in 'empowerment capacity'.

A framework was developed to structure an analysis of empowerment. The framework is based on the assumption that empowerment is experienced diversely by different social scales. Analysis of the social scales differentiated between empowerment and increasing the 'empowerment capacity' of the individual or the community. The framework is also based on the

assumption that the empowerment impact of the PGIMS project, as with other PPGIS initiatives, results from a variety of project components referred to as 'catalysts'. Four catalysts are considered relevant to the PGIMS project: the *information* contained within the PGIMS, the participatory *processes* employed, the technological *skills* acquired through the project, and the *tools* used to develop the PGIMS.

The framework introduced in Chapter Seven and summarized in Figure 7.1 helps the researcher to structure an analysis of how the four catalysts of the PGIMS project empower or disempower, as well as increase or decrease empowerment capacity, at the individual and community social scale. Data, gathered during the field research, that were indicative of empowerment and empowerment capacity were sorted and categorized. These 'indicators' were then incorporated into the appropriate cell in the framework according to the relevant social scale and catalyst.

The empowerment framework offers a structured approach to categorizing the field data and enabling an analysis of how the PGIMS project empowered or disempowered individuals and communities. The analysis helped reveal that certain catalysts of the project were more instrumental than others in empowering different social scales (see figure 7.2). The framework was also useful for differentiating the impacts of the project in terms of empowerment versus changes in empowerment capacity.

There are weaknesses in the framework, both those associated with the analysis, as well as those associated with the use of indicators. Weaknesses of the analysis included determining how much the PGIMS catalysts have contributed to observed indicators compared to other factors exogenous to the PGIMS project. Also, several catalysts may have contributed to observed indicators of empowerment and empowerment capacity, or it may be difficult to determine whether the impact was on the individual or the community. This makes it difficult sometimes to decide which indicators belong in which cells of the framework.

Weaknesses of using indicators are that they sometimes may not indicate empowerment and empowerment capacity, they may be based on incorrect or biased interpretation of the data by the researcher, and they may be difficult to observe and measure, especially subtle internal changes in empowerment capacity. It may also sometimes be difficult to gauge the importance or permanence of certain indicators.

8.3 THE PGIMS PROJECT AND EMPOWERMENT

It is important to note that the eighteen month period in which the research took place is a relatively short period and changes relating to the PGIMS project and empowerment that occur in the future cannot be anticipated. However, the research revealed that the PGIMS did play a role in both empowering and disempowering individuals and communities involved in the project. A number of key themes emerged:

- There was evidence that the PGIMS project empowered the participating individuals and communities, as shown by several incidents in which they appeared to gain some increased influence over decision-making. However it is difficult to know how lasting or significant this impact is, as it may be only due to the novelty of the technologies, and as there is no evidence of permanent change in the power structures of individuals in the communities or of the communities in the region. There was also evidence that the PGIMS project increased empowerment capacity in individuals and communities. This indicates that this project has contributed to future empowerment of these individuals and communities.
- At the individual scale, the skills acquired and the participatory processes used had the most significant impact on empowerment. Empowerment capacity at the individual scale was raised through acquiring skills, as indicated by increased self-esteem, increased critical awareness of the influencing role of the popular media and increased economic opportunities. At the community scale it was the information in the PGIMS and the prestige associated with having and using the tools that most contributed to empowerment. The empowerment

capacity of communities was increased by the information, the process and to a lesser extent the tools as indicated by increased community confidence, cohesion, identity, independence and ability to organize.

- As noted by Harris and Weiner (1998b), the PGIMS project both empowered and disempowered, and increased and decreased empowerment capacity. This occurs both because the project impacts individuals and communities differently, depending upon other pre-existing conditions, as well as because the project only impacts some individuals and communities, giving them relative power over those that the project did not reach.
- Benefits of individual empowerment can conflict with community aspirations for empowerment. For example, learning new technical skills, although empowering for the individual, may lead to disempowerment of the community if he or she is hired to work outside the community as a result. However, those individuals who worked for the community as well as their own individual benefit appeared to be most empowered by the project, as they gained rather than lost status within the community.
- Despite the PGIMS project being implemented more or less equally in Benung and Tepulang, the communities were empowered by different catalysts and in different ways. In Benung community members used the information to communicate to outside parties and influence decision-making processes. Catalysts such as the information, process and tools all served to raise Benung's already high empowerment capacity, with none observed to have had a negative effect. In Tepulang it was the prestige and power associated with owning and using the tools that most contributed to empowerment. All four catalysts were observed to decrease Tepulang's already low empowerment capacity, although there were several exceptions, notably the increased ability of women to organize and the increased sense of cultural identity through an increased understanding of culture, history and *adat*.

- Empowerment is largely dependent upon pre-existing conditions in individuals and communities. The higher the empowerment capacity an individual or community already had, the more likely they were to use the PGIMS project to further empower themselves. There were also other important pre-existing conditions not related to empowerment capacity that had an effect on an individual's or a community's ability to be empowered by the PGIMS project.

In conclusion, this thesis has shown that the PGIMS project influenced both the empowerment and empowerment capacity of individuals and communities associated with the project. Furthermore, this research has contributed to advancing an understanding of empowerment as it relates to PPGIS initiatives, by developing a framework for structuring an analysis of empowerment in a clear and logical way. This will have application for evaluating and possibly also monitoring other similar projects in the future.

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APPENDIX A:

HUMAN RESEARCH ETHICS COMMITTEE CONSENT REQUIREMENTS

Prior to the semi-structured interviews participants were informed verbally:

- The information from this interview will be used for Jon Corbett's Geography Ph.D. research. The results of this study will be prepared for presentation at a special meeting with the supervisor and other members of Jon Corbett's Ph.D. committee. In addition, reports containing the results of this study will be prepared for CIFOR, CIDA and the University of Victoria. These reports will be made available to you as they are produced. Results may also be published in scientific journals and/or conference proceedings.
- The questions in this interview will ask you to evaluate parts of the PGIMS project (referred to as Community Information Systems in the two villages).
- Your name will not appear on any documents that you provide.
- Jon Corbett will make every effort to maintain your privacy by using pseudonyms in place of your true names.
- No other individual or organization will have access to the data that you provide. Every effort will also be made to ensure confidentiality and your anonymity.
- Your participation in this interview is entirely voluntary and you are free to refuse to participate, to withdraw from it at any time, or to refuse to answer certain questions, without any negative consequences.
- In the event that you withdraw from the study, any data that you have provided will be destroyed, if you wish, or used as it is.

It was initially planned that interviewees would have to sign a consent form. This was considered unacceptable by villagers. As a result the consent request was provided orally at the beginning of the interview and recorded.

APPENDIX B:

SEMI STRUCTURED INTERVIEW QUESTIONS

Each one of the primary question is followed by a series of probes, depending on the response from the first question

1. What do you know about the GIMS project?
   - Are you interested in becoming involved?
2. Have you had the opportunity to see the information on the computer?
   - Do you feel that this information is useful?
   - If yes, why is it useful?
   - How might it be more useful?
   - Is there any type of information that is more important than others?
   - What other information needs to be added?
   - Do you think that this information might be interesting to people from outside the village?
   - Has the project changed the way that you think about information in the village?
   - Has the project changed anything else in the village?
3. Who has right to access the information on the computer?
   - Who should decide who has the rights to access the information on the computer?
4. What are some of the issues and problems with the project?
   - How can we overcome these problems?
5. Have you been happy with the project's process?
   - Do you think that other people in the village are clear about the purpose and objectives of the project?
   - Why do you think that other people in the village might want to get involved with the project?
   - How can we increase the enthusiasm of people not involved in order to better include them?

6. How will we make the project work effectively in the village in the future, and particularly after the external collaborators have left the village?
    - Where would you like to see the equipment stored?
    - Who will take responsibility for the tools?
    - How will they manage this responsibility?
7. How do you feel that these tools have integrated into your life?
    - How do you feel that these tools have integrated into the village?
    - Has your impression towards them changed over the duration of the project?
8. What responsibilities do the operators have in the future?

Every semi structured interview ended with asking the interviewee if they had any questions for the interviewer.

APPENDIX C:

LIST OF COMMUNITY MEETINGS AND MULTI-STAKEHOLDER WORKSHOPS

Table C.1 List of Benung's community meetings, with their purpose, date and number in attendance

Meeting	Purpose	Date	Attendance
First community meeting	Introduction to PGIMS	21 September, 2000	35
Second community meeting	Decision-making	25 October, 2000	25
Third community meeting	Defining community computer regulations	26 November, 2000	22
Fourth community meeting	Presenting community computer regulations	12 February, 2001	25
Women's meeting	Decision-making	12 March, 2001	6
Fifth community meeting	Conclusion and final impressions of PGIMS	7 August, 2001	25

Table C.2 List of Tepulang's community meetings, with their purpose, date and number in attendance

Meeting	Purpose	Date	Attendance
First community meeting	Introduction to PGIMS	20 September, 2000	55
Meeting with village leaders	Decision-making	25 October, 2000	8
Second community meeting	Decision-making	24 October, 2000	61
Third community meeting	Defining community computer regulations	2 November, 2000	12
Fourth community meeting	Defining community computer regulations	12 November, 2000	50
Fifth community meeting	Presenting community computer regulations	6 December, 2000	20
Sixth community meeting	Trying to find solution to computer operator conflict and choice of new computer operator	25 January, 2001	15
Seventh community meeting	Trying to find solution to computer operator conflict and choice of new computer operator	12 February, 2001	33

Women's meeting	Decision-making	10 March, 2001	20
Eighth community meeting	Discussing information for presentation at multi-stakeholder meeting	20 April, 2001	30
Final presentation	Conclusion and final impressions of PGIMS	6 August, 2001	12

Table C.3 List of multi-stakeholder workshops held during PGIMS project, with their purpose, date and number in attendance

Meeting	**Purpose**	**Date**	**Attendance**
Multi-stakeholder dissemination workshop	Presentation of PGIMS to participants from West Kutai and discuss its potential in the region	23 April, 2001	36
Multi-stakeholder training workshop	Train participants to create PGIMS and discuss its potential in the region	23 – 28 July, 2001	12

APPENDIX D:

MULTI-STAKEHOLDER WORKSHOP QUESTIONNAIRE

Name	
Place and date of birth	
Last education	
Employment	
Work place	

SECTION 1

1. **Do you use a computer in your workplace or village?**

   Yes (*If yes go to number 2*)

   No (*If no go to question 8*)

2. **For what tasks do you use a computer?**

3. **What software programs do you use?**

4. **What information do you share with other people?**

5. **Do you own your own computer?**

   Yes (*If yes go to number 6*)

   No (*If no go to number 8*)

6. **For what tasks do you most often use your private computer?**

7. **What software programs do you use?**

SECTION 2

8. After seeing the PGIMS, what new things have you learnt? Please comment!

9. What is your opinion of the PGIMS that has been developed in Benung and Tepulang?

10. What information is most important to document in the area that you come from? Why is this information important?

11. What are the uses of documenting this information?

12. What are the strengths of sharing information using the PGIMS method?

13. What are the weaknesses of sharing information using the PGIMS method?

14. What information is most commonly communicated between the regional government and villages in the region? What is the process for communicating this information?

15. In your opinion what is the best way for local communities to incorporate their knowledge, aspirations and ideas into the development of the region?

16. **Please comment on whether you feel that the PGIMS is a good method for local communities to communicate their information with groups outside of the village?**

17. **Do you feel that the map component of the PGIMS is a useful way to manage and communicate information? Please explain your answer.**

18. **Do PGIMS like the ones that you have seen today have value or use in the area that you are from? Please explain your answer.**

19. **Do you have any input or opinions or further questions about this research?**

APPENDIX E:

EQUIPMENT USED TO DEVELOP THE PGIMS

This equipment list was replicated twice, one set for each village. All costs are in Canadian Dollars.

Camera equipment

Digital camera (Kodak Millennium Edition)	$647
32 Megabyte flash card (image storage)	$125
Tripod (shared with video equipment)	$35
Rechargeable AA battery charger	$40
8 rechargeable AA batteries (4 in the camera at any one time and 4 charging)	$40
Flash card reader for computer (USB compatible peripheral for transferring images from the flash card to the computer)	$35

Video equipment

Sony dcr trv120e digital video camera	$1471
10 120 minute Hi8 video cassettes	$120
External zoom/gun Sony microphone (for greatly improved audio capture)	$120
Headphones (to help cameraperson positioning when recording)	$25
Standard equipment with video unit (AC power cable, composite video capture cables, remote control, standard battery pack [2 hour play time], remote control, strap)	0
Firewire cable (for transferring information from the video camera to the computer)	0

Computer

Pentium 3 555 Mhz processor	$2679
128 meg SD Ram	
2 Hard drives one 40 and one 20 GB hard drive	

Iomega CD-RW (CD burner also used to make video compact discs)

3.5" floppy disk drive

I-Will main board (with onboard video and sound cards)

Firewire capture card (computer PC card to enable video transfer to the computer)

17-inch monitor

Speakers, keyboard, mouse, cover, mouse pad

Earth grounded casing

Uninterrupted power supply (UPS)

Current stabiliser

Canon Colour Printer

UMax Scanner

Software

(Software was included in the cost of the computer)

Windows 98 Second Edition (video driver/Firewire compatible)	0
Paint Shop Pro v. 6.02 (image editor)	0
U-Lead Video Studio Basic SE v. 4.1 later upgraded to v. 5 (video editor)	0
Microsoft Office 2000 (word processing and spreadsheet capabilities)	0
Microsoft FrontPage 2000 (HTML editor, data/information manager)	0
Norton Utilities 2000 (including system doctor and anti virus software)	0
Total cost per village of all equipment in Canadian Dollars	**$5337**

APPENDIX F: RULES GOVERNING THE USE OF EQUIPMENT IN BOTH VILLAGES

VILLAGE REGULATION
No.1 / Village of Benung / 2000
THE VILLAGE INVENTORY / ESPECIALLY THE COMPUTER, VIDEO CAMERA AND CAMERA

1. People from outside the village of Benung are not allowed to use the computer, video camera and camera, even if they understand how to use the above pieces of equipment
2. People from outside the village of Benung who have an important task to do with the computer, video camera and camera must pay and use the official village operators.
3. People from the village of Benung who already know how to use the computer, video camera and camera can use these three pieces of equipment "IF IT IS FOR SOMETHING REALLY IMPORTANT"
4. All people in the village of Benung who want to learn to use the computer, video camera and camera must do so together with the official village operators.
5. The computer, video camera and camera are not allowed to be used for anything except their intended purpose and must be stored in the specified place.
6. The secretaries of the village of Benung must understand how to use the computer, video camera and camera for the purpose of village administration, for gathering and storing village information which is considered important and useful both for people of the present and future generations.
7. Use and operation of the computer, video camera and camera must be done in co-ordination with the official village operators and must be agreed upon by the PGIMS committee (the three official village operators and the village government).
8. If the computer, video camera and camera are used for things other than their intended purpose and as a result are broken, this becomes the responsibility of the person that used them.
9. IT IS FORBIDDEN for somebody to use the computer, video camera and camera without the knowledge of the PGIMS committee
10. Each member of the community of Benung or outsider who wants to learn to use the computer must pay for the cost of the electricity for the computer to the amount of 1000 Rupiah for each class.
11. Each member of the community of Benung or outsider who has not yet been taught how to use the computer, video camera and camera is not allowed to use these pieces of equipment. This is so that the equipment will last a long time and not quickly be broken.

Director of the village committee Benung — Traditional Head Benung

(Robinus) — (L.P. Lama)

Benung, 10 Desember 2000
With the knowledge of the village head Benung
(Firminus Nado)

VILLAGE REGULATION
No.I / Village of Tepulang / 2000
THE VILLAGE INVENTORY / ESPECIALLY THE COMPUTER

HANDYCAM AND CAMERA

Points

1. People from outside the village of Tepulang cannot use the computer, video camera or camera, even if they already know how to use them.
2. People outside the community members of Tepulang that need to use the computer, video camera and camera may pay an operator to do this work.
3. The people of Tepulang that already understand the computer, video camera and camera can use this equipment **"ONLY IF IT IS IMPORTANT"**
4. Every community member of Tepulang that want to learn the computer, video camera or camera must first contact an operator.
5. The computer, video camera and camera cannot be put to wrong use and must be kept in their correct place.
6. The village secretaries must know how to use the computer, video camera and camera to facilitate the administration of the village collect and save information considered important and useful for the members of the community both now and for future generations.
7. The system of using and operating the computer, video camera and camera must be connected to the operator and have the agreement of the person responsible for them.
8. If the computer, video camera and camera are wrongly used and become broken it is the responsibility of the person using the equipment.
9. Those people that want to use the computer, video camera and camera without the knowledge of the operator or person responsible for the equipment **ARE NOT ALLOWED.**
10. The person responsible for the computer, video camera and camera is **DURSONO DUHUNG.**

Director of the community council Tepulang — Traditional Head Tepulang

(Viterius Edi Setiawan) — **(L a n y a)**

Tepulang, 5 December 2000.
With the knowledge of the Village Head of Tepulang

(Yulianus Kodang)

APPENDIX G: INDICATORS OF EMPOWERMENT AND EMPOWERMENT CAPACITY PRESENTED IN THE FRAMEWORK

	Empowerment of the individual	**Change in empowerment capacity in the individual**	**Empowerment of the Community**	**Change in empowerment capacity in the community**
Information	• Decreased social influence of inaccurate informants	• Increased confidence to communicate information to outsiders	• Increased social influence with regional decision-makers • Increased social influence with other communities	• Increased community confidence to make statements to outside groups • Increased community identity through understanding local history, culture and adat • Increased and decreased community ability to own and control information • Increased and decreased community cohesion between generations through sharing information
Processes	• Increased social influence of female computer operators • Increased social influence of less powerful villagers			• Increased and decreased community cohesion among villagers • Increased ability of women to organize themselves • Increased and decreased community dependence on external collaborators

Skills	• Increased and decreased social influence of male computer operators	• Increased self-esteem of computer operators through mastery of skills • Increased and decreased self-esteem of other villagers through access/non-access to training • Increased critical awareness of computer operators leading to demystification of popular media • Increased economic opportunity for computer operators		• Decreased community cohesion between educated and less-educated
Tools		• Increased self-esteem from association with tools	• Increased bargaining power with outsiders	• Increased community prestige associated with the tools • Increased and decreased community ability to own and control tools