

Down the drain

*A study on the political ecology of wastewater governance
affecting slum settlements in rapidly urbanizing Chiang Mai*



Master thesis – 30 ECTS

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ABSTRACT

Slum communities located along the borders of the Mae Kha canal in Chiang Mai are exposed to city wastewater flowing along their houses. Lacking capacity among the local municipality to adequately protect the urban poor against socio-environmental problems appears to have a power-laden dimension. By implementing a political ecology framework, this study has aimed to expose the underlying power structures that shape the current governance of the canal. It has become clear that in different ways, the current means for wastewater disposal suppress the basic human rights of the urban poor in Chiang Mai. Pollution, floods and droughts in the canal are influenced by political processes and put the communities at risk. The case of Chiang Mai does not appear to form an exception. With increasing urbanization in developing countries, local governments are challenged with the management of socio-environmental issues in their rapidly expanding cities. Herein protection for the urban poor is urgently required, since their closely built settlements, often located in unsafe environments puts this group in a particularly vulnerable position.

Keywords: Political ecology, governance, wastewater management, slum communities.

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PREFACE

The moment in which I will finish my studies in International Sustainable Development is approaching. A good time to reflect upon what I have learned over the past two years. During my studies I have been able to conduct research at two very different localities. The first year I studied the implications of soy monocultures and pesticide use in Argentina, while the past 6 months I have dedicated myself to researching wastewater governance affecting slums in Chiang Mai city. Though these topics appear unrelated at first sight, for me the underlying processes appear similar. With the extensive agricultural production of contemporary times, a trend is going on wherein plots of rural land are being taken over by agricultural companies. A trip into the surroundings of Chiang Mai, showed me that large-scale soy production is also taking over parts of Thailand's rural north. In the city of Chiang Mai I was able to study an issue that I perceive as a consequence of this global trend in food-production; ex-smallholder farmers cannot sustain a living any longer in the rural and migrate to the city, where they become 'the urban poor'.

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1. INTRODUCTION

The number of people living in slum settlements is expected to grow in the coming decades (UN-HABITAT, 2012a). Both the World Bank (2009) and the UN (2012) mention small and medium-sized cities, those counting less than 500,000 inhabitants, as being especially prone to rapid urban growth. Due to limited institutional capacities and constrained financial resources, these rapid expanding ‘second- and third-tier cities’ face particularly severe struggles to deliver infrastructure and basic services to its inhabitants (Brown, Dayal & Rumbaitis Del Rio, 2012). In its World Urbanization Prospects (2012), the UN predicted that 60% of the increase of the world’s urban population between now and 2050 would take place in Asia. Ever-increasing numbers of rural migrants seek their fortune in urban areas in Asia, while governments fail to meet their demand for housing. These economically deprived groups fulfil their own housing needs through the creation of slum settlements (Fitrianto, 2008). Due to closely built settlements, located in unsafe environments, slum dwellers live in hazardous circumstances (Wisner, 2003; Satterthwaite, 2008). Where governments fail to deliver services to its growing populations, the poorest inhabitants of today’s cities generally receive the consequences hereof (Zimmer & Sakdapolrak, 2012). In an attempt to protect the increasing number of urban poor, exploring the underlying patterns that shape the contemporary risks they face is urgently required.

Chiang Mai, the second largest city of Thailand, is a prime example of a medium sized Southeast Asian city, where slum settlements are expanding rapidly. Increasing numbers of slum dwellers locate themselves along the borders of the Mae Kha canal, which runs through the city of Chiang Mai. The municipality uses this canal for the sewage disposal of its wastewater. Pollution, floods and draughts put the communities living along this canal at risk. With expected urbanization, it is likely that more poor citizens will settle themselves along the canal in the future.

In line with political ecology thinking, the study starts from the assumption that exposure to such risks does not exist in isolation from social power structures. By applying *political ecology* as an analytical framework, this study explores how power relations among the various actors that are related to the Mae Kha shape the current governance of the canal.

1.1 Aim and relevance of the research

The research has been conducted as part of an internship position at Metabolic, a Dutch company that through implementation of holistic and replicable technologies aims at realizing a more sustainable future. One of their aspirations is to reach the urban poor with implementation of low-cost DIY technologies. However, in order to offer locally suitable solutions, a thorough understanding of a local culture, socio-environmental problems and opportunities for sustainable development is essential. This research has been executed to obtain such understanding, thereby providing the social, cultural and political background information from which possible technologies can be created, suitable to local requirements. To assure an unbiased understanding herein, together with Metabolic it was decided to

conduct the research in an open fashion. The focus was set on unravelling and understanding local problems, not implementing a market research for Metabolic's products. Conducting the research with this open view moreover benefitted an independent character of the research.

On an academic level, the research aims to provide a deeper theoretical understanding on how power structures shape unequal socio-environmental realities. This study attempts to reveal such patterns by analysing and relating the findings within a broader academic development context. By doing so, the study will add to a deeper understanding of the consequences that social power structures can have on the poorest communities. Hereby the study will add to global debates on struggles over natural resource management and power differences in our urbanizing and hazardous world. Moreover, by reflecting on the possibilities for integrative management, in which the needs of all stakeholders are met, the study aspires to explore possibilities for more equity in governing natural resources. On the local level, the study aims to contribute in achieving more equitable power-relations among the stakeholders under investigation. This is attempted through applying participatory research techniques, in which the various actors are encouraged to find integrative solutions.

1.2 Research questions

To achieve these goals, the following research question is formulated: *How do social power structures determine the current governance of the Mae Kha canal in Chiang Mai?*

For answering this question, the following sub-questions are specified:

- 1 *What actors are involved with or affected by the management of the Mae Kha canal?*
- 2 *What are the cultural, natural and economic perceptions and interests concerning the canal by those various actors?*
- 3 *In what ways do these perceptions and interests agree and conflict with each other?*
- 4 *What is the distribution of effective power between these stakeholders?*
- 5 *How does the distribution of power offer and restrain possibilities for holding alternative values on the canal?*

1.3 Thesis overview

In answering these questions, this thesis firstly provides a literature review on slums, governance and urban wastewater management in developing countries. The goal of this review is to establish a deeper understanding of the underlying trends that determine the hazardous circumstances in which the urban poor are living today. Then the theoretical foundations and application of political ecology as an analytic framework for this study will be set out. In the Methods chapter, the various applied research techniques are presented and discussed. The results are divided into 4 sections. The first section is devoted to the development context of Chiang Mai and the Mae Kha canal, wherein shortly the historic, geographic, socio-cultural, political and economic context of the city is discussed. This will

provide background information, from which the results can be interpreted. Then the various actors under study are introduced. For all actors, the various perceptions on and interests in the canal are discussed, thereby showing the ways in which these overlap and contradict each other. By comparing these varying interests with the current governance of the canal, it becomes apparent how the execution of power in realising how the canal is managed is divided among the various actors. A visual representation will provide a schematic illustration of the various roles in managing the Mae Kha canal. The extent to which this fits and contributes to current debates on slum governance and sustainable development will be discussed. Finally, a critical reflection on the study and possibilities for future research are set out.

2. LITERATURE REVIEW

This chapter presents an overview on academic research and insights that have been obtained within the field of slums, governance and urban wastewater management in developing countries. Herein a special focus is set on human-environment relations. The chapter hereby aims to provide a deeper understanding of the underlying trends that determine the hazardous realities that the urban poor are facing today.

2.1 The emergence of slum settlements

While urbanization is associated with prosperity and economic success, it also appears to be a breeding ground for inequality. Today's urban poor lack access to basic services like health care and adequate housing and they are prone to disasters (Satterthwaite, 2013). The difficulty to sustain a living in rural areas draws people to the city, where poverty often forces them to live in hazardous, marginalized urban regions (Barker, 2010). Hence 'slums' come into being.

At present, roughly one billion people live in slum settlements (UN-HABITAT, 2012a), thereby forming around 15% of the world population. Especially in developing countries, numbers of slum dwellers are high, where they can comprise more than 50% of the total urban population (The World Bank, 2009). International attempts to improve the housing situation of slums dwellers have gained successes over the past decade. According to UN-Habitat, 227 million people were moved out of slum conditions between the years 2000 and 2010 (UN-HABITAT, 2012a). Despite these achievements, the numbers of slum dwellers continue to grow. Within the same time period, the global amount of slum dwellers had increased with the net number of 50 million. The World Bank (2009) anticipates two billion new urban residents in the next 20 years. Going hand in hand with urbanization, the number of slum dwellers will continue to grow in the coming decades.

Slum residents are vulnerable to natural hazards due to their closely built settlements, often located in unsafe environments (Wisner, 2003). As Barker (2010) puts it: "Squatter communities tend to appear on land no one else wants and their residents are often unaware of the risks involved in living in vulnerable locations." According to Satterthwaite (2013), the risk of being exposed to disasters is more than 50 times higher for slum dwellers than for the urban upper class. Among the main threats slum dwellers are exposed to, UN-HABITAT (2012b) mentions 'life-threatening problems related to sanitation and pollution (including water pollution from garbage and sewers)' and 'exposure to environmental hazards (landslides, flooding, poor drainage)'. The proximity to better health-care facilities than in rural areas, would suggest that the poor are better off in the city. However, in reality the urban poor often generally do not have access to health care, as services are unaffordable or facilities are inaccessible to them. They also die disproportionately of both infectious and chronic, degenerative diseases (Montgomery et al. 2004; Montgomery, 2009).

UN-HABITAT (2008) defines a slum household as group of individuals living under the same

roof in an urban area, that lacks one or more of the following characteristics:

1. Durable housing of a permanent nature that protects against extreme climate conditions.
2. Sufficient living space, which means not more than three people sharing the same room.
3. Easy access to safe water in sufficient amounts at an affordable price.
4. Access to adequate sanitation in the form of a private or public toilet shared by a reasonable number of people.
5. Security of tenure that prevents forced evictions.

In various developing countries in Asia, the Asian Coalition for Housing Rights (ACHR) is dedicated to improve the last mentioned slum characteristic: tenure security. Somsook Boonyabancha is the founder and secretary general of the ACHR. According to her the problem in housing the urban poor is not so much the availability of land, but rather the institutional arrangements that decide over this land: “Slums and squatter settlements in Asian cities keep increasing in size and number. The fact that all these millions of poor people continue to find pockets of land to squat on means that land for housing the poor is in fact available in our cities – but the land they find doesn’t belong to them, it isn’t legal and it isn’t secure. So the problem is not the availability of urban land for housing but, rather, how the management of urban land is failing to deliver this most basic component of decent housing to the city’s poorer citizens (..) Slums are a direct result of land mismanagement and of a city’s failure to address the basic housing needs of the poor” (Boonyabancha 2009).

The term ‘slum’ has been the focus of intense debate within development studies. For decades, researchers stopped using the term for it had developed a connotation with crime, hopelessness and unemployment, thereby creating a little nuanced and stereotypic image of the urban poor (Portes, 1972; Marris, 1979; Gilbert, 2007). The UN reintroduced the term in its ‘Cities without slums’ project in 1999 (UN-HABITAT 2003a), with the aim to stipulate the urgency of problems related to the urban poor and to attract funding for solving these problems (Gilbert, 2007). Critics warned that the adoption of the term would awaken the old stereotypic analysis of slums. Moreover, with its campaign on ending slums, the UN would rather evoke acts that focus on the clearance of slums by ‘sweeping them back under the carpet’, than improving the livelihoods of the urban poor (Davis, 2006; Gilbert, 2007; Wilhelm, 2011). Especially in Asia, forced evictions of slums settlements are a common practice in slum governance (UNESCAP, 2008). Despite such criticism and fears, the term slum has been widely adopted in recent development studies focused on Asia, while having received a strong connotation with upgrading work (CODI, 2005; Fitrianto, 2008; ACHR, 2012). For the aim of this research the concept slum will be used, not to refer to the old stereotypical connotation of slums, but rather to nuance the concept, in order to add to a more elaborate understanding of urban poor settlements.

2.2 Governing slums

Adequate environmental management is urgently required to protect the urban poor. According to Satterthwaite (2008), the most serious human-environment problems in expanding cities can largely be accounted to lacking governance. The urgency of adequate urban management for such human-environmental problems, especially for the poor, is represented in his work:

“The fact that large urban centres have high concentrations of people, enterprises (..) and their wastes, can make them very hazardous places in which to live and work. With inadequate or no environmental management, environmental hazards become the main causes of ill-health, injury and premature death. The urban poor face the greatest risks as their homes and neighbourhoods generally have the least adequate provision for water supplies, sanitation, drainage, garbage collection and health care.”

Satterthwaite (2008)

According to Satterthwaite (2008) good environmental management would enforce pollution control and waste management practices. He stipulates the importance of responsible urban governments that have strong linkages with the low-income groups of its city and include their desires in the decision making process. To achieve this, he mentions an explicit role for local federations, which can act to reduce inequalities through empowering the poor (Satterthwaite, 2013).

Satterthwaite’s ideas are mainly in line with the aspirations as set out by UN-HABITAT. As a follow-up on its ‘Cities without slums’ project, the UN has launched a new plan in its aim to alleviate the urban poor from slum circumstances. During an international conference on ‘Making slums history’ in Rabat (2012), UN-Habitat proposed to adopt the alleviation of slums in its new ‘Sustainable Development Goals’. The target is to halve the proportion of people living in slums between 2015 and 2030 (UN-HABITAT, 2012a). In acquiring this, the UN points at the necessity of ‘good urban management’. In line with Satterthwaite, this includes a transparent and accountable government that aspires to achieve equity through engaging its citizens in decision-making, with a priority for marginalized groups, like the poor (UN-HABITAT, 2009). This makes clear that the UN does not aspire to initiate a forced removal or relocation of slum settlements, but rather to achieve improvement that meets the needs of the urban poor. Hereby the UN notes the necessity to shift away from central state control in managing cities, since they are no longer able to address the emerging needs of rapidly expanding and complex ‘urban realities’.

While many developing countries are implementing decentralization policies, the policies being implemented are not necessarily beneficial to the governance practices in developing countries. Scholars have warned for difficulties with accountability and service delivery, which can become a problem especially for the poor (Litvack, Ahmad, & Bird, 1998; Bardhan & Mookherjee, 2006). Bardhan & Mookherjee (2006) describe how lacking managerial and technical expertise at the local level may prevent a successful provision of services. Lama-

Rewal (2011) stipulates the complexity a decentralized system can bring. In her 2011 paper, she discusses how the provision of services can become highly complex when responsibilities are not distributed clearly. In Delhi, she describes the urban governance as follows: “A multiplicity of agencies work in the same territory, under the responsibility of different levels of government, which translates into overlapping, inefficiency and reduced accountability”. These downsides stipulate the need to analyse local governance in developing countries when approaching the set of challenges in slums.

In line with decentralization processes in Thailand (Warr & Sarntisart, 2004) this study adopts a bottom-up perception on governance. Governance is defined as the 'exercise of authority, control, management and power of government' (World Bank, 1992). Governing is not merely the task of state organs; it is widely perceived to be the task of the private sector, civil society and the state combined (UNDP, 1997). Zimmer & Sakdapolrak (2012) remark that within the field of development studies, governance is perceived as a 'rather organized process; of negotiations that lead to the identification of a common goal and of a rational, technical, and somewhat apolitical management of means of reaching this goal'. With such a static perception of governance, the dynamic character of urban problems is difficult to tackle. Moreover, Zimmer & Sakdapolrak argue that the power relations that shape urban realities are often overlooked. In their analysis of governing slum communities, Zimmer & Sakdapolrak (2012) therefore propose a bottom-up perspective on governance, in which the dynamic processes that shape 'everyday governance' are recognized. In line with their view, this study will analyse governance as a dynamic process of development, shaped by power distributions between actors like the private sector, civil society and the state.

A challenge that comes with the required protection of slum settlements is the management of wastewater disposal. The rapid and uncontrolled growth in developing cities makes the management of wastewater highly complex (UN-HABITAT, 2003b). The UN estimates that 90% of all wastewater produced in developing countries ends up untreated in rivers, lakes and seas (UN, 2010). Where in the 19th and early 20th century of the global West most sewers transported rain- and wastewater to rivers or other receiving water bodies (Tjallingii, 2012), this is still the case in most developing countries today, while in addition these urban centres are facing the problems of contemporary times. According to DANIDA et al. (2006), floodplains and borders of canals are typical locations for slum dwellers to settle themselves. Slums at such localities are exposed to floods and draughts, but the risks of living at such sites are particularly high when the water is polluted (DANIDA et al., 2006).

That wastewater management in rapidly urbanizing developing countries is shaped by power-laden structures is described in the following: “The process by which wastewater is disposed of in a rapidly growing city is often chaotic and poorly managed (..) as each business seeks the most convenient (and cheapest) means to dispose of wastewaters, which often means that their wastewaters contaminate water sources for their neighbours or for those downstream” (UN-HABITAT, 2003b). Wastewater poses serious consequences to both the environment as well as humans that use or live along these waters, especially if the wastewater contains poisonous chemicals from industrial sources or hazardous materials from hospital waste (UN-HABITAT, 2003b). Wastewater is used widely by both urban and non-urban farmers in developing countries for irrigation and can cause a variety of diseases as well as a rapid

degradation of the environment (Hussain, Raschid, Hanjra, Marikar & Van der Hoek, 2001; UN, 2010). Though it is hard to quantify the impact of wastewater flows, the UN estimates that every day, 2 million tons of sewage and other effluents drain into the world's waters (UN, 2010).

A common way of treating wastewater in developing countries is the 'end-of-pipe' technique, in which dirt water flows to a treatment plant downstream for cleaning. These systems require high investment costs as well as operation and maintenance costs. Due to restricted local budgets, lack of local expertise, and lack of funding, such treatment systems are often inadequately operated in developing countries (Paraskevas et al., 2002). Sound management of wastewater would entail the arrangement of safe means for disposal, pollution control and flood management, especially in cities with high levels of rainfall. Realizing this requires trained personnel and funding within an accountable, transparent system. Herein corruption should be controlled and planning needs to be on the specific local realities and local demands (UN-HABITAT, 2003b). However, realizing such wastewater management appears to be difficult in developing countries, where wastewater management is generally low on the list of priorities (Massoud, Tarhini & Nasr, 2009).

Pelling (1999) analysed how divisions in power shape the risks to flood exposure among the urban poor. In order to reduce vulnerability of the urban poor, he stipulates the importance of inclusiveness in decision-making on environmental management, through a reformation of the institutional framework. More recently, Zimmer & Sakdapolrak (2012) investigated wastewater management in a slum community in Delhi, India. Here slum dwellers were exposed to their own wastewater when heavy rainfall would lead to overflow of the drainage systems. Both studies stipulate the existence of power relations in managing the threats that are posed on the urban poor, thereby strengthening the assumption that struggles the urban poor are facing today do not exist in isolations from political power relations. Recognizing the political forces that shape unequal urban realities is the first step towards finding possibilities for a 'good urban management', in which marginalized groups are engaged in decision-making. As mentioned in the introduction, this study focuses on slum communities in Chiang Mai, located along the borders of the Mae Kha canal, which is used as the sewerage for the city. Analysing the political forces that shape the governance of this canal can provide useful insight into how power relations determine contemporary socio-environmental realities. The theoretical foundations herein lay in *political ecology* thinking. The next chapter will set out this line of reasoning as the analytical framework for this study.

3. THEORETICAL FRAMEWORK

"God created the universe in such a manner that all in common might derive their food from it, and that the earth should also be a property common to all. Why do you reject one who has the same rights over nature as you? The earth belongs to all. But she is monopolised by some, at the expense of all whom she belongs to."

Saint Ambrose, fourth century

The most prominent line of reasoning used for this thesis is based upon *political ecology*. Based on this approach, a deeper theoretical understanding is provided on the relations between power distribution and exposure to environmental hazards. This chapter provides an overview of the theoretical foundations, philosophies, and concepts within the field of political ecology and discusses how this fits into sustainable development thinking. Hereby the analytical framework as applied for the purpose of this study will be disclosed.

3.1 Political ecology

Within sustainable development studies, a school of thought that seeks to analyse human-environment relations is *political ecology*. Researchers from a wide variety of disciplines apply this framework. Its assumptions are based on the notion that vulnerability to environmental changes is related to power distributions within societies. One of the first users of the term, Bruce Russett, used political ecology as the title for an academic magazine in 1975 and introduced it as the exploration of the relations between political systems and their social and physical environment.

Within development studies more specifically, political ecology can be seen as the union of two academic fields: On the one hand *political economy*, that analyses conflicts that emerge from unequal economical distribution and on the other hand *ecological analysis*, that investigates how species interact with their environment and with each other (Greenberg & Park, 1994). By combining economic and ecological issues, political ecology aims to analyse human-environmental processes from a holistic approach. The adoption of political ecology in development studies was strongly influenced by the work of Blaikie and Brookfield (1987), who defined the field as follows: "The phrase 'political ecology' combines the concerns of ecology and a broadly defined political economy. Together this encompasses the constantly shifting dialectic between society and land-based resources, and also within classes and groups within society itself". Examined topics generally include problems related with vulnerability to hazards and unequal control over natural resources. By taking into account the political, economic and social context of a specific location, the power relations among different actors that depend on or relate to a natural resource are explored. Political ecologists focus, for instance, on how the effects of decisions concerning the natural environment are distributed among those related to and dependent on certain resources (Blaikie & Brookfield, 1987; Forsyth, 2003; Dallman, 2013).

Different points of focus within political ecology

In an overview on the application of political ecology in development studies, Jon Schubert (2005) identifies three major points of focus within the field of political ecology: post-structuralism, socially constructed categories and environmental entitlements. Though the perspectives differ in focus, the divisions between them should be interpreted loosely, as some researchers use the various approaches simultaneously.

Post-structuralism

The first perspective Schubert (2005) distinguishes, post-structuralism, entails the deconstruction of environmental concepts, hazards and conflicts, by exposing underlying assumptions, mainly through discourse analysis. Schubert describes this stream as the most 'influential branch' within political ecology research. It derives from the assumption that discourses construct social reality and thereby shape the environment.

Arturo Escobar is one of the most influential political ecologists, using this post-structural perspective (Schubert, 2005). Over the past decades, Escobar has made major contributions to the articulation of a framework for political ecology. He perceives an economic bias amongst political ecologists and stresses the importance of including the cultural and environmental aspects of inequality (Escobar, 1996; Escobar 2006a; Escobar, 2006b). For all three domains - the economic, natural and cultural - focus should be on what Escobar calls '*difference in equality*'. This entails the possibility for holding differences in a society, while at the same time ensuring equality. Analysing in what ways this difference is enabled or restrained is one of the most important research questions for these days according to Escobar. In more concrete terms, difference in equality entails the possibilities for practising cultural and economic norms and values and perceiving nature in alternative ways, as opposed to dominating values and norms in a particular society. Escobar perceives a lack of coexistence in difference and equality in most societies. The general held belief is that difference will lead to conflict and therefore pressure for assimilation is constantly practiced. Subaltern groups would be excluded and dominated by those who control access over the world's resources (Escobar, 2006a; Escobar, 2006b).

Escobar perceives this pressure for equality along all three domains. In economics by pressure to adopt capitalistic forms of production, in nature, by using resources merely for creating profit and in culture by a pressure to adopt a particular set of cultural norms as 'natural' and universal. Important questions arising from this would be: 'In what ways are economic, cultural, and ecological difference-in-equality either enabled or denied?', 'What are the conflicts that result from this denial?' and 'How do differences create or propagate inequalities in social power?'. He brings up the concept of *distribution* as a useful tool for linking together difference, conflict, and equality. With distribution he means 'the difference in effective power associated with particular values and practices'. In analysing distribution, attention should be put on whose cultural perspective defines the norms and values that regulate the social practices in a society; 'Who controls the production of knowledge, the conception of property, and so forth' (Escobar, 2006b).

His post-structural focus becomes most clear in his deconstruction of sustainable development thinking. Through analysing discourses concerning sustainable development, he creates a clear and critical deconstruction of contemporary reasoning in this school of thought. He describes that the common belief since the Brundtland report entails that to overcome poverty, a form of economic growth is needed that protects the environment (Escobar, 1996). From the premise that natural resources are scarce, sustainable development thinkers state that production should be as efficient as possible by producing 'more with less'. Escobar argues that by speaking of a 'management of resources', the idea of the earth as a giant market/utility company' is produced. Herein lies the assumption that the current system of economic growth through natural exploitation is valid. This would convey a deep cultural domination in terms of production and profitability in which the entire system is constructed to serve mankind (Escobar, 1996; Escobar 2006a; Escobar, 2006b). Hereby Escobar provides an example of the production of social realities and the way in which discourses create and shape reality. A similar example of deconstructing social reality comes from Vandana Shiva. In her book 'Staying Alive' (1988, p.16), she criticises the dominating western science of that time: "...this transformation of nature, from a living, nurturing mother to inert, dead and manipulable matter was eminently suited to the exploitation imperative of growing capitalism. (..) The nurturing earth image acted as a cultural constraint on exploitation of nature".

Critics of the post-structural perspective argue that political ecologists in this field largely oversee the ecological dimension. By deconstructing social reality, they would ignore the realities of nature (Vayda and Walters, 1999). This criticism is rooted in the fundamentally different ideas on how reality is perceived: either as a social construct or as an objective truth. In paragraph 3.3 later in this chapter, this form of criticism will be further discussed.

Socially constructed categories

The second perspective within political ecology that Schubert (2005) distinguishes concerns a focus on 'socially constructed categories, like class, gender and ethnicity'. Scholars that conduct research from this perspective study the power relations and access to resources within and between different social groups, from the assumption that social categories affect interaction with the environment. The majority of studies within this field focus on the unequal division of power amongst men and women and how this influences access to resources and vulnerability to natural disasters (Goldman and Schurman, 2000; Schubert, 2005). Critics of the category approach argue that by focusing on specific predetermined categories, social diversity in a society might be undermined, through a classification in stereotypes (Forsyth, 2003). Attention so far has mainly focused on gender, thereby overlooking other social groups like, class or ethnicity. Like the post-structuralist approach, the category approach has been criticized for not taking into account the ecological dimension appropriately (Walker, 2005).

Environmental entitlements

Lastly, Schubert describes a rights-based approach, which he terms 'environmental entitlements'. It deals with concepts like access, rights and environmental justice. The field is largely based on work of Amartya Sen (1982), who noted that hunger would be caused by lacking access to food, rather than a shortage of food. Within this context, political ecologists

take into account the idea that our natural world is not an open playground, with unlimited access to resources for everyone, but that institutional and socially constructed rules determine property and user rights (Johnson, 2004). Entitlements are constructed through interactions between institutions and social actors, when fighting over the use of resources and are therefore subject to constant change (Leach, Mearns and Scoones, 1999; Schubert, 2005). Through analysing entitlements, understanding is provided on how people gain access to and control over the use of resources. Critics on the entitlements approach discuss the lack of analyses beyond the local scale; entitlement scholars mainly restrict their analyses to the case-level.

3.2 Political ecology and sustainable development thinking

In exploring the relations between political systems and their social and physical environment, political ecology formed one of the first attempts to unite the social and natural sciences. The roots of this integrative approach lay in sustainable development thinking. This paragraph sets out the development of this school of thought, to provide a deeper understanding of the origins of political ecology.

In the beginning of the 20th century, the foundation of the social sciences established itself with a sharp divert from the natural sciences; In studying society and human-human interactions, the new discipline did not consider the role of nature. Hereby social scientists attempted to distinguish their field from the then dominating natural and physical sciences (Goldman and Schurman 2000). On their behalf, natural scientists did neither adopt aspects from the newly evolved social studies. The two disciplines remained in sharp seclusion until the 1970's, when environmental concerns in the West started to rise like acid rain and global warming. This initiated attempts to analyse environmental problems from an interdisciplinary approach (Schubert, 2005; De Vries, 2011).

In 1987 growing environmental concerns were united in the famous Brundtland report, in which the term 'sustainable development' was first brought up. In this report sustainable development was defined as '*development that meets the needs of the present without compromising the ability of future generations to meet their own needs*' (WCED, 1987). The report was followed by ever-increasing scientific- and media attention for human-made environmental disasters like famines and pollution. Initially the concept was used to refer to a desired environmental or ecological state; the ecosystem should be restored to its 'natural balance' (De Vries, 2011). In the 1990's however, the recognition grew that natural disasters could no longer be perceived as being merely natural. Social scientists saw the necessity of analysing eco-systems in terms of power and control and natural scientists started to take into account the human factor when studying ecology (Bryant, 1992; Schubert, 2005; Walker, 2005). It was widely acknowledged that environmental disasters did not exist in isolation from institutional arrangements and power structures.

The fundamental distinction between the social and natural sciences began to collapse. This happened in parallel with a shift from modernization thinking, towards a post-modernist way to interpret the world (De Vries, 2011). The believe that universal truths could be unravelled

through modern science, was no longer considered valid. The idea of an unbiased truth - which natural scientists claimed to be exposing already for centuries - made place for a plurality of values and interpretations. Reality was now seen as a social construction rather than an objective truth. In line with this reasoning, development scholars shifted their focus away from global development patterns, towards local and bottom-up development (De Vries, 2011). Social scholars of political ecology adopted this line of reasoning. How this shift in development thinking created a gap amongst the social and natural scientists within political ecology will be discussed in the subsequent paragraph.

3.3 General criticism on Political Ecology

While political ecology concerns a field of research that initially sought to combine the strengths of both the social and natural sciences in analysing environmental problems, critics suggest that the field has not yet succeeded in doing so. Most criticism on researchers applying political ecology refers to the lacking integration of the natural domain into their analysis (Peterson, 2000; Schubert, 2005; Walker, 2005; Clement, 2010). According to Peterson (2000), such approaches should better be labelled as '*the political economy of natural resources*, for they do not consider ecosystems to be active agents'. At the same time, also natural scientists are accused of not incorporating the human aspect sufficiently in their work (Peterson, 2000; Clement, 2010).

Schubert (2005) describes how the underlying factors that determine the inability of scholars to successfully incorporate both domains, are the conflicting epistemological foundations on which different researchers base their work. He perceives a division between positivism and post-positivism, which for this matter can be seen as synonyms for the earlier discussed perspectives of modernism and post-modernism. Herein positivists claim to unravel an objective, value-free truth (modernism), while post-positivists interpret the world as being inseparable from subjective observation (post-modernism) (Forsyth, 2003). Where positivists derive their assumptions from the idea that there exists a natural equilibrium in nature, which is disturbed by human activity, post-positivists on the other hand interpret social and environmental changes in terms of scale and historical context, thereby making explicit the subjective value that is inseparable from their work. Scholars argue that political ecologists have the tendency to stick to their own field, thereby dismissing the chance of integrating both fields and creating a coherent theoretical school (Schubert, 2005). According to Torras (2005) and Walker (2005), the inconsistent utilizations of political ecology, have led to a lacking robust framework, which for instance could guide in providing clear policy recommendations.

Another criticism on political ecology concerns its main focus on rural regions, thereby neglecting processes in urban areas. In their work on political ecology, Heynen, Kaika and Swyngedouw (2006) stress the importance of studying *the urban* in Political Ecology. While more than half of the world's population lives in urban regions, they see debates on environmental problems hardly stipulating the effects of urbanization on environmental degradation. Environmental issues are discussed in global terms, rather than recognizing the urban origins of many problems in sustainability. Moreover, they state that those academics that do focus on urban environments, oversee the relationship between a 'capitalist urbanization processes' and socio-environmental injustices. In line with political ecology

thinking, they point out the necessity for a focus on the uneven power-relations of socio-ecological processes, while adding the need for such research to consider urban areas.

3.4 Applying the political ecology framework

By taking into account the main outlooks from and criticism on political ecology, this paragraph will describe the approach to political ecology as applied for the current research. In overcoming the lack in studies on urban political ecology, the research will focus on human-environmental processes taking place in a rapidly expanding, medium-sized city. The study is based on the assumption that the point of departure in doing development research should be from an anthropocentric view, since there is no other view that we can truly know. Or as De Vries (2011) puts it: *“Most people will adhere to an anthropocentric view, but some people want to extend it to all life or even the planet as a whole. Such an eco-centric view can in theory be defended – but the defence is, in practice always by a human being.”* This however does not mean that the environment should not be considered. Well-being of human life depends on the quality of its environment and for that reason possibilities to a vital ecosystem on the long-term should be considered. By letting go the idea that nature should be the point of departure in political ecology, but accepting the idea that its wealth in seeking sustainable development is crucial, a successful integrated form of political ecology can be realized.

The three points of focus as set out by Schubert will be taken into account when conducting this study. In line with Escobar’s post-structural approach in analysing human-environment relations, the discourses of the various actors related to the canal under study will be analysed. Herein the possible cultural, economic and natural values that these actors adhere to the canal will be explored. Attention will be set on the difference in effective power among the various actors, by exploring whose values determine the current management of the canal, and whose values are therein ignored. In doing so, special notice will be put on possible variations in effective power among gender, class or ethnicity. Moreover, institutional and social rules on property and use of the canal will be explored to obtain more understanding on the construction of possible variations in effective power.

To overcome unsustainable human-environment relations, wherein people are exposed to threatening living circumstances, general patterns of the causes of unsustainable life need to be revealed. Unfortunately, up till now most learned lessons remain limited to the borders of the location under study (De Vries, 2011). If general patterns of unsustainable life forms can be identified, this could provide solutions for other places in the world. By linking observed patterns in the management of the canal under study to insights obtained from scholars on other localities, such general patterns can be exposed. This study attempts to reveal such patterns by analysing and discussing the finding within the broader development context of political ecology in the conclusion chapter of this report. By incorporating a political ecology framework based on the described assumptions, this study aims to contribute to the description of such general patterns, and thereby in the creation of a firmer theoretical framework in political ecology. Besides this academic aspiration, the study also aims to contribute in achieving more equitable power-relations among the stakeholders under investigation. How this is put into practice, will become apparent in the subsequent chapter,

the Research Methodology.

4. RESEARCH METHODOLOGY

The study followed a methodology along qualitative and participatory lines. Action research was executed based on the *Soft System Methods* (SSM) as described by Flood (2010). The basis for his methods is in line with political ecology theory, as Flood has set out a participatory tool for analysing socio-ecological systems. The method is in line with 'soft systems thinking' that, corresponding with post-modernism, derives from the assumption that social reality is a construction created by people's interpretations and experiences. Therefore, he reasons that 'to achieve a meaningful understanding of any situation, it is necessary to study both the cultural aspects of the context as well as the interpretations and perceptions that people form within the cultural context.' Herein he stresses the importance of incorporating the perceptions of all stakeholders, that is, all those taking action and all those influenced by those actions. According to Flood, after recognizing the political and social power structures that are formed by these perceptions, the system can be transformed in line with people's desires (Flood, 2010).

The SSM is set up in a stepwise approach: First a problem is identified. Interviewees are then asked to provide a schematic reflection on these problems, to obtain a better understanding herein. After discussing the problem more in-depth, the subjects of the study are finally encouraged to conceptualize solutions to the problem and to identify the required actions to realize this. By applying Flood's action research techniques, the power relations between the actors related to the Mae Kha canal were explored. The methods for the present study as described below, are based on the techniques as proposed by Flood (2010), with some alterations and additions to fit the current study purpose.

4.1 Research procedure

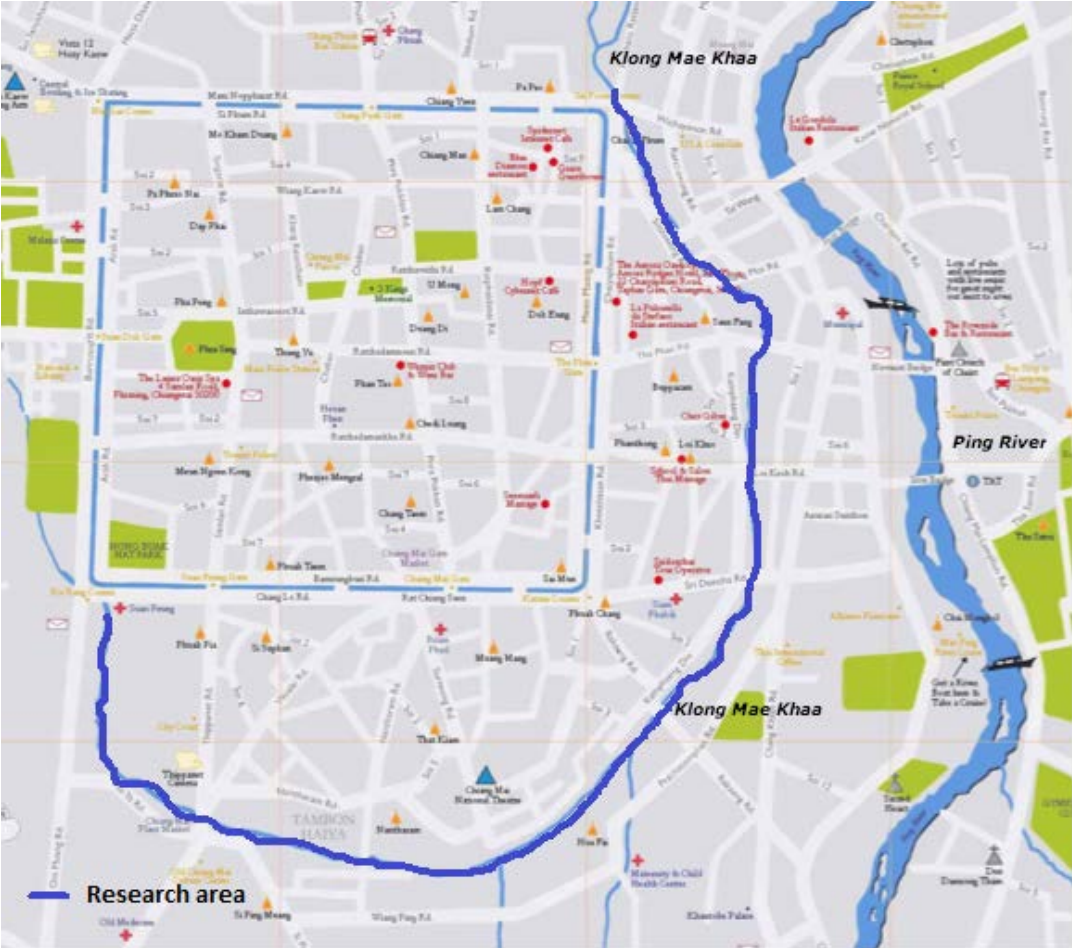
First a bibliographical study was conducted on documentations related to the cultural-historical, economical, geographical and political background of Chiang Mai city, the Mae Kha canal and the proliferation of slums along its borders. This provided a cultural-historical context from which to analyse the current situation in Chiang Mai. As stipulated in the theoretical chapter, in analysing power structures an understanding of the local context is essential, since the context provides the basis on which power structures are built. In line with this reasoning, the results chapter of this report will start with an overview on the development context of Chiang Mai, as acquired from the bibliographic review. When conducting this review, some of the problems related to the canal became apparent and various actors related to those problems were identified. Three Civil Society Organisations (CSO's), active with slum communities along the Mae Kha were yet distinguished, as well as the political actors that govern the current management of the canal. Sources included academic articles, theses, journalistic publications and websites.

Selection of research area

The entire Mae Kha canal is 20 kilometers long and runs through 3 sub districts, within Chiang Mai province (Dr. Wasan, personal communication, May 6, 2013). For the purpose of this study, the focus was set on a selection of the canal, within the borders of Chiang Mai city.

It was chosen to limit the area of research to that part of the canal, that runs along ‘Kampaeng Din’, the old outer-city wall, because this wall determines the historical city region of Chiang Mai and gives home to some 10 slum communities (Srisuwan, 2005; Kon Jai Baan, personal communication, March 27, 2013). In map 3.1 the exact research area is visualised with a dark-blue line.

Map 4.1. The area of study within Chiang Mai city



Source: www.orangesmile.com (2013)

Geographic mapping

To explore the selected research area, Geographic Information Technology (GIT) was used. GIT can be applied as a useful tool when analysing social relations in their geographic context (Corbett, Rambaldi, Kyem, Weiner, Olson, Muchemi & Chambers (2006). It refers to a set of techniques and geographic data, used to analyse and display geographic information. Hereby insight can be gained in spatial relationships that allows for a geographic approach to problem solving. For the purpose of this study, GIT was practiced to obtain geographic information on the selected area of the Mae Kha canal. During walks along the canal, divided over four days, all settlements (slums communities, houses, factories, businesses, etc.) located within roughly 30 meters from the canal were marked on a detailed map. In addition, annotations and

photographs were made of the physical characteristics of the canal, water-related infrastructure and human activities related to the canal that took place during these walks. Although outside the scope of this study, a trip was made towards the source of the canal, located a few km north of the city, to obtain background knowledge on the geographic situation of the canal further upstream. Afterwards, by making use of GIS, markings, pictures and annotations were added in a private digital map in Google Earth. Hereby a comprehensive geographic map was produced of the canal, the buildings and actors that are located along its borders and the various ways in which the canal is used.

Sampling techniques

Based on the produced geographic map, actors located along the canal could be identified and were generally divided into three subgroups: slums, businesses and non-slum households. For the focus of this research, the first two groups, slums and businesses, were selected for investigation. Within these identified groups, diversity was large and therefore one could argue that this classification is a rather simplistic one. When presenting the results this will be discussed per subgroup, but for now it can be said that a deeper classification would have been more representative of the actors along the canal. However, due to time restrictions of the study, this was not feasible. In line with data obtained from bibliographic research, roughly 10 slum communities were identified. Of those, 7 communities that were evenly spread along the canal were selected for further investigation. For each community, one active member was selected to represent the community, either being the community leader, or someone well known in the community, being engaged with political or communal activities. Due to time-limitations, it was not feasible to study more inhabitants for all communities. Instead, it was chosen to select one community to conduct in-depth research with various inhabitants, described later in this chapter. The interviews with the community leaders should be seen as merely providing basic information on the communities, not a representative of the perceptions of all communities. Based on a contact list from Kon Jai Baan, a CSO working with the slum communities, 4 communities were contacted. The other 3 communities were reached through the snowballing technique as described by Willis (2010), in which an equal representation of female and male representatives was assured.

Based on the mapping, the main businesses within the research area that were identified were motor-mechanics, hairdressers, hotels, handcraft vendors and food vendors. 8 businesses, evenly spread along the research area, were selected to form the business sample. Businesses from each identified group were selected, with both small and larger businesses composing a representative sample of the businesses along the canal.

In-depth interviews

A full list of all interviewees that participated in this study can be found in Appendix I. With the selected representatives for slum communities, businesses, CSO's and municipal officials, in-depth interviews were conducted using semi-structured interviews, which can be found in Appendix II, III, IV and V respectively. For the CSO's and politicians, some alterations to the question templates were made, depending on the position of the interviewee. The political ecology framework formed the basis for these questions. Thereby the main focus was set on activities related to the canal, the values that were assigned to the canal and the perceptions

concerning control distribution in managing the canal. Since the interviews were conducted in cooperation with another researcher, the question-lists contain additional questions that were not asked for the purpose of this study. Along the lines of informed consent (Brydon, 2010), interviewees were informed about the reason for the study prior to the interview. Moreover, they were asked permission for recording the interview and whether they preferred to be anonymous.

Unless the interviewee spoke English, which was the case with 6 out of 41 interviewees, the interview was conducted with the help of a translator. Prior to the data-collection phase, the researcher had obtained basic knowledge of the Thai language and culture by attending a beginners language course of one month. This made the researcher able to understand some of the general content during the interviews and provided the ability to correct or interrogate the translation when necessary. For the entire study 3 different translators were employed, all residents of Chiang Mai city who held a university degree. Prior to the interviews, the question lists were practiced with the translators, in which the translator was asked to answer the questions, when necessary, from imagination. This was done to assure that the translator understood all questions correctly and also to adjust the template where necessary, for cultural differences in the meaning and understanding of Thai and English language. Moreover, this provided insight in the initial perceptions and ideas from the translators concerning the Mae Kha canal and slums along it, which was important to consider for this could influence the interaction with the interviewee as well as the translation.

Power map

During the interviews, all interviewees were asked to create a power map. Herein all actors related to the canal and the relations between them were visualized. As set out in the question templates under the heading *actor map*, the interviewee was first asked to write down all actors involved in managing the Mae Kha, each one on a different post-it. The relation of each actor with the canal was written on the post-it subsequently. Then the interviewee was asked to organize the actors on an A-2 sheet of paper, with lines and sentences that reflected the relations between them. Following this, crayons were provided and the interviewee was asked to highlight the actors with red for the strongly influential, orange for the medium influential, yellow for the little influential and blue for the non-influential in deciding (managing) what happens to the Mae Kha. Finally, it was asked if there were actors related to the canal that were not yet included in the map and where these would fit in.

Some interviewees felt uncomfortable creating the maps themselves. Therefore, based on the interviewee's input, the researcher would create the map, sometimes in collaboration with the translator. The expressed relations were visualized, attempting to reflect the interviewees answers closely by constantly checking whether the map reflected the interviewee's ideas.

Besides providing a visualization of the power relations to both the researcher and the interviewee, the power maps also offered the opportunity to identify actors that were not yet selected by the researcher, based on the geographic map and the bibliographic study. For government officials the list of interviewees was extended by asking for contact details of

mentioned actors (snowballing) when finalizing the interview. For CSO's it appeared that the initial list was extensive, since no additional actors were mentioned during the power mappings. Because of stories on an active slum community upstream, outside the scope of this research, this community was investigated using similar methods as for the other actors, thereby forming an additional case study.

Case study

After all stakeholders were heard, one community was selected to conduct a more in-depth case study to provide insight into the perceptions of community members. Through applying action research, an attempt was made to empower the inhabitants of this community. This was practiced at a community called *Kampaeng Ngam*. This community was selected, due to its central position along the canal; it was located neither upstream nor downstream, thereby possibly reflecting some aspects of communities along the entire canal. Moreover, the community included people from various ethnic groups, which were mentioned during the interviews with community representatives.

Kampaeng Ngam counts 134 households, of which 14 households, including the community leader, were selected for the research. Thereby the sample formed more than 10% of the entire community. Based on the interview with the community leader, it became apparent that the community could be divided into three sub-groups: the poorest people living on a low area, richer people living up a hill, and another group uphill that evolved around the former community leader. Since people were working at different times, the households were approached by visits to the community, spread over 3 days at different times of the day. During the selection of household representatives, an equal representation of the three sub-groups, ethnicity and gender was assured.

The selected household representatives were interviewed, by means of a semi-structured in-depth interview, which can be found in Appendix VI. The interviewees were asked to make two visual representations; one in which the canal was represented as they see it now, and one which reflects the canal as they would like it to be. The interviewees were asked to do so on a sheet of paper, being provided with pencils and colour crayons. No geographic focus or actors were mentioned, with the aim to obtain merely the perceptions of the interviewee on the Mae Kha. For all except 2 of the interviewees it was difficult to express themselves in a drawing. They mentioned to be either unable or not willing to make a drawing. Therefore the interviewees were asked to formulate a visual description of the Mae Kha, which the researcher would then illustrate on paper, constantly checking with the interviewee, whether the image was correct.

As described by Flood (2010), an important step in action research is to formulate the actions that need to be done to pursue a particular purpose. Therefore, after the drawings were completed, the interviewees were asked to think about what steps needed to be made to change the current canal into the image of how they would like it to be. They were challenged to think about what needed to be done by whom in general, and more specifically what they could do themselves in realizing this. Herein the perceived current power divisions and the

desires in changing them were discussed.

Conceptual model

Based on the acquired discourses from the various stakeholders related to the canal, a conceptual model was produced in which the main problems, interactions and power relations between all stakeholders related to the Mae Kha are schematically presented. This was accomplished by selecting and ordering the verbs and concepts that were used most frequently during the interviews. From this, feedback loops were drawn that describe the interactions between the stakeholders and the canal. The conceptual model provides a clear overview of the power relations that are present among the various stakeholders in their relation to the canal. Moreover, the aim was to provide insight in the current processes that undermine an integrative management of the canal, in which the needs of all actors are considered. By making these processes apparent, insight is provided into what needs to be changed for a more integrative management of the Mae Kha to be realized.

4.2 Considerations and limitations

In addition to the geographic mapping in which the borders of the slum communities were roughly sketched, it was planned to create detailed maps on a household level for a selection of slum communities. Various scholars have praised the empowering effects of mapping slum communities, because it weakens existing common property management systems. It can strengthen communities to claim rights over this land and its resources, which had not been acknowledged by the state (Corbett, Rambaldi, Kyem, Weiner, Olson, Muchemi & Chambers, 2006). Moreover, it can help communities to plan the management of their resources and resolve resource conflicts within their own communities, providing a critical tool for negotiation with other groups, including neighboring communities and governmental institutions (Fox, Suryanata, Hershock and Pramono, 2006; ACHR, 2011). On the local level however, the effects of mapping do not always remain limited to the intended benefits. Harris and Weiner (1998) for instance stressed that mapping can simultaneously empower and marginalize indigenous communities. Fox, Suryanata, Hershock and Pramono (2006) conducted a study on the social and ethical implications from mapping in various Asian countries, including Thailand. Their case studies report instances in which the mappings actually undermined the goals of community strengthening. Herein private actors for instance managed to obtain community maps and used them as a tool to acquire rights to lease the land for commercial purposes.

After critically taking these potentially ironic effects into consideration, it was decided to not map the slum communities in Chiang Mai on a household level. Even though the municipality has information on household numbers for most slum communities, they have no knowledge on amounts of immigrants from surrounding countries living along Mae Kha. During interviews with the community representatives it became clear that for some communities this group makes up half of the population. To prevent the creation of a tool for the municipality to easily find and evict these people, it was decided to respect their anonymity. In line with this decision, the names of the communities where immigrants were settled, in total 5 communities, have been censored. Moreover, it was chosen not to display the created map

showing where the communities are located, to prevent traceability of the data. This lack in visible data might complicate the understanding of the results on communities. However, the ethical considerations are herein given priority.

As explained, the research was conducted with the help of 3 translators. Despite a thorough preparation for the interviews on meaning and understanding, the language barrier that exists between Thai and English must be considered when interpreting the results. Especially since this research focused on subjective meanings concerning the canal, the opinion and understanding of the translators might have colored the provided answers to some extent. In an attempt to minimize such bias, prior to the interview varying opinions on the Mae Kha and the necessity to strive for an objective attitude was discussed.

On the other hand, the translators offered assistance in understanding and overcoming cultural barriers and language use, between the researcher and the interviewees. For instance, during the preparation of the interviews, one translator noted that the word 'conflict' does not really exist in Thai. The only equivalent for it, had a very negative, almost violent connotation. For 'disagreement' was a more suitable translation in Thai, therefore this word was used when discussing conflict concerning the Mae Kha.

A cultural barrier that was more difficult to overcome relates to tendency of Thai to be reluctant in expressing negative feelings like discontent. This became apparent in discussions with the teacher during the Thai language course on Thai culture. When consulting the translators they mentioned this to be something deep-rooted in Thai society. Since the research focused on problems related to the governance of the Mae Kha canal, and people's perceptions on practices of other herein, this cultural reluctance might have stemmed people from expressing discontent. At the same time, it can be discussed whether people experience discontent at all, in a culture where this is never made explicit. As will become apparent in the results section, during the interviews people did express quite some dissatisfaction with the current governance of the canal. However, when keeping the cultural barrier in mind, their statements might be weakened to some extent.

The research was conducted in collaboration with a fellow-student, who studied biosocial aspects shaping the urban environment of the Mae Kha canal from a systems approach. Due to the overlapping character of both studies the interviews were conducted conjointly, to prevent the need to interview people twice. In setting up the interviews, most questions overlapped and were therefore merged. For both theses also specific questions were formulated. Therefore the interviews occupied more time, than when merely questions were asked for one study. This was especially the case when interviewing the community representatives, wherein some lasted up to 5 hours, also depending on how much the interviewee wanted to tell. To prevent people from feeling uncomfortable or bothered by the time it took, it was regularly checked with the interviewee if they would prefer to end the interview. However, when considering the cultural reluctance in expressing discontent, as discussed in the previous paragraph, it could be that for some the interview lasted longer than they liked. In 3 cases the interviewees suggested to continue the interview on another day. In general it seemed like the interviewees enjoyed talking about the issue very much and were

not bothered by the time the interview asked from them.

During the case-study where action research was conducted, an attempt was made to empower the community in its presence along and interactions with the canal, in line with the methods as described by Flood (2010). Herein the interviewees were asked to create visual presentations of how they see the canal and how they would like it to be. They were challenged to formulate possible solutions in realizing this. The extent to which this directly 'empowered' the community appears small. Most interviewees did not feel comfortable to create the representations themselves, and finding solutions for the problems they experience was difficult, since they did not feel in control of these problems. However, it is likely that the research has stimulated people to talk about the issue with community members. This can help the community to form a more cohesive unit, from which the problem of pollution in Mae Kha and their existence along the canal can be stipulated. During an interview the representative of the CSO POP mentioned strong social structures within a community to be important to prevent executions, since to her knowledge the only community that was ever successfully evicted was one with no organizational structure. Possibly, the action research did fuel some aspirations towards more union among the community.

Finally, some remarks should be made on the amount of interviewees consulted for this research. Since this thesis concerns a small-scale study, that occupied 20 fulltime weeks, the research was bound to time limitations. The decision to consult a broad variety of different actors related to the Mae Kha, complicated the aspiration to interview more people per group, or to distinguish these groups further. Therefore, the research does offer a general overview on the variety of actors, their opinion on the Mae Kha and conflicts herein, however when reading the results of the subsequent chapter it must be taken into account that the achieved results cannot be generalized to all people belonging to the specified groups.

5. RESULTS

This chapter presents the results achieved for the purpose of this study. The chapter is divided into four sections: a development context that provides background information on Chiang Mai and the Mae Kha, an introduction of the actors under study, the perceptions and interests from these actors related to the Mae Kha, and lastly the power relations between them in managing the Mae Kha. Hereby this chapter will provide answers to the 5 sub questions and the main research question as formulated for this research.

5.1 Development context Chiang Mai

This first section of the results will present the development context of Chiang Mai and the Mae Kha canal. The development context will be discussed concerning the historic, political, economic and geographic domain. Lastly the development of slums along the borders of the Mae Kha is discussed. The aim hereby is to provide a basis for interpreting the results in the subsequent results sections. Having understanding of the local context is important when analysing power relations and decision making, since such processes will largely be shaped by the local context.

Historical background

The city of Chiang Mai was established in 1296 A.D by king Meng Rai. The city is located in a province of the same name in the north of Thailand (see map 5.1). He selected this site based on various reasons that made this location particularly suitable for the creation of his

Map 5.1 South-east Asia, a close up of Thailand and its two biggest cities



Source: www.bbc.co.uk

city. Within a plain valley, the city would get protection from Suthep Mountain on the west and Ping River on its eastside (see map 5.2). The Mae Kha canal, a side branch of the Ping, runs between the city and Ping River from north to south. Roughly 20 km south of the city it merges with the Ping again. Thereby the Mae Kha provided a second protection barrier for the city, both from possible enemies as well as from floodwater coming from Ping River (Yang, 1997). King Meng Rai would have stated that his city would never flood, because of the protection it received by the presence of the

Mae Kha. In addition the Mae Kha offered a source of water and food to the city for the land between the Ping and the Mae Kha appeared suitable for cultivating rice fields, due to the frequent flooding of this area. The king designed the city within the borders of a squared wall surrounded by a moat, which are still present today. Along the Mae Kha, an outer city wall was constructed, from ground that was dug out of the canal. In doing so, the canal was broadened and deepened. Some of the parts of the old historical wall are still preserved today (Srisuwan, 2005; Lekuthai, 2008).

Map 5.2 Chiang Mai city with Suthep Mountain on its west and Ping River on its eastern border



Various residents of Chiang Mai told that king Meng Rai would have seen white elks and white rats in the valley, before he founded the city. This showed him that the place was safe, since there appeared to be no enemies for such rare and vulnerable animals. Chiang Mai exposes this story today, by having statues and information boards displaying the animals that king Meng Rai observed before he settled himself. Picture 5.2 shows such a visualization of the story, situated along the Mae Kha canal.

Image 5.1 A visualisation of the establishment of Chiang Mai, showing elks, rats and King Meng Rai



Political and economic background

Thailand is a constitutional monarchy, headed by King Rama IX. The prime minister of Thailand, Yingluck Shinawatra, is the first female prime minister of Thailand and serves this position since August 2011. Originally she comes from the province of Chiang Mai (Royal Thai Government, 2013). Chiang Mai city is perceived as ‘the capital of northern Thailand’, being after Bangkok Thailand’s 2nd most important city (Carter, 2009). The municipality of Chiang Mai city was founded in 1935 and currently includes 7 sub-districts, and parts of 7 other sub-districts (Chiang Mai Municipality, 2013).

According to the most recent Population and Housing census of the National Statistical Office of Thailand, the municipality of Chiang Mai counted 336,007 inhabitants in 2010. So-called greater Chiang Mai includes the non-municipal surroundings of the city and counted a population of 346,746 in 2010. With an annual growth rate of 1.47 for the entire province (National Statistical Office of Thailand, 2010), it is likely that Chiang Mai’s population has increased at the time of writing. As the result of the population increase, in 1983 the boundary of Chiang Mai Municipality was extended from 17.50 km² to 40,216 km² (Lekuthai, 2008), whereby Chiang Mai city expanded into its agricultural surroundings (Lim, Boochabun & Ziegler, 2012).

Scholars have reported various reasons for the population growth of Chiang Mai city. One of the main mentioned reasons are the various National Economic and Social Development Plans (NESDPs) that started in 1961 (Srisuwan, 2005; Samadhi & Tantayanusorn, 2006; Sangawongse, Prabudhanitisarn & Karjangthimaporn, 2011). With these plans, the national government intended to encourage the development of city-infrastructure in remote regions. During the first plan that lasted from 1961 until 1966 tourist promotion began (Samadhi & Tantayanusorn, 2006). Also in this period Thailand’s first provincial university was established right outside Chiang Mai city. This brought many people from several regions to Chiang Mai province and boosted the economic growth of both the urban centre and Chiang Mai province as a whole (Uraivan Tan-kim-yong, 1979). In order to reduce migration towards Bangkok, the Thai government selected 5 areas that would become prior zones for development with its fourth NESDP (1977-1981). Chiang Mai was herein selected as the prior city of the northern region. In the 5th amendment of the NESDP from 1982–1986, Chiang Mai was designed as a northern hub from which highways, transportation systems and tourism followed. As a consequence the city expanded, both in terms of size and population. Lim, Boochabun & Ziegler (2012) speak of a farm-to-city transition in greater Chiang Mai, in which the urban area increased from 9% to more than 33% between 1989 and 2009. According to Sangawongse, Prabudhanitisarn & Karjangthimaporn (2011) Chiang Mai city has become a ‘pull factor’, attracting people from rural areas to seek education and employment opportunities. “At the same time, the rural areas become “push factor” that detracts people away due to the lack of services and employment opportunities.”

At the Chiang Mai TEDx conference in April 2013, people concerned about their city gathered to discuss topics for new meetings on change in Chiang Mai. During the conference three inhabitants mentioned ‘rapid uncontrolled growth’ in the city as a negative form of

development that is taking place over the past decades in their city. Rising condominiums, expanding tourism and pollution in the city were mentioned as phenomena that they would like to change. This suggests that the side effects of rapid economic growth might not be perceived as a positive form of development for at least some share of Chiang Mai's inhabitants.

In 1996 Atkinson spoke of Thailand as an excessively centralized country, 'being until recently an extreme, even by Asian standards'. He stipulated the necessity of stronger local governance to manage urban environmental problems. Atkinson noted problems with corruption in Chiang Mai, which prevented successful urban governance. He described this as follows: "What was particularly disheartening was the way in which the Mayor and his associates had created a political momentum amongst the poorer communities designed to assure his continued re-election whilst running an openly corrupt system of urban management." As will become clear, in the subsequent sections of this chapter, this is still the state of affairs in contemporary times.

Atkinson (1996) perceived a widespread construction of vacant building in the entire city, without any adequate planning framework for this. Waste disposal was not arranged, and attempts by CSOs to arrange this were all rejected by the municipality. Atkinson expressed the hope that after the mayor was voted out in 1995, progress towards more inclusive bottom-up governance could be made. In 1999 a decentralization process took place in Thailand, wherein the central state diverted parts of its power to local municipalities. According to Apavatjirut (2007), this process largely failed for Chiang Mai, where the local government was unable to provide sufficient services to its city. That this is still the case, at least for wastewater disposal, will become apparent in the subsequent sections of this chapter.

Geographic background

Like the rest of Thailand, Chiang Mai knows two main seasons: the wet season from May until October and the dry season from November to April. Wiriya, Prapamontol & Chantara, (2013) tested the precipitation over 12 years in Chiang Mai, and this varied between 828.6 and 1612.3 mm per year, spread over 96 to 147 days. Yearly average temperatures lay between 15 and 38 degrees. Together this makes that Chiang Mai has a tropic wet and dry climate (Wiriya, Prapamontol & Chantara, 2013).

Alterations and increases of floods along canals and riverbanks are a common phenomenon in Thailand (Lebel, Foran, Garden, Manuta, & Mai, 2009; Lim, Boochabun & Ziegler 2012). In Chiang Mai, excessive rainfall leads to floods coming from run-off water from Suthep Mountain. There are active attempts to prevent floods along the Mae Kha canal (Things Asian, 2002; Chiang Mai City News, 2012; Our Chiang Mai, 2012). However, according to Manuta, Khрутmuang, Huaisai, and Lebel (2006), the main focus in Chiang Mai for reducing floods is set on the central business and tourist district. This thought is supported by journalistic reports on municipal cleaning activities that would secure a flow mainly in the 'upper class' area along the Mae Kha (Chiang Mai City News, 2012).

According to Lim, Boochabun and Ziegler (2012), urbanization has increased the intensity of floods over the past years in Chiang Mai. They mention the construction of 3 major ring roads, which have chopped up the Mae Kha, to be causing more serious floods in recent years. Moreover, the narrowing and lining of the Ping River banks and floodplains are blamed for causing heavier floods at different sites in the city over the past few years (Lim, Boochabun and Ziegler, 2012).

With the growth of Chiang Mai city, the Mae Kha has become increasingly polluted. Gugino et al (2006) speak of an 'open sewer flowing through the heart of the city'. Tests have revealed that the water quality of the Mae Kha falls into the lowest class of Thai national categorization (Gugino et al, 2006) and that it is heavily polluted with metals, posing great risks to its environment (Yang, 1997). Though more recent data on pollution in the Mae Kha is absent, a tour along the canal confirms that at least pollution from solid waste is still present.

Together, the pollution and the floods of the Mae Kha pose risks to the people living near its banks and borders (Gugino, et al 2006; Lebel et al, 2009). Lebel et al (2009) mentions for instance the contamination of drinking water supplies as a critical factor in disease outbreaks after flooding. Next to floods, also droughts have posed threats to people living nearby the Mae Kha, since in case of drought, pollution accumulates and does not flow away (Things Asian, 2002).

Development of slums along Mae Kha

Chiang Mai counts 62 slum settlements, which house some 11,320 families (CODI, 2005). Around 10 of these communities are located along the Mae Kha canal. Angunthip Srisuwan, a lecturer at the Faculty of architecture from Chiang Mai University, has been dedicated to the investigation of slum settlements in Chiang Mai city. According to Srisuwan (2005) the capital system emerging from Thailand's Development Plans, changed the rural society into an urban one, without planning or considerations for rural citizens. Low prices for agricultural goods and a lack of farmland forced farmers to work in the industrialized labour market of Chiang Mai city. Due to lacking housing facilities, these migrants found no other option than to settle themselves illegally at sites in the city, thereby forming the slum settlements of Chiang Mai. These communities have situated themselves in a vulnerable position; According to Srisuwan (2005), the site along the canal was historically unoccupied, due to seasonal floods. People live and work directly along the Mae Kha (CODI, 2005; Gugino et al, 2006), while having to deal with the threats the canal poses to their living situation (Srisuwan, 2005).

For more than ten years the slums of the Mae Kha are threatened with eviction by the local government (Srisuwan, 2005; Ribeiro & Srisuwan 2005; Kon Jai Baan, personal communication, March 27, 2013). The municipality wants to upgrade the Mae Kha canal and its historical wall into a tourist attraction site, in which the slum settlements form an unappealing sight. Moreover, the slum-communities are accused of polluting the Mae Kha. According to Srisuwan (2005) there are various actors besides the slum communities that influence the canal water quality. She mentions upstream condominiums and a slaughterhouse

that use the canal as a waste disposal site.

5.2 Introduction of actors under study

As mentioned in the Methods chapter, the identified actors are distinguished into four groups, namely: slums, businesses, government officials and CSO's. In this section the actors under study are introduced, thereby elaborating on the first sub-questions: *What actors are involved with or affected by the management of the Mae Kha canal?* Herein the slum communities and the residents for the case study are introduced, providing basic information on their demographics and the housing situation. For the sample of businesses, information is provided on the type and size of the selected businesses. All the CSO's in Chiang Mai that relate (parts of) their work to the canal are shortly introduced, providing insight on their main activities with the canal. And finally the governmental officials and their main responsibilities related to the canal are specified.

Slum communities

7 communities were selected to represent the slum settlements within the defined research area along Mae Kha. The extent to which these slum communities can be perceived as forming one actor is arguable. For instance the types of houses, the numbers of illegal inhabitants or the ways in which the Mae Kha is used vary widely between the different communities. Despite this variation, for the aim of this research it was chosen to perceive the communities as forming one actor, since they do face similar problems in their lives along the borders of the Mae Kha. To prevent an overgeneralization among the various communities, an attempt is made in this section to reflect both the perceived similarities as well as the differences among the investigated various settlements.

Table 5.1 presents the slum communities under study, including the year of foundation, the number of inhabitants, the number of households, the percentage of non-registered households and the percentage of non-durable households per community. All presented numbers are based on estimations made by the community representatives during the interviews. The year of foundation presents the year in which according to the community representative the first settlers located themselves and the community started to take shape. For Patipimu and Chiong Klang however, the year of official registration in the housing census is presented, since the community representatives did not know when the first settlers came. Therefore, for these communities it can be assumed that the initial inhabitants settled themselves there before the presented years.

The numbers for inhabitants and households are based on official registration numbers, plus estimations on additional illegal inhabitants, made by the community representatives. Since the representatives did not know the exact numbers of illegal inhabitants in their community, the rows on inhabitants and households show rather round numbers. The percentage of non-registered inhabitants shows estimations made by the community representatives on the share of inhabitants that is not registered in the housing census, being mainly immigrants from neighbouring countries like Laos and Burma. Based on these numbers and considering a total of 10 communities along the investigated area, it can be expected that roughly 7,000 slum dwellers live along the old city part of the canal, in some 1,600 households. The secretary of the mayor from Chiang Mai estimated that of all slums along the Mae Kha, about 500 households are situated inside the canal. This group mainly consists of immigrants that came

to Chiang Mai around 10 years ago, thereby forming the second inflow of people that situated themselves near Mae Kha.

The last column in table 5.1 shows the estimated share of households that is not of a durable character, being one of the 5 defining features for a slum. Houses made from cement, brick, wood and bamboo or combinations of these materials, are considered as durable. The houses inside the canal (made from wood and bamboo), as well as houses from waste and reused materials are considered to be non-durable. This distinction is made, based on discussions with the community representatives on which housing types are resistant to extreme climate conditions in this local context. Even though none of the houses directly along the canal were protected against floodwater coming into their houses, those houses made of cement and brick could resist damage and deterioration from the floods for at least some decades. This was not the case for most houses made of waste materials or those inside the canal; these would fall apart within 3 or 4 years. Since the numbers and percentages in the table are all based on estimations and perceptions, they should be interpreted with caution. They should be seen as a general sketch about the communities, not as an exact display of reality.

Table 5.1 Basic information of investigated slum communities

<i>Community</i>	<i>Year of foundation</i>	<i>Inhabitants (N)</i>	<i>Households (N)</i>	<i>Non-registered inhabitants (%)</i>	<i>Non-durable houses (%)</i>
Chiong Klang	2003	1200	200	50	0
Patipimu	2002	1000	260	50	0
Kampaeng Ngam	1995	500	134	0	20
Klong Poey	1992	300	61	65	65
Lepromak	1983	100	20	100	100
Fah Mai	1975	1200	315	0	0
Klamdolak	1968	600	110	50	0
Total	-	4.900	1.100	-	-

For the remaining 4 slum-criteria the following can be said, based on the interviews with community representatives: All communities have access to tap water for prices they can afford. Drinking water is mainly obtained from machines on the street for 1 Baht per 1.5 liters. During the interviews with community members in Kampaeng Ngam it became clear that 2 of the 14 interviewed households could not afford this price for drinking water. They were obliged to drink the tap water. Based on the relative low share of non-durable households in Kampaeng Ngam (20%), this community can be said to be wealthier than at least 2 other communities. Therefore it is likely that in other communities more inhabitants have problems to afford drinking water. In all communities, each household had access to a toilet. For all except Lepromak, the black water is stored in a septic tank, which is emptied by the municipality when full. For Lepromak this service is not provided; their black water runs into the ground. Concerning sufficiency of living space, defined by the UN as not more than three people sharing one room, it is more difficult to provide a clear answer, since this generally differs for the registered and non-registered. Overall it can be said that the non-

registered immigrants share their room with numbers of people exceeding the limit of 3. For this group estimations vary between 8 – 12 people sharing one room. For most registered households community leaders did not expect numbers to exceed more than 3 people sharing one room. The last criterion for slums concerns the tenure situation. For all the communities, security of tenure is lacking, due to a constant threat for eviction. Despite the achievement of rental agreements for some households in Klamdolak, Kampaeng Ngam and Fah Mai, such agreements do not provide the inhabitants protection against evictions. The issue of eviction is further elaborated on in the ‘municipality’ paragraph of section 5.3. To sum up, since all communities lack at least one of the defining slum features, all communities are considered to be slums. Table 5.2 gives an overview per community on the slum criteria. Herein the '+' means that the slum criteria is not met, the '-' means the criterion is met and the '+/-' that this likely differs for households within the community. The table is based on the interpretations as described above and therefore its subjective character should be considered when reviewing it.

Table 5.2. Slum criteria per community

<i>Community</i>	<i>Durable housing</i>	<i>Access to water</i>	<i>Toilet</i>	<i>Space</i>	<i>Secure tenure</i>
Klong Poey	+/-	+/-	+	+/-	-
Patipimu	+	+	+	+/-	-
Lepromak	-	+/-	+/-	-	-
Chiong Klang	+	+	+	+/-	-
Kampaeng Ngam	+/-	+/-	+	+/-	-
Fah Mai	+	+	+	+/-	-
Klamdolak	+	+/-	+	+/-	-

The community selected for the case study was *Kampaeng Ngam*, meaning 'beautiful wall', referring to the historical city wall along which their community is situated. Basic information from the selected sample of household representatives is presented in table 5.3. Due to time-limitations for this study, merely 13 households were selected to conduct interviews. Though the sample consists of a diverse selection of households, generalizations to the entire community cannot be made from this small number of interviewees. Therefore, the results from the case study should be interpreted with caution.

As table 5.3 shows, residents of Kampaeng Ngam distinguish themselves into 2 different ethnicities: 'Aka' and 'Thai'. Those belonging to the Aka ethnicity are people that originally lived in hill-tribes, sharing the Aka language. Even though they are originally from Thailand, the Aka are not considered to be Thai. The 'Thai' are those that speak the Thai language and that come from cities or rural villages, from anywhere in Thailand. In one household lived a man from France, who was married to an Aka lady and together they raised her children. Though exact numbers are lacking, in 2 other communities, the community representatives spoke of 'some' foreigners living in their community. Therefore this Frenchman living in Kampaeng Ngam does not appear to be an exceptional case. His household was selected for

the case study, since he could offer an 'outside' perspective on the community as being from another culture, while having lived in the community for 6 years.

The interviews with the community leader as well as with the households in Kampaeng Ngam suggested that there were no illegal immigrants from surrounding countries living in this community. Therefore this group was not heard for the purpose of this study. Since there are considerable numbers of immigrants present in the other communities, this would have been an interesting sub-group within the slum communities for this study. Especially since this group does not have voting rights and therefore can be considered to be most marginalized in managing the Mae Kha. Future research could investigate their perceptions, role and power in the management of the Mae Kha canal.

The column on income in table 5.3 displays the income per household per month in Baht. Two residents reported not to know their income; they mentioned to live by the day and not to count their money. The average income per person in the last column shows the income per month divided by the household size. Based on the international poverty-line as set up by the WorldBank (2008), people living on less than \$2.50 a day are considered poor and those living on less than \$1.25 a day, live in extreme poverty. Converted to Thai currency per month this means that people living on less than 2,326 Baht per month fall below the poverty line and those living on less than 1,202 Baht live in extreme poverty. For the 13 households of Kampaeng Ngam, this means that at least 8 households live in poverty, and of those 4 households live in extreme poverty. Considering this to be a representative sample of the entire community, this means that more than 60% of Kampaeng Ngam lives in poverty. All interviewed Aka residents make their money by making handcraft products, which are sold on street markets in the city. The Thai have either little stores (laundry, food) or sell vegetables at nearby markets.

Table 5.3 Sample of interviewed community residents Kampaeng Ngam

<i>Name</i>	<i>Sex</i>	<i>Age</i>	<i>Education level</i>	<i>Household (N)</i>	<i>Ethnicity</i>	<i>Income/month</i>	<i>Average income p.p.</i>
Anonymous	F	49	None	3-4	Aka	Don't know	-
Oerai	F	60	Primary school, 4 th grade	3	Thai	Don't know	-
Som	M	32	High school 6 th grade	3	Thai	-	-
Sainuan	F	62	Primary school, 6 th grade	11	Thai	4,800	436
Somkit	M	61	Primary school, 4 th grade	1	Thai	600	600
Lotee	M	34	None	8	Aka	8,000	1,000
Busum	F	56	None	4	Aka	4,800	1,200
Kong Kam	M	58	Primary school, 4 th grade	6	Thai	9,000	1,500
Kamompo	F	45	University	8	Thai	15,000	1,800
Anonymous	M	60	University	7	French/Aka	> 15,000	2,100
Dong	M	38	None	9	Aka	< 20,000	2,200
Somboon	F	60	Primary school, 3 rd grade	4	Thai	10,000	2,500
Chud	M	43	High school, 6 th grade	3	Thai	< 20,000	6,600

Businesses

Like the slum communities, neither do the selected businesses along Mae Kha form a homogenous group. During the geographic mapping it became apparent that there were tiny food stands that would just have one employee as well as big 20-floor hotels and many businesses which size would fall somewhere in between these extremes. Despite this variety in business sizes it was chosen to analyse the businesses as forming one actor along Mae Kha, since for all, the Mae Kha showed to serve as a waste disposal site. When presenting the results for this group, in this and the following paragraphs, attention is set on exposing the variances as well as the similarities between the different businesses under study, to nuance the idea of this group as forming one homogenous actor. Moreover, due to time constraints for this research, the selected sample consists of merely 8 businesses. Therefore, generalizing the results to all businesses along Mae Kha is not possible. The results from this group should therefore be interpreted merely as providing an impression on the perceptions and uses of the Mae Kha from businesses along the canal.

In Table 5.4 the business sample is presented, with basic information on the type of business, the number of employees working there to give an indication on the size of the business, and the years the business has been situated along the canal. Except for the hotel, those businesses that were situated for a longer period along the canal (the garage and the fruit stand), expressed to be concerned with the historical value of the Mae Kha, while the newer businesses cared more about its present state. Therefore the selection of these different businesses showed to provide a variety of insights.

Table 5.4. Basic information of businesses along Mae Kha

<i>Business</i>	<i>Employees (N)</i>	<i>Customers (N)/Month</i>	<i>Years along Mae Kha</i>
Guesthouse	2	15	0.5
Fish stand	3	1,200 – 1,500	1
Handcraft stand	13	-	3
Food stand	1	300	6
Hairdresser	1	150 - 300	8
Centara Hotel	400	21,567	20
Garage	5	150 - 300	30
Fruit stand	10	6,000	30

The guesthouse deserves a point of remark, since this business was owned by a Belgian man, who was running this business since 6 months, together with his Thai wife. Even though his business was directly situated along the Mae Kha, he had never heard of the canal before. The issue of increasing numbers of foreigners starting businesses in Chiang Mai, while not knowing about the Mae Kha and its history, was brought up as a recent phenomenon by 5 community representatives. Therefore the guesthouse owner offered an important perspective to be considered in this study.

From the interviews with the slum and business representatives, it became clear that more than half of the businesses under study were related to slum communities, in the sense that slum residents would be the employees or owners of the business. The hotel and the guesthouse however did not have any work-related bond with slum residents.

Civil Society Organizations

Three CSO's were identified, that are engaged with the Mae Kha canal and the slum communities located along it. Interviews with all actors, suggested that besides these three CSO's no other organizations were engaged in activities related to the Mae Kha or the communities along its border. *Kon Jai Baan*, meaning 'people love houses', is a voluntary architectural organisation in Chiang Mai committed to improve the housing situation of slum residents along the Mae Kha. During the time of research they had yet been engaged with housing projects at Fah Mai and Klamdolak, and they were initiating to set up work at Kampaeng Ngam.

Another selected CSO was the *People's Organization for Participation* (POP), which focuses on strengthening collaboration within and between communities in dealing with problems they face and communicating these problems to the municipality. POP is working with the communities Klong Poey, Kampaeng Ngam, Chiong Klang and 4 other communities along the Mae Kha that were not selected for this study. In their work they also collaborate with Kon Jai Baan and CODI Chiang Mai.

The last CSO, the *Community Organization for Development Institute* (CODI) in Chiang Mai, is a regional department of CODI Thailand. They work with all communities located along the Mae Kha in improving households and providing loans for housing-related projects. They also provide budget for projects initiated by the municipality, to improve infrastructure in the communities.

Government

Until the year 2005 the northern Marine Department (in control of 10 provinces in the north of Thailand), was responsible for the management of the Mae Kha canal. Their main activity related to the canal was dredging. However, in line with national policies that aimed to restructure political power divisions, the responsibility of the Mae Kha was transferred to the municipality of Chiang Mai 8 years ago, explains the head of the Marine Department. He mentions that the Mae Kha is a holy river, and therefore the citizens of Chiang Mai can easily protest against new plans related to it. Since the municipality would have more understanding of local conflicts related to the Mae Kha and the communities along it, the central government decided to decentralise the management of the Mae Kha. For the transfer of power, there was a workshop day at the Marine Department to inform the municipality on the rules and regulations concerning the Mae Kha.

It appears that this transfer of duty did not succeed entirely, since the municipality only takes

responsibility for the appearance of the canal and its borders, so expresses the secretary of the mayor of Chiang Mai. According to him, the dredging would still be the responsibility of the Marine Department. Slum communities located along the borders and inside the canal are part of the appearance and therefore fall under the responsibility of the municipality. For monitoring the quality of the water however, the municipality does have a department.

The Sanitation Department of the municipality is responsible for the sewage systems within Chiang Mai city. Under this same department falls the responsibility for the drainage of rainwater. How exactly the Sanitation Department is related to the Mae Kha will become clear in the following section, in which the perceptions and interest regarding the canal from the different actors are set out.

5.3 Perceptions and interests concerning the Mae Kha

This section sets out the varying perceptions and interests in the canal from the different actors under study. The way the Mae Kha is currently managed will be clarified. The municipality will be presented first, since knowledge on the way they use the Mae Kha is essential in understanding the perceptions and interest from other groups. First a description is provided on the various ways in which the canal is used and perceived by all different actors. For each group of actors this will be described based on their own reasoning and from descriptions that other groups provided on them. Attention is set on where the perceptions and interests overlap and conflict with each other. Hereby this section aims to provide answers to the 2nd and 3rd research questions:

- *What are the cultural, natural and economic perceptions and interests in the canal by those various actors?*
- *In what ways do these perceptions and interests agree and conflict with each other?*

Municipality; Mae Kha as sanitation-system

The interviews with municipal officials reveal that the Mae Kha canal is used for the outflow of wastewater from the city of Chiang Mai. A sanitary engineer from the Sanitation Department explains that the sanitation system of the city leads all grey wastewater from the city to the Mae Kha. The water that runs through the canal is mainly composed of wastewater that in case of rain gets diluted, also with water coming from Suthep Mountain. The officials estimate that between 10 and 50 % of the wastewater coming from the city on the west side of the canal, ends up in the Mae Kha. The rest of the wastewater would be led into a pipe that is now being constructed, underneath the Mae Kha. The wastewater that ends up in the canal comes from households, businesses, hospitals and slum-communities. This is composed mainly of grey wastewater, though the municipal official in charge of water quality suspects that there also runs some black wastewater through the canal; while most people have septic tanks for the disposal of their black water, he doubts whether all communities living along the canal have access to such a tank.

The pipe underneath the Mae Kha is being constructed by the Sanitation Department of the municipality. Once this pipe is finished it will serve as the new sewage system for Chiang Mai. This pipe should prevent wastewater from ending up in the Mae Kha. Water in this pipe will lead to a treatment centre south of the city, where the water gets treated before it flows into the Ping River. At the moment the pipe is partly functioning; less than one third of the city's sewage works are connected to this system. According to a professor in engineering from the University of Chiang Mai, the pipe is currently only 2 km long, thereby covering the business and hotel region along the Mae Kha on the eastern border of the city. After this area the pipe ends and wastewater would still end up in the canal, flowing along the slum communities that are situated south of the city centre. Moreover, the pipe is not isolated from the canal; wastewater that flows through this system, can still end up in the Mae Kha in case of an overflow. At the moment the construction of the new sewage system came to a hold, due a lack in available budget.

The pipe underneath the Mae Kha is not the only water infrastructure for which the municipality expresses to not have sufficient budget. All along the canal, various water workings have been constructed by the central government some 10 years ago, which have never been functioning, due to lacking finances for the maintenance, expresses the secretary of the mayor. According to a professor in engineering at Chiang Mai University, the reluctance in maintaining the systems, has to do with a lack of ownership among the municipality: “I think this is something that we can identify as a failure in the government: people lack the understanding of participation. The central government just thinks: ‘this is a good thing for the city’. Even though it is needed by the local people, once they are not involved, they do not have the sense of ownership. This is something that has to be developed and improved.”

Of the infrastructure implemented by the central government, there are 2 constructions mentioned to be functioning: A pump, with which water from the Ping can be directed to flush the Mae Kha, when the canal is smelling bad and a dam, which regulates the amount of water flowing through the Mae Kha. Both are located on the northeast corner of the city, right above the region where the largest hotels are situated. Within the hotel region, at the same part as where the sewage pipe is situated, the canal is cemented along its borders for 2.5 km. This was done by the central government some 30 years ago to improve possibilities for cleaning, explains the secretary of the mayor. When asking why this wasn't done along the entire canal, he explains that after this, there was no budget anymore.

As being responsible for the quality of the water in the canal, the municipality executes water tests every month. The municipal official in charge of water quality executes these tests at 13 different points along the entire canal. In addition, in case of a complaint on the state of the canal, they check on possible wastewater dumping. The regular controls and incidental checks only measure the level of oxygen content in the water. For possible chemicals or other pollutants, no tests are performed, express both the secretary of the mayor and the official in charge of the water quality.

All businesses in Chiang Mai are obliged to have a system that treats their wastewater before this is being disposed into the Mae Kha. In case of ‘dumping’ untreated water, they risk a fine of 2,000 Baht. Dumping however appears to be a common practice in Chiang Mai. During the geographic mapping, there were four instances observed in which foamy water was running out of drainage systems into the Mae Kha (see image 5.2 for an example).

Image 5.2 Wastewater running through drainage system



Picture taken on April 9th 2013.

According to the municipal official on water control, the only water running from these systems should be rainwater, but he knows of instances where people have connected their own wastewater pipe to this drainage system, as a way to dispose their wastewater. Since it had not rained for weeks during the mapping, it is likely that the observed water flows were instances of wastewater dumps.

Moreover, the municipality also plays a role itself in dumping wastewater. Three communities located along the Mae Kha south of this city, mention a slaughterhouse belonging to the municipality as a big source of pollution. They would often see blood, intestines and sometimes even dead piglets floating along the canal. The secretary of the mayor admits that the slaughterhouse does not have any functioning treatment system for its wastewater at this moment. Plans are to move the slaughterhouse out of the city. However, according to the secretary there is no budget to realise this, nor for the installation of a new treatment system.

Since there are no prescriptions on specific types of treatment systems, businesses are free to choose their own system. The only thing tested in case of a complaint is whether the water that comes out their treatment system passes the standard on oxygen level. For households there are no obligations for having a treatment system. The officials reveal that for all households in Chiang Mai, the grey wastewater is directly led towards the Mae Kha.

The different interviewed officials express to perceive the management of the Mae Kha not solely as their responsibility. As the representative from the Sanitation Department puts it: “In the summer when it smells people complain to the municipality about letting it smell: they think it’s the municipalities responsibility”. Hereby the municipality clearly withdraws itself from the duty to arrange a sewage system that does not expose its citizens to the wastewater from the city.

Despite their knowledge on the functioning of the current sewage system, all interviewed officials point at the slum communities along the Mae Kha as being the main polluters of the canal. According to the chief of drainage systems, the hotels and businesses are easy to inspect; they have treatment systems, while slum communities would just throw everything in the water. The communities would pollute the canal by disposing their garbage and wastewater into the canal. Moreover, the people that live inside the canal obstruct the flow of the water, thereby preventing the possibility to flush out the dirt in the water. According to the representative of the Sanitation Department the slum communities use the Mae Kha as a forgotten backyard: “The problem is the people who live along the Mae Kha. They just throw the whole bed in the Mae Kha because they think it is not the front of their house. They think it’s just the backyard and you can do anything with the backyard because no one can see it. Now the municipality wants the people to see the Mae Kha as a front door.”

Using a canal for sanitation appears to be common in Thailand, as the sanitary engineer from the municipality explains: “Every city in Thailand has a canal like the Mae Kha, some cities have no wastewater treatment at all. Chiang Mai city has the only waste water treatment system in all of Chiang Mai province.” According to both the official in charge of water quality as well as the leader of Kampaeng Ngam, the sewage system would have been either in the Ping River or in the Mae Kha. Since the Ping River would lead to a lot more protest, the municipality would have chosen the Mae Kha for its wastewater. As the leader of Kampaeng Ngam puts it: “There is a lot of waste water and they don’t know where it should go. It’s only the Mae Kha, because the Ping is the face of Chiang Mai. Everyone knows the Ping. No one really knows Mae Kha so they can do anything to the Mae Kha. If they would let the wastewater go to Ping, they cannot fight with a whole lot of people in Chiang Mai. But if they just let it go to Mae Kha, they just have to fight with the communities around. So this is a lot easier.”

The current use of the Mae Kha as the city’s sanitation system however is not in line with the aspirations of the municipality on the near future of the Mae Kha. In 2015 the city of Chiang Mai will celebrate its 720th anniversary. To rejoice this, the central government of Thailand has released a budget of 3,000 million Baht for renovating the Mae Kha. The municipality is working on a plan for what this renovation will entail, together with the central government. In the creation of this plan, the municipality is consulted by dr. Wasan, a professor in engineering at Chiang Mai University.

The municipality wants the Mae Kha to become a green public area where residents of Chiang Mai and tourists can walk around. Wastewater will either be cleaned before it goes to Mae Kha, or it will be led somewhere else. A floating market will be created along with other

attractions for tourists. According to the municipal officials, a part of the renovation will entail the removal of the slum communities along Mae Kha, for they would be polluting the canal. The exact details however are unclear, since the plans are still under construction, explains the secretary of the mayor. Either all slum residents will be removed, or only those living inside the canal. Dr. Wasan aspires to reform the Mae Kha into a 'new Venice', in which people are living in harmony with the canal. He suggests the municipality to relocate only those slum residents living inside the Mae Kha, because he believes their living circumstances are particularly bad: "I think those who live there, in that kind of houses, they themselves, they do not want to live there. They just don't have another choice. They are people who come from other provinces, rural area's. And they want to find housing in the city, get a job. I think we shouldn't allow our friends to live in such dirty, unhealthy conditions. It is not good for people, human beings, to live there." For the ones situated along the canal, he suggests to improve the houses and realize healthier living conditions on the site.

Slum communities; Mae Kha as their home

"If a tourist like you would ask me about Mae Kha, I would say: 'It's just dirty water, its polluted'. If my daughter would ask me I would say: 'This is your house, your home'."

Lung Wing - community leader of Fah Mai

For the slum communities settled along the Mae Kha, the canal forms part of their home. Therefore they are confronted with the consequences of how the canal is being used every day. The initial settlers of the communities came between 10 and 50 years ago from the rural surroundings of Chiang Mai to the city in an attempt to make a living. "Life in the rural areas is very tough, it's hard to make a living there", expresses a resident from community Kampaeng Ngam. Since the land along the Mae Kha is mainly public, they can stay there for free, mention the community representatives as the reason for being located along Mae Kha. Their decision for settlement at this location has little to do with the presence of the canal, the various community representatives explain.

However, in the past the communities did use the Mae Kha for a variety of activities. Community representatives and residents from Kampaeng Ngam that already lived along Mae Kha in their childhood, mentioned to go swimming, fishing and sailing when they were young. Since the past 30 years the canal is getting more and more polluted, they report. Ever since the canal is not being used anymore for such activities. "Now it's just trash, so it's just not the feeling anymore", explains the community representative of Lepromak, who used to go sailing along the entire Mae Kha when he was young.

Despite the pollution, nowadays in four slum communities the residents use the borders of the canal to grow vegetables and fruits. The water from the canal there is used for watering the plants and vegetables. During the dry season the water is also used on the streets, to prevent dust from floating around. The Frenchman living in Kampaeng Ngam, expresses his concerns about the uses of the water of the Mae Kha. "It is so polluted, and people just grow their vegetables here and eat it. It's unbelievable." He moreover mentions to see people fishing in the Mae Kha, which is affirmed by three other residents. They would eat it themselves, or sell

their catch at the markets. During the geographic mapping, two instances were reported of people fishing in the Mae Kha. In community Kampaeng Ngam, when conducting the case study, children were playing in the water (see picture 5.1). According to the Frenchman, the people aren't familiar with the risks of using the canal's water, due to little education.

Image 5.3 Children playing in Mae Kha, community Kampaeng Ngam



Picture taken on May 10th 2013.

Another way in which slum residents use the Mae Kha, is during a national festival called Loi Katong. Every year in November after the rainy season has come to an end, during one night people will light candles and let them flow along a river. With these candles, the people let their sad thoughts flow away with the water. The community leader of Kampaeng Ngam tells that he and some other people from the slums use the Mae Kha for this ritual. However, since people live so close along the water, not all slum residents enjoy 'the sadness' passing by their houses. The activity however is in line with the spiritual value that the Thai would assign to rivers and waterways. The community representative of community Ling Ko, situated further upstream, mentions that in Thai culture, all waterways are said to house a female spirit, that should be honoured and treated with respect. Through a ritual like Loi Katong, this can be practiced. Other community representatives however do not perceive this spiritual value in the Mae Kha. While they do acknowledge spirits as being a part of Thai culture, they mention it to be something only the elderly would really believe.

Among the community representatives, the historical role of the Mae Kha in Chiang Mai receives great value. All of them mention that the Mae Kha is one of the reasons why king Meng Rai selected this region to start his city. The leaders of Klong Poey and Fah Mai mention the historical importance of the Mae Kha in preventing the city from flooding. The representatives of Klamdolak and Chiong Klang are actively trying to raise awareness on the

historical role of the Mae Kha for Chiang Mai amongst the youth in their community. They say that the Mae Kha has been forgotten in Chiang Mai and by making it known again they hope to make a step towards a cleaner canal. According to the leader of Fah Mai, the reason that the Mae Kha is being forgotten has to do with increasing amounts of immigrants: “There are many different people here; Thai, Chinese, foreigners and mountain people live here. They can stay here for free and many people come from everywhere to live and work here. They come here because they cannot go home after work, so they settle themselves here, on the public land. Each year less people care about the history of the canal. Not many people know about the history of the rice fields, so people would have to care to find out.”

Of the 13 interviewed residents of Kampaeng Ngam, 8 people express to not know anything about the history of the Mae Kha. The only reason why the Mae Kha is of importance to them is due to the floods and the bad smell. Three residents mention the old wall along Mae Kha for having a historical importance, since it used to protect the city against enemies. One interviewee expresses the importance of the Mae Kha to the entire city: “Historically the Mae Kha is a symbol, because the city was born with the river”. The 5 residents that do assign a historical value to the Mae Kha are all Thai. Of those that express to not know anything about the history, 5 belong to the Aka ethnicity and 3 are Thai.

Mentioned problems that the slum communities face related to living along the Mae Kha include a bad smell, mosquitos, floods and health problems like headaches and sore throats. All community representatives as well as the residents from Kampaeng Ngam report these same problems. The floods generally take place 2 to 3 times per year, during the rainy season. In case of a flood, the water will stay up high for some days, and enters the houses of the people that live directly along the Mae Kha. If possible, people will stay on a second floor, until the water has moved. Afterwards they will need to replace their furniture if they had any. Except for Klamdolak, since this community is situated on elevated land, all communities express to suffer from these problems related to floods. Herein the difficulty for them is not so much the water, but rather the pollution that this water brings along.

Community Lepromak lays relatively low, and therefore gets frequently exposed to floods from various degrees. The community representative tells that the communal toilet used to be outside his house and in case of only a minor flood he and all others living there would need to walk through the water to reach the toilet. This would leave his feet itchy and covered with red bumps. The scars from this are still visible on his feet. To avoid the need to walk through the water, he and other households in his community have created toilets attached to their houses, which they can reach from the inside. Once or twice a year, the community suffers from a heavier flood and then the residents will sleep higher up in the street for a few days.

Regarding health, the French resident from Kampaeng Ngam expresses to observe more problems than the headaches and sore throats among his community members. He saw 4 cases of people being sick in the past month, with symptoms of which he was sure to be caused by dengue. One little kid went to the hospital and got treated. The rest doesn't have the money to get any kind of treatment at the hospital, he explains. Also the community leader of Kampaeng Ngam mentions to be concerned about the health risks that the Mae Kha poses on

his community. According to him the Mae Kha is a source of germs, and therefore the water should not be touched and used in any way. He mentions a boy that fell in the Mae Kha last year and that had to be in the hospital for 4 months. However, directly confronting people with possible harmful behaviour is something he doesn't do. He just warns people for health risks during official meetings a few times a year. According to the translator, not confronting people and correcting them on their behaviour is something that is deeply rooted within Thai culture.

The slum community representatives, all mention the businesses along the Mae Kha to be polluting the canal. The main polluters they mention are the hotels and fresh markets. All express to be sure that most businesses do not have their treatment systems functioning, because of the substances that they observe floating along the canal. The foam, colours, and smell that pass by their houses cannot be from households alone, they express. Though they do acknowledge that the communities release their wastewater into the canal without any treatment, this would be nothing compared to the hotels and other businesses. "A hotel has 200 rooms. If all rooms are occupied, one hotel already produces much more wastewater than 1 community", explains the community leader of Chiong Klang. The representative from Lepromak, the community situated on the northeast corner of the city, is the only interviewee from this group that also expresses immigrants to be polluting the canal. He mentions Burmese that are living further upstream to be throwing trash in the water.

The most mentioned polluters by the residents of Kampaeng Ngam are other slum communities that live further upstream. Of the 13 interviewees, 7 express to see the slums as the main polluters of the canal. 3 residents mention businesses like hotels and the slaughterhouse, and 3 others express to not know who pollutes the canal. One lady mentions to sometimes see a garbage truck passing by, which dumps trash in the canal. How often this happens and by whom she doesn't know. None of the interviewed residents seems to be aware that the wastewater from the city of Chiang Mai runs through the Mae Kha.

The community leader of Kampaeng Ngam, organizes meetings a few times per year, in which all community members are invited to discuss problems related to Mae Kha and to find solutions. According to the Frenchman, Aka people that live in Kampaeng Ngam never join in these meetings, since the discussions are all in Thai. Due to the language barrier, they would not be included in decisions on how this community deals with the Mae Kha. In both Klamdolak and Klong Poey difficulties between different ethnic groups became apparent as well. In these communities immigrants, mainly from Laos and Burma, have settled themselves. In talking about 'the community' it became apparent that the community representatives did not include the immigrants in this concept, thereby suggesting that they do not perceive the immigrants to form part of their community. In arranging activities related to the Mae Kha, these groups were never involved, due to language and cultural barriers.

Except for Lepromak, all communities engage in cleaning the Mae Kha. Two times per year, on the kings and queens birthday, the communities unite and take out the garbage and the vegetation growing on Mae Kha. The main goal herein is to make the canal look nicer and to stimulate the flow of water. The community representative of Klamdolak expresses to have

initiated this collective cleaning 15 years ago, thereby showing the municipality that this can be done very quickly: “The government was already thinking about this for 10 years. And we showed him: one day, to take the garbage from the canal, the plants, the bed, the bicycles. Just one day! But the government think and planned for 10 years, and they couldn’t do it.”

The communities also act individually in cleaning the Mae Kha. All community representatives explain to stimulate cleaning and non-littering behaviour among the community, either by arranging discussion evenings on the issue, or by using a loudspeaker to spread the message. They express to have started organizing such cleanings, in an attempt to improve their image in Chiang Mai. All representatives are aware that the slums are seen as the source of pollution to the Mae Kha in general discourse in Chiang Mai. With the cleanings they want to show that they can live in harmony along the Mae Kha and that they do not need to be removed for the canal to look nice. However, all community representatives mention that their effort will not show any improvement as long as the canal continues to be used as a sewage system.

Businesses; Mae Kha for wastewater-disposal

Of the 8 business respondents, 2 express to have never heard of the Mae Kha canal. When pointing at the stream behind their business, it becomes clear that they know the stream, just not that it had a name. All businesses express to perceive the Mae Kha as a polluted, smelly stream. The hotel, the guesthouse and the hairdresser, express that it degrades the quality of their business. The only respondent expressing a positive remark is the garage owner: being located along the flowing water cools down the area, which he enjoys during summertime.

In economic terms, the businesses use the Mae Kha as a way to dispose their wastewater. All interviewees from this group, except for the lady working at the handcraft stand and the hotel, express to release their wastewater into the Mae Kha. The handcraft stand would not produce any wastewater. Out of the 7 businesses that produce wastewater, 5 mention to have a treatment system that cleans their water, before this is released into the Mae Kha. Except for the hotel, none of the interviewees knows what this system exactly does to their wastewater. They mention it to be a system implemented by the government and roughly once a year the municipality would come to check if it is still working. Costs for maintaining the system are for the businesses. The representatives of the hotel express to treat their wastewater with a system that adds oxygen, before the water is led into the pipe that is situated underneath the Mae Kha. To their knowledge their wastewater therefore never gets into the canal.

The guesthouse and the food stand do not have any treatment systems for their wastewater, mention their representatives. The Belgian owner tells he bought his guesthouse 6 months before and the outflow pipes were all already leading straight to the canal, without there being any treatment system. The wastewater from his dishes, the laundry and cleaning all goes straight into the Mae Kha. He has no idea where his toilet water goes, and he assumes it to also go into the Mae Kha. So far he has never been checked on his wastewater disposal and he is not aware of any rules or regulations regarding his wastewater. The lady owning the food stand neither knows of any rules nor regulations on wastewater disposal for her business. She

explains that she only produces wastewater from the dishes. She describes a traditional way in which she treats her wastewater, by not disposing it right into the canal, but by letting it run through the ground on the borders of the canal. She believes that by doing this, no dirt from her water will end up in the canal. During the interview however, she throws a bucket of dishwater right into the canal.

Both the fish and fruit stand are part of the Muang Mai market, located along the Mae Kha near the northeast corner of the city moat. This market is mentioned by 5 community representatives and 2 of the CSO's as being a big source of pollution to the Mae Kha. According to both business owners, there would be a treatment system underneath this market. However, in case of rain, this overflows and then all wastewater will run into the Mae Kha. The fish stand owner expresses that during the rainy season he sees many markets just throwing their wastewater in the streets, to let it flow away into the canal with the rain.

The ideas on who the main polluters of the Mae Kha would be, vary per business. The interviewees from the fruit stand, garage, hairdresser, restaurant and hotel all mention the slums explicitly. This is remarkable, since except for the hotel, all these interviewees belong to slum communities. However they appear to make a distinction between ethnicity in pollutant behaviour; those slum citizens that would pollute the canal are illegal immigrants, mainly coming from Burma. The Burmese immigrants would not care about the Mae Kha, since they are not from Chiang Mai, and generally only stay for short periods of time. The hotel does not make such a distinction and mentions all slum communities to be polluting the canal. The lady from the handcraft stand and the guesthouse owner both express to see all people whose wastewater goes to Mae Kha as polluters.

CSO's; Mae Kha as a developing site

For the CSO's engaged with the slum communities along Mae Kha, the main aim is to improve the livelihoods of the communities. They do this through upgrading the housing situation and infrastructure, while strengthening communication, within and between different communities as well as between different actors. Hereby they aspire to improve the quality of the Mae Kha canal in addition, though this is of secondary importance to them. They work from the assumption that the communities have the right to live along the canal and therefore should be strengthened in their presence there.

Both Kon Jai Baan and POP have participated in the organization of canal-wide cleaning activities with the communities. Herein the initiative came from the communities; they just served as helpers in organizing the events. They mention this as an important way of working; by letting the people decide what happens, they will feel more engaged and the results will be more satisfying.

All CSO's perceive the entire city of Chiang Mai to contribute to the pollution in Mae Kha. While the whole city believes that only the slum residents are causing the pollution, nobody realises that all wastewater from the city ends up in the Mae Kha, they explain. Kon Jai Baan

has conducted surveys along the Mae Kha, in which the appearance of the canal was reported, to identify the sources of pollution. They noticed most pollution along the business area where most hotels are situated. They suspect that most of the hotels along Mae Kha do not have a functioning treatment system and that therefore they are a big source of pollution.

POP has engaged in similar activities together with community residents. Herein they went to inspect the wastewater outflows along the Mae Kha on amount and appearance. According to POP the knowledge they obtained during this trip had strengthened the communities in forming a coherent group: “In the past, the communities, would blame each other. But after they did the survey on where the pollution was from, they know that the main polluters are not the communities, but the businesses along the canal and from the whole of Chiang Mai city.” In addition POP stresses the fact that the municipality is responsible for the arrangement of a decent drainage system. However, instead of helping the people that suffer from their bad management practices, they use the bad image of slums as an excuse in their attempt to expel them.

Conclusion

This section has made clear that the interests and perceptions with regard to the Mae Kha vary between the different identified actors. The municipality of Chiang Mai uses the Mae Kha as a sewage system for the grey wastewater of its city, thereby mainly perceiving the Mae Kha as an economic utility. They mention the wastewater coming from businesses not to be a source of pollution to the canal, since businesses are obliged to treat their wastewater before disposal. It has become clear however that not all businesses treat their wastewater nor are all familiar with the rules on wastewater treatment. Moreover, those that do treat their wastewater, merely add oxygen to it, in line with the requirements from the municipality. This means that possible chemicals or other pollutants are never removed from the wastewater. Thereby it becomes clear that like the municipality, the businesses along Mae Kha perceive the canal as an economic utility. For both actors however, the slum communities are perceived as the main polluters of the canal. With the plan for renovating the Mae Kha, the municipality aims to assign a social value to the Mae Kha, with in addition a new economic value through attracting tourists to this ‘New Venice’.

For the slum communities, the Mae Kha forms part of their homes. They live and work directly along its borders and enjoy the trees growing along it. Some eat its fish and use its water for vegetables and fruits. Thereby for them the Mae Kha has social, natural and economic value. The communities are exposed to the pollution of the Mae Kha continuously, which degrades their health as well as their quality of life. They are blamed for the pollution in the Mae Kha by the municipality, the businesses along the Mae Kha, and according to CSO’s by the entire city of Chiang Mai. For this image they are threatened with eviction, to make place for the renovation of the Mae Kha. The CSO’s that work with the slum communities aim to support the communities in their presence along the Mae Kha. They aim to achieve this by improving the housing situation and the communication, both between communities and between communities and other actors.

The apparent difficulty in valuing the Mae Kha differently than other actors, is in line with the lack in 'difference in equality' as formulated by Escobar (2006a), discussed in the theoretical framework. By using the Mae Kha for its wastewater disposal, the municipality and businesses threaten communities living along the canal in their necessity to use the site as their home, where they can safely grow vegetables and hold social activities. Herein the needs of the urban poor are clearly suppressed by the municipality and businesses in Chiang Mai, whose values largely determine current the governance process.

It appears that within the slum communities along the Mae Kha, 'socially constructed categories' are formed, based on ethnicity. Sub-groups consist of immigrants, or other ethnic minorities and they seem more marginalized from the decision-making process on the Mae Kha than the registered 'Thai' residents. Due to language and cultural barriers, the 'non-Thai' appear not included in cleaning activities and discussion sessions on the Mae Kha canal. Moreover, they are blamed to be the main cause of pollution to the canal, by almost all studied businesses. The only ethnic minority that was considered in this study are the Aka living in Kampaeng Ngam. To draw firm conclusions on the supposedly marginalized position of all ethnic minorities along Mae Kha, future research should investigate their perceptions and uses of the Mae Kha and their position in the governance structure.

The entitlements approach as discussed by Johnson (2004), proposes that institutional and socially constructed rules determine property and user rights. For the slum communities along Mae Kha, lacking entitlements are visible in the absent tenure security. Though the communities are situated on public land, the municipality aspires to remove them, in the realization of the renovation plan for the Mae Kha. While not providing the poor with possibilities in affordable alternative housing, the municipality hereby clearly suppresses the basic human rights of its urban poor.

5.3 Power relations in governing the Mae Kha

In the previous section the variety of perceptions and interests related to the Mae Kha among the identified actors were discussed. This section will report the power relations between the actors that determine the current management of the Mae Kha canal. First the perceptions on power divisions from the different actors are presented. Then a visual representation of the roles of different actors in shaping how the Mae Kha is managed is displayed, thereby offering a simplified model of the current power structures in managing the Mae Kha. Hereby this section aims to answer the 4th and 5th sub questions:

- 4 *What is the distribution of effective power between these stakeholders?*
- 5 *How does the distribution of power offer and restrain possibilities for holding alternative values on the canal?*

The municipality perceives the central government as having most power in managing the Mae Kha. The central government is in charge of budgets and implementation of water-related infrastructure, express the interviewed officials. When the municipality wants to develop anything related to the Mae Kha, they depend on the central government for financial support. The officials perceive themselves, the businesses along Mae Kha and the University of Chiang Mai of medium influence. Herein the municipality has the power to hand out fines to businesses. One municipal official mentioned businesses as a possible financial source of support. An example is given of a business that once supported a project for improving the Mae Kha. Chiang Mai University collaborates with the municipality on the implementation of the renovation plan and provides knowledge on how to improve the Mae Kha. Communities and NGO's are seen as little influential, though 2 officials do mention the power of communities in hindering the progress of the project for the innovation of the Mae Kha.

According to community representatives, the municipality is together with businesses along the Mae Kha the most influential actor in deciding what happens with the Mae Kha. The communities perceive themselves as having little influence. Of the interviewed community representatives, 5 mention that the municipality does not involve the communities in the execution of projects related to the canal. Without discussing what the problems are that communities face, they would just come with a plan and execute this. The community representative of Klamdolak gives an example of how the municipality once tried to take over the community's cleaning activities. After her community had yet organized various cleaning events themselves, at one day the municipality came with a budget and took out all plants and garbage, without discussing this with the people living there. According to the representative of Klamdolak this is a typical way of how the municipality deals with the Mae Kha: by not involving the people in such a project, the people living along the canal would not feel responsibility any longer of keeping the canal clean.

All interviewed community representatives mention interrelatedness between businesses and the municipality in dealing with the Mae Kha, thereby suggesting corruption to be a problem. The community leader of Kampaeng Ngam notices the municipality to be helping businesses in the disposal of their wastewater: "It is the Thai style of working. The businessman and the

municipality they have to help each other. For example: sometimes when it dries, they don't let the wastewater go into the canal, because it can easily be inspected. But when it rains, they (the municipality) just let the water go. Then black water comes so fast, so I'm quite sure that it works in that way."

Community Lepromak suggest the municipality to be favouring the business area and thereby neglecting the slum areas along Mae Kha. Community Klong Poey and Lepromak are located near the dam and pump that are used to regulate the flow of the water in Mae Kha. Based on how the dam and pump are regulated, for the community leader of Lepromak it is clear that these systems are only there to improve the appearance of the hotel zone along Mae Kha. Many of the floods that take place in Lepromak and Klong Poey, are because the dam downstream to these communities is closed. Hereby the municipality aims to prevent the hotel region from flooding, while causing floods at slum regions.

The community representatives also perceive corruption between the municipality and the communities; a process also described by the three CSO's. Already for 3 decades, prior to elections local politicians would come to the communities and ask for votes, by promising tenure security. However, in reality they never keep their promises, expresses the community representative of Klamdolak; all communities are still under threat of eviction. "They promise with their mouth, but never with the paper", she explains. In September 2013 new elections will be held in Chiang Mai. Due to the released budget for the renovation of the Mae Kha, the situation has become more complex now. According to the community leader of Kampaeng Ngam there is reluctance in the acceptance of the budget within the municipality, since nobody wants to take the responsibility for removing or relocating the slum residents out of fear for losing a share in votes. According to Kon Jai Baan this political system puts the communities in a doubtful situation. "The people feel secure, to live, because they are part of the political process in the elections when they vote. They have power to negotiate. But in terms of the land they live it is still insecure." This however only holds for the Thai residents. The illegal immigrants obviously have no right to vote, and thereby appear to have least power in managing the Mae Kha. Moreover, in line with the current plans for renovating the Mae Kha it appears that the immigrants, mainly living inside the canal, will have the biggest chance for being relocated.

According to the community representatives and the CSO POP, communities should collaborate more to form one coherent group, which would have more say in the current management of the Mae Kha. The representative of POP expresses to perceive that communities do no longer blame each other for polluting the Mae Kha as an achievement towards more unity. However, when consulting the residents of Kampaeng Ngam, this does not appear to be the case. Awareness on the use of the Mae Kha as a sewage system for Chiang Mai is lacking among the residents of Kampaeng Ngam. The people living there blame other communities upstream for causing the pollution in Mae Kha. It is possible that similar convictions exist among residents of other communities. In addition, the appearing lack of coherence between Thai and immigrants in 3 of the investigated communities challenges the achievement of unity within communities further.

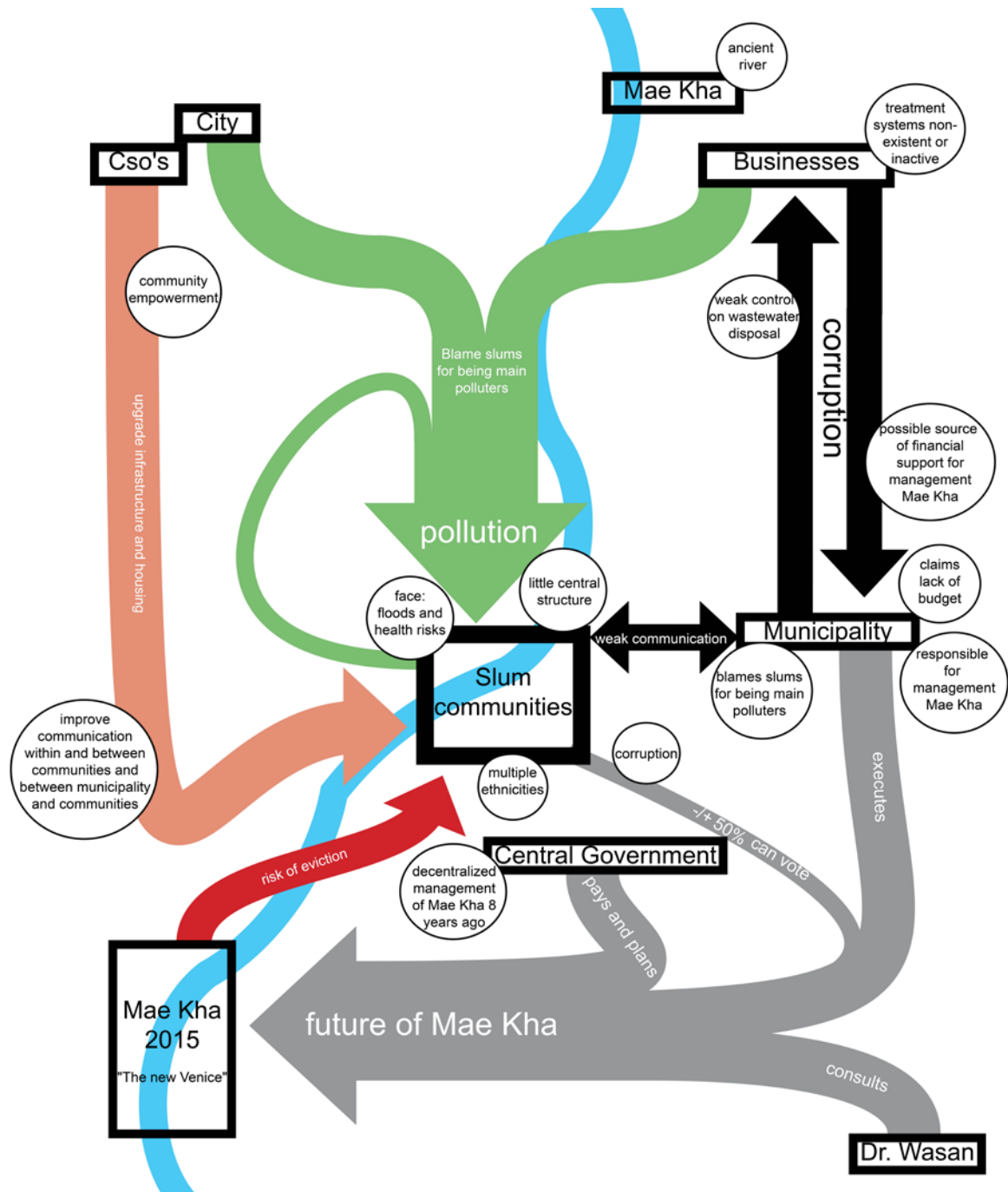
Figure 5.1 displays the roles of the different identified actors in shaping how the Mae Kha is currently managed. Thereby this model visualizes the current power structures among the studied actors, which determine the management of Mae Kha. Displaying a situation in a model like this can help to get a grasp of complex situations. However, at the same time the visualization will be at the expense of nuances. An attempt is made in this model, to reflect the actions of various actors that shape the management of Mae Kha in general terms. When studying the model, it must be kept in mind that it offers a simplification of reality as obtained by analysing the discourses of the studied actors.

The city and businesses are shown to pose pollution to the Mae Kha and thereby to the slum communities. Also the communities themselves pollute the canal. In their position along the polluted canal they face floods and health risks. While various actors are polluting the canal, merely the slums are blamed for this by the businesses, municipality and the city. Businesses have generally non-existent or inactive treatment systems for their wastewater disposal. There is corruption, both between the municipality and businesses concerning waste disposal as well as between the municipality and communities concerning votes and tenure rights. For the municipality businesses can present a source of financial support in the execution of development plans concerning the Mae Kha.

Within and between communities there is little central structure. This is strengthened by the various ethnic groups within communities, that seem to complicate cohesion. Between the communities and the municipality of Chiang Mai, communication is weak; both groups are unaware of each other's needs and desires concerning the Mae Kha. CSOs strengthen the slums in their presence along the Mae Kha, through upgrading infrastructure and housing. Moreover, they attempt to improve communication both within and between communities and between communities and the municipality in governing the Mae Kha.

The municipality of Chiang Mai is since 8 years responsible for the management of Mae Kha. This formed part of a larger decentralization process the central government of Thailand executed since the late 1990's. Together, the municipality, the central government and dr. Wasan are creating a plan for renovating the Mae Kha, into 'The new Venice'. The plan puts slum communities at risk for eviction, while using their votes, can have some influence on the execution of those plans.

Figure 5.1 Actors and their roles in the current governance of Mae Kha



Conclusion

As forming the last part of the results chapter, this section presented the various ways in which the different actors are related to the governance of the Mae Kha, thereby displaying the execution of power between those different actors. It has become clear that the interactions between the different actors under study cannot be perceived as negotiations between equals. Through cleaning activities and voting the slum communities attempt to have a say in the management of the canal. This gives them some extend of power to negotiate their presence along the Mae Kha. However, the communities do not have the ability to enforce the municipality to provide an alternative for its current wastewater disposal means. By blaming the communities of polluting the canal, the municipality has found a means to withdraw itself from the responsibility in safeguarding these inhabitants from pollution. This is successful to such a degree that at least a share of the slum residents believes that the communities are the main polluters of the Mae Kha. Suggestions of corruption between businesses along Mae Kha and the municipality indicate that it is favourable to the municipality to use the Mae Kha canal as a sewage system for its city. Hereby the municipality clearly prioritises the use of the canal as an economic utility, above the livelihoods of its poorest citizens. Hereby the desire among the communities to live safely along Mae Kha is clearly suppressed. The next chapter will present the conclusion of this study, wherein the limitations of this study plus possibilities for future research will be discussed.

6. CONCLUSION

By applying a political ecology framework, this thesis investigated how power structures determine the current governance of the Mae Kha canal in Chiang Mai. For the various identified actors the values, uses and perceptions on the canal were explored. In line with Escobar (1996; 2006a; 2006b) focus was set on which actors define the norms that regulate the current governance of the canal and whose perspectives and needs are therein neglected. Hereby the distribution of effective power among the various actors was determined.

The findings of this study should be interpreted with caution; Due to time limitations of this small-scale research, not all actor groups could be heard extensively. The distinction between different actors was drawn rather simplistic and therefore the various groups do not present homogenous sets of stakeholders. Generalization to all those involved or affected by the governance of the Mae Kha therefore cannot be made. This study rather stipulates the shortcomings and consequential problems that come with current governance of the Mae Kha canal. This thesis thereby aims to put the socio-environmental challenges for governing rapidly urbanizing cities in the developing world on the agenda.

For Chiang Mai it appears that the needs and desires of slum communities located along the Mae Kha are largely neglected in the current governance of the canal. While the identified slum communities see and use the Mae Kha as their home, the municipality of Chiang Mai uses this canal for the wastewater disposal of its city. The apparent pollution in the canal coming from this wastewater threatens the health and the quality of life of the urban poor settled along the canal's borders. Such threats are especially apparent during periods of floods and droughts.

The various ways in which the municipality governs the canal, appear to favour the desires of businesses, rather than the needs of the urban poor. While wastewater treatment would be obliged for businesses, this merely entails the adding of oxygen to the water, thereby not filtering out any chemicals or other pollutants. Controls on the functioning of these systems appear to fall short. Moreover, the municipality itself does not adhere to its own rules; the municipal slaughterhouse has no functioning treatment system for its wastewater, which therefore runs directly into the Mae Kha. As stipulated in the literature review chapter, the use of a canal for wastewater disposal is not an uncommon practice in developing countries. Lacking budgets for the implementation and maintenance of piping and treatment systems make that safe wastewater disposal is difficult to realize in the rapidly urbanizing cities of the developing world. This appears to be in line with the situation in Chiang Mai. Most infrastructure built along the canal, is not functioning, for the municipality cannot afford the costs of maintenance. However, the infrastructure that does function, appears to regulate the flow and control floods mainly along the centre area of the canal where most hotels are situated, resulting in more flood incidents in nearby communities.

By blaming the communities of polluting the canal, the municipality withdraws itself from the responsibility to safeguard these inhabitants from pollution. In addition, this appears to be an

excuse for the aspired removal of (parts of) the communities, in renovating the Mae Kha to become 'the New Venice'. While a budget of 3,000 million Baht has been released for renovating the Mae Kha, rather than seeking alternatives for their wastewater disposal, municipal officials mainly focus on possibilities for the elimination of slum residents when discussing the plans for implementation of this budget. While not providing the poor with possibilities in affordable alternative housing, the municipality has constructed a form of property rights that neglects the urban poor in attaining their basic human rights.

Cities in developing countries require 'good urban governance', which UN-HABTAT (2012a) specifies as a clear and accountable government, in which citizens and especially marginalized groups are engaged in decision-making processes. It has become clear that the municipality of Chiang Mai has still a lot to achieve in the realisation of good urban governance: The needs of the urban poor are largely ignored in the decision-making process concerning the Mae Kha canal, while they are receiving the consequences of the current ways it is being used.

Strong social ties within and between communities are essential for the urban poor to achieve more say in governing processes (UNESCAP, 2008). In Chiang Mai, there seems to be a lot to gain for communities on this aspect. Both within and between communities, communication can be improved. Communities now appear scattered into various ethnic groups, each with their own language and cultural background. Knowledge on the current use of the Mae Kha as the city's sanitation system appears absent among the residents; as a consequence they blame each other of pollution. Though further research is required to stipulate this, now it appears that both within and between communities the different ethnic groups have not formed a cohesive unity. In accomplishing this, the help of CSO's for obtaining stronger social ties should be central.

Massoud, Tarhini and Nasr (2009) discuss the possibilities for decentralised wastewater treatment systems in developing countries. They state this can offer a cost-effective means to treat wastewater, in places where local governments have difficulties in the implementation and maintenance of centralized systems. In line with this reasoning, Metabolic, the company that initiated the focus of this research, could provide the residents of the Mae Kha communities the tools, knowledge and assistance for installing their own low-cost wastewater treatment systems. Hereby the communities could use the waste that is filtered from their water as a source of income, by for instance selling this to biodiesel companies. Such activities are yet practiced in a slum in Bangkok (community leader Bang Bua, personal communication, February 21st, 2013). This will not solve the pollution in the Mae Kha, but it might create more coherence among communities when they are stimulated to cooperate on the execution of this. For a successful implementation, it is important to incorporate the knowledge and networks of the discussed CSO's, local community members, the local government and possibly interested businesses for investment. Only by incorporating all actors, an integrative governance of the Mae Kha can be realized. With such applications the communities can become the frontrunners in applying sustainable solutions in governing the Mae Kha canal, in aiming to restore their current lack in power.

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APPENDIX 1. List of interviewed persons

National and local institutes

Organisation	Name	Function
CODI	Virat Treampongphan	Advisor Planning and Design
CODI	Joy	Architect CODI
CODI Chiang Mai	Nikom Kao	Architect
Marine Department	Anan Kaiuwuychian	Head of department northern region
Chiang Mai Municipality	Suratawhit Pai San	Secretary of Mayor Chiang Mai
Chiang Mai Municipality	Manupan Plungplub	Water quality control
Chiang Mai Municipality	Tao-wan Moo	Chief of maintenance drainage systems
Chiang Mai Municipality	WongKot OwatSakun	Sanitary engineer
Chiang Mai University	Jompakdee Wasan	Assistant professor, engineering
Kon Jaj Baan	Tee Supawut	Community architect
Kon Jai Baan	Luntom Nak	Community architect
Kon Jai Baan	Praewponn	Community architect
POP	Ao Tongon	Operational officer

Communities

Community	Name	Function
Kampaeng Ngam	Lung Nun	Community leader
Klamdolak	Phan Ngam	Active community member
Klamdolak	May	Student social sciences
Chiong Klang	Song-Rit	Community leader
Fah Mai	Lung Wing	Community leader
Klong Poey	Pra Yoon	Community leader
Patipimu	Sa-man	Community leader
Ling Ko	Wallop Namvongprom	Community consultant
Lepromak	Aad	Active community member
Bang Bua (Bangkok)	Anonymous	Community leader
Bang Bua (Bangkok)	Anonymous	Committee member

Residents Kampaeng Ngam Community

Anonymous	Busum
Oerai	Anonymous
Dong	Chud
Kong Kam	Sainuan
Somboon	Somkit
Lotee	Kamompo
Som	

Businesses along Mae Kha

Representative	Type of business
Salesperson	Handcraft stand
Owner	Guesthouse
Owner	Hairdresser
Owner	Garage
Owner	Food stand
Owner	Fish stand at Muang Mai market
Owner	Fruit stand at Muang Mai market
Room manager	Centara Hotel
General engineer	Centara Hotel
Manager human resources	Centara Hotel

APPENDIX 2. Semi-structured interview with community representatives

Introduction

We are Merel and Christie, we are students in Sustainable Development from The Netherlands, doing our thesis research on the Mae Kha canal. The interview will take more or less 1.5 hours. Is this ok with you? Thank you for agreeing to be interviewed, your cooperation is important to us.

If it is ok with you we will record the interview (wait for an answer). If you do not desire for us to use your name then the data acquired through this interview will be treated anonymously. After the research the recordings will be deleted. You are free to withdrawal from participation at any point during and after this interview. We are working in cooperation with CODI and Kon Jai Baan. If you oppose to us sharing the information obtained through the interviews with these organizations, then we will not share the full interviews, with them. If there are any questions you would rather not answer, this is no problem. If there is anything you would like to add or change afterwards, you can always contact me by e-mail or phone at: mereldeelder@gmail.com, or 08-13492706. If you agree to these terms then we can now start the interview:

General information

1. Can you show on the map where more or less the borders of this community are?
2. How many people live in this community?
3. What ethnic groups are living in this community?
4. When was this community started?
 - a) Why did communities settle themselves here?
 - b) How did the Mae Kha canal influence the decision to settle on this location?
5. How has the community changed over the last ten years?

Perception on Mae Kha

6. Can you describe the Mae Kha?
7. How has the Mae Kha changed in your memory?
8. How does the Mae Kha influence life in this community?
9. How does the community use the Mae Kha?
10. Why do you think communities along the canal are threatened with eviction?
 - a) What is the experience of this community with this?
11. What do you think that the general opinion is on your community in Chiang Mai?

Quality of Mae Kha

12. Can you describe the differences in the Mae Kha between the rainy season and the dry season?
13. How do these seasonal changes impact life in this community?
14. What are the problems with Mae Kha?
15. What activities are being undertaken to improve the Mae Kha? By whom?
 - a) What activities are being undertaken by individual households?
 - b) What infrastructure has been built along the canal? When? By whom?
 - c) How have these activities impacted the area?
16. How many houses do floods affect every year? Which ones?
17. What are the good things about the Mae Kha?
18. How does this community damage the Mae Kha?
19. Does waste (dirty) water, from the community, flow into the Mae Kha?
 - a) From whom? What water? Is this treated (or cleaned) first?

20. How would you like the Mae Kha to be in the future, if anything were possible?
21. What do you think is good about the way the canal is managed currently?
22. What would you change about the way the Mae Kha is managed currently? Why?
 - a) What role do you envision for your community herein?
 - b) What other actors do you think should be involved? How? Why?

Visual representation of relation with Mae Kha

Step 1: List all the actors (including yourself) involved with the canal.

Step 2: Write on each post-it shortly the relation of this actor with the canal.

Step 3: Describe the interactions between these actors (by linking these actors with lines, and shortly writing down these interactions in a few words).

Step 4: Can you highlight the actors (by marking) with red for the strongly influential, orange for the medium influential, yellow for the little influential and blue for the non-influential in deciding (managing) what happens to the Mae Kha?

Step 5. Are there other actors along the canal who are not included yet? Can you add them and highlight them.

Others along the Mae Kha

23. Who are the most important polluters of the canal?
 - a) Can you indicate them on the map?
24. How do they pollute the canal?
25. How does this affect this community?
26. What is the relation between your community and these actors (work, land ownership etc.)?
27. Are there conflicts with other actors related to the water of the Mae Kha?
28. How would you describe your relation with other communities?

Municipality and Mae Kha

29. How does the municipality of Chiang Mai engage with the Mae Kha?
30. What has the municipality done with the Mae Kha? When?
31. What is your opinion on the role of the municipality in the current management of the Mae Kha canal?

Housing and facilities

32. According to the housing census of Chiang Mai, houses are distinguished in the following categories:
 - a) Cement or brick
 - b) Wood
 - c) Wood and cement or brick
 - d) Natural material, like bamboo and thatch
 - e) Reused materials
 - f) Other:
33. How many houses of your community belong to each category (in numbers) *(at least mention majority and presence of each)?
34. In how many houses do you estimate that more than 3 persons share one room?
35. How do people here get their drinking water?
 - a) How much does this cost your household per week/month?
 - b) Who offers these services?
36. How do people obtain water for other uses than drinking?
 - a) How much does this cost your household per week/month?

- b) Who offers these services?
- 37. How do people here get access to electricity?
 - a) How much does this cost your household per week/month?
 - b) Who offers these services?
- 38. Are there households in the community without a flush toilet? How many?
- 39. What is done with the garbage here?
 - a) Is this collected/recycled/burned/dumped? By whom?
- 40. What is the tenure (housing rights) situation of the households in this community?
 - a. Does this situation vary for different households?
 - b. What has been done to secure tenure rights for this community?
 - c. When? By whom? How?

Importance Mae Kha

- 41. How is the Mae Kha of importance in your view?
 - a. Can you describe the cultural (religious) importance of the Mae Kha?
 - b. Can you describe the historical role of the Mae Kha?
 - c. Can you describe the role of the Mae Kha in social terms?
 - d. Can you describe the economic importance of the Mae Kha?

Finalization

- Is there anything you would like to add on the subjects we have discussed so far?
- Do you have any questions for me on the research we are doing?
- Can I contact you in the near future if there are any subjects that I may need further clarification on?
- Do you have any other contacts that I might interview on this subject?

Thank you for your time.

APPENDIX 3. Semi-structured interview with businesses along Mae Kha

Introduction

We are Merel and Christie, we are students in Sustainable Development from The Netherlands, doing our thesis research on the Mae Kha canal. The interview will take more or less half an hour. Is this ok with you? Thank you for agreeing to be interviewed, your cooperation is important to us.

If it is ok with you we will record the interview (wait for an answer). If you do not desire for us to use your name then the data acquired through this interview will be treated anonymously. After the research the recordings will be deleted. You are free to withdrawal from participation at any point during and after this interview. We are working in cooperation with CODI and Kon Jai Baan. If you oppose to us sharing the information obtained through the interviews with these organizations, then we will not share the full interviews, with them. If there are any questions you would rather not answer, this is no problem. If there is anything you would like to add or change afterwards, you can always contact me by e-mail or phone at: mereldeelder@gmail.com, or 08-13492706. If you agree to these terms then we can now start the interview:

General information

1. What type of services does your business offer?
2. How many people work here?
3. How many costumers do you have on average per month/week/day?
4. Since when has you business been on this location?
5. Do you own or rent this place?
6. Why did you choose to put your business here?
 - a. Did you consider the Mae Kha when you chose this location?

Perception on Mae Kha

7. Can you describe the Mae Kha?
8. How does the Mae Kha influence your business?
9. How does your business use the Mae Kha?
10. How do seasonal changes of the Mae Kha in the rainy season and dry season influence your business?
11. What do you think that the general opinion is on the Mae Kha in Chiang Mai?

Importance Mae Kha

12. How is the Mae Kha of importance in your view?
 - e. Can you describe the cultural (religious) importance of the Mae Kha?
 - f. Can you describe the historical role of the Mae Kha?
 - g. Can you describe the role of the Mae Kha in social terms?
 - h. Can you describe the economic importance of the Mae Kha?

Quality of Mae Kha

13. What are the problems with Mae Kha?
14. How does your business damage the Mae Kha?
15. Does untreated waste (dirty) water from your business flow into the Mae Kha?
 - a. What type of water?
 - i. Kitchen
 - ii. Cleaning (laundry?)
 - iii. Toilet

- b. If any of the water is treated (cleaned), how?
 - c. What are the products that your business uses that end up in the canal?
16. How much water do you use monthly?
 17. How much electricity do you use monthly?
 18. What would you change about the way the Mae Kha is managed currently? Why?
 - a. What role do you envision for your business herein?
 - b. What other actors do you think should be involved? How? Why?

Visual representation of relation with Mae Kha

Step 1: Think of all the actors (including yourself) involved with the canal in any way, and write each one on a different post-it?

Step 2: Now add the relation of each actor with the canal.

Step 3: Describe the relations between these actors with lines attaching them to each other.

Step 4: Highlight the actors with red for the strongly influential, orange for the medium influential, yellow for the little influential and blue for the non-influential in deciding (managing) what happens to the Mae Kha.

Step 5. Are there other actors along the canal who are not included yet? Can you add them and highlight them.

Others along the Mae Kha

19. Who are the most important polluters of the canal? (show on the map)
20. How do they pollute the canal?
21. What is the relation between your business and these actors?
22. Are there any conflicts about the water of the Mae Kha?
23. How does the municipality of Chiang Mai engage with the Mae Kha?
24. What do you think about communities along the canal being threatened with eviction?

Regulations

25. What are the laws for disposing your wastewater?
26. Are these laws clear to you?
27. Are there inspections to monitor the disposal of your wastewater? By whom?

Finalization

- Is there anything you would like to add on the subjects we have discussed so far?
- Do you have any questions for me on the research we are doing?
- Can I contact you in the near future if there are any subjects that I may need further clarification on?
- Do you have any other contacts that I might interview on this subject?

Thank you for your time.

APPENDIX 4. Semi-structured interview with CSOs active with the Mae Kha

Introduction

We are Merel and Christie, we are students in Sustainable Development from The Netherlands, doing our thesis research on the Mae Kha canal. The interview will take more or less 1.5 hours. Is this ok with you? Thank you for agreeing to be interviewed, your cooperation is important to us.

If it is ok with you we will record the interview (wait for an answer). If you do not desire for us to use your name then the data acquired through this interview will be treated anonymously. After the research the recordings will be deleted. You are free to withdrawal from participation at any point during and after this interview. We are working in cooperation with CODI and Kon Jai Baan. If you oppose to us sharing the information obtained through the interviews with these organizations, then we will not share the full interviews, with them. If there are any questions you would rather not answer, this is no problem. If there is anything you would like to add or change afterwards, you can always contact me by e-mail or phone at: mereldeelder@gmail.com, or 08-13492706. If you agree to these terms then we can now start the interview:

General information

1. Can you explain to us what your organization exactly does?
2. How long has your organization been active with the Mae Kha?
3. What are the actors with whom you work with on the Mae Kha?

Perception on Mae Khaa

4. In our research we are focussing on the interactions between communities living along the Mae-Kha and the canal itself.
5. How would you describe the Mae Kha?
6. What environmental services does the Mae Kha provide to Chiang Mai?
7. How do seasonal changes (rainy season/dry season) of the Mae Kha impact Chiang Mai?
8. What areas (on the map) are affected by seasonal flooding of the Mae Kha?
9. What do you think the influence of the Mae Kha is on the health of the actors living directly along it?
10. What do you think that the general opinion is on the Mae Kha in Chiang Mai?
11. What is generally seen as the source of pollution of the Mae Kha in popular discourse in Chiang Mai?

Visual representation of relation with Mae Kha

Step 1: List all the actors (including yourself) involved with the canal.

Step 2: Write on each post-it shortly the relation of this actor with the canal.

Step 3: Describe the interactions between these actors (by linking these actors with lines, and shortly writing down these interactions in a few words).

Step 4: Can you highlight the actors (by marking) with red for the strongly influential, orange for the medium influential, yellow for the little influential and blue for the non-influential in deciding (managing) what happens to the Mae Kha?

Step 5. Are there other actors along the canal who are not included yet? Can you add them and highlight them.

Actors along the Mae Khaa

12. What are the most important sources of pollution to the canal?
 - a. Can you indicate them on the map?
 - b. Through which activities does this polluting occur?
13. What are the sources of the waste (dirty) water, flowing directly into the Mae Kha? Is this water treated (or cleaned) first?
14. Can you describe the relationships between the various actors using the canal?
15. Are there conflicts between these actors on the management of the Mae Kha?
16. What activities are being undertaken to improve the Mae Kha? By whom?
 - a. What activities are being undertaken by individual actors?
 - b. What is the role of your organization in these activities?
17. What infrastructure has been built along the canal (on the map)?
 - a. When? By whom? Why? (5 minutes)
 - b. How have these activities impacted the areas?
18. What are in your opinion the good things about the Mae Kha?

Management of the Mae Kha

19. What do you think is good about the way the Mae Kha is currently managed?
20. What would you change about the way the Mae Kha is currently managed? Why?
 - a. What actors do you consider important herein?
 - b. What role would you ascribe to these actors, why?
21. How would you describe the relationship of the municipality with the Mae Kha?
22. What has the municipality done with the Mae Kha? When?
23. What is your opinion on the role of the municipality in the current management of the Mae Kha canal?
24. In what ways does the current management influence the life of the people that live along the canal?
25. Why do you think communities along the canal are threatened with eviction?

Importance Mae Kha

26. How is the Mae Kha of importance in your view?
 - a. Can you describe the cultural (religious) importance of the Mae Kha?
 - b. Can you describe the historical role of the Mae Kha?
 - c. Can you describe the role of the Mae Kha in social terms?
 - d. Can you describe the economic importance of the Mae Kha?

Finalization

- Is there anything you would like to add on the subjects we have discussed so far?
- Do you have any questions for me on the research we are doing?
- Can I contact you in the near future if there are any subjects that I may need further clarification on?
- Do you have any other contacts that I might interview on this subject?

Thank you for your time.

APPENDIX 5. Semi-structured interview with municipal officials

Introduction

We are Merel and Christie, we are students in Sustainable Development from The Netherlands, doing our thesis research on the Mae Kha canal. The interview will take more or less 1 hour. Is this ok with you? Thank you for agreeing to be interviewed, your cooperation is important to us.

If it is ok with you we will record the interview (wait for an answer). If you do not desire for us to use your name then the data acquired through this interview will be treated anonymously. After the research the recordings will be deleted. You are free to withdrawal from participation at any point during and after this interview. We are working in cooperation with CODI and Kon Jai Baan. If you oppose to us sharing the information obtained through the interviews with these organizations, then we will not share the full interviews, with them. If there are any questions you would rather not answer, this is no problem. If there is anything you would like to add or change afterwards, you can always contact me by e-mail or phone at: mereldeelder@gmail.com, or 08-13492706. If you agree to these terms then we can now start the interview:

General information

42. Could you explain to us what your position entails?
43. For how long have you been at this position?
44. Could you describe how your Department has been involved in the management of the Mae Kha?
45. What are the responsibilities of your Department in managing the Mae Kha?
46. Since when has the Mae Kha been an aspect of this Department's responsibilities?
47. What are the activities that your department undertakes related to the Mae Kha?
 - a. Water quality tests (when, where, data)?
 - b. Water-infrastructure (why, when, where, effects)?
48. What are the plans of your Department for developing the Mae Kha?
 - a. With what actors does your Department collaborate in realizing these plans?

Actor map

Step 1: What are all the actors involved in managing the Mae Kha?

Step 2: What is the relation of those actors with the canal?

Step 3: How do these actors interact? Organize the post-its on the big poster in a way that visualizes the interactions between these actors.

Step 4: Can you highlight the actors (by marking) with red for the strongly influential, orange for the medium influential, yellow for the little influential and blue for the non-influential in deciding (managing) what happens to the Mae Kha?

Step 5. Are there other actors along the canal who are not included yet? Can you add them and highlight them (central government?).

Management

49. What is your opinion on the current management of the Mae Kha canal?
50. Are there things you would like to change about the management?
 - a. What? How? By whom?

Quality of Mae Kha

51. What are the sources of water currently flowing through the Mae Kha?
 - a. Natural sources? Non-natural sources? Urban sources?
 - a. Could you indicate them on a map?
 - b. How much (waste) water from the city flows into the Mae Kha?
 - c. What water is this?
52. How would you describe the current quality of the water of the Mae Kha?
 - a. What pollutants are found in the water?
 - b. Are any found in hazardous quantities?
53. We heard from various people in Chiang Mai that wastewater from the city goes directly into the Mae Kha without prior treatment. What is your information on this?
54. Is the quality of the soil (sediment and banks) of the Mae Kha also tested?
 - a. What pollutants are found in it?
 - b. Does this vary for different (layers) areas?
 - c. Are there any health hazards?
55. What has been the reason for cementing the canal?
 - a. When was this done?
 - b. Why wasn't this done along the entire canal?
 - c. What were the reasons for selecting those regions that are now made concrete?
 - d. What have been the effects hereof?
56. What is your opinion on the eco-system of the Mae Kha?
 - a. Could you tell us about the fish stalks and other marine life in the canal?
 - b. How does the Mae Kha impact the plants that grow around it and in it?
 - a) Are these safe for consumption?

Polluters of Mae Kha

57. Who are according to you the main polluters of the canal?
58. Through which activities does this polluting occur?
59. How does your Department engage in preventing polluting activities?
60. We heard rumours that some businesses like hotels and hospitals lack functioning treatment systems. What information do you have on this?
 - a. What is the consequence when a business does not have a functioning treatment system?
 - b. What is your experience with this?

Communities along Mae Kha

61. For the communities living along the Mae Kha, what do you consider to be the health risks they are exposed to by the Mae Kha?
62. The development plan for the celebration of 720 years existence of Chiang Mai, includes a development plan for the Mae Kha. What does this plan entail exactly?
 - a. What is the role of your Department in the creation of this plan?
 - b. What will this plan imply for the living situation of communities?
 - a) Eviction?
63. How would you describe your Department's relation with the communities along Mae Kha?

Importance Mae Kha

64. How is the Mae Kha of importance in your view?
 - a. Can you describe the cultural (religious) importance of the Mae Kha?
 - b. Can you describe the historical role of the Mae Kha?
 - c. Can you describe the role of the Mae Kha in social terms?

- d. Can you describe the economic importance of the Mae Kha?
65. What are in your opinion the good things about the Mae Kha?

Finalization

- Is there anything you would like to add on the subjects we have discussed so far?
- Do you have any questions for me on the research we are doing?
- Can I contact you in the near future if there are any subjects that I may need further clarification on?
- Do you have any other contacts that I might interview on this subject?

Thank you for your time.